

TECHNICAL SPECIFICATIONS FOR :

PROJECT : **New Cultural Club - Croatian National Home**

615 Barton Street, Stoney Creek, Ontario

CLIENT : Croatian National Home
Stoney Creek, Ontario

PROJECT No. : 2021-39

DATE : March 2, 2026 ISSUED FOR TENDER



ARCHITECTURAL

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1. Name of General Contractor

1. Name: _____
2. Address: _____
3. Phone: _____

2. Name of Project

New Cultural Club
Croatian National Home
615 Barton St. East
Stoney Creek, Ontario

3. Addressed to Owner

Croatian National Home
Attention: Ivan Luksic, President
615 Barton St. East
Stoney Creek, Ontario

4. Tender Amount

We, the undersigned General Contractors, having visited the Site and examined all conditions affecting the work, propose to furnish all materials, labour and equipment required to construct the project according to all Contract Documents including addenda numbered _____ - _____ for the stipulated price of (in Canadian funds):

General Trades: _____

Mechanical: _____

Electrical: _____

CONTRACT PRICE _____

The Contract Price includes all applicable taxes and duties but excludes the H.S.T. This price will remain in effect for a period of ninety (90) days after Tender Closing.

Taxes (HST) payable by the Owner to the Contractor is: _____ dollars.

Signed by _____

Signature of Authorized Officer of Company _____

Dated, _____

5. Cash Allowance and Contingency Allowance

The Stipulated Sum includes the Cash Allowance and Contingency Allowance specified in Section 01020.

6. Bonds

Enclosed with this Tender are:

1. A Bid Bond is not required.
2. An Agreement to Bond from an approved bonding Company for a 50% Performance Bond and for a 50% Labour and Material Bond, should this Tender be accepted.

7. Construction Schedule

Should this tender be accepted on or prior to April 15, 2026, the contract will be substantially performed no later than April 1, 2027, and the contract will be completed no later than May 5, 2027.

8. List of Subcontractors

1. The following is the list of Subcontractors proposed to be used on this contract. Any substitution shall be subject to the approval of the Owner and contingent upon evidence of withdrawal or bankruptcy, satisfactory to the Architect:

EXCAVATION & BACKFILL _____
ASPHALT PAVING _____
CONCRETE _____
PRECAST STRUCTURAL CONCRETE _____
MASONRY _____
MISCELLANEOUS METAL _____
STRUCTURAL STEEL _____
STEEL DECK _____
MILLWORK _____
ALUMINUM COMPOSITE PANELS _____
METAL PANEL CLADDING _____
ROOFING AND SHEET METAL _____
CAULKING AND SEALING _____
METAL DOORS AND FRAMES _____
ALUMINUM WINDOWS _____

DRYWALL _____
 CERAMIC & PORCELAIN TILE _____
 RESILIENT FLOORING _____
 ACOUSTIC CEILINGS _____
 PAINTING _____
 TOILET PARTITIONS _____
 ELEVATOR _____
 LANDSCAPING _____
 SITE SERVICES _____
 MECHANICAL _____
 ELECTRICAL _____

9. Unit Prices – To be submitted within 24 hours after the tender close date and time.

The following unit prices are submitted in accordance with paragraph 10 of Section 00200.

The following unit prices will apply in connection with approved additions or deductions; unit prices shall include statutory charges, overhead and profit. The unit prices shall not include PST, GST and HST. UNIT PRICES FOR ADDITIONS ARE NOT TO EXCEED PRICES FOR DEDUCTIONS BY MORE THAN 25%. The Owner reserves the right to accept or reject all unit prices; refer to ***Instruction to Bidders***.

	<u>Additions</u>	<u>Deductions</u>	
Excavation and Backfilling:			
Hand Excavation (Including Disposal) \$	\$		per m ³
Machine Excavation (Including Disposal) \$	\$		per m ³
Manual Backfilling/Tamping \$	\$		per m ³
Machine Backfilling/Roller \$	\$		per m ³
Granular 'A' (Supply and Install) \$	\$		per m ³
Granular 'B' (Supply and Install) \$	\$		per m ³
¾" Clear Stone (Supply and Install) \$	\$		per m ³
Cast-in-Place Concrete Curbing: \$	\$		per lin. m
H.D. Asphalt Paving c/w base as specified \$	\$		per m ²
Reinforcing in Place, including shop drawings, cutting, bending, tying, chairs, etc.):			
Standard Black \$	\$		per kg
Epoxy Coated \$	\$		per kg

10. Alternative Prices (refer to definitions in Section 01030)

1. Alternative Price No. 1: Provide spray foam insulation in cavity wall in lieu of rigid insulation. Refer to specification section 07219. Applies over the extent of all masonry cavity wall construction and the prefinished metal siding (corrugated) cladding around the mechanical Penthouse. Thickness of spray foam to provide A/V barrier properties. This alternative insulation system includes flexible sheet A/V barrier transition membranes, per section 07112, around all wall openings including windows and doors, and along transitions between different cladding types. Minimum width of transition membrane sheet segment, contacting on wall, is 200mm around windows frames, door frames, other openings and along top end of roof parapets, and 500mm between cladding types. Installation of this system to also include the required cavity wall fire stopping as shown on typical detail 1 on drawing A3.00.

Change in Contract Price: \$ _____ Credit or Extra (circle applicable)

11. Break Out Prices (refer to definitions in Section 01030)

Break Out Price No. 1: All work associated with the construction of the partial basement portion of the build. Including extended lobby stairs to basement, waterproofing, extended foundation walls. All electrical and mechanical work for partial basement. (Refer the drawings for more details)

Change in Contract Price: \$ _____ Credit

12. Conflict Declarations

We, the undersigned declare that this tender is made without any connection, knowledge, comparison of figures or arrangements with any other company, firm or person making a tender for the same work and is fair and without collusion or fraud.

13. Signatures

We are submitting this Tender under Corporate Seal as a Limited Company or witnessed as an individual or partnership.

Name of Official Position of Signature below

Signature of Authorized Officer of Company

Company Seal

Witness

Dated at _____ on _____ 2026

End of Tender Form

1.1 Tenders

1. Sealed Tenders are invited for the supply of all labour, materials, equipment and service to complete the above noted project, in accordance with the Drawings and Specifications as prepared by Grguric Architects Incorporated, Stoney Creek, Ontario.
2. Tenders for the work will only be accepted on the special forms provided for this purpose by the Architect. Bidders must fill in duplicate the copies provided, retain one (1) copy for his own record and enclose and seal the other copy in an envelope.
3. In the receipt of Tenders for the work, no obligation is incurred to accept the lowest or any proposal. The Owner reserves the right to refuse any of all Tenders for any subdivision of the work. Each Bid must be construed to cover all of the work of the trade bid, for notwithstanding the fact, that the Bid in recapitulating the same may omit some parts.
4. The Owner reserves the power and right to reject Tenders received from parties who cannot show a reasonable acquaintance with, and preparation for the proper performance of the class of work herein specified and shown on the drawings. Evidence of such competency must be furnished by the Bidders when requested to do so.
5. Tenders containing escalation clauses will not be considered.
6. Bidders must furnish all information requested on the Tender Form and should any uncertainty arise as to the proper manner of completing the Form, the Architect will give the requisite information. Tender Forms must be completed in a legible manner without alterations or erasures. Incomplete Tenders will not be considered.
7. Tenders must remain open for acceptance for a period of ninety (90) days and until a formal Contract and Bond for the work is executed by the successful Tenderer, as approved by the Owner.
8. Incorporated Companies must attach Corporate Seal, and Signatures of proper Officers must be affixed.
9. The contractor is expected to start construction on **April 30, 2026**.

1.2 Tender Closing Date

Tenders for the work must be delivered to:

Grguric Architects Incorporated
28 King Street, East, Unit B
Stoney Creek, Ontario L8G 1J8
Attention: John I. Grguric, OAA

Sealed Tenders must be submitted before 2:00:00 pm local time on, April 02, 2026

1.3 Bonds NOT REQUIRED AS STATED ON TENDER FORM

1.4 Subcontractor

1. The Bidder must be responsible that all materials and labour called for in the Specifications and Drawings (and any Addenda or changes thereto) are included in the Tender. The Bidder to state the names of all subcontractors and manufacturers as called for on the Tender Form. The List of Subcontractors and manufacturers set forth **are not to be altered or changed**, except as may be directed by the Architect who may require that an alternative subcontractor be employed at the time of the signing of the Contract, provided that the necessary adjustment is made to the Contract Amount.

1.5 Contract

1. The successful Bidder is required to execute the "Canadian Standard Construction Document Stipulated Price Contract CCDC 2, 2020," revised to include amendments thereto, as set out in the Amendments to General Conditions.
2. The successful Bidder is to execute the said formal contract as called for within ten (10) business days after notification of the acceptance of his Tender or forfeit the amount of the Bid Bond enclosed with the Tender.

1.6 Completion Date

1. The work is to be carried to completion as rapidly as possible, consistent with good building practice and reasonable economy ready for the Owner's full occupancy in the time stated in the Tender.
2. The term "Completion" is understood to mean that the work of the Contract has been completed, including all items of the Architect's Deficiency List, to the Architect's satisfaction and the work accepted by the Owner.

1.7 Sales Taxes

1. The Tender Amount shall not include any value added or consumption taxes including without limitation: Harmonized Sales Tax (HST).
2. The successful General Contractor shall account separately on each application for payment the appropriate amount of Taxes which the General Contractor is legally obliged to collect and remit to the Government.

1.8 Drawings & Specifications

1. The drawings hereinafter referred to will be those listed in this Specification, together with such other working drawings as may be issued by the Architect during the progress of the work.
2. Bidders must examine the Architectural and Structural, Mechanical and Electrical Drawings and Specifications, and fully inform themselves regarding the requirements, conditions and

limitations pertaining to the work of the Contract, and include and allow for accordingly in the preparation of their Tender.

3. Bidders must check the set of Drawings and Specifications issued to them for Tendering purposes to ensure that they are complete and all drawings are included, as listed in the List of Drawings, and all Trades and Pages are included in the Specifications, as listed in the Index.

1.9 Questions Re: Drawings & Specifications

1. Bidders finding discrepancies in, or omissions from the Drawings and Specifications, or in doubt as to the meaning and intent of any part thereof, must contact the Architect office by fax or email only for clarification. Contact Grguric Architects Incorporated, John Grguric, Email: office@2gai.com Fax No. 905-664-8737. Phone calls will not be entertained.

The Architect will not be held responsible for verbal instructions or any explanations or interpretations of the drawings and specifications. If necessary, any and all instructions or clarifications will be in the form of a written Addenda sent by the Architect. The Architect must receive questions not less than three (3) days before date set for receipt of Tenders.

The information contained in the Addenda supersedes and amends the Drawings, Specifications and Schedules, as set forth therein. Bidders must include and allow for addenda instructions and information accordingly. Bidders must state on the Tender Form in the space provided, the numbers of all Addenda received and included for, by them in the preparation of the Tender.

1.10 Unit Prices

1. Tenderer must submit unit prices applicable to the various work, as specified.
2. Unit prices must, where applicable, form the basis for adjustments in connection with any additions to, or omissions from the work during the existence of the Contract.
3. Unit prices must include labour, materials and applicable taxes and other relative charges, but must be exclusive of overhead and profit. Any work done, on the basis of unit prices, must be carried out generally in accordance with Specifications for similar work and must be to the Architect's approval.
4. Unit prices for additions are not to exceed prices for deductions by more than 25%.

1.11 Examination of Site

1. Bidders must visit and thoroughly examine the site to fully familiarize themselves with the existing conditions including but not limited to: access to the site and the existing configuration. The Contractor will be held to have visited the site and examined all conditions affecting the proposed work including location of all services which may have to be protected, removed or relocated. The site shall be accepted by the Contractor in its present condition. No claims for extra payment will be considered for extra work, expenses or difficulties encountered due to the existing site conditions which were visible from an examination of the

site. The submission of Tender shall be deemed confirmation that the Bidder has inspected the site and is thoroughly familiar with existing conditions. Contractor shall accept sole responsibility for any error or neglect on their part in this regard.

1.12 Pre-qualified Contractors

The following Contractors have been pre-qualified to bid on this project. Bidders other than those listed will not be considered.

1. **General Contractors**

Company Name	Email	Phone	Fax	City
TRP Construction	info@trpconstruction.ca	905-336-1041	905-336-9564	Burlington
Golden Gate Contracting	tm@ggcontracting.ca	905-844-1122	905-844-0051	Burlington
DeFaveri Group	ilarina@defaveri.ca	905-560-2555	905-560-1306	Hamilton
Bestco Construction	estimating@bestcoconstruction.com	905-304-4597		Hamilton
G.S. Wark Ltd.	craig@wark.net	905-529-4717	888-529-0477	Hamilton
Schilthuis Construction Inc	Estimating@Schilthuis.com	(905) 648-2311	(905) 648-8455	Caledonia

End of Section

1.1 General

1. Examine the place of the work for the existing conditions, matters and limitations relating to the scope of work such as but not exclusively: access and egress to and from the place of the work, adjacent buildings, obstructions, services, actual and proposed grade (levels), soils conditions, landscaping, parking areas, services, and rights and interests of other parties affecting the deployment of the place of the work and the work to be done thereon.
2. Be responsible to ensure that the subcontractors shall also conduct a thorough examination and have full knowledge of conditions at the place of the work affecting their work.

1.2 Site Investigation Data

1. A copy of the Geotechnical Investigation report is provided under separate attachment.
 1. Prepared by: EXP Services Inc.
 2. Project Number: HAM-23009539-AO dated January 17, 2024
 3. Total Pages: 24 pages
2. A copy of the Soil Characterization report is provided under separate attachment.
 1. Prepared by: EXP Services Inc.
 2. Project Number: HAM-23009539-AO dated February 16, 2024
 3. Total Pages: 73 pages

1.3 Disclaimer:

1. The Geotechnical Reports are not part of the Contract Documents prepared by the Architect or his subconsultants. The Geotechnical report was not prepared by or under the supervision of the Architect. While every effort has been made to attempt to provide comprehensive geotechnical information for the purposes of design and tendering, the Architect and his consultants claim no responsibility for the accuracy of the information contained in the report. Bidders must satisfy themselves in regard to all matters relating to conditions that may affect either the methods of construction or the cost of the work before submitting bids or commencing the work.

End of Section



615 Barton Street, Stoney Creek, ON

Croatian National Home

Type of Document:

Geotechnical Investigation Report

Project Name:

Proposed New Croatian National Home
615 Barton Street
Stoney Creek, Ontario

Project Number:

HAM-23009539-A0

Prepared By:

EXP Services Inc.
1266 South Service Road
Suite C1-1
Stoney Creek, Ontario L8E 5R9
t: +1.905.573.4000
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Date Submitted:

January 17, 2024

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1. Introduction and Background

This report presents the results of a geotechnical investigation carried out at the site of the proposed New Croatian National Home located at 615 Barton Street in Stoney Creek, Ontario. It is understood that the proposed development will consist of a new, one-storey and partial two-storey building. The front half of the building will include a partial basement, with the remainder of the building containing no basement areas. The development will also include at-grade parking and access road pavement structures, with limited landscaping. The investigation was authorized by Mr. Ivan Luksic on behalf of Croatian National Home (client).

The purpose of this investigation was to determine the subsoil and groundwater conditions at the site by advancing a total of four (4) boreholes and based on an assessment of the factual subsurface data, provide an engineering report containing general geotechnical recommendations pertinent to the proposed construction. EXP also completed environmental testing and a Soil Characterization Report to facilitate excess soil disposal or re-use and the results are presented under separate cover.

The comments and recommendations given in this report assume that the above-described design concept will proceed into construction. If changes are made either in the design phase or during construction, this office must be retained to review these modifications. The result of this review may be a modification of our recommendations or the requirement of additional field or laboratory work to check whether the changes are acceptable from a geotechnical viewpoint.

1.1 Site Description & Geological Setting

The site is situated at 615 Barton Street in Stoney Creek, Ontario and is centred at approximate UTM coordinates 605413 Easting, 4786495 Northing. The topography at the site is generally flat lying. At the time of the investigation, the site was vacant, consisting predominantly of unmaintained grasses and a thicket along the west portion of the site. Commercial properties bound the site to the north and east and a dense thicket with an associated water course bounds the site to the west. Residential and commercial properties are located to the west of the site.

Based on the review of the Ontario Geological Survey (OGS), Map P.993, *Quaternary Geology of the Grimsby Area*, and OGS Map 2343, *Paleozoic Geology of the Grimsby Area*, red shale of the Queenston Formation underlies the site.

2. Field Investigation

As requested, a total of four (4) boreholes, numbered BH-1 to BH-4, were advanced at the site of the proposed construction at the locations provided by the client as shown on Drawing No. 1 in Appendix A. The boreholes were advanced using solid stem augers to depths of approximately 4.7 m below existing grades.

The fieldwork for this investigation was carried out on November 29, 2023. Drilling and sampling operations were completed by a combination of auger and split-spoon techniques using track mounted drilling equipment owned and operated by a specialist drilling subcontractor. Prior to the commencement of the drilling, the public and private-owned underground services were located to minimize the risk of contacting any such services during the investigation.

Soil samples were obtained using a 51 mm (2 inch) outside diameter split-spoon sampler driven in conjunction with Standard Penetration Test procedure (ASTM D1586) at the depths noted graphically on the borehole logs. The retained soil and bedrock samples were logged in the field and then carefully packaged and transported to our Hamilton laboratory for detailed visual, textural and olfactory classification. The Standard Penetration Test (SPT) N values and pocket penetrometer measurements were recorded and used to provide an assessment of the compactness condition or consistency of the in-situ soils.

Groundwater levels within the boreholes were measured prior to backfilling. All boreholes were backfilled upon completion of drilling in accordance with O.Reg. 903.

The boreholes were located in accessible areas on site by EXP field personnel. The approximate geodetic ground surface elevations at the borehole locations were interpolated from the site topographical map, entitled, *Plan of Survey with Topographic Details of Part of Lot 15, Concession 1, City of Hamilton*, prepared by J.D. Barnes Limited, with reference No. 22-16-080-00, and dated August 9, 2022.

3. Subsurface Conditions

Details of the subsurface conditions encountered during the drilling program are summarized on the borehole logs in Appendix A. The logs include textural descriptions of the subsoil and groundwater conditions and indicate the soil boundaries inferred from non-continuous sampling and observations during drilling. These boundaries reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. The "Notes on Sample Description" preceding the borehole logs form an integral part of and should be read in conjunction with this report.

3.1 Soil Stratigraphy

Surficial topsoil was encountered at all boreholes which was underlain by a layer of silty sand (possible fill) and/or native silty clay. Shale bedrock was encountered underlying the native soils at depths ranging from approximately 1.5 to 3.8 m below grade. Details of the encountered materials are provided in the following subsections.

3.1.1 Topsoil

Surficial topsoil was encountered at all boreholes and was noted to have a thickness of approximately 50 to 410 mm. It is noted that topsoil thicknesses may further vary across the site.

3.1.2 Possible Fill

A 100 mm thick layer of possible fill (silty sand) was encountered below the surficial topsoil at Borehole BH-1. The silty sand is presumably reworked or disturbed native soil, and contained a trace of gravel. The silty sand was brown in colour and in a moist state.

3.1.3 Silty Clay

Native silty clay was encountered below the topsoil and/or silty sand (possible fill) at all borehole locations. The silty clay stratum likely consists of residual soil (completely weathered bedrock) and extended to the bedrock surface at depths ranging from approximately 1.5 to 3.8 m below grade. The silty clay contained a trace of sand and occasional rootlets; it was reddish brown and/or grey; and in a moist state, with moisture contents of the

stratum ranging from 9 to 21%. SPT ‘N’ values ranged from 7 to 64 blows per 305 mm penetration. Based on these ‘N’ values, and the undrained shear strengths ranging from 100 kPa to greater than 225 kPa as determined by pocket penetrometer measurements, the silty clay is classified as firm to stiff in its upper about 0.5 m, changing to very stiff to hard below. Three (3) grain size analyses were conducted on selected samples of the stratum and the results are summarized in the table below.

Table 3-1: Summary of Laboratory Testing of Silty Clay

Sample No. and Depth	Grain Size Distribution (%)				Atterberg Limits Results			Soil Classification
	Clay	Silt	Sand	Gravel	Liquid Limit	Plastic Limit	Plasticity Index	
BH-1 SS2 @ 0.8 m	23	72	5	0	22	14	8	CL
BH-3 SS2 @ 0.8 m	47	45	8	0	42	21	21	CI
BH-4 SS3 @ 1.5 m	26	72	2	0	26	15	11	CL

The material is classified as a low to medium plasticity clay (CL & CI) with liquid limit values ranging from 22 to 42, plastic limit values ranging from 14 to 21, and plasticity indices ranging from 8 to 21. The complete set of laboratory results are presented in Appendix B.

3.1.4 Bedrock

Red shale bedrock of the Queenston Formation was encountered in all boreholes underlying the silty clay at depths ranging from approximately 1.5 to 3.8 m below grade. The contact elevations shown in the borehole logs should not be interpreted as exact planes of bedrock since the auger frequently penetrated some distance into the weathered rock before high resistance to augering was noticed. Further, the distinction between highly weathered shale and the clay immediately overlying the rock is not always clear due to shale fragments in the clay; Consequently, some of the materials shown as silty clay on the borehole logs, right above the surface of the bedrock, might be very weak and highly weathered shale.

Rock core samples were not obtained but it is recommended that rock coring be carried out if rock characteristics for excavation are required. Based on the drilling observations and local experience, the Queenston Shale in the area is typically highly weathered in the upper portion (approximately 1 to 3 m) and becomes more sound (slightly weathered, weak to moderately strong) below this depth. The upper portion generally exhibits characteristics more commonly encountered in soil than in sound rock (slake durability index less than 80%, higher moisture content, etc.). Hard limestone interbeds are also possible within the shale; these hard layers can result in contractual problems for excavations and drilling. The bedrock surface depths/elevations are summarized in the following table.

Table 3-2: Depths and Elevations of Bedrock Surface

Borehole No.	Approx. Ground Geodetic Elevation (m)	Depth of Bedrock Surface (m)	Approx. Elevation of Bedrock Surface (m)
BH-1	86.7	1.5	85.2
BH-2	86.7	1.5	85.2
BH-3	86.3	3.8	82.5

Borehole No.	Approx. Ground Geodetic Elevation (m)	Depth of Bedrock Surface (m)	Approx. Elevation of Bedrock Surface (m)
BH-4	85.6	2.3	83.3

3.2 Groundwater Conditions

Groundwater levels were measured in the open boreholes during and upon completion of drilling operations. No free water was encountered in any of the boreholes during the investigation; however, groundwater levels are not anticipated to have stabilized during the short term of the investigation. Seasonal variations in the water table should be anticipated, with higher levels occurring during wet weather conditions (spring thaw and late fall) and lower levels occurring during dry weather.

4. Engineering Discussion and Recommendations

It is understood that the proposed development will consist of a new, one-storey and partial two-storey building. The front half of the building will include a partial basement, with the remainder of the building containing no basement areas. The development will also include at-grade parking and access road pavement structures, with limited landscaping. We offer the following comments and recommendations for the proposed construction.

4.1 Site Grading

The following procedures are recommended for the construction within building and pavement areas at the site, where there is a requirement to raise the existing grade and generate the necessary founding subgrade:

- All existing fill materials, disturbed soils, and organic/deleterious materials should be removed from the building and pavement areas.
- The exposed subgrade surface should be proof-rolled with a fully loaded truck and reviewed by a geotechnical representative. Any soft or very loose areas detected during the proof-rolling process should be sub-excavated and replaced with approved material compacted to 100% Standard Proctor Maximum Dry Density (SPMDD).
- Low areas can then be brought up to final subgrade level with approved on-site or imported material placed in lifts not exceeding 200 mm. Fill placed in building areas must be compacted to 100%. Fill placed in pavement areas should be compacted to at least 95% SPMDD, with the upper 600 mm compacted to at least 98% SPMDD. The moisture content of the fill should be at or near its optimum moisture content to ensure the specified densities can be achieved with reasonable compactive effort.
- Re-use of the on-site fill should be at the discretion of the geotechnical consultant during construction. Some adjustment of moisture content may be required to facilitate compaction of re-used materials. Re-used materials must also be free from organics and deleterious materials. It should also be noted that the silty clay soils on site will require strict moisture control measures to allow for efficient compaction and mobility of the construction equipment. The shale bedrock where encountered should not be reused as backfill.
- All imported borrow fill material from local sources should be free from organic material and foreign objects (trees, roots, debris, etc.) and should be approved by EXP prior to transport to the site. In addition, the

chemical quality of the borrowed fill material should be assessed by EXP in accordance with the current applicable MECP regulations and guidelines.

- All excavation, backfilling and compaction operations should be monitored on a full-time basis by EXP’s geotechnical staff to approve materials and to ensure the specified degrees of compaction have been obtained.

4.2 Building Foundation Recommendations

Based on the conditions encountered in the boreholes, the proposed building can be founded using conventional strip and spread footing foundations supported on the native silty clay or underlying bedrock. Foundations constructed on the native silty clay can be designed using a geotechnical resistance of 250 kPa at Serviceability Limit State (SLS) and factored geotechnical resistance of 375 kPa at Ultimate Limit State (ULS) at or below the depths given in the table below. Highly weathered shale bedrock was encountered underlying the silty clay at depths ranging from 1.5 to 3.8 m below grade and foundations on the highly weathered shale bedrock can be designed for 500 kPa at SLS and 750 kPa at ULS. The geotechnical resistances provided are subject to review following a footing base inspection by EXP during construction.

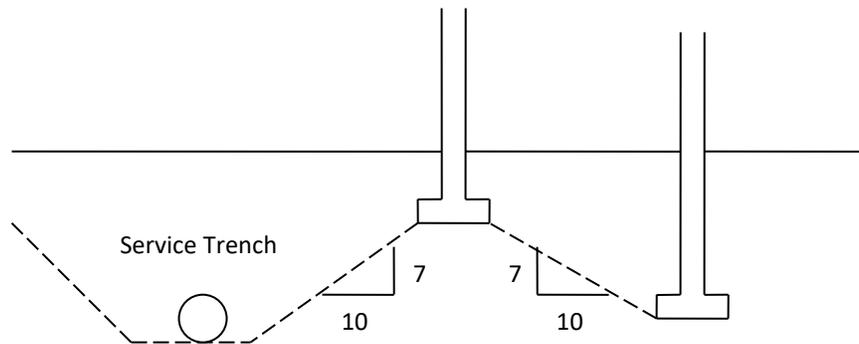
Table 4-1: Available Geotechnical Resistance

Borehole No.	Geotechnical Reaction at SLS (kPa)	Geotechnical Resistance at ULS (kPa)	Founding Stratum	Minimum Founding Depth / Highest Founding Elev. (m)
BH-1	250	375	Native Silty Clay	0.8 / 85.9
	500	750	Weathered Shale	1.5 / 85.2
BH-2	250	375	Native Silty Clay	0.8 / 85.9
	500	750	Weathered Shale	1.5 / 85.2
BH-3	250	375	Native Silty Clay	1.5 / 84.8
	500	750	Weathered Shale	3.8 / 82.5

Provided that the ground is not disturbed due to groundwater, precipitation, traffic, etc., and the geotechnical reaction values provided are not exceeded, then total and differential settlement should be small and within the normally tolerated limits of 25 mm and 20 mm, respectively.

4.3 General Foundation Recommendations

Conventional foundations in soil at different elevations should be located such that higher footings are set below a line drawn up at 10:7, horizontal to vertical from the near edge of the lower footing. This concept should also be applied to excavations for new foundations in relation to existing foundations or underground services.



FOOTINGS NEAR SERVICE TRENCHES OR AT DIFFERENT ELEVATIONS

All foundations or grade beams exposed to freezing conditions must be provided with a minimum of 1.2 m of earth cover or equivalent insulation for frost protection, depending on the final grade requirements. All footing bases must be visually inspected and approved by a geotechnical engineer from EXP prior to pouring concrete for the footings.

The recommended geotechnical resistances have been calculated by EXP from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of underground conditions becomes available. For example, it should be appreciated that modifications to bearing levels may be required if unforeseen subsoil conditions are revealed after the excavation is exposed to full view or if final design decisions differ from those assumed in this report. For this reason, this office should be retained to review final foundation drawings and to provide field inspections during the construction stage.

4.4 Excavations

All excavations must be completed in accordance with the most recent regulations of the Ontario Occupational Health and Safety Act (OHSa). The native silty clay and highly weathered rock may generally be classified as Type 2 Soil below a depth of approximately 1 m below grade, while the encountered fill and upper layers of the native silty clay may generally be classified as Type 3 Soil. In accordance with the OHSa regulations if the excavation contains more than one type of soil, the soil shall be classified as the type with the highest number. Excavations of the overburden soils may be undertaken with a sufficiently powerful hydraulic excavator. Excavations proceeding into the weathered shale would require heavy duty hydraulic excavators, equipped with rock teeth (for shale excavation). Deeper excavations into the sound shale or where limestone lenses are encountered will require the use of rock breaking equipment such as pneumatic hammers.

The OHSa requires that excavation slopes be cut at predetermined inclinations, based on the soil types encountered. Type 2 and Type 3 soils are expected to be stable for short construction periods at slopes of approximately 45° to the horizontal (i.e. 1V:1H), with Type 2 soils cut at 1.2 m from the base from the excavation. The need to excavate flatter side slopes if excessively wet or soft/loose materials, or concentrated seepage zones are encountered, should not be overlooked. Water (i.e. surface water runoff) should not be permitted to enter and/or pond within the construction area.

It is important to note that soils encountered in the construction excavations may vary significantly across the site. Our preliminary soil classifications are based solely on the materials encountered in the boreholes advanced at the site. The contractor should verify that similar conditions exist throughout the proposed area of excavation. If

different subsurface conditions are encountered at the time of construction, we recommend that EXP be contacted immediately to evaluate the conditions encountered.

4.5 Lateral Earth Pressure

The lateral earth pressure acting on subsurface walls or retaining structures may be calculated using the following equation, assuming that a drainage system is used to prevent hydrostatic pressure:

$$p = K(\gamma h + q)$$

where p = Lateral earth pressure at depth h (kPa)

K = Coefficient of earth pressure

γ = Unit weight of supported soil

h = Depth to point of interest (m)

q = Surcharge load acting adjacent to the wall at the ground surface (kPa)

The mobilization of full active or passive resistance requires a measurable and perhaps significant wall movement or rotation. Therefore, unless the structural element can tolerate these deflections, the at-rest earth pressure should be used in design.

Table 4-2: Material Types and Earth Pressure Properties

Material	Unfactored Friction Angle ϕ'	Coefficient of Active Earth Pressure (K_a)	Coefficient of Passive Earth Pressure (K_p)	Coefficient of At-Rest Earth Pressure (K_0)	Unit Weight, γ (kN/m ³)
OPSS Granular A	35	0.27	3.69	0.43	23.0
OPSS Granular B	32	0.31	3.25	0.47	22.0
Compacted On-Site Silty Clay	30	0.33	3.00	0.50	22.0

The effect of compaction surcharge should be taken into account in the calculations of active and at-rest earth pressures. The lateral pressure due to compaction should be taken as at least 12 kPa at the surface, and its magnitude should be assumed to diminish linearly with depth to zero at the depth where the active (or at rest) pressure is equal to 12 kPa. This pressure distribution should be added to the calculated active (or at rest) pressure. Notwithstanding, lighter compaction equipment and smaller lifts should be used adjacent to walls to prevent overstressing.

4.6 Groundwater Control

Groundwater levels were measured in the open boreholes during and upon completion of drilling operations. Free water was not encountered during the investigation. Based on the conditions encountered during the investigation and the anticipated excavation depths, significant groundwater seepage is not expected during construction and should be readily controllable using conventional construction sump pumping techniques combined with oversized excavations and ditching, as required.

Dewatering requirements will be governed by the time of year the construction is performed. It is the responsibility of the contractor to propose a suitable dewatering system based on the time of construction and the groundwater levels. The method used should not undermine adjacent structures.

4.7 Building Floor Slab-on-Grade and Permanent Drainage

The floor slab-on-grade for the proposed building can be supported on the native silty clay or engineered fill as outlined in Section 4.1 (Site Grading) of this report. It is recommended that the exposed subgrade be examined by a geotechnical engineer prior to constructing the floor slab-on-grade. Any loose or disturbed material encountered during the review should be sub-excavated and replaced with approved fill placed in lifts not exceeding 200 mm and compacted to 100% SPMDD within 2% of the optimum moisture content.

Perimeter drains and underfloor drainage pipes are not required for the proposed building section with no basements, provided that the finished floor is at least 300 mm above the finished exterior grades around the building, and that the exterior grades are sloped away from the building. For areas with partial basement, perimeter drainage is considered necessary unless the building is constructed as a “tank” and waterproofed. The need for underfloor drainage can be assessed during construction but is not anticipated to be required. If installed, the systems should not be connected to the same collector pipe. A weeping tile system, protected by granular filter fabric or geotextile, should be utilized to prevent the build-up of hydrostatic pressure behind the basement walls.

The floor slab should be cast on a layer of moisture barrier consisting of 19 mm clear stone with a thickness of at least 200 mm. The clear stone layer will minimize the capillary rise of moisture from the subsoil to the floor slab (moisture barrier). Adequate saw cuts should be provided in the floor slab as directed by the structural engineer to help control cracking.

Around the perimeter of the proposed building, the ground surface should be sloped away from the structure to promote surface water run-off and reduce groundwater infiltration adjacent to the foundations.

4.8 Backfill

Backfill used to satisfy under slab requirements and service trenches, etc., should be compactible fill, i.e., inorganic soil with its moisture content close to its optimum moisture content as determined in the Standard Proctor Test. Any fill placed below concrete slab areas should be compacted to 100 % SPMDD in lifts not exceeding 200 mm.

To minimize potential problem, any trench backfilling operations should follow closely after excavation so that only minimal length of trench slope is exposed. This will minimize wetting of the subgrade material. Should construction extend to the winter season, particular attention should be given to ensure that frozen material is not used as backfill.

The majority of excavated material will likely consist of silty clay. In general, the excavated material may be re-used for backfilling subject to the removal of any organics or other obviously unsuitable material. However, moisture content adjustment of re-used soils should be expected. The shale bedrock where encountered should not be reused as backfill.

In general, the overburden soils are not free draining and therefore should not be used where this characteristic is required, or in confined areas. Imported granular material conforming to OPSS 1010 for Granular B Type I or II would be suitable for these purposes.

All backfilling and compaction operations must be closely examined by a qualified geotechnical consultant to ensure uniform compaction to specification requirements, especially in the vicinity of manholes and catch basins, and in all areas that are not readily accessible to compaction equipment.

4.9 Earthquake Considerations

The recommendations for the geotechnical aspects to determine the earthquake loading are presented in the subsections below.

4.9.1 Subsoil Conditions

The subsoil and groundwater information at this site have been examined in relation to Section 4.1.8.4 of the OBC 2012. Foundations are anticipated to be founded either on the native silty clay or on the shale bedrock. Bedrock surface was encountered at all boreholes at depths ranging from 1.5 to 3.8 m below grade.

There have been no shear wave velocity measurements carried out at this site and therefore, N values and EXP’s knowledge of the soil and bedrock conditions in the area have been used to determine the site classification.

4.9.2 Site Classification

Based on the known soil conditions and anticipated founding conditions, the recommended Site Class for this site is “C” as per Table 4.1.8.4.A, Site Classification for Seismic Site Response, OBC 2012. The acceleration and velocity-based site coefficients, F_a and F_v , should be determined from Tables 4.1.8.4.B. and 4.1.8.4.C. respectively of the OBC for the above recommended Site Class.

It may be possible to achieve an improved site class through the evaluation of the subsurface conditions using shear wave velocities. EXP can be contacted to provide this service, if required.

4.10 Roadway and Parking Lot Construction

The recommended pavement structures are provided in the table below and are based on an estimate of the subgrade soil properties determined from visual examination and textural classification of the soil samples, and traffic requirements. Consequently, the recommended pavement structures should be considered for preliminary design purposes only.

Table 4-3: Recommended Pavement Structures

Pavement Layer	Compaction Requirements	Medium-Duty Parking	Truck Routes & Heavy-Duty Parking
Asphaltic Concrete (OPSS 1150)	Min 92.0% Maximum Relative Density (MRD)	40 mm HL3 50 mm HL8	40 mm HL3 60 mm HL8

Pavement Layer	Compaction Requirements	Medium-Duty Parking	Truck Routes & Heavy-Duty Parking
Granular A Crusher Run Limestone (OPSS 1010)	100% SPMDD	150 mm	150 mm
Granular B Type II (OPSS 1010)	100% SPMDD	250 mm	350 mm

The granular base and sub-base must be placed in maximum 200 mm lifts and compacted to 100% of the SPMDD at moisture content within 2% of the optimum moisture content. The subgrade should be compacted to 98% SPMDD for at least the upper 600 mm (and at least 95% SPMDD below). The recommended pavement structures outlined assumes adequate provision for drainage.

The foregoing design assumes construction is carried out during dry periods and the subgrade is properly shaped, crowned, and then proof-rolled in the full-time presence of a representative of this office. Soft or spongy subgrade areas should be sub-excavated and properly replaced with suitable approved backfill compacted to at least 98% SPMDD. If construction is carried out during wet weather, and heaving or rolling of the subgrade is experienced, additional thickness of sub-base course material may be required.

The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure uniform subgrade moisture and density conditions are achieved. In addition, the need for adequate drainage cannot be over emphasized. The finished pavement surface and underlying subgrade should be free of depressions and should be sloped to provide effective surface drainage toward catch basins. Surface water should not be allowed to pond adjacent to the outside edges of pavement areas. Subdrains should be installed to intercept excess subsurface moisture and prevent subgrade softening.

Additional comments on the construction of the paved areas are as follows:

- Assuming that satisfactory crossfalls have been provided for subdrainage, subdrains extending from and between catch basins may be sufficient.
- To minimize problems of differential movement between the pavement and catch basins/manholes due to frost action, the backfill around the structures should consist of free draining granular fill.
- The most severe loading conditions on pavement areas and the subgrade may occur during construction. Consequently, special provisions such as half loads during paving, etc. may be required, especially if construction is carried out during unfavourable weather.

5. General Comments

The information presented in this report is based on a limited investigation designed to provide information to support an overall assessment of the current geotechnical conditions of the subject property. The conclusions presented in this report reflect site conditions existing at the time of the investigation.

EXP Services Inc. should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, EXP Services Inc. will assume no responsibility for interpretation of the recommendations in the report.

The comments given in this report are intended only for the guidance of design engineers. The number of boreholes required to determine the localized underground conditions between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc., would be much greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should, in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

More specific information, with respect to the conditions between samples, or the lateral and vertical extent of materials, may become apparent during excavation operations. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent; should this occur, EXP Services Inc. should be contacted to assess the situation and additional testing and reporting may be required. EXP Services Inc. has qualified personnel to provide assistance in regard to future geotechnical and environmental issues related to this property.

We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.



Isaac Asonya, P.Eng.
Geotechnical Engineer



James Ng, M.Eng., P.Eng., MICE
Geotechnical Manager, Infrastructure Projects

Appendix A

Drawings & Borehole Logs



EXP Services Inc.
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 1266 South Service Rd. Unit C1-1
 Stoney Creek, ON L8E 5R9
 Canada



www.exp.com
 • BUILDINGS • EARTH & ENVIRONMENT • ENERGY •
 • INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

LEGEND:



APPROXIMATE BOREHOLE LOCATION

TITLE AND LOCATION:

BOREHOLE LOCATION PLAN
 GEOTECHNICAL INVESTIGATION
 PROPOSED NEW CROATIAN NATIONAL HOME
 615 BARTON STREET, STONEY CREEK, ON

JOB NO.:

HAM-23009539-A0

DRAWN BY:

IA

SCALE:

NTS

CHECKED BY:

JG

DATE:

DECEMBER 2023

DWG NO.:

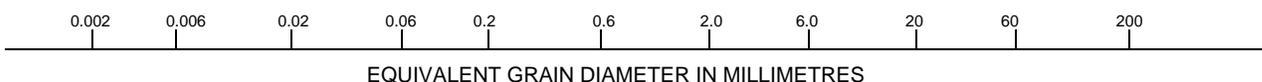
1

Notes on Sample Descriptions

1. All sample descriptions included in this report follow the International Society for Soil Mechanics and Foundation Engineering (ISSMFE), as outlined in the Canadian Foundation Engineering Manual. Note, however, that behavioral properties (i.e. plasticity, permeability) take precedence over particle gradation when classifying soil. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

UNIFIED SOIL CLASSIFICATION

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	



ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		

2. **Fill:** Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.
3. **Till:** The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (75 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

Notes On Soil Descriptions

4. The following table gives a description of the soil based on particle sizes. With the exception of those samples where grain size analyses have been performed, all samples are classified visually. The accuracy of visual examination is not sufficient to differentiate between this classification system or exact grain size.

Soil Classification		Terminology	Proportion
Clay and Silt	<0.060 mm	"trace" (e.g. Trace sand)	1% to 10%
Sand	0.060 to 2.0 mm	"some" (e.g. Some sand)	10% to 20%
Gravel	2.0 to 75 mm	adjective (e.g. sandy, silty)	20% to 35%
Cobbles	75 to 200 mm	"and" (e.g. and sand)	35% to 50%
Boulders	>200 mm		

The compactness of Cohesionless soils and the consistency of the cohesive soils are defined by the following:

Cohesionless Soil		Cohesive Soil		
Compactness	Standard Penetration Resistance "N" Blows / 0.3 m	Consistency	Undrained Shear Strength (kPa)	Standard Penetration Resistance "N" Blows / 0.3 m
Very Loose	0 to 4	Very soft	<12	<2
Loose	4 to 10	Soft	12 to 25	2 to 4
Compact	10 to 30	Firm	25 to 50	4 to 8
Dense	30 to 50	Stiff	50 to 100	8 to 15
Very Dense	Over 50	Very Stiff	100 to 200	15 to 30
		Hard	>200	>30

5. ROCK CORING

Where rock drilling was carried out, the term RQD (Rock Quality Designation) is used. The RQD is an indirect measure of the number of fractures and soundness of the rock mass. It is obtained from the rock cores by summing the length of the core covered, counting only those pieces of sound core that are 100 mm or more length. The RQD value is expressed as a percentage and is the ratio of the summed core lengths to the total length of core run. The classification based on the RQD value is given below.

RQD Classification	RQD (%)
Very Poor Quality	<25
Poor Quality	25 to 50
Fair Quality	50 to 75
Good Quality	75 to 90
Excellent Quality	90 to 100

$$\text{Recovery Designation \% Recovery} = \frac{\text{Length of Core Per Run}}{\text{Total Length of Run}} \times 100$$

Log of Borehole BH-4

Project No. HAM-23009539-A0

Drawing No. 6

Project: Proposed New Croatian National Home

Sheet No. 1 of 1

Location: 615 Barton Street, Stoney Creek, ON

Date Drilled: November 29, 2023

Auger Sample



Combustible Vapour Reading

Natural Moisture

Drill Type: D-50 Track Mount. Solid Stem.

SPT (N) Value



Plastic and Liquid Limit

Dynamic Cone Test



Undrained Triaxial at

% Strain at Failure

Datum: Geodetic

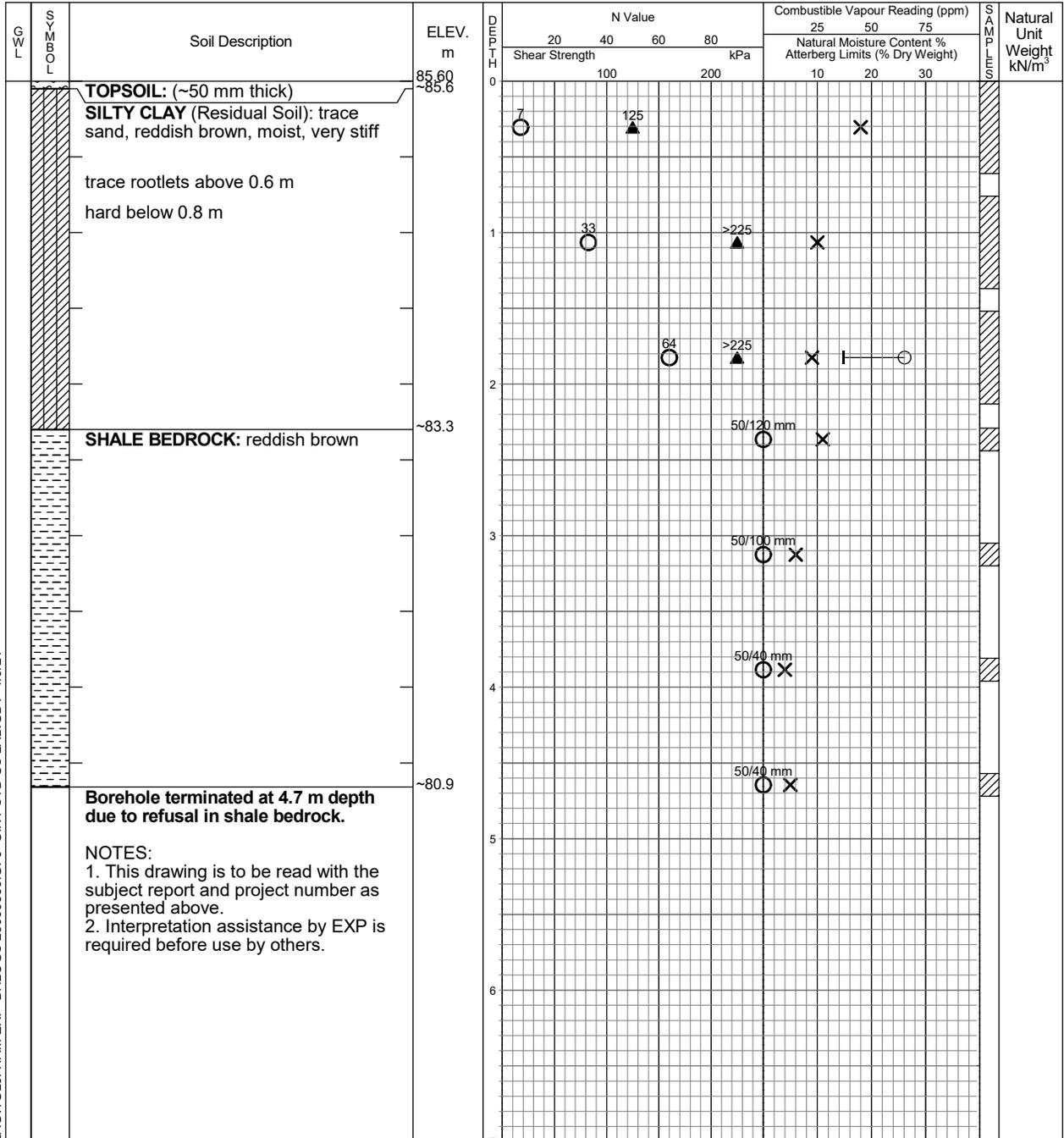
Shelby Tube



Field Vane Test



Penetrometer



LAGWGLJFHAM-EXP_BHLOGS 23009539.GPJ GINT STD US LAB.GDT 1/9/24

Time	Water Level (m)	Depth to Cave (m)
on completion	dry	open

Appendix B

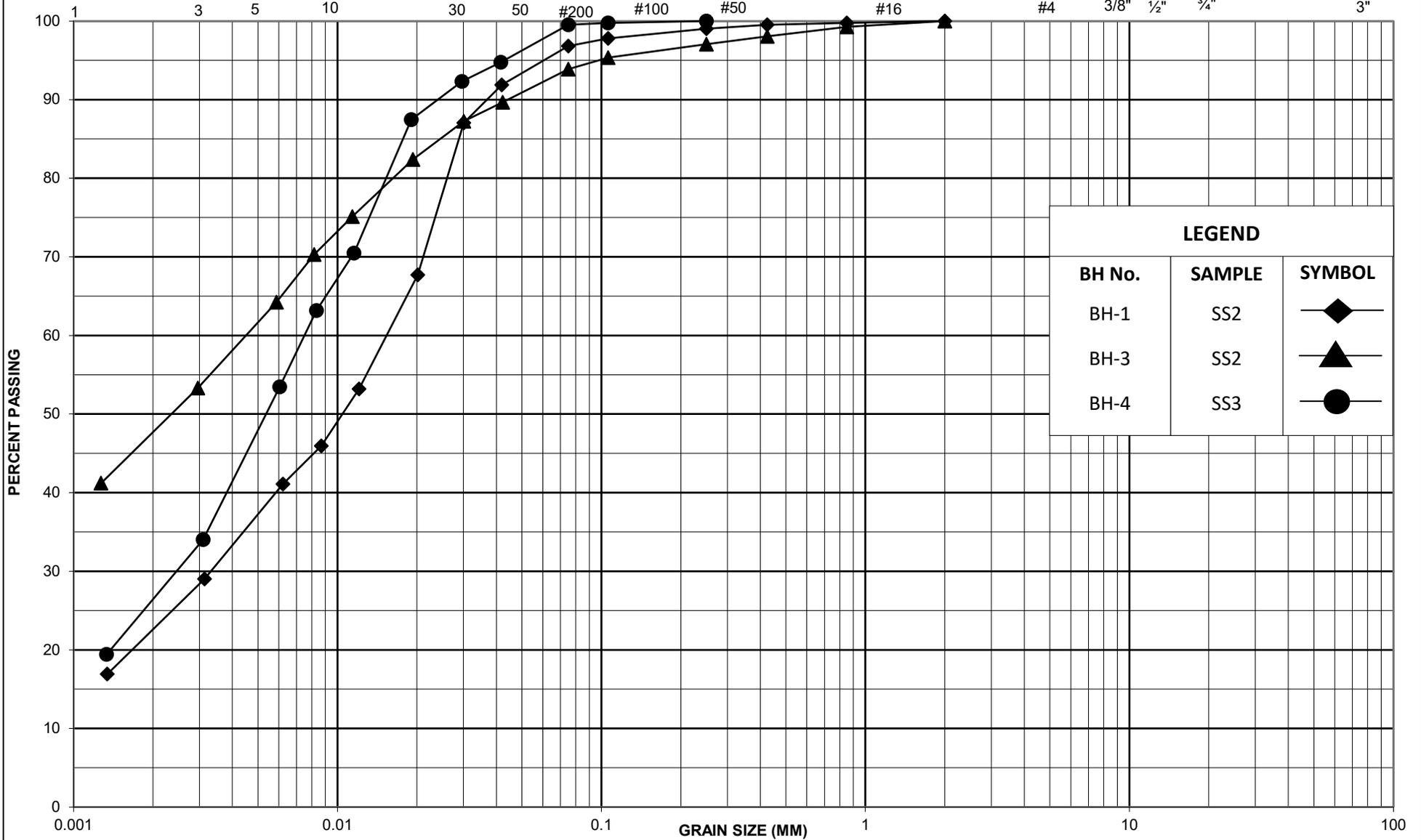
Laboratory Test Results

ISSMFE SOIL CLASSIFICATION SYSTEM

CLAY	SILT			SAND			GRAVEL			Cobbles
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	

GRAIN SIZE IN MICROMETERS

SIEVE DESIGNATION (Imperial)



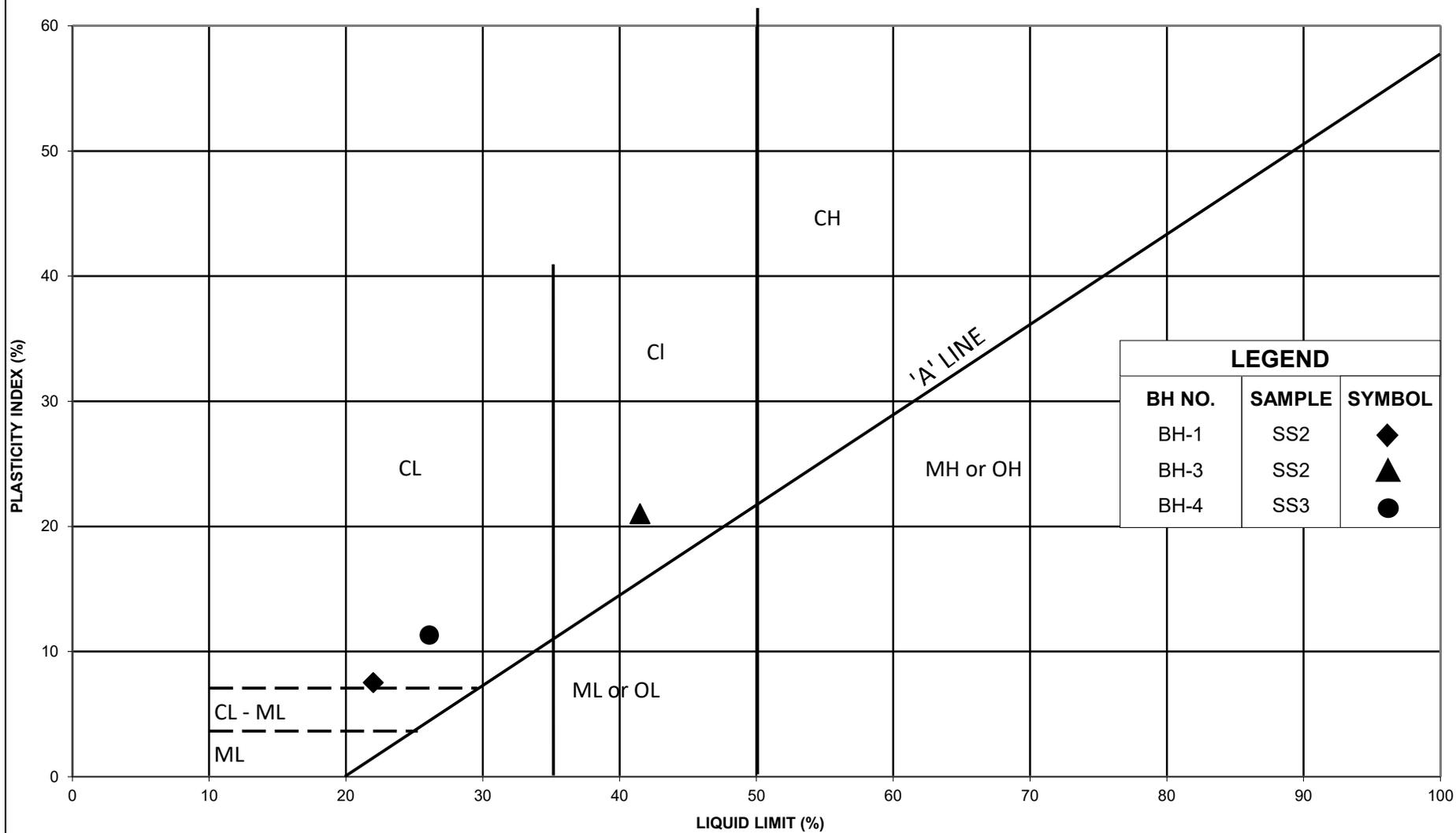
LEGEND		
BH No.	SAMPLE	SYMBOL
BH-1	SS2	◆
BH-3	SS2	▲
BH-4	SS3	●



GRAIN SIZE DISTRIBUTION

DRAWING NO.:	B1
PROJECT NO.:	HAM-23009539-A0
DATE:	DECEMBER 2023

PROPOSED NEW CROATIAN NATIONAL HOME
615 Barton Street, Stoney Creek, ON



PLASTICITY CHART
SILTY CLAY (CL & CI)

DRAWING NO.:	B2
PROJECT NO.:	HAM-23009539-A0
DATE:	DECEMBER 2023



Soil Characterization Report

615 Barton Street, Stoney Creek , Ontario

Client:

Croatian National Home c/o Mr. John Grguric
Grguric Architects Incorporated
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Soil Characterization Report

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1 Executive Summary

EXP Services Inc. (EXP) was retained by the Croatian National Home c/o Grguric Architects Incorporated (“Client”) to complete an in-situ environmental characterization for excess soil for the property municipally addressed as 615 Barton Street, in Stoney Creek, Ontario (hereinafter referred to as the ‘Project Area’) (refer to Figure 1). This report was prepared in support of the proposed development of the property, with a one-storey and partial two-storey commercial building.

The Project Area is located on the north side of Barton Street, approximately 140 m west of the intersection of Fruitland Road and Barton Street. The Project Area measures approximately 1 hectare (2.5 acres) in area, with approximately 55 m of frontage on Barton Street, and is currently undeveloped. It is our understanding that the property has never been developed.

This in-situ environmental characterization of excess soil program was conducted in accordance with Ontario Regulation (O.Reg.) 406/19 “On-Site and Excess Soil Management” made under the Environmental Protection Act, R.S.O 1990, c. E.19, and in accordance with generally accepted professional practices. Subject to this standard of care, EXP makes no express or implied warranties regarding its services and no third-party beneficiaries are intended. Limitation of liability, scope of report and third-party reliance are outlined in Section 8 of this report.

The objective of the in-situ environmental characterization of excess soil is to characterize the surface and subsurface soil within the Site for the proposed redevelopment of the property in the advance of soil movement. An approximate volume of 2,500 cubic metres (m³) of soil is proposed for removal as excess soil.

As the property has never been developed (i.e. is considered to be sensitive), a due diligence approach was established for this project. As such, an Assessment of Past Uses (APU) was not completed in advance of soil sampling.

The results and findings of the in-situ soil characterization of excess soils conducted at the Project Area are summarized as follows:

- A total of four (4) boreholes, numbered BH to BH4, were advanced at the Project Area as shown on Figure 2. The boreholes were advanced to depths of approximately 4.7 metres below ground surface (m bgs).
- The boreholes were advanced on the Project Area and encountered topsoil at each location, overlying a 100 mm thick layer of reworked silty sand material at BH-1, followed by silty clay below the topsoil and/or silty sand (reworked native material at BH1) at all borehole locations. Red shale bedrock of the Queenston Formation was encountered in all boreholes underlying the silty clay at depths ranging from approximately 1.5 to 3.8 m below grade.
- Soil samples were submitted for the analysis of Petroleum Hydrocarbons (PHCs); Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); Metals (including hydride-forming metals), Volatile Organic Compounds (VOCs), Organochlorine Pesticide (OCs), Electrical Conductivity (EC), Sodium Adsorption Ratio (SAR), pH; and Synthetic Precipitation Leaching Procedure (SPLP).
- For assessment purposes, EXP selected the Ministry of Environment, Conservation and Parks (MECP) (2022) Table 1: Full Depth Background Site Condition Standards (SCS) for Residential / Parkland / Institutional / Industrial / Commercial / Community (RPIICC) Land Use – coarse and/or fine textured soil (Table 1 SCS) and Table 7.1: Full Depth Excess Soil Quality Standards for shallow soils in a Non-Potable Ground Water Condition for Industrial / Commercial / Community (ICC) Property Use (Table 7.1 ESQS) for comparison purposes.
- Five (5) soil samples, including one (1) field duplicate, were analyzed for PHCs and BTEX. PHCs and BTEX were not detected or were at the laboratory reportable detection limits (RDLs).

- Five (5) soil samples, including one (1) field duplicate, were analyzed for Metals including hydride-forming metals. Metals were not detected or were below the applicable Table 1 SCS and Table 7.1 ICC ESQS, with the exception of the following:
 - Table 1 SCS: Boron in BH4 SS1 and field duplicate (DUP2)
- Two (2) soil samples were analyzed for VOCs. VOC parameters were not detected at the laboratory reporting detection limits (RDLs).
- Two (2) soil samples were analyzed for OCs. OC parameters were either not detected at the laboratory RDLs or detected below the applicable Table 1 SCS and Table 7.1 ICC ESQS.
- Five (5) soil samples, including one (1) field duplicate, were analyzed for EC and SAR. EC and SAR were detected below the applicable Table 1 SCS and Table 7.1 ICC ESQS.
- The Table 7.1 ESQS criteria are applicable if soil pH is in the range of 5 to 9 for surface soil (less than 1.5 m below soil surface) and 5 to 11 for subsurface soil (greater than 1.5 m below soil surface). The reported pH values for surface soils ranged between 7 and 7.21. The reported pH values for subsurface soils ranged between 7.21 and 7.3.
- Four (4) soil samples were analyzed for SPLP. SPLPs were not detected at the laboratory RDLs or were detected below the applicable Leachate Screening Levels.
- No evidence of free product (i.e. visible film or sheen), odours, or staining was observed during soil sampling.

Based on the results of the investigation, all the tested parameters from the soil samples meet the Tables 1 SCS and Table 7.1 ICC ESQS, with the exception of boron at BH4 (Table 1 SCS only).

During construction activities, soils should be handled in the following manner:

- Soils generated from the Project Area may not be removed to a Table 1 SCS receiving site based on the presence of boron on BH4.
- When compared to the remaining standards, including Table 2.1 agricultural, the soil samples meet these standards. Therefore, soils can be removed to a receiving site accepting the following soils: Table 2.1 (agricultural, RPI, ICC), Table 3.1 (RPI, ICC)

2 Introduction

EXP Services Inc. (EXP) was retained by the Croatian National Home c/o Grguric Architects Incorporated (“Client”) to complete an in-situ environmental characterization for excess soil for the property municipally addressed as 615 Barton Street, Stoney Creek, Ontario (hereinafter referred to as the ‘Project Area’) (refer to Figure 1). This report was prepared in support of the proposed development of the property, with a one-storey and partial two-storey commercial building. It is our understanding that the property has never been developed.

The objective of the in-situ environmental characterization of excess soils is to support the proposed relocation of potential “excess soil” during development activities. It is understood that approximately 2,500 m³ of excess soil will be generated and disposed of off-site.

As the property has never been developed (i.e. is considered to be sensitive), a due diligence approach was established for this project. As such, an Assessment of Past Uses (APU) was not completed in advance of soil sampling. It is understood that approximately 2,500 m³ of excess soil will be generated and disposed of off-site. To facilitate the removal of this material during construction, EXP has proposed a due diligence sampling program at a rate of 1 sample per 500 m³.

This in-situ environmental characterization of excess soil program was conducted in accordance with Ontario Regulation (O.Reg.) 406/19 “On-Site and Excess Soil Management” made under the Environmental Protection Act, R.S.O 1990, c. E.19, and in accordance with generally accepted professional practices.

Subject to this standard of care, EXP makes no express or implied warranties regarding its services and no third-party beneficiaries are intended. Limitation of liability, scope of report and third-party reliance are outlined in Section 8 of this report.

2.1 Site Description

The Project Area is located on the north side of Barton Street, approximately 140 m west of the intersection of Fruitland Road and Barton Street. The Project Area measures approximately 1 hectare (2.5 acres) in area, with approximately 55 m of frontage on Barton Street, and is currently undeveloped.

Refer to Figure 1 for the Site location plan.

2.2 Project Area Information

Details of the Site are outlined in the table below:

Municipal Address	615 Barton Street, Stoney Creek, ON
Land Use	Undeveloped
Project	One-storey and partial two-storey commercial building
Area	1 hectare (2.5 acres)
Property Owner	Croatian National Home c/o Grguric Architects Incorporated
Associated Contact and Address	Mr. John Grguric Grguric Architects Incorporated 28 King Street East, Unit B Stoney Creek, ON L8G 1J8
Name of Any Other Person Who Engaged the Qualified Person	Mr. John Grguric
Project Leader(s)	To be determined
Qualified Person(s)	Jennifer Hayman, P.Geo., QPESA

2.3 Current and Proposed Future Uses

At the time of the investigation, the Project Area was undeveloped land. The proposed future land use is commercial.

2.4 Applicable Site Condition Standards

Analytical results obtained for Site soil samples were assessed against the generic Excess Soil Quality Standards (ESQS) as established under the Environmental Protection Act and regulated under O. Reg 406/19. Tabulated background ESQS (Table 1) applicable to environmentally sensitive Sites and effects based generic ESQS (Tables 2.1 to 9.1) applicable to non-environmentally sensitive Sites are provided in the accompanying “Rules for Soil Management and Excess Soil Quality Standards” (MECP 2019) document. The effects-based ESQS (Tables 2.1 to 9.1) are protective of human health and the environment for different groundwater conditions (potable and non-potable), land use scenarios (residential, parkland, institutional, commercial, industrial, community and agricultural/other), soil texture (coarse or medium/fine) and restoration depth (full or stratified).

In order to facilitate the maximum soil reuse potential, EXP selected the following for comparison purposes:

- Table 1: Full Depth Background Site Condition Standards (SCS) for Residential / Parkland / Institutional / Industrial / Commercial / Community (RPIICC) Land Use – coarse and/or fine textured soil (Table 1 SCS); and
- Table 7.1: Full Depth Excess Soil Quality Standards for shallow soils in a Non-Potable Ground Water Condition for Industrial / Commercial / Community (ICC) Property Use (Table 7.1 ESQS).

3 Background Information

3.1 Physical Setting

The following physiographic, geological and soil maps were reviewed:

- "Toporama"; Natural Resources Canada. Map 030M11 - TORONTO. Scale 1:10,000. 2008.
- "Quaternary Geology, Seamless coverage of the Province of Ontario"; Data Set 14 - Revised, Scale 1: 1,000,000 Issued 2000.
- "Bedrock Geology of Ontario, Southern Sheet," Ontario Geological Survey, MDR126-REV1. Scale 1:250,000. Issued 2011.

Based on the review of the above maps, the following information was obtained:

- The Site is approximately 280 m above sea level and is generally flat, with a gentle slope downwards on the north portion of the Site.
- A review of the topographic map indicated that an unnamed tributary transects the southwest portion of the Site, and traverses along the west boundary of the Site on the north portion of the Site. This tributary runs in a northerly direction towards Lake Ontario, which is situated approximately 1.3 km north of the Site. Based on local topography, the anticipated groundwater flow direction is to the north, towards Lake Ontario.
- The Site and surrounding areas are dominated by undifferentiated carbonate and clastic sedimentary rock, exposed at surface or covered by a discontinuous, thin layer of drift. from the Paleozoic Era.
- The bedrock in the general area forms part of a group belonging to the Clinton Group; Cataract Group, consisting of sandstone, shale, dolostone, and siltstone.
- .

3.2 Previous Environmental Investigations

No following reports were available for review at the time of this Soil In-Situ Characterization Report.

4 Scope of Investigation

4.1 Overview of Site Investigation

The objective of the in-situ environmental characterization of excess soils is to support the proposed relocation of potential “excess soil” during development activities. Based on the sample frequency standards established in the regulation five (5) soil samples (including duplicates) were collected and analyzed for parameters in support of excess soil characterization (per O.Reg. 406/19) based on a characterization volume of approximately 2,500 m³ of soil. If characterization of additional soil is required to support the required volume of “excess soil” generated during development, further characterization will be required of that additional soil.

4.1.1 Scope of Work

The scope of work for the in-situ environmental characterization of excess soil is as follows:

- Request local utility locating companies (e.g. cable, telephone, gas, hydro, water, sewer, and storm water) to mark any underground utilities present at the Site;
- Oversee a licensed drilling company to advance a total of four (4) boreholes across the Project Area, as part of a combined environmental and geotechnical investigation;
- Collect representative soil samples from the boreholes for laboratory analysis of some or all of the following Petroleum Hydrocarbons (PHCs); Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); Metals (including hydride-forming metals), Volatile Organic Compounds (VOCs), Organochlorine Pesticide (OCs), Electrical Conductivity (EC), Sodium Adsorption Ratio (SAR), pH; and Synthetic Precipitation Leaching Procedure (SPLP);
- Analyze the data and prepare a report of the findings, in accordance with O.Reg 406/19.

4.2 Media Investigated

The in-situ environmental characterization of excess soil included the investigation of the surface and subsurface soil on the Project Area. As there were no surface water bodies on the Site, sediment sampling was not required.

4.3 Deviations from Sampling and Analysis Plan

The field investigative and sampling program was carried out following the requirements of the Site Sampling and Analysis Plan (SAP) presented in Appendix A. No significant deviations from the SAP were reported that could affect the sampling and data quality objectives for the Site.

4.4 Impediments

At the time of the Site investigation, there were no restrictions that did not allow for the completion of the boreholes.

5 Investigation Method

5.1 General

The Site investigative activities consisted of the following:

- Advancement of four (4) boreholes to the proposed area of excess soils to facilitate the collection of soil samples for in-situ soil characterization purposes

Boreholes were advanced in the overburden soils with a licensed drilling operator (Elite Drilling Services) under the full-time supervision of EXP staff during a concurrent geotechnical investigation (reported under a separate cover). The drilling equipment used to advance the boreholes is described below. No petroleum-based greases or solvents were used during drilling activities.

The approximate locations of the boreholes are shown on Figure 2.

5.2 Underground Utilities

Prior to the commencement of drilling activities, the locations of underground utilities including but not limited to cable, telephone, natural gas, electrical lines, water, sewer, and storm water conduits were marked out by public locating companies and private locating company.

5.3 Borehole Program

The fieldwork for the in-situ environmental characterization of excess soil occurred on November 29, 2023. The boreholes were advanced under the full-time supervision of EXP staff.

A total of four (4) boreholes, numbered BH-1 to BH-4, were advanced at the Project Area as shown on Figure 2. The boreholes were advanced to a depth of approximately 4.7 metres below ground surface (m bgs). The boreholes were advanced using a conventional auger D50 track mounted drill rig equipped with split spoon sampling equipment. No petroleum-based greases or solvents were used during drilling activities.

EXP continuously monitored the drilling activities to record the physical characteristics of the soil, depth of soil sample collection and total depth of boreholes. Field observations are summarized on the borehole logs provided in Appendix B. Representative soil samples from the boreholes were recovered in the overburden of the boreholes at regular intervals using a split spoon sampler.

Efforts to prevent cross contamination during the soil sampling program included the use of dedicated nitrile gloves, sampling containers, hermetic sampling syringes etc. during sampling handling, washing the auger flights between sample locations, and cleaning the split spoon sampler between runs.

5.4 Soil: Sampling

The soil sampling conducted during the completion of the in-situ environmental characterization of excess soil was undertaken in accordance with the SAP presented in Appendix A, to ensure that soil quality was characterized in accordance with O. Reg. 406/19.

Soil samples for geologic characterization and chemical analysis were collected on a continuous basis in the overburden materials using sampling equipment advanced into the subsurface using a D50 track mounted drill rig equipped with split spoons. Upon retrieval from the boreholes, the split spoons were placed on a flat surface and disassembled by drilling personnel to provide access of the recovered cores. Geologic and sampling details of the recovered cores were logged and assessed for the potential presence of non-aqueous phase liquids. Soil stratigraphy encountered in the boreholes were texturally, visually, and olfactory

classified in the field and in the laboratory. Soil samples were logged for colour, grain size, moisture content, density, structures, texture, and/or staining. Field observations are summarized on the borehole logs provided in Appendix B.

Measures were taken in the field and during transport to preserve sample integrity prior to chemical analysis. Recommended volumes of soil samples selected for chemical analysis were collected from the recovered cores into pre-cleaned, laboratory-supplied glass sample jars/vials identified for the specified analytical test group. Samples intended for PHC fractions F1 and VOCs were collected using a laboratory-supplied soil core sampler, placed into the vials containing methanol for preservation purposes and sealed using Teflon lined lids.

Soil samples selected for laboratory analysis were placed in clean coolers containing ice prior to and during transportation to the subcontract laboratory AGAT Laboratories (AGAT), in Mississauga, Ontario. The samples were transported/submitted within the acceptable holding time to AGAT Labs following Chain of Custody protocols for chemical analysis.

Decontamination and other protocols were followed during sample collection and handling to minimize the potential for sample cross-contamination. New disposable nitrile gloves were used for the handling and sampling of each retrieved soil core.

Soil samples submitted for specific chemical analysis were selected on the basis of visual inspection, Total Organic Vapour (TOV) readings, sample location, and/or depth interval.

Appropriate quality assurance/quality control (QA/QC) samples were collected during soil sampling, including field duplicate samples, as presented in Table I.

5.5 Soil: Field Screening Measurements

Where required for the characterization of volatile parameters, a portion of each composite soil sample was placed in a sealed plastic bag and allowed to reach ambient temperature prior to field screening, using an RKI Eagle II (RKI) device equipped with a Photoionization Detection (PID) instrument, calibrated with isobutylene and hexane gases. The measurements were made by inserting the instrument's probe into the plastic bag while manipulating the sample to ensure volatilization of the soil gases. These readings provide a real-time indication of the relative concentration of combustible vapours encountered in the subsurface during drilling and are used to aid in the assessment of the vertical and horizontal extent of volatile parameter contamination and the selection of soil samples for analysis.

The field screening measurements, in parts per million (ppm) isobutylene and hexane equivalents, are presented on the select borehole logs in Appendix B. It should be noted that field measurements are for screening purposes only and the presence/absence of contamination is determined by laboratory analysis.

Each sample was additionally examined for visual, textural, and olfactory classification at the time of sampling.

5.6 Analytical Testing

The contractual laboratory selected to perform the chemical analyses was AGAT, of Mississauga, ON. AGAT is an accredited laboratory under the Standards Council of Canada/Canadian Association of Laboratory Accreditation (Accredited Laboratory No. 1003200, respectively) in accordance with ISO/IEC 17025:2005 – "General Requirements for the Competence of Testing and Calibration Laboratories". Certificates of Analysis were received from AGAT reporting the results of all the chemical analyses performed on the submitted soil samples. Copies of the Certificates of Analysis are provided in Appendix C. Review of the Certificates of Analysis, prepared by AGAT, indicates that they were in compliance with the requirements set out under subsection 47(3) of O. Reg. 153/04.

The "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the *Environmental Protection Act*" (MECP, 2011) establishes criteria used in assessing the performance of analytical laboratories when the data are used in support of the filing of Records of Site Condition.

5.7 Residue Management Procedures

The residue materials produced during the drilling activities comprised of soil from the boreholes. As per the geotechnical investigation, all soil drilled was placed back into the boreholes. Additionally, as no assumed contaminated materials were observed during drilling, ex-situ containerization was not deemed to be warranted.

5.8 Quality Assurance and Quality Control Measures

Quality Control/Quality Assurance measures, as set out in the Sampling and Analysis Plan, were implemented during sample collection, storage and transport to provide accurate data representative of conditions in the surficial fill and upper overburden soils and the water table aquifer. The QA/QC measures included decontamination procedures to minimize the potential for sample cross contamination, the execution of standard operating procedures to collect representative and unbiased samples, the collection of quality control samples to evaluate sample precision and accuracy, and the implementation of measures to preserve sample integrity.

Decontamination protocols were followed during sample collection and handling to minimize the potential for cross-contamination. New disposable nitrile gloves were used for the handling and collection of samples from each soil interval.

Soil samples selected for chemical analyses were collected from the split spoon and placed directly into pre-cleaned, laboratory-supplied glass jars or vials. Sample volumes were consistent with analytical test group requirements as specified by the receiving laboratory.

Measures were followed to preserve sample integrity between collection and receipt by the contractual laboratory. All soil samples, immediately upon collection were placed in insulated coolers pre-chilled with ice for storage and transport to the contractual laboratory. Samples were received by the contractual laboratory within specific analytical test group holding time requirements.

Documentation procedures were followed to confirm sample identification and tracked sample movement. Each sample was assigned a unique identification ID number, which was recorded along with the date, time of sampling and requested analyses on labels affixed to the sampling containers, and in a bound field notebook. Chain of Custody protocols were followed to track sample handling and movement until receipt by the contractual laboratory. Field QA/QC samples were collected during the soil sampling. Duplicate samples were collected to evaluate sampling precision to evaluate the potential for sample cross-contamination during handling and transport.

Two (2) duplicate soil samples were collected during the Site investigation. The field duplicates are presented in Table I.

6 Review and Evaluation

6.1 Geology

The soil investigation conducted at the Project Area for the soil characterization consisted of the advancement of four (4) boreholes (BH-1 to BH-4) into the overburden materials. The boreholes were advanced to depths of approximately 4.7 m bgs. The borehole logs describing geologic details of the soil recovered during the Project Area drilling activities are presented in Appendix B.

The boreholes were advanced on the Project Area and encountered topsoil at each location, overlying a layer of reworked native silty sand (BH-1 only), followed by native silty clay which was underlain by shale bedrock extending to the borehole termination depths of 4.7 m bgs. Refer to borehole logs provided in Appendix B for details of soil stratigraphy.

6.1.1 Surface Material

Surficial topsoil was encountered at all boreholes and was noted to have a thickness of approximately 50 to 410 mm. It is noted that topsoil thicknesses may further vary across the Site.

6.1.2 Reworked Native Material

A 100 mm thick layer of reworked silty sand material was encountered below the surficial topsoil at BH-1. The silty sand is presumably reworked or disturbed native soil and contained a trace of gravel. The silty sand was brown in colour and in a moist state.

6.1.3 Native Material

Native silty clay was encountered below the topsoil and/or silty sand (reworked native material) at all borehole locations. The silty clay stratum likely consists of residual soil (completely weathered bedrock) and extended to the bedrock surface at depths ranging from approximately 1.5 to 3.8 m below grade. The silty clay contained a trace of sand and occasional rootlets; it was reddish brown and/or grey; and in a moist state.

6.1.4 Bedrock

Red shale bedrock of the Queenston Formation was encountered in all boreholes underlying the silty clay at depths ranging from approximately 1.5 to 3.8 m below grade. The bedrock extended to the maximum depth of the investigation at 4.7 m bgs.

6.2 Soil: Field Screening

TOV readings from each sample interval were measured for soil samples selected for BTEX/PHC analysis from all boreholes within the APECs where BTEX/PHCs were identified as COCs. Vapour concentrations readings collected during test pitting were measured using the RKI Eagle 2 in ppm calibrated with isobutylene and hexane or equivalent. The vapour readings, in hexane, are provided on the borehole logs in Appendix B.

Soil samples submitted for chemical analysis were selected on the basis of visual inspection of the recovered soil samples, TOV readings, sample location and/or depth interval. Both hexane and isobutylene readings indicate that there are insignificant volatile particles in the soil vapours.

6.3 Soil Quality

In accordance with the scope of work, chemical analyses were performed on selected soil samples recovered from various depth intervals across the boreholes. Copies of the laboratory Certificates of Analysis for the analyzed soil samples are provided in Appendix C. A summary of the analytical results for the soil samples, including the locations and depths of each sample, a

comparison of concentrations against applicable ESQS, and the identification of the potential contaminants of concern, are provided in Table 1.

6.3.1 Petroleum Hydrocarbons (PHCs) including BTEX

Five (5) soil samples, including one (1) field duplicate, were analyzed for PHCs and BTEX. PHCs and BTEX were not detected at the laboratory reportable detection limits (RDLs).

6.3.2 Metals (including Hydride Forming Metals)

Five (5) soil samples, including one (1) field duplicate, were analyzed for Metals including hydride-forming metals. Metals were not detected or were below the applicable Table 1 SCS and Table 7.1 ICC ESQS, with the exception of the following:

- Table 1 SCS: Boron in BH4 SS1 and field duplicate (DUP2,)

6.3.3 Volatile Organic Compounds (VOCs)

Two (2) soil samples were analyzed for VOCs. VOCs were not detected at the laboratory reportable detection limits (RDLs).

6.3.4 Organochlorine Pesticide (OCs)

Two (2) soil samples were analyzed for OCs. OCs were either not detected at the laboratory RDLs or detected below the applicable Table 1 SCS and Table 7.1 ICC ESQS.

6.3.5 Electrical Conductivity and Sodium Adsorption Ratio

Five (5) soil samples, including one (1) field duplicate, were analyzed for Electrical Conductivity and Sodium Adsorption Ratio (SAR). EC and SAR were detected below the applicable Table 1 SCS and Table 7.1 ICC ESQS.

6.3.6 pH

The Table 7.1 ESQS criteria are applicable if soil pH is in the range of 5 to 9 for surface soil (less than 1.5 m below soil surface) and 5 to 11 for subsurface soil (greater than 1.5 m below soil surface). The reported pH values for surface soils ranged between 7 and 7.21. The reported pH values for subsurface soils ranged between 7.21 and 7.3.

6.3.7 Synthetic Precipitation Leaching Procedure (SPLP)

Four (4) soil samples were analyzed for Synthetic Precipitation Leaching Procedure (SPLP). The results of the analysis together with the applicable Tables 1 and 7.1 Leachate Screening Levels (LSLs) are presented in Table II. SPLP were not detected or were detected below the applicable Table 7.1 LSL and Table 1 LSL.

6.3.8 Chemical Transformation and Soil Contaminant Source

Based on the results of the investigation, the Boron exceedance at BH-4 may attributed to the soil heterogeneity.

6.3.9 Evidence of Non-Aqueous Phase Liquid

Inspection of the soil cores retrieved from the boreholes did not indicate the presence of staining, non-aqueous phase liquid (NAPL), or sheen at the time of the in-situ soil characterization program.

6.4 Sediment Quality

As no surface water body was located on-Site, the in-situ soil characterization program did not include sediment sampling.

6.5 Quality Assurance and Quality Control Measures

Quality assurance and quality control measures were taken during the field activities to meet the objectives of the sampling and quality assurance plan to collect unbiased and representative samples to characterize existing conditions in the overburden and bedrock materials, and water table units at the Site.

Review of field activity documentation indicated that recommended sample volumes were collected from soil and groundwater for each analytical test group into appropriate containers and preserved with proper chemical reagents in accordance with the protocols set out in the Analytical Protocol. Samples were preserved at the required temperatures in pre-chilled insulated coolers and met applicable holding time requirements, when relinquished to the receiving laboratory.

Field QA/QC samples were collected during soil sampling. Two (2) field duplicate soil samples were collected to evaluate sampling precision. Refer to Table I for a summary of the QA/QC samples collected and submitted for chemical analysis.

The field duplicate sample results were quantitatively evaluated by calculating the relative percent difference (RPD). The RPD values for all parameters analyzed in soil ranged from 0% to 23%. Assessment of the duplicate soil sample showed that the results generally met analytical test group specific acceptance criteria. The overall assessment indicates that the soil and groundwater samples were collected with an acceptable level of precision, and the data is acceptable quality for meeting the objectives of the Soil In-Situ Characterization Report.

The laboratory reported detection limits (RDLs) met the Table 1 SCS and Table 7.1 ESQS.

The Analytical Protocol (MECP, 2011) establishes criteria used in assessing the performance of analytical laboratories when the data are used in support of the filing of Records of Site Condition.

The analytical program conducted by AGAT included analytical test group specific QA/QC measures to evaluate the accuracy and precision of the analytical results and the efficiency of analyte recovery during solute extraction procedures. The laboratory QA/QC program consisted of the preparation and analysis of laboratory duplicate samples to assess precision and sample homogeneity, method blanks to assess analytical bias, spiked blanks and QC standards to evaluate analyte recovery, matrix spikes to evaluate matrix interferences and surrogate compound recoveries (VOCs only) to evaluate extraction efficiency. The laboratory QA/QC results are presented in the Quality Assurance Report provided in the Certificate of Analysis prepared by AGAT. The QA/QC results are reported as percent recoveries for matrix spikes, spike blanks and QC standards, relative percent difference for laboratory duplicates and analyte concentrations for method blanks. The QA/QC results were assessed against test group control limits in the case of spiked blanks, matrix spikes and surrogate recoveries and alert criteria in the case of method blanks and laboratory duplicates. Review of the laboratory QA/QC results reported by AGAT indicated that they were within acceptable control limits or below applicable alert criteria for the sampled media and analytical test groups. Based on the assessment of the QA/QC, the analytical results reported are of acceptable quality and data qualifications are not required.

7 Conclusions

The results and findings of the in-situ soil characterization of excess soils conducted at the Project Area are summarized as follows:

- A total of four (4) boreholes, numbered BH to BH4, were advanced at the Project Area as shown on Figure 2. The boreholes were advanced to depths of approximately 4.7 metres below ground surface (m bgs).
- The boreholes were advanced on the Project Area and encountered topsoil at each location, overlying a 100 mm thick layer of reworked silty sand material at BH-1, followed by silty clay below the topsoil and/or silty sand (reworked native material at BH1) at all borehole locations. Red shale bedrock of the Queenston Formation was encountered in all boreholes underlying the silty clay at depths ranging from approximately 1.5 to 3.8 m below grade.
- Soil samples were submitted for the analysis of Petroleum Hydrocarbons (PHCs); Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); Metals (including hydride-forming metals), Volatile Organic Compounds (VOCs), Organochlorine Pesticide (OCs), Electrical Conductivity (EC), Sodium Adsorption Ratio (SAR), pH; and Synthetic Precipitation Leaching Procedure (SPLP).
- For assessment purposes, EXP selected the Ministry of Environment, Conservation and Parks (MECP) (2022) Table 1: Full Depth Background Site Condition Standards (SCS) for Residential / Parkland / Institutional / Industrial / Commercial / Community (RPIICC) Land Use – coarse and/or fine textured soil (Table 1 SCS) and Table 7.1: Full Depth Excess Soil Quality Standards for shallow soils in a Non-Potable Ground Water Condition for Industrial / Commercial / Community (ICC) Property Use (Table 7.1 ESQS) for comparison purposes.
- Five (5) soil samples, including one (1) field duplicate, were analyzed for PHCs and BTEX. PHCs and BTEX were not detected or were at the laboratory reportable detection limits (RDLs).
- Five (5) soil samples, including one (1) field duplicate, were analyzed for Metals including hydride-forming metals. Metals were not detected or were below the applicable Table 1 SCS and Table 7.1 ICC ESQS, with the exception of the following:
 - Table 1 SCS: Boron in BH4 SS1 and field duplicate (DUP2)
- Two (2) soil samples were analyzed for VOCs. VOC parameters were not detected at the laboratory reporting detection limits (RDLs).
- Two (2) soil samples were analyzed for OCs. OC parameters were either not detected at the laboratory RDLs or detected below the applicable Table 1 SCS and Table 7.1 ICC ESQS.
- Five (5) soil samples, including one (1) field duplicate, were analyzed for EC and SAR. EC and SAR were detected below the applicable Table 1 SCS and Table 7.1 ICC ESQS.
- The Table 7.1 ESQS criteria are applicable if soil pH is in the range of 5 to 9 for surface soil (less than 1.5 m below soil surface) and 5 to 11 for subsurface soil (greater than 1.5 m below soil surface). The reported pH values for surface soils ranged between 7 and 7.21. The reported pH values for subsurface soils ranged between 7.21 and 7.3.
- Four (4) soil samples were analyzed for SPLP. SPLPs were not detected at the laboratory RDLs or were detected below the applicable Leachate Screening Levels.
- No evidence of free product (i.e. visible film or sheen), odours, or staining was observed during soil sampling.

Based on the results of the investigation, all the tested parameters from the soil samples meet the Tables 1 SCS and Table 7.1 ICC ESQS, with the exception of boron at BH4 (Table 1 SCS only).

During construction activities, soils should be handled in the following manner:

- Soils generated from the Project Area may not be removed to a Table 1 SCS receiving site based on the presence of boron on BH4.
- When compared to the remaining standards, including Table 2.1 agricultural, the soil samples meet these standards. Therefore, soils can be removed to a receiving site accepting the following soils: Table 2.1 (agricultural, RPI, ICC), Table 3.1 (RPI, ICC)

*Soil Characterization Report
615 Barton Street, Stoney Creek, ON
HAM-23009539-A0
February 16, 2024*

8 General Limitations

The information presented in this report is based on a limited investigation designed to provide information to support an assessment of the current environmental conditions within the subject property. The conclusions and recommendations presented in this report reflect Site conditions existing at the time of the investigation.

More specific information with respect to the conditions between samples, or the lateral and vertical extent of materials may become apparent during excavation operations. The interpretation of the borehole information must, therefore, be validated during any such excavation operations. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent. Should this occur, EXP Services Inc. should be contacted to assess the situation, and the need for additional testing and reporting. EXP has qualified personnel to provide assistance in regard to any future geotechnical and environmental issues related to this property.

The environmental investigation was carried out to address the intent of applicable provincial Regulations, Guidelines, Policies, Standards, Protocols, and Objectives administered by the Ministry of the Environment and Climate Change. It should also be noted that current environmental Regulations, Guidelines, Policies, Standards, Protocols, and Objectives are subject to change, and such changes, when put into effect, could alter the conclusions and recommendations noted throughout this report. Achieving the study objectives stated in this report has required us to arrive at conclusions based upon the best information presently known to us. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing information obtained and in the formulation of the conclusions. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the engineering profession. It is intended that the outcome of this investigation assist in reducing the client's risk associated with environmental impairment. Our work should not be considered 'risk mitigation'. No other warranty or representation, either expressed or implied, is included or intended in this report.

This report was prepared for the exclusive use of **Croatian National Home c/o Grguric Architects Incorporated** and may not be reproduced in whole or in part, without the prior written consent of EXP, or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

*Soil Characterization Report
615 Barton Street, Stoney Creek, ON
HAM-23009539-A0
February 16, 2024*

9 Closure

We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

Yours truly,

EXP Services Inc.



Lauren Eldridge, B.A.
Project Manager
Environmental Services



Jennifer Hayman, P.Geo., QP^{ESA}
Discipline Lead, Excess Soils
Environmental Services

10 References

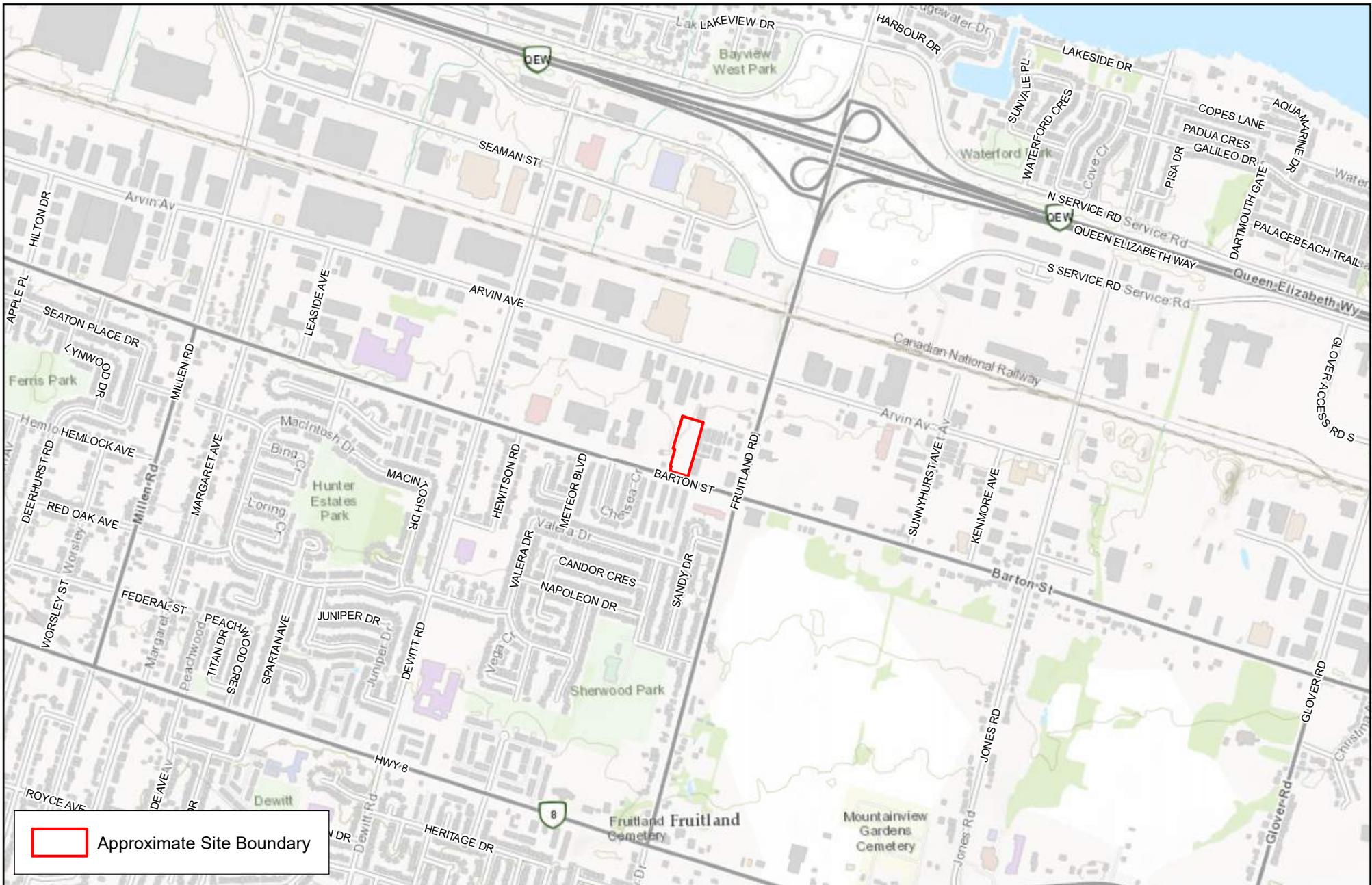
This study was conducted in general accordance with the applicable Regulations, Guidelines, Policies, Standards, Protocols, and Objectives administered by the Ministry of the Environment. Specific reference is made to the following:

- Canadian Standards Association [CSA] (2000) Z769-00, Phase II Environmental Site Assessment. Canadian Standards Association, March 2000.
- Environmental Protection Act, R.S.O. 1990, Chapter E.19, as amended, September 2004.
- Ministry of the Environment [MECP] (1996) Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario. Ontario Ministry of the Environment, December 1996.
- MECP (2011a) Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Ontario Ministry of the Environment, March 2004, amended as of July 1, 2011.
- MECP (2011) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. Ontario Ministry of the Environment, April 15, 2010.
- MECP (2022) Rules for Soil Management and Excess Soil Quality Standards. Ontario Ministry of the Environment, December 29, 2022
- Occupational Health and Safety Act - Ministry of Labour (MOL).
- Ontario Regulation 153/04, made under the Environmental Protection Act, May 2004, as amended.
- Ontario Regulation 406/19, made under the Environmental Protection Act, December 2019, as amended
- Ontario Water Resources Act – R.R.O. 1990, Regulation 903, amended.
- Ontario Geological Survey (2010a) Physiography of Southern Ontario (Scale 1:22,000).
- Topographic Map available at the Natural Resources Canada (NRC) website <http://atlas.nrcan.gc.ca/site/english/maps/topo/map>
- Ontario Geological Survey (2010b) Surficial geology of Southern Ontario (Scale 1:22,000).
- Ontario Geological Survey (2011) Bedrock geology of Ontario (Scale 1:22,000).
- 615 Barton Street, Stoney Creek, ON - Geotechnical Investigation Report. EXP Services Inc. January 17, 2024.

EXP Services Inc.

Soil Characterization Report
615 Barton Street, Stoney Creek, ON
HAM-23009539-A0
February 16, 2024

Figures

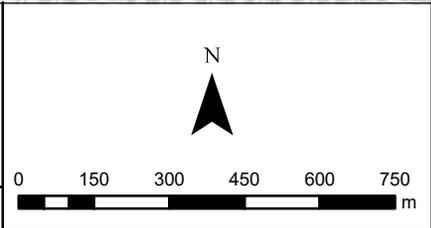


 Approximate Site Boundary

EXP Services Inc.
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 Canada
 www.exp.com



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TITLE AND LOCATION:
SITE LOCATION PLAN
 Soil Characterization Program
 615 Barton Street
 Stoney Creek, Ontario

PROJECT No: HAM-23009539-A0	OWN: AC
SCALE: AS NOTED	CHKD: JH
DATE: FEBRUARY 2024	FIG. No.: 1



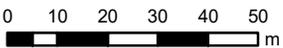
 Borehole
 Approximate Site Boundary

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TITLE AND LOCATION:

BOREHOLE LOCATION PLAN
 Soil Characterization Program
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PROJECT No:	HAM-23009539-A0	OWN:	AC
SCALE:	AS NOTED	CHKD:	JH
DATE:	FEBRUARY 2024	FIG. No.:	2

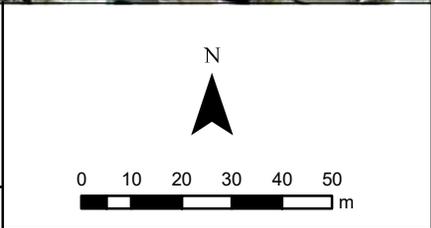


● Soil Sample Meets Applicable SCS and ESQS for PHCs
 □ Approximate Site Boundary

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TITLE AND LOCATION:
**SOIL ANALYTICAL RESULTS -
 PETROLEUM HYDROCARBONS (PHCS)
 INCLUDING BTEX**
 Soil Characterization Program
 615 Barton Street
 Stoney Creek, Ontario

PROJECT No:	HAM-23009539-A0	OWN:	AC
SCALE:	AS NOTED	CHKD:	JH
DATE:	FEBRUARY 2024	FIG. No.:	3



● Soil Sample Meets Applicable SCS and ESQS for VOCs

□ Approximate Site Boundary

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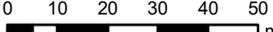


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TITLE AND LOCATION:
**SOIL ANALYTICAL RESULTS -
 VOLATILE ORGANIC COMPOUNDS (VOCs)**
 Soil Characterization Program
 615 Barton Street
 Stoney Creek, Ontario

PROJECT No:	HAM-23009539-A0	OWN:	AC
SCALE:	AS NOTED	CHKD:	JH
DATE:	FEBRUARY 2024	FIG. No.:	4

BH-4	Field Duplicate	
	BH-4 SS1	BH-4 SS1 DUP 2
	29-Nov-23	29-Nov-23
Boron (Total)	43	72

Sample Location	Sample ID	
	Sample Date	
Parameter	Sample Depth (m bgs)	
	Sample Concentration (µg/g)	
Parameter	O.Reg. 153/04 Table 1 SCS RPIICC	Ont. Reg. 406/19 Table 7.1 ESQS ICC
	Concentration (µg/g)	
Boron (Total)	36	120

- Soil Sample Exceeds Applicable SCS and/or ESQS for Metals
- Soil Sample Meets Applicable SCS and ESQS for Metals
- Approximate Site Boundary

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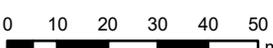


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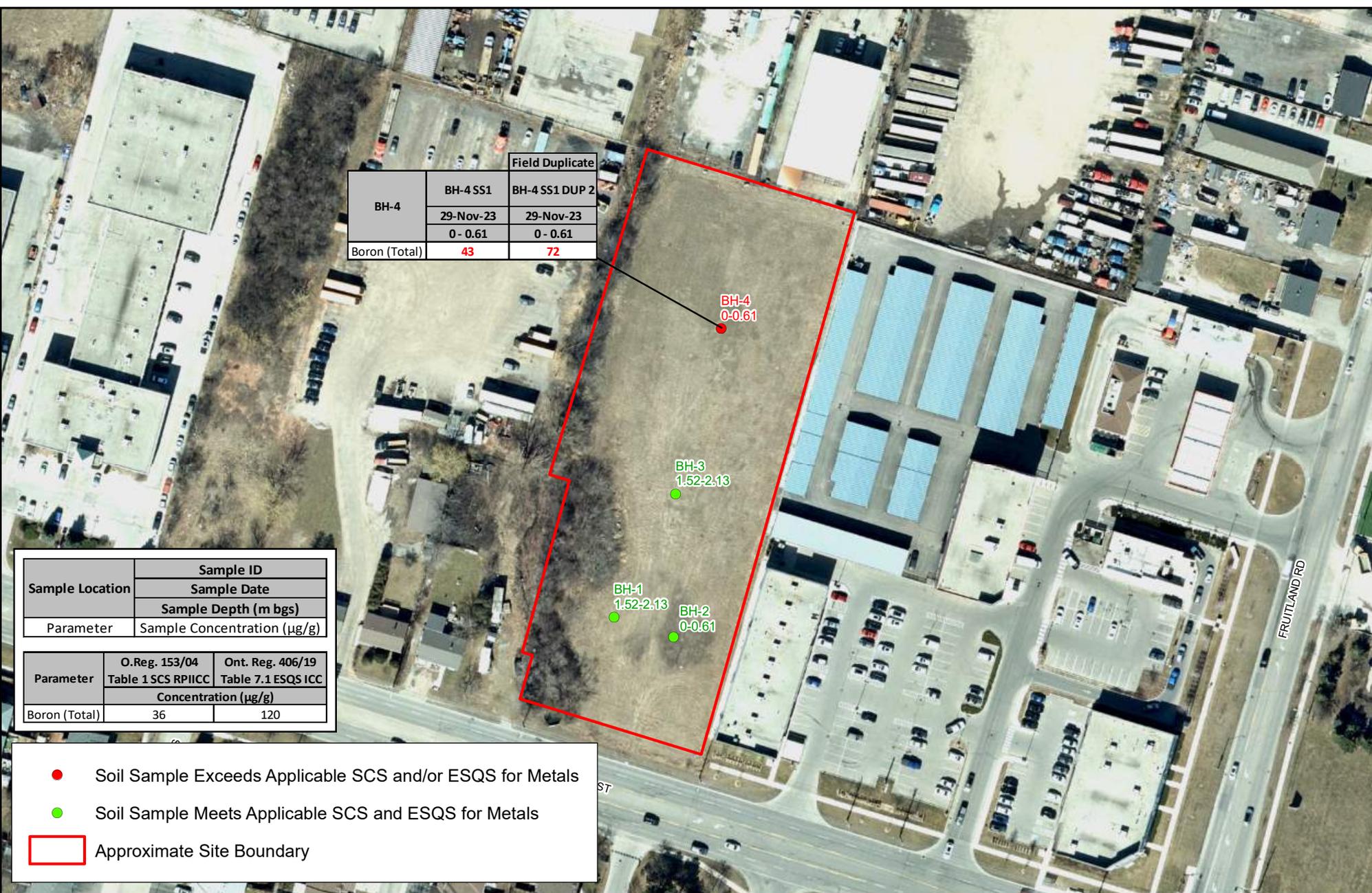


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TITLE AND LOCATION:
**SOIL ANALYTICAL RESULTS -
METALS INCLUDING HYDRIDE-FORMING METALS**
Soil Characterization Program
615 Barton Street
Stoney Creek, Ontario

PROJECT No:	HAM-23009539-A0	OWN:	AC
SCALE:	AS NOTED	CHKD:	JH
DATE:	FEBRUARY 2024	FIG. No.:	5



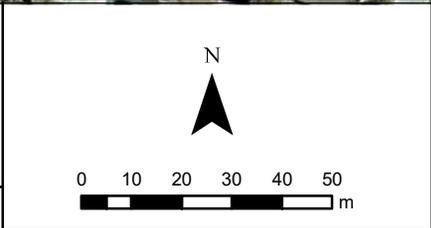


● Soil Sample Meets Applicable SCS and ESQS for EC and SAR
 Approximate Site Boundary

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TITLE AND LOCATION:
**SOIL ANALYTICAL RESULTS -
 ELECTRICAL CONDUCTIVITY (EC) AND
 SODIUM ADSORPTION RATIO (SAR)**
 Soil Characterization Program
 615 Barton Street
 Stoney Creek, Ontario

PROJECT No:	HAM-23009539-A0	OWN:	AC
SCALE:	AS NOTED	CHKD:	JH
DATE:	FEBRUARY 2024	FIG. No.:	6



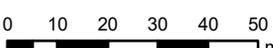
● Soil Sample Meets Applicable SCS and ESQS for OCPs
 Approximate Site Boundary

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TITLE AND LOCATION:
**SOIL ANALYTICAL RESULTS -
 ORGANOCHLORINE PESTICIDES (OCPs)**
 Soil Characterization Program
 615 Barton Street
 Stoney Creek, Ontario

PROJECT No:	HAM-23009539-A0	OWN:	AC
SCALE:	AS NOTED	CHKD:	JH
DATE:	FEBRUARY 2024	FIG. No.:	7

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Soil Characterization Report
615 Barton Street, Stoney Creek, ON
HAM-23009539-A0
February 16, 2024

Tables

TABLE I: SOIL ANALYTICAL RESULTS - Bulk Soil

Soil Characterization Report

615 Barton Street, Stoney Creek, Ontario

HAM-23009539-A0

Location ID	Sample ID	Lab ID	Sampling Date	Soil Sample Depth (m)	Consultant	Laboratory	Certificate of Analysis Number	BH-1		BH-2			BH-3		BH-4	
								BH1-SS1	BH1-SS3	BH-2 SS1	BH-2 SS3	DUP 1	BH-3 SS1	BH3-SS3	BH4-SS1	DUP 2
MECP (2011) Table 1: Full Depth Background SCS RPIICC Land Use (coarse and/or fine textured soil)	MECP (2022) Table 7.1: Full Depth ESQS for Shallow Soils in a Non- Potable Groundwater Condition ICC Property Use	RDL*	5506155	5506209	5506216	5506222	5506226	5506229	5506245	5506247	5506262	5506264				
			29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23				
			0 - 0.61	1.52 - 2.13	0 - 0.61	1.52 - 2.13	Field Duplicate of BH-2 SS3	0 - 0.61	1.52 - 2.13	0 - 0.61	Field Duplicate of BH-4 SS3	0.76 - 1.37				
			EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP				
			AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT				
			23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326				
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)																
Benzene	0.02	0.02	0.02	<0.02	-	-	<0.02	<0.02	<0.02	-	-	<0.02				
Toluene	0.2	0.88	0.05	<0.05	-	-	<0.05	<0.05	<0.05	-	-	<0.05				
Ethylbenzene	0.05	0.6	0.05	<0.05	-	-	<0.05	<0.05	<0.05	-	-	<0.05				
m-Xylene + p-Xylene	NV	NV	0.05	<0.05	-	-	<0.05	<0.05	<0.05	-	-	<0.05				
o-Xylene	NV	NV	0.05	<0.05	-	-	<0.05	<0.05	<0.05	-	-	<0.05				
Xylenes (Total)	0.05	0.12	0.05	<0.05	-	-	<0.05	<0.05	<0.05	-	-	<0.05				
Petroleum Hydrocarbons (PHCs)																
PHC F1 (C6-C10)	25	NV	5	<5	-	-	<5	<5	<5	-	-	<5				
PHC F1 (C6-C10) - BTEX	25	25	5	<5	-	-	<5	<5	<5	-	-	<5				
PHC F2 (C10-C16)	10	10	10	<10	-	-	<10	<10	<10	-	-	<10				
PHC F3 (C16-C34)	240	1700	50	<50	-	-	<50	<50	<50	-	-	<50				
PHC F4 (C34-C50)	120	3300	50	<50	-	-	<50	<50	<50	-	-	<50				
Volatile Organic Compounds (VOCs)																
Acetone	0.5	1.8	0.5	-	-	-	<0.50	-	-	-	-	-				
Benzene	0.02	0.02	0.02	-	-	-	<0.02	-	-	-	-	-				
Bromodichloromethane	0.05	5.8	0.05	-	-	-	<0.05	-	-	-	-	-				
Bromoform	0.05	2.5	0.05	-	-	-	<0.05	-	-	-	-	-				
Bromomethane	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-				
Carbon Tetrachloride	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-				
Chlorobenzene	0.05	0.28	0.05	-	-	-	<0.05	-	-	-	-	-				
Chloroform	0.05	0.05	0.04	-	-	-	<0.04	-	-	-	-	-				
Dibromochloromethane	0.05	5.5	0.05	-	-	-	<0.05	-	-	-	-	-				
1,2-Dichlorobenzene	0.05	0.69	0.05	-	-	-	<0.05	-	-	-	-	-				
1,3-Dichlorobenzene	0.05	6.8	0.05	-	-	-	<0.05	-	-	-	-	-				
1,4-Dichlorobenzene	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-				
Dichlorodifluoromethane	0.05	1.8	0.05	-	-	-	<0.05	-	-	-	-	-				
1,1-Dichloroethane	0.05	2.3	0.02	-	-	-	<0.02	-	-	-	-	-				
1,2-Dichloroethane	0.05	0.05	0.03	-	-	-	<0.03	-	-	-	-	-				
1,1-Dichloroethylene	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-				
cis-1,2-Dichloroethylene	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-				
trans-1,2-Dichloroethylene	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-				
1,2-Dichloropropane	0.05	0.05	0.03	-	-	-	<0.03	-	-	-	-	-				
cis-1,3-Dichloropropene	0.05	0.088	0.05	-	-	-	<0.05	-	-	-	-	-				
trans-1,3-Dichloropropene	0.05	0.5	0.05	-	-	-	<0.05	-	-	-	-	-				
Ethylbenzene	0.05	0.6	0.05	-	-	-	<0.05	-	-	-	-	-				
Ethylene Dibromide (1,2-Dibromoethane)	0.05	0.05	0.04	-	-	-	<0.04	-	-	-	-	-				
Hexane (n)	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-				
Methylene chloride (Dichloromethane)	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-				
Methyl ethyl ketone (2-Butanone)	0.5	2.3	0.5	-	-	-	<0.50	-	-	-	-	-				
Methyl Isobutyl Ketone	0.5	0.93	0.5	-	-	-	<0.50	-	-	-	-	-				

TABLE I: SOIL ANALYTICAL RESULTS - Bulk Soil

Soil Characterization Report

615 Barton Street, Stoney Creek, Ontario

HAM-23009539-A0

Location ID	MECP (2011) Table 1: Full Depth Background SCS RPIICC Land Use (coarse and/or fine textured soil)	MECP (2022) Table 7.1: Full Depth ESQS for Shallow Soils in a Non- Potable Groundwater Condition ICC Property Use	RDL*	BH-1		BH-2			BH-3		BH-4		
				BH1-SS1	BH1-SS3	BH-2 SS1	BH-2 SS3	DUP 1	BH-3 SS1	BH3-SS3	BH4-SS1	DUP 2	BH-4 SS2
Sample ID				5506155	5506209	5506216	5506222	5506226	5506229	5506245	5506247	5506262	5506264
Lab ID				29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23
Sampling Date				0 - 0.61	1.52 - 2.13	0 - 0.61	1.52 - 2.13	Field Duplicate of BH-2 SS3	0 - 0.61	1.52 - 2.13	0 - 0.61	Field Duplicate of BH-4 SS3	0.76 - 1.37
Soil Sample Depth (m)				EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Consultant				AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT
Laboratory				23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326
Certificate of Analysis Number													
Methyl t-butyl ether (MTBE)	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-	-
Styrene	0.05	0.23	0.05	-	-	-	<0.05	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	0.05	0.05	0.04	-	-	-	<0.04	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-	-
Tetrachloroethylene	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-	-
Toluene	0.2	0.88	0.05	-	-	-	<0.05	-	-	-	-	-	-
1,1,1-Trichloroethane	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-	-
1,1,2-Trichloroethane	0.05	0.05	0.04	-	-	-	<0.04	-	-	-	-	-	-
Trichloroethylene	0.05	0.05	0.03	-	-	-	<0.03	-	-	-	-	-	-
Trichlorofluoromethane	0.25	0.46	0.05	-	-	-	<0.05	-	-	-	-	-	-
Vinyl Chloride	0.02	0.02	0.02	-	-	-	<0.02	-	-	-	-	-	-
1,3-Dichloropropene	0.05	0.05	0.05	-	-	-	<0.05	-	-	-	-	-	-
Organochlorine Pesticides (OCPs)													
Aldrin	0.05	0.088	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Chlordane (alpha)	NV	NV	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Chlordane (gamma)	NV	NV	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Chlordane (Total)	0.05	0.05	0.007	<0.007	-	<0.007	-	-	<0.007	-	<0.007	-	-
o,p DDD	NV	NV	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
p,p-DDD	NV	NV	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
DDD (Total)	0.05	0.55	0.007	<0.007	-	<0.007	-	-	<0.007	-	<0.007	-	-
o,p DDE	NV	NV	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
p,p-DDE	NV	NV	0.005	<0.005	-	<0.005	-	-	0.025	-	0.047	-	-
DDE (Total)	0.05	0.52	0.007	<0.007	-	<0.007	-	-	0.025	-	0.047	-	-
op-DDT	NV	NV	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
pp-DDT	NV	NV	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
DDT (Total)	1.4	1.4	0.007	<0.007	-	<0.007	-	-	<0.007	-	<0.007	-	-
Dieldrin	0.05	0.088	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Endosulfan I	NV	NV	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Endosulfan II	NV	NV	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Endosulfan	0.04	0.04	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Endrin	0.04	0.04	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Heptachlor	0.05	0.05	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Heptachlor Epoxide	0.05	0.05	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Hexachlorobenzene	0.01	0.66	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Hexachlorobutadiene	0.01	0.01	<0.01	<0.01	-	<0.01	-	-	<0.01	-	<0.01	-	-
Hexachloroethane	0.01	0.01	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-
Methoxychlor	0.05	0.05	0.005	<0.005	-	<0.005	-	-	<0.005	-	<0.005	-	-

TABLE I: SOIL ANALYTICAL RESULTS - Bulk Soil

Soil Characterization Report

615 Barton Street, Stoney Creek, Ontario

HAM-23009539-A0

Location ID	Sample ID	Lab ID	Sampling Date	Soil Sample Depth (m)	Consultant	Laboratory	Certificate of Analysis Number	BH-1		BH-2			BH-3		BH-4		
								BH1-SS1	BH1-SS3	BH-2 SS1	BH-2 SS3	DUP 1	BH-3 SS1	BH3-SS3	BH4-SS1	DUP 2	BH-4 SS2
								5506155	5506209	5506216	5506222	5506226	5506229	5506245	5506247	5506262	5506264
								29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23
								0 - 0.61	1.52 - 2.13	0 - 0.61	1.52 - 2.13	Field Duplicate of BH-2 SS3	0 - 0.61	1.52 - 2.13	0 - 0.61	Field Duplicate of BH-4 SS3	0.76 - 1.37
								EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
								AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT
								23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326	23H099326
Metals																	
Barium	220	670	2	-	178	58	-	-	-	85.2	99.5	127	-				
Beryllium	2.5	8	0.5	-	1	0.9	-	-	-	1	1.2	1.1	-				
Boron (Total)	36	120	5	-	25	19	-	-	-	36	43	72	-				
Cadmium	1.2	1.9	0.5	-	<0.5	<0.5	-	-	-	<0.5	<0.5	<0.5	-				
Chromium (total)	70	160	5	-	26	20	-	-	-	29	30	30	-				
Cobalt	21	80	0.8	-	15.7	12.4	-	-	-	16.4	16.2	16.7	-				
Copper	92	230	1	-	8.4	6.9	-	-	-	8.9	9.7	9.2	-				
Lead	120	120	1	-	8	9	-	-	-	7	20	35	-				
Molybdenum	2	40	0.5	-	0.7	<0.5	-	-	-	1.1	0.8	0.6	-				
Nickel	82	270	1	-	32	25	-	-	-	34	35	37	-				
Silver	0.5	40	0.5	-	<0.5	<0.5	-	-	-	<0.5	<0.5	<0.5	-				
Thallium	1	3.3	0.5	-	<0.5	<0.5	-	-	-	<0.5	<0.5	<0.5	-				
Uranium	2.5	33	0.5	-	0.53	0.67	-	-	-	0.98	0.84	1.07	-				
Vanadium	86	86	2	-	28.4	42.8	-	-	-	31.2	33.2	29.8	-				
Zinc	290	340	5	-	68	62	-	-	-	73	87	104	-				
Hydride-Forming Metals																	
Antimony	1.3	40	0.8	-	<0.8	<0.8	-	-	-	<0.8	<0.8	<0.8	-				
Arsenic	18	18	1	-	4	3	-	-	-	5	6	6	-				
Selenium	1.5	5.5	0.8	-	<0.8	<0.8	-	-	-	<0.8	<0.8	<0.8	-				
Other Regulated Parameters (ORPs)																	
Electrical Conductivity (mS/cm)	0.57	1.4	0.005	-	0.149	0.144	-	-	-	0.195	0.174	0.17	-				
Sodium Adsorption Ratio (unitless)	2.4	12	NA	-	0.552	0.332	-	-	-	0.416	0.377	0.241	-				
pH (pH Units)	5-9 (surface soil); 5-11 (subsurface soil)	5-9 (surface soil); 5-11 (subsurface soil)	NA	-	7.17	7.21	-	-	-	7.3	7	7.09	-				

All soil concentrations reported in µg/g unless otherwise indicated.

RDL = Reporting Detection Limit

* Maximum RDL below MECP (2011) SCS

'<' = Parameter below detection limit, as indicated

'NV' = No value

NA = Not applicable or not analyzed

Bold Concentration exceeds applicable MECP (2011) Table 1 SCS.

Bold Concentration exceeds applicable MECP (2011) Table 1 SCS and Table 3.1 ESQS.

TABLE II: SOIL ANALYTICAL RESULTS - Synthetic Precipitation Leaching Procedure (SPLP)

HAM-23009539-A0

615 Barton Street, Stoney Creek, Ontario

Sample ID	MECP (2022) Table 2.1: LSL for Full Depth Excess Soil in a Potable Ground Water Condition ICC Property Use	MECP (2022) Table 3.1: LSL for Full Depth Excess Soil in a Non-Potable Ground Water Condition ICC Property Use	RDL*	SPLP1	SPLP2	SPLP3	SPLP 4
Lab ID				5506211	5506212	5506213	5506214
Sampling Date				29-Nov-23	29-Nov-23	29-Nov-23	29-Nov-23
Consultant				EXP	EXP	EXP	EXP
Laboratory				AGAT	AGAT	AGAT	AGAT
Certificate of Analysis Number				23H099395	23H099395	23H099395	23H099395
SPLP Metals							
Antimony Leachate	6	NV	0.5	<0.6	<0.6	<0.6	<0.6
Arsenic Leachate	NV	NV	0.2	<5	<5	<5	<5
Barium Leachate	1000	4600	0.2	<100	<100	<100	<100
Beryllium Leachate	4	11	0.5	<0.8	<0.8	<0.8	<0.8
Boron (Total) Leachate	5000	NV	0.1	<500	<500	<500	<500
Cadmium Leachate	NV	NV	0.05	<0.20	<0.20	<0.20	<0.20
Chromium (Total) Leachate	50	130	0.1	<10	<10	<10	<10
Cobalt Leachate	3.8	10	0.5	<0.3	<0.3	<0.3	<0.3
Copper Leachate	14	14	1	<6.9	<6.9	<6.9	<6.9
Lead Leachate	NV	NV	0.1	<1.0	<1.0	<1.0	<1.0
Molybdenum Leachate	23	NV	1	<1.5	1.5	2.1	<1.5
Nickel Leachate	78	78	1	<10	<10	<10	<10
Selenium Leachate	10	10	0.1	<5.0	<5.0	<5.0	<5.0
Silver Leachate	0.3	0.3	0.01	<0.10	<0.10	<0.10	<0.10
Thallium Leachate	2	NV	0.05	<0.5	<0.5	<0.5	<0.5
Uranium Leachate	20	66	0.1	<2	<2	<2	<2
Vanadium Leachate	NV	NV	1	1.3	<0.9	1.4	1.8
Zinc Leachate	180	180	5	<20	<20	<20	<20

All soil concentrations reported in µg/L.

RDL = Reporting Detection Limit

* Maximum RDL below MECP (2011) SCS

'<' = Parameter below detection limit, as indicated

'NV' = No value

NA = Not applicable or not analyzed

Red Concentration exceeds MECP (2022) Table 1 LSL.

Orange Concentration exceeds MECP (2022) Table 1 LSL and Table 3.1 LSL.

EXP Services Inc.

Soil Characterization Report
615 Barton Street, Stoney Creek, ON
HAM-23009539-A0
February 16, 2024

Appendix A – Sampling and Analysis Plan



Sampling and Analysis Plan

1. Introduction

The Sampling and Analysis Plan (SAAP) that was developed in support of Ontario Regulation (O.Reg.) 406/19 On-Site and Excess Soil Management made under the Environmental Protection Act, R.S.O 1990, c. E.19, for the subject land consisting of a parcel of land located within the northern corner of the property located at 615 Barton Street, Stoney Creek, Ontario (hereinafter referred to as the 'Project Area'). An in-situ soil characterization of excess soil program will be conducted to provide further characterization of the Site's surface and subsurface conditions prior to soil movement activities during construction. The SAAP presents the procedures and measures that will be undertaken during field investigative activities to characterize the Site conditions and meet the data quality objectives of the In-situ soil characterization of excess soil.

The SAP presents the sampling program proposed for the Site, the recommended procedures and protocols for sampling and related field activities, the data quality objectives, and the quality assurance/ quality control measures that will be undertaken to provide for the collection of accurate, reproducible and representative data.

2. Field Sampling Program

The field sampling program was developed in conjunction with the requirements set out in O. Reg 406/19 to advance four (4) boreholes across the Project Area. It is noted that, soil from selected boreholes will be submitted for analysis. A total of five (5) soil samples (including plus samples) will be submitted for analysis, which corresponds to a due diligence characterization volume of 2,500 m³ of soil.

The field sampling program was developed to provide for the collection of samples of the surficial and subsurface soil materials for chemical analysis of one or more of: Petroleum Hydrocarbons (PHCs) including Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), Metals (including hydride-forming metals), electrical conductivity (EC), sodium absorption ratio (SAR), organochlorine (OCPs), and Synthetic Precipitation Leaching Procedure (SPLP) in soil. The soil sampling media consists of the surface soils and upper overburden materials (depths up to 4.7 m below grade). The soil sampling will be location-specific to assess for the potential presence of COCs based on the identification of areas of potential environmental concern (APECs). Vapour readings will also be collected in the field to determine if samples are to be submitted for BTEX and PHC F1-F2 analysis.

Vertical control of the boreholes will be obtained through the completion of an elevation survey with surveyed relative to an arbitrary benchmark. Groundwater flow and direction in the water table aquifer will also be determined through groundwater level measurements and the elevations established from the Site elevation survey.

3. Field Methods

To meet the requirements of the field sampling program, the following field investigative methods will be undertaken:

- Borehole drilling; and,
- Soil Sampling;

The field investigative methods will be performed following the procedures and protocols set out in EXP's standard operating procedures and are outlined below.

3.1 Borehole Drilling

Boreholes will be advanced at the Site to facilitate the collection of soil samples for chemical analysis and geologic characterization. A total of four (4) boreholes are proposed to be advanced at the Project Area for the in-situ soil characterization of excess soil. Boreholes will be advanced up to a maximum depth of approximately 4.7 m below grade for the collection of surface and subsurface soil beneath the Site. The borehole location will be selected to determine the presence or absence of impacts in the soils.

Prior to drilling, utility clearances will be obtained from public and private locators, as required. If any uncertainty regarding the location of a buried utility at a test pit location is encountered, hand augering or digging will be performed beforehand to confirm the location of the utility.

Where there is overlying asphalt or concrete, the overlying material will be mechanically cored to provide access to the underlying soil materials. The boreholes will be drilled a licensed operator under the oversight of EXP field staff.

3.2 Soil Sampling

The soil samples will be collected using 5 cm diameter, 61 cm long, split spoons and solid stem augers or a 5 cm diameter, 1.2 m long, dual tube sampling system with interior dedicated vinyl sampling tubes. Upon retrieval from the boreholes, the split spoons or vinyl sampling tubes will be placed on a flat surface and disassembled by drilling personnel to provide access of the recovered cores. Geologic and sampling details of the recovered cores will be logged, and the samples will be assessed for the potential presence of non-aqueous phase liquids. Soil stratigraphy encountered in the boreholes will be texturally, visually and olfactory classified in the field and in the laboratory. Soil samples will be logged for colour, grain size, moisture content, density, structures, texture, staining, and field vapour readings. A Photo-ionization Detector (PID) or Gastechtor™ will be utilized to screen the soil samples for Total Organic Vapour (TOV). Representative worst-case soil samples from each borehole will be collected and submitted to a certified laboratory for analysis based on TOV readings, sample depth, visual and/or olfactory field observations.

Recommended volumes of soil samples selected for chemical analysis will be collected into pre-cleaned laboratory-supplied glass sample jars/vials identified for the specified analytical test group. Samples intended for PHC/BTEX and VOCs will be collected using a laboratory-supplied soil core sampler, placed into the vials containing methanol for preservation purposes and sealed using Teflon lined septa lids. The samples will be placed into clean insulated coolers chilled with ice for storage and transport. The samples will be assigned unique identification numbers, and the date, time, location, and requested analyses for each sample will be documented in a bound field note-book. The samples will be submitted to the contractual laboratory within analytical test group holding times under Chain of Custody protocols. New disposable chemical resistant gloves will be used for each soil core to prevent sample cross-contamination.

3.6 Elevation Survey

An elevation survey will be conducted with the purpose of obtaining relative vertical control of the borehole locations.

4. Field Quality Assurance/Quality Control Program

The objective of the field quality assurance/quality control (QA/QC) program is to obtain soil samples and other field measurements that provide data of acceptable quality that meets the objectives of the in-situ soil characterization of excess soil. The objectives of the QA/QC program will be achieved through the implementation of procedures for the collection of unbiased (i.e. non-contaminated) samples, sample documentation and the collection of appropriate QC samples to provide a measure of sample reproducibility and accuracy. The field QA/QC measures will comprise:

- Decontamination Protocols;
- Equipment Calibration;
- Sample Preservation;
- Sample Documentation; and,
- Field Quality Control Samples.

Details on the field QA/QC measures are provided below.

4.1 Decontamination Protocols

Decontamination protocols will be followed during field sampling where non-dedicated sampling equipment is used to prevent sample cross contamination. For the borehole drilling and soil sampling, soil sampling devices will be cleaned/decontaminated between sampling intervals and auger flights between borehole locations in accordance with SOP requirements. For the monitoring well installation, well components are not to come into contact with the ground surface prior to insertion into boreholes. Electronic water level meters will be decontaminated between monitoring well locations during well development and purging activities. For hydraulic conductivity tests, the electronic water level meters will be decontaminated between sampling locations. All decontamination fluids will be collected and stored in sealed, labeled containers.

4.2 Equipment Calibration

All equipment requiring calibration will be calibrated in the field according to manufacturer's requirements using analytical grade reagents, or by the supplier prior to conducting field activities, and subsequently checked in the field. The calibration of all pre-calibrated instruments will be checked in the field using analytical grade reagents and re-calibrated as required. For multiple day sampling events, equipment calibration will be checked prior to the beginning of sampling activities. All calibration data will be documented in a bound hard cover notebook.

4.3 Sample Preservation

All samples will be preserved using appropriate analytical test group specific reagents, as required, and upon collection placed in pre-chilled insulated coolers packed with ice for storage and transport.

4.4 Sample Documentation

All samples will be assigned a unique identification number, which is to be recorded along with the date, time, project number, company name, location and requested analysis in a bound field notebook. All samples will be handled and transported following COC protocols.

4.5 Field Quality Control

Field quality control samples will be collected to evaluate the accuracy and reproducibility of the field sampling procedures. For soil sampling, one (1) field duplicate is to be collected for every ten (10) samples submitted for chemical analysis. The field duplicate samples will be assessed by calculating the relative percent difference and comparing to the analytical test group specific acceptance criteria.

Sampling and Analysis Plan

HAM-23009539-A0 - Soil Characterization

615 Barton Street, Stoney Creek, ON

ID	Total Depth (mbgs)	Media	Lab Analysis							Rationale	Notes
			VOC	PHC F1 to F4 / BTEX	ICPMS Metals	pH	EC, SAR	OCPs	SPLP		
BH-1	5	Soil	1	1	1	1	1	1	1	Assessment of on-site APEC	Collect 1 sample for PHCs, BTEX, OCPs in upper materials above 1.5 m. Collect 1 sample for VOCs, metals, EC, SAR at either a) water table b) area of odours, elevated readings or staining.
BH-2	5	Soil	1	2	1	1	1	1	1	Assessment of on-site APEC	Collect 1 sample for metals, EC, SAR, OCPs in upper materials above 1.5 m. Collect 1 sample for VOCs, PHCs and BTEX at either a) water table b) area of odours, elevated readings or staining. Collect duplicate sample for BTEX, PHCs.
BH-3	5	Soil		1	1	1	1	1		For hydrogeological purposes only.	Collect 1 sample for PHCs, BTEX, OCPs in upper materials above 1.5 m. Collect 1 sample for VOCs, metals, EC, SAR at either a) water table b) area of odours, elevated readings or staining.
BH-4	3	Soil		1	1	1	1	1		Assessment of on-site APEC	Collect 1 sample for metals, EC, SAR, OCPs in upper materials above 1.5 m. Collect 1 sample for VOCs, PHCs and BTEX at either a) water table b) area of odours, elevated readings or staining.
Leachate	NA	Soil							4	Waste disposal purposes	Collect SPLP samples at the same location as metals. Do not composite samples
Duplicate	NA	Soil			1	1	1			QA/QC	Collect duplicate samples as indicated

Notes:

QA/QC note: if there is not enough sample at proposed interval, use alternative borehole for duplicate collection



(3 m) BH-4

(5 m) BH-3

615 Barton St

(5 m) BH-1

(5 m) BH-2

455

Barton St

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Google Earth

EXP Services Inc.

Soil Characterization Report
615 Barton Street, Stoney Creek, ON
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Appendix B – Borehole Logs

Log of Borehole BH-1

Project No. HAM-23009539-A0

Drawing No. 1

Project: Soil Characterization Report

Sheet No. 1 of 1

Location: 615 Barton Street, Stoney Creek, ON

Refer to Borehole Location Plan.

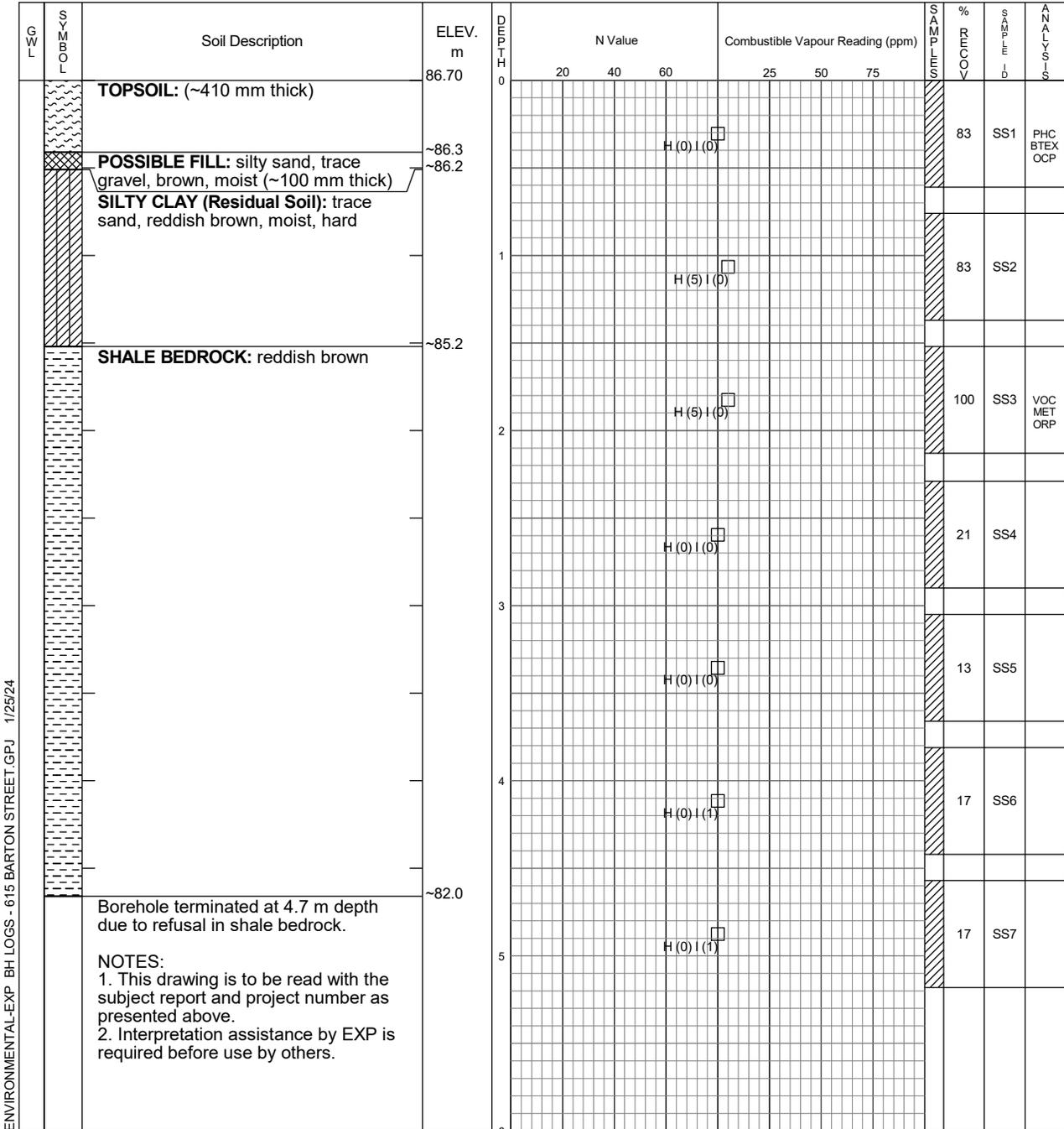
Date Drilled: November 29, 2023

Drill Type: D-50 Track Mount. Solid Stem.

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



ENVIRONMENTAL-EXP BH LOGS - 615 BARTON STREET GPJ 1/25/24



EXP Services Inc.
 Brampton, Ontario
 Telephone: 905-793-9800
 Facsimile: 905-793-0641

Time	Water Level (m)	Depth to Cave (m)
on completion	dry	open

Log of Borehole BH-2

Project No. HAM-23009539-A0

Drawing No. 2

Project: Soil Characterization Report

Sheet No. 1 of 1

Location: 615 Barton Street, Stoney Creek, ON

Refer to Borehole Location Plan.

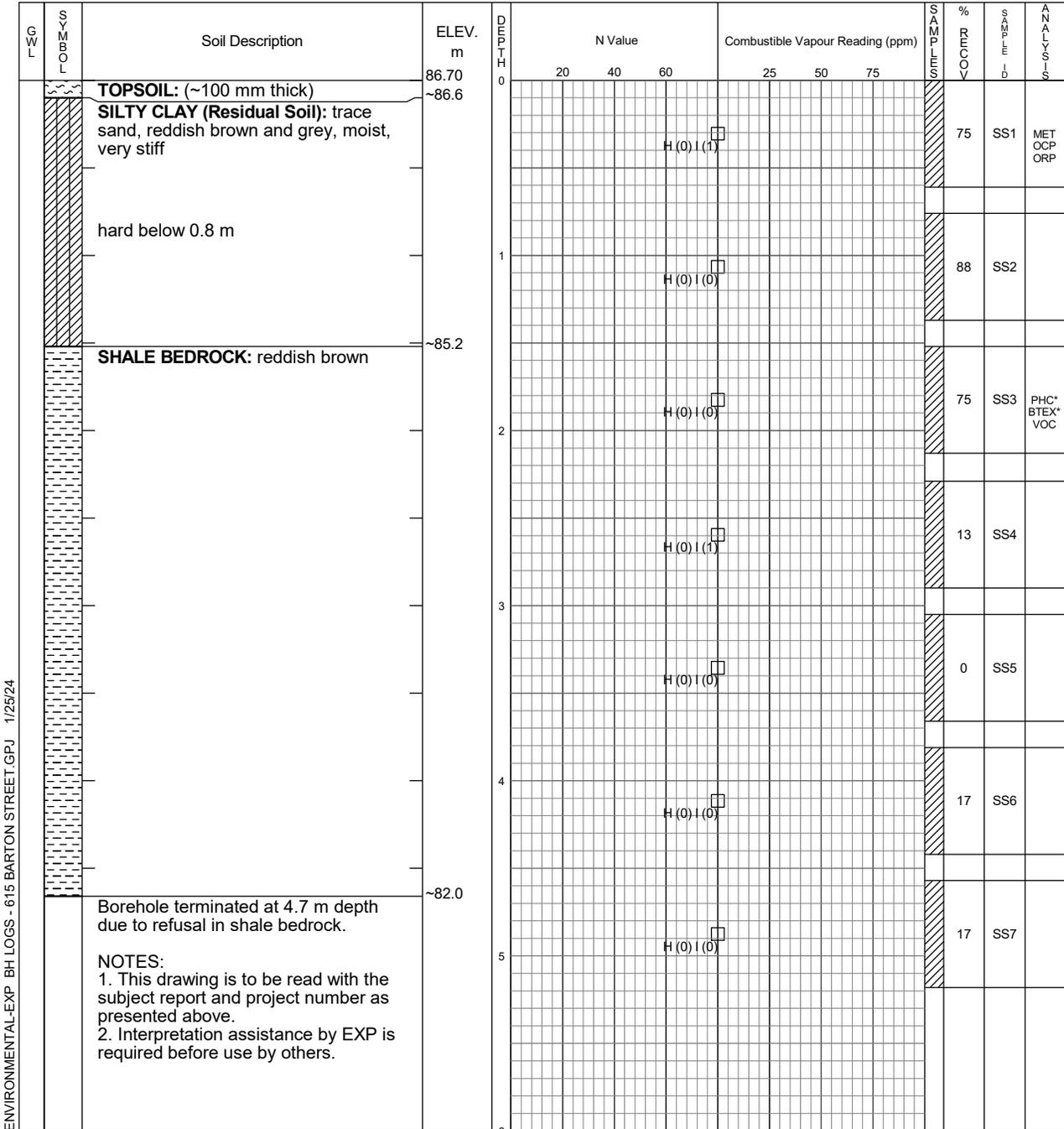
Date Drilled: November 29, 2023

Drill Type: D-50 Track Mount. Solid Stem.

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	* Duplicate Sample
ING	Metals and Inorganics	PCB Polychlorinated Biphenyls
MET	Metals	PHC Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC Volatile Organic Compounds
PEST	Organochlorine Pesticides	



ENVIRONMENTAL-EXP BH LOGS - 615 BARTON STREET GPJ 1/25/24



EXP Services Inc.
 Brampton, Ontario
 Telephone: 905-793-9800
 Facsimile: 905-793-0641

Time	Water Level (m)	Depth to Cave (m)
on completion	dry	open

Log of Borehole BH-3

Project No. HAM-23009539-A0

Drawing No. 3

Project: Soil Characterization Report

Sheet No. 1 of 1

Location: 615 Barton Street, Stoney Creek, ON

Refer to Borehole Location Plan.

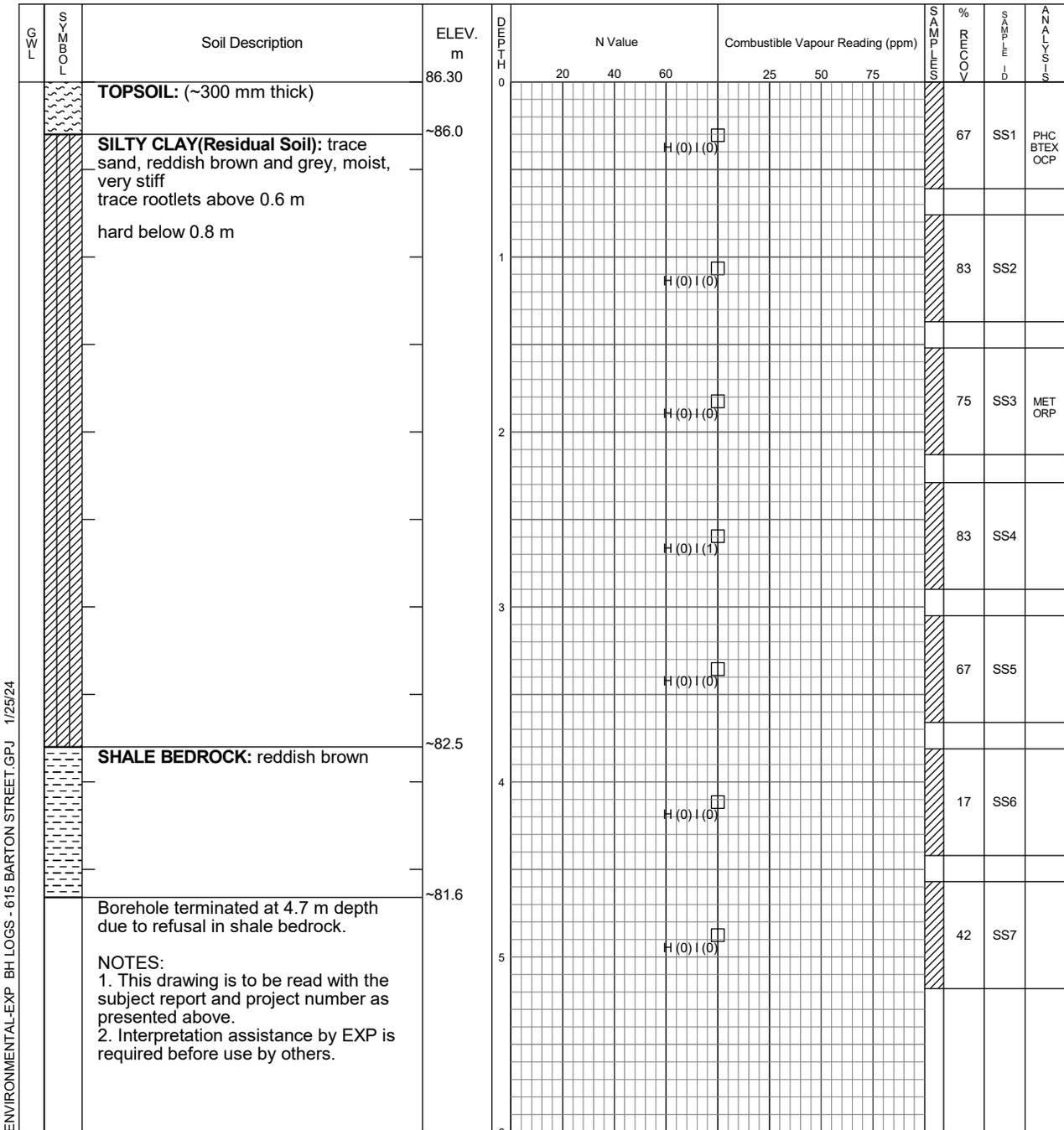
Date Drilled: November 29, 2023

Drill Type: D-50 Track Mount. Solid Stem.

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	* Duplicate Sample
ING	Metals and Inorganics	PCB Polychlorinated Biphenyls
MET	Metals	PHC Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC Volatile Organic Compounds
PEST	Organochlorine Pesticides	



ENVIRONMENTAL-EXP BH LOGS - 615 BARTON STREET GPJ 1/25/24



EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Time	Water Level (m)	Depth to Cave (m)
on completion	dry	open

Log of Borehole BH-4

Project No. HAM-23009539-A0

Drawing No. 4

Project: Soil Characterization Report

Sheet No. 1 of 1

Location: 615 Barton Street, Stoney Creek, ON

Refer to Borehole Location Plan.

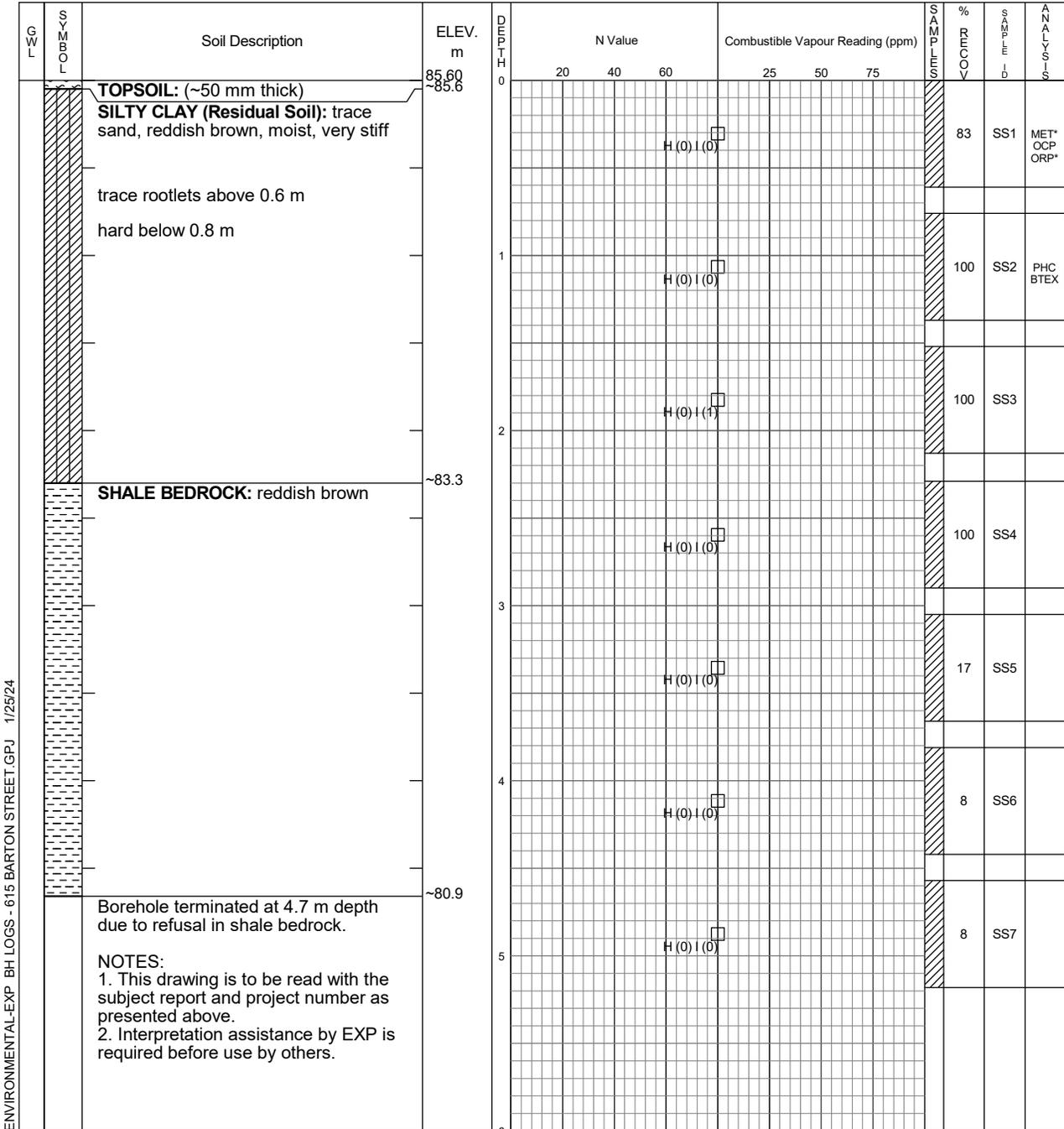
Date Drilled: November 29, 2023

Drill Type: D-50 Track Mount. Solid Stem.

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	* Duplicate Sample
ING	Metals and Inorganics	Polychlorinated Biphenyls
MET	Metals	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC Volatile Organic Compounds
PEST	Organochlorine Pesticides	



ENVIRONMENTAL-EXP BH LOGS - 615 BARTON STREET GPJ 1/25/24



EXP Services Inc.
 Brampton, Ontario
 Telephone: 905-793-9800
 Facsimile: 905-793-0641

Time	Water Level (m)	Depth to Cave (m)
on completion	dry	open

EXP Services Inc.

Soil Characterization Report
615 Barton Street, Stoney Creek, ON
HAM-23009539-A0
February 16, 2024

Appendix C – Laboratory Certificate of Analysis

CLIENT NAME: EXP SERVICES INC
1266 SOUTH SERVICE ROAD, SUITE C1-1
STONEY CREEK , ON L8E 5R9
(905) 573-4000

ATTENTION TO: Jennifer Hayman
PROJECT: Soil Characterization

AGAT WORK ORDER: 23H099326

SOIL ANALYSIS REVIEWED BY: Sukhwinder Randhawa, Inorganic Team Lead
TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Dec 07, 2023

PAGES (INCLUDING COVER): 23

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

***Notes**

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.



Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

5835 COOPERS AVENUE
 MISSISSAUGA, ONTARIO
 CANADA L4Z 1Y2
 TEL (905)712-5100
 FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 153(511) - ORPs (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

Parameter	Unit	SAMPLE DESCRIPTION:		BH1-SS3	BH-2 SS1	BH3-SS3	BH4-SS1	DUP 2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2023-11-29	2023-11-29	2023-11-29	2023-11-29	2023-11-29
		G / S	RDL	5506209	5506216	5506245	5506247	5506262
Electrical Conductivity (2:1)	mS/cm		0.005	0.149	0.144	0.195	0.174	0.170
Sodium Adsorption Ratio (2:1) (Calc.)	N/A		N/A	0.552	0.332	0.416	0.377	0.241

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5506209-5506262 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



skaw



Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 406/19 - Characterization Package - Inorganics (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

Parameter	Unit	SAMPLE DESCRIPTION:		BH1-SS3	BH-2 SS1	BH3-SS3	BH4-SS1	DUP 2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2023-11-29	2023-11-29	2023-11-29	2023-11-29	2023-11-29
		G / S	RDL	5506209	5506216	5506245	5506247	5506262
Antimony	µg/g	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	1	4	3	5	6	6	
Barium	µg/g	2.0	178	58.0	85.2	99.5	127	
Beryllium	µg/g	0.5	1.0	0.9	1.0	1.2	1.1	
Boron	µg/g	5	25	19	36	43	72	
Cadmium	µg/g	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Chromium	µg/g	5	26	20	29	30	30	
Cobalt	µg/g	0.8	15.7	12.4	16.4	16.2	16.7	
Copper	µg/g	1.0	8.4	6.9	8.9	9.7	9.2	
Lead	µg/g	1	8	9	7	20	35	
Molybdenum	µg/g	0.5	0.7	<0.5	1.1	0.8	0.6	
Nickel	µg/g	1	32	25	34	35	37	
Selenium	µg/g	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	
Silver	µg/g	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Thallium	µg/g	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Uranium	µg/g	0.50	0.53	0.67	0.98	0.84	1.07	
Vanadium	µg/g	2.0	28.4	42.8	31.2	33.2	29.8	
Zinc	µg/g	5	68	62	73	87	104	
pH, 2:1 CaCl ₂ Extraction	pH Units	NA	7.17	7.21	7.30	7.00	7.09	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5506209-5506262 pH was determined on the 0.01M CaCl₂ extract prepared at 2:1 ratio.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:





Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

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<http://www.agatlabs.com>

CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 153(511) - OC Pesticides (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

Parameter	Unit	SAMPLE DESCRIPTION:		BH1-SS1	BH-2 SS1	BH-3 SS1	BH4-SS1
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2023-11-29	2023-11-29	2023-11-29	2023-11-29
	G / S	RDL	5506155	5506216	5506229	5506247	
Hexachloroethane	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Gamma-Hexachlorocyclohexane	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor Epoxide	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan I	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan II	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Alpha-Chlordane	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
gamma-Chlordane	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chlordane	µg/g	0.007	<0.007	<0.007	<0.007	<0.007	<0.007
op'-DDE	ug/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pp'-DDE	µg/g	0.005	<0.005	<0.005	<0.005	0.025	0.047
DDE	µg/g	0.007	<0.007	<0.007	<0.007	0.025	0.047
op'-DDD	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pp'-DDD	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DDD	µg/g	0.007	<0.007	<0.007	<0.007	<0.007	<0.007
op'-DDT	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pp'-DDT	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DDT (Total)	µg/g	0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Dieldrin	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	µg/g	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobutadiene	µg/g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Moisture Content	%		0.1	10.2	12.4	19.0	17.5
wet weight OC	g		0.005	10.5	10.8	10.4	10.1
Surrogate	Unit	Acceptable Limits					
TCMX	%	50-140	105	83	78	109	
Decachlorobiphenyl	%	50-140	108	108	93	110	

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

5835 COOPERS AVENUE
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<http://www.agatlabs.com>

CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 153(511) - OC Pesticides (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5506155-5506247 Results are based on the dry weight of the soil.

DDT total is a calculated parameter. The calculated value is the sum of op'DDT and pp'DDT.

DDD total is a calculated parameter. The calculated value is the sum of op'DDD and pp'DDD.

DDE total is a calculated parameter. The calculated value is the sum of op'DDE and pp'DDE.

Endosulfan total is a calculated parameter. The calculated value is the sum of Endosulfan I and Endosulfan II.

Chlordane total is a calculated parameter. The calculated value is the sum of Alpha-Chlordane and Gamma-Chlordane.

The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

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CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

Parameter	Unit	SAMPLE DESCRIPTION:		BH1-SS1	DUP 1	BH-3 SS1	BH-4 SS2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2023-11-29	2023-11-29	2023-11-29	2023-11-29
		G / S	RDL	5506155	5506226	5506229	5506264
Benzene	µg/g	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g	5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	50	NA	NA	NA	NA	NA
Moisture Content	%	0.1	10.2	7.2	19.0	19.0	9.7
Surrogate	Unit	Acceptable Limits					
Toluene-d8	% Recovery	60-140	87.0	93.0	86.0	89.0	
Terphenyl	%	60-140	79	80	76	92	

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

5835 COOPERS AVENUE
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CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5506155-5506264 Results are based on sample dry weight.
The C6-C10 fraction is calculated using Toluene response factor.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Quality Control Data is available upon request.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
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<http://www.agatlabs.com>

CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 153(511) - PHCs F1 - F4 (with VOC) (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

SAMPLE DESCRIPTION: BH-2 SS3
SAMPLE TYPE: Soil
DATE SAMPLED: 2023-11-29
G / S RDL 5506222

Parameter	Unit	G / S	RDL	5506222
F1 (C6 to C10)	µg/g		5	<5
F1 (C6 to C10) minus BTEX	µg/g		5	<5
F2 (C10 to C16)	µg/g		10	<10
F3 (C16 to C34)	µg/g		50	<50
F4 (C34 to C50)	µg/g		50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA
Moisture Content	%		0.1	8.1
Surrogate	Unit	Acceptable Limits		
Toluene-d8	%	50-140	102	
Terphenyl	%	60-140	83	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
5506222 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 The chromatogram has returned to baseline by the retention time of nC50.
 Total C6 - C50 results are corrected for BTEX contribution.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.
 Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

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CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

Parameter	Unit	SAMPLE DESCRIPTION: BH1-SS3		
		G / S	RDL	5506209
Dichlorodifluoromethane	µg/g		0.05	<0.05
Vinyl Chloride	ug/g		0.02	<0.02
Bromomethane	ug/g		0.05	<0.05
Trichlorofluoromethane	ug/g		0.05	<0.05
Acetone	ug/g		0.50	<0.50
1,1-Dichloroethylene	ug/g		0.05	<0.05
Methylene Chloride	ug/g		0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g		0.05	<0.05
Methyl tert-butyl Ether	ug/g		0.05	<0.05
1,1-Dichloroethane	ug/g		0.02	<0.02
Methyl Ethyl Ketone	ug/g		0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g		0.02	<0.02
Chloroform	ug/g		0.04	<0.04
1,2-Dichloroethane	ug/g		0.03	<0.03
1,1,1-Trichloroethane	ug/g		0.05	<0.05
Carbon Tetrachloride	ug/g		0.05	<0.05
Benzene	ug/g		0.02	<0.02
1,2-Dichloropropane	ug/g		0.03	<0.03
Trichloroethylene	ug/g		0.03	<0.03
Bromodichloromethane	ug/g		0.05	<0.05
Methyl Isobutyl Ketone	ug/g		0.50	<0.50
1,1,2-Trichloroethane	ug/g		0.04	<0.04
Toluene	ug/g		0.05	<0.05
Dibromochloromethane	ug/g		0.05	<0.05
Ethylene Dibromide	ug/g		0.04	<0.04
Tetrachloroethylene	ug/g		0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g		0.04	<0.04
Chlorobenzene	ug/g		0.05	<0.05
Ethylbenzene	ug/g		0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

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CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

SAMPLE DESCRIPTION: BH1-SS3
 SAMPLE TYPE: Soil
 DATE SAMPLED: 2023-11-29
 5506209

Parameter	Unit	G / S	RDL	5506209
Bromoform	ug/g		0.05	<0.05
Styrene	ug/g		0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g		0.05	<0.05
o-Xylene	ug/g		0.05	<0.05
1,3-Dichlorobenzene	ug/g		0.05	<0.05
1,4-Dichlorobenzene	ug/g		0.05	<0.05
1,2-Dichlorobenzene	ug/g		0.05	<0.05
Xylenes (Total)	ug/g		0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g		0.04	<0.04
n-Hexane	µg/g		0.05	<0.05
Moisture Content	%		0.1	9.4
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	50-140		107
4-Bromofluorobenzene	% Recovery	50-140		92

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5506209 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.

1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

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<http://www.agatlabs.com>

CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

Parameter	Unit	SAMPLE DESCRIPTION: BH-2 SS3	
		G / S	RDL
			5506222
Dichlorodifluoromethane	µg/g	0.05	<0.05
Vinyl Chloride	ug/g	0.02	<0.02
Bromomethane	ug/g	0.05	<0.05
Trichlorofluoromethane	ug/g	0.05	<0.05
Acetone	ug/g	0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	<0.05
Methylene Chloride	ug/g	0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	<0.05
1,1-Dichloroethane	ug/g	0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.02	<0.02
Chloroform	ug/g	0.04	<0.04
1,2-Dichloroethane	ug/g	0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	<0.05
Benzene	ug/g	0.02	<0.02
1,2-Dichloropropane	ug/g	0.03	<0.03
Trichloroethylene	ug/g	0.03	<0.03
Bromodichloromethane	ug/g	0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.04	<0.04
Toluene	ug/g	0.05	<0.05
Dibromochloromethane	ug/g	0.05	<0.05
Ethylene Dibromide	ug/g	0.04	<0.04
Tetrachloroethylene	ug/g	0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.04	<0.04
Chlorobenzene	ug/g	0.05	<0.05
Ethylbenzene	ug/g	0.05	<0.05
m & p-Xylene	ug/g	0.05	<0.05

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

5835 COOPERS AVENUE
 MISSISSAUGA, ONTARIO
 CANADA L4Z 1Y2
 TEL (905)712-5100
 FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: EXP SERVICES INC

SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-07

SAMPLE DESCRIPTION: BH-2 SS3
 SAMPLE TYPE: Soil
 DATE SAMPLED: 2023-11-29
 5506222

Parameter	Unit	G / S	RDL	5506222
Bromoform	ug/g		0.05	<0.05
Styrene	ug/g		0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g		0.05	<0.05
o-Xylene	ug/g		0.05	<0.05
1,3-Dichlorobenzene	ug/g		0.05	<0.05
1,4-Dichlorobenzene	ug/g		0.05	<0.05
1,2-Dichlorobenzene	ug/g		0.05	<0.05
Xylenes (Total)	ug/g		0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g		0.05	<0.05
n-Hexane	µg/g		0.05	<0.05
Moisture Content	%		0.1	8.1
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	50-140		102
4-Bromofluorobenzene	% Recovery	50-140		88

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5506222 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
 1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
 The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Quality Assurance

CLIENT NAME: EXP SERVICES INC
PROJECT: Soil Characterization
SAMPLING SITE: Barton Street

AGAT WORK ORDER: 23H099326
ATTENTION TO: Jennifer Hayman
SAMPLED BY: CH

Soil Analysis															
RPT Date: Dec 07, 2023			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - ORPs (Soil)

Electrical Conductivity (2:1)	5506209	5506209	0.149	0.129	14.4%	< 0.005	95%	80%	120%					
Sodium Adsorption Ratio (2:1) (Calc.)	5506209	5506209	0.552	0.523	5.4%	NA								

Comments: NA signifies Not Applicable.

O. Reg. 406/19 - Characterization Package - Inorganics (Soil)

Antimony	5505560		<0.8	<0.8	NA	< 0.8	111%	70%	130%	87%	80%	120%	103%	70%	130%
Arsenic	5505560		3	3	NA	< 1	101%	70%	130%	104%	80%	120%	112%	70%	130%
Barium	5505560		150	149	0.7%	< 2.0	99%	70%	130%	107%	80%	120%	110%	70%	130%
Beryllium	5505560		0.8	0.8	NA	< 0.5	107%	70%	130%	105%	80%	120%	112%	70%	130%
Boron	5505560		16	16	NA	< 5	78%	70%	130%	97%	80%	120%	101%	70%	130%
Cadmium	5505560		<0.5	<0.5	NA	< 0.5	104%	70%	130%	103%	80%	120%	100%	70%	130%
Chromium	5505560		32	33	3.1%	< 5	104%	70%	130%	102%	80%	120%	121%	70%	130%
Cobalt	5505560		11.2	11.4	1.8%	< 0.8	105%	70%	130%	104%	80%	120%	109%	70%	130%
Copper	5505560		21.8	22.0	0.9%	< 1.0	101%	70%	130%	104%	80%	120%	100%	70%	130%
Lead	5505560		8	8	0.0%	< 1	98%	70%	130%	98%	80%	120%	93%	70%	130%
Molybdenum	5505560		<0.5	<0.5	NA	< 0.5	100%	70%	130%	108%	80%	120%	110%	70%	130%
Nickel	5505560		21	22	4.7%	< 1	106%	70%	130%	103%	80%	120%	104%	70%	130%
Selenium	5505560		<0.8	<0.8	NA	< 0.8	102%	70%	130%	108%	80%	120%	113%	70%	130%
Silver	5505560		<0.5	<0.5	NA	< 0.5	94%	70%	130%	104%	80%	120%	96%	70%	130%
Thallium	5505560		<0.5	<0.5	NA	< 0.5	100%	70%	130%	104%	80%	120%	98%	70%	130%
Uranium	5505560		0.81	0.80	NA	< 0.50	100%	70%	130%	106%	80%	120%	107%	70%	130%
Vanadium	5505560		45.4	46.4	2.2%	< 2.0	126%	70%	130%	98%	80%	120%	114%	70%	130%
Zinc	5505560		57	59	3.4%	< 5	109%	70%	130%	105%	80%	120%	109%	70%	130%
pH, 2:1 CaCl2 Extraction	5510835		6.65	6.83	2.7%	NA	104%	80%	120%						

Comments: NA signifies Not Applicable.

Duplicate NA: results are under 5X the RDL and will not be calculated.

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Certified By:



J. Hayman

Quality Assurance

CLIENT NAME: EXP SERVICES INC
AGAT WORK ORDER: 23H099326
PROJECT: Soil Characterization
ATTENTION TO: Jennifer Hayman
SAMPLING SITE: Barton Street
SAMPLED BY: CH

Trace Organics Analysis

RPT Date: Dec 07, 2023			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Benzene	5505691		<0.02	<0.02	NA	< 0.02	110%	60%	140%	104%	60%	140%	74%	60%	140%
Toluene	5505691		<0.05	<0.05	NA	< 0.05	86%	60%	140%	111%	60%	140%	102%	60%	140%
Ethylbenzene	5505691		<0.05	<0.05	NA	< 0.05	111%	60%	140%	97%	60%	140%	84%	60%	140%
m & p-Xylene	5505691		<0.05	<0.05	NA	< 0.05	108%	60%	140%	87%	60%	140%	77%	60%	140%
o-Xylene	5505691		<0.05	<0.05	NA	< 0.05	106%	60%	140%	112%	60%	140%	99%	60%	140%
F1 (C6 to C10)	5505691		<5	<5	NA	< 5	106%	60%	140%	108%	60%	140%	95%	60%	140%
F2 (C10 to C16)	5509955		< 10	< 10	NA	< 10	108%	60%	140%	108%	60%	140%	100%	60%	140%
F3 (C16 to C34)	5509955		< 50	< 50	NA	< 50	106%	60%	140%	110%	60%	140%	121%	60%	140%
F4 (C34 to C50)	5509955		< 50	< 50	NA	< 50	66%	60%	140%	102%	60%	140%	95%	60%	140%

O. Reg. 153(511) - VOCs (Soil)

Dichlorodifluoromethane	5505965		<0.05	<0.05	NA	< 0.05	88%	50%	140%	88%	50%	140%	90%	50%	140%
Vinyl Chloride	5505965		<0.02	<0.02	NA	< 0.02	101%	50%	140%	102%	50%	140%	106%	50%	140%
Bromomethane	5505965		<0.05	<0.05	NA	< 0.05	82%	50%	140%	116%	50%	140%	93%	50%	140%
Trichlorofluoromethane	5505965		<0.05	<0.05	NA	< 0.05	106%	50%	140%	98%	50%	140%	93%	50%	140%
Acetone	5505965		<0.50	<0.50	NA	< 0.50	102%	50%	140%	98%	50%	140%	108%	50%	140%
1,1-Dichloroethylene	5505965		<0.05	<0.05	NA	< 0.05	78%	50%	140%	73%	60%	130%	94%	50%	140%
Methylene Chloride	5505965		<0.05	<0.05	NA	< 0.05	105%	50%	140%	96%	60%	130%	81%	50%	140%
Trans- 1,2-Dichloroethylene	5505965		<0.05	<0.05	NA	< 0.05	72%	50%	140%	80%	60%	130%	92%	50%	140%
Methyl tert-butyl Ether	5505965		<0.05	<0.05	NA	< 0.05	79%	50%	140%	72%	60%	130%	91%	50%	140%
1,1-Dichloroethane	5505965		<0.02	<0.02	NA	< 0.02	85%	50%	140%	86%	60%	130%	91%	50%	140%
Methyl Ethyl Ketone	5505965		<0.50	<0.50	NA	< 0.50	103%	50%	140%	107%	50%	140%	99%	50%	140%
Cis- 1,2-Dichloroethylene	5505965		<0.02	<0.02	NA	< 0.02	84%	50%	140%	70%	60%	130%	88%	50%	140%
Chloroform	5505965		<0.04	<0.04	NA	< 0.04	83%	50%	140%	75%	60%	130%	86%	50%	140%
1,2-Dichloroethane	5505965		<0.03	<0.03	NA	< 0.03	97%	50%	140%	84%	60%	130%	82%	50%	140%
1,1,1-Trichloroethane	5505965		<0.05	<0.05	NA	< 0.05	73%	50%	140%	87%	60%	130%	83%	50%	140%
Carbon Tetrachloride	5505965		<0.05	<0.05	NA	< 0.05	71%	50%	140%	72%	60%	130%	85%	50%	140%
Benzene	5505965		<0.02	<0.02	NA	< 0.02	84%	50%	140%	71%	60%	130%	88%	50%	140%
1,2-Dichloropropane	5505965		<0.03	<0.03	NA	< 0.03	100%	50%	140%	78%	60%	130%	94%	50%	140%
Trichloroethylene	5505965		<0.03	<0.03	NA	< 0.03	86%	50%	140%	69%	60%	130%	105%	50%	140%
Bromodichloromethane	5505965		<0.05	<0.05	NA	< 0.05	98%	50%	140%	101%	60%	130%	98%	50%	140%
Methyl Isobutyl Ketone	5505965		<0.50	<0.50	NA	< 0.50	107%	50%	140%	98%	50%	140%	95%	50%	140%
1,1,2-Trichloroethane	5505965		<0.04	<0.04	NA	< 0.04	100%	50%	140%	90%	60%	130%	96%	50%	140%
Toluene	5505965		<0.05	<0.05	NA	< 0.05	90%	50%	140%	86%	60%	130%	84%	50%	140%
Dibromochloromethane	5505965		<0.05	<0.05	NA	< 0.05	96%	50%	140%	80%	60%	130%	105%	50%	140%
Ethylene Dibromide	5505965		<0.04	<0.04	NA	< 0.04	85%	50%	140%	72%	60%	130%	99%	50%	140%
Tetrachloroethylene	5505964		<0.05	<0.05	NA	< 0.05	89%	50%	140%	90%	60%	130%	91%	50%	140%
1,1,1,2-Tetrachloroethane	5505965		<0.04	<0.04	NA	< 0.04	78%	50%	140%	91%	60%	130%	89%	50%	140%
Chlorobenzene	5505965		<0.05	<0.05	NA	< 0.05	92%	50%	140%	95%	60%	130%	89%	50%	140%
Ethylbenzene	5505965		<0.05	<0.05	NA	< 0.05	102%	50%	140%	96%	60%	130%	95%	50%	140%

Quality Assurance

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

ATTENTION TO: Jennifer Hayman

SAMPLING SITE: Barton Street

SAMPLED BY: CH

Trace Organics Analysis (Continued)

RPT Date: Dec 07, 2023			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
m & p-Xylene	5505965		<0.05	<0.05	NA	< 0.05	104%	50%	140%	100%	60%	130%	100%	50%	140%	
Bromoform	5505965		<0.05	<0.05	NA	< 0.05	96%	50%	140%	90%	60%	130%	81%	50%	140%	
Styrene	5505965		<0.05	<0.05	NA	< 0.05	98%	50%	140%	92%	60%	130%	93%	50%	140%	
1,1,2,2-Tetrachloroethane	5505965		<0.05	<0.05	NA	< 0.05	88%	50%	140%	97%	60%	130%	98%	50%	140%	
o-Xylene	5505965		<0.05	<0.05	NA	< 0.05	81%	50%	140%	89%	60%	130%	89%	50%	140%	
1,3-Dichlorobenzene	5505965		<0.05	<0.05	NA	< 0.05	105%	50%	140%	100%	60%	130%	104%	50%	140%	
1,4-Dichlorobenzene	5505965		<0.05	<0.05	NA	< 0.05	95%	50%	140%	102%	60%	130%	98%	50%	140%	
1,2-Dichlorobenzene	5505965		<0.05	<0.05	NA	< 0.05	92%	50%	140%	89%	60%	130%	103%	50%	140%	
n-Hexane	5505965		<0.05	<0.05	NA	< 0.05	102%	50%	140%	89%	60%	130%	101%	50%	140%	

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

O. Reg. 153(511) - OC Pesticides (Soil)

Hexachloroethane	5509879		< 0.005	< 0.005	NA	< 0.005	93%	50%	140%	92%	50%	140%	82%	50%	140%
Gamma-Hexachlorocyclohexane	5509879		< 0.005	< 0.005	NA	< 0.005	83%	50%	140%	101%	50%	140%	90%	50%	140%
Heptachlor	5509879		< 0.005	< 0.005	NA	< 0.005	86%	50%	140%	106%	50%	140%	101%	50%	140%
Aldrin	5509879		< 0.005	< 0.005	NA	< 0.005	83%	50%	140%	98%	50%	140%	104%	50%	140%
Heptachlor Epoxide	5509879		< 0.005	< 0.005	NA	< 0.005	104%	50%	140%	98%	50%	140%	101%	50%	140%
Endosulfan I	5509879		< 0.005	< 0.005	NA	< 0.005	91%	50%	140%	108%	50%	140%	109%	50%	140%
Endosulfan II	5509879		< 0.005	< 0.005	NA	< 0.005	85%	50%	140%	107%	50%	140%	89%	50%	140%
Alpha-Chlordane	5509879		< 0.005	< 0.005	NA	< 0.005	86%	50%	140%	105%	50%	140%	95%	50%	140%
gamma-Chlordane	5509879		< 0.005	< 0.005	NA	< 0.005	87%	50%	140%	104%	50%	140%	92%	50%	140%
op'-DDE	5509879		< 0.005	< 0.005	NA	< 0.005	96%	50%	140%	96%	50%	140%	94%	50%	140%
pp'-DDE	5509879		0.007	0.008	NA	< 0.005	95%	50%	140%	101%	50%	140%	97%	50%	140%
op'-DDD	5509879		< 0.005	< 0.005	NA	< 0.005	95%	50%	140%	113%	50%	140%	104%	50%	140%
pp'-DDD	5509879		< 0.005	< 0.005	NA	< 0.005	85%	50%	140%	101%	50%	140%	96%	50%	140%
op'-DDT	5509879		< 0.005	< 0.005	NA	< 0.005	82%	50%	140%	114%	50%	140%	89%	50%	140%
pp'-DDT	5509879		< 0.005	< 0.005	NA	< 0.005	85%	50%	140%	107%	50%	140%	99%	50%	140%
Dieldrin	5509879		< 0.005	< 0.005	NA	< 0.005	89%	50%	140%	112%	50%	140%	108%	50%	140%
Endrin	5509879		< 0.005	< 0.005	NA	< 0.005	96%	50%	140%	108%	50%	140%	99%	50%	140%
Methoxychlor	5509879		< 0.005	< 0.005	NA	< 0.005	87%	50%	140%	102%	50%	140%	100%	50%	140%
Hexachlorobenzene	5509879		< 0.005	< 0.005	NA	< 0.005	102%	50%	140%	92%	50%	140%	103%	50%	140%
Hexachlorobutadiene	5509879		< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	90%	50%	140%	82%	50%	140%

O. Reg. 153(511) - PHCs F1 - F4 (with VOC) (Soil)

F1 (C6 to C10)	5505965		<5	<5	NA	< 5	94%	60%	140%	97%	60%	140%	95%	60%	140%
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O. Reg. 153(511) - VOCs (with PHC) (Soil)

Dichlorodifluoromethane	5505965		<0.05	<0.05	NA	< 0.05	88%	50%	140%	88%	50%	140%	90%	50%	140%
Vinyl Chloride	5505965		<0.02	<0.02	NA	< 0.02	101%	50%	140%	102%	50%	140%	106%	50%	140%
Bromomethane	5505965		<0.05	<0.05	NA	< 0.05	82%	50%	140%	116%	50%	140%	93%	50%	140%
Trichlorofluoromethane	5505965		<0.05	<0.05	NA	< 0.05	106%	50%	140%	98%	50%	140%	93%	50%	140%

Quality Assurance

CLIENT NAME: EXP SERVICES INC
AGAT WORK ORDER: 23H099326
PROJECT: Soil Characterization
ATTENTION TO: Jennifer Hayman
SAMPLING SITE: Barton Street
SAMPLED BY: CH

Trace Organics Analysis (Continued)

RPT Date: Dec 07, 2023			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Acetone	5505965		<0.50	<0.50	NA	< 0.50	102%	50%	140%	98%	50%	140%	108%	50%	140%	
1,1-Dichloroethylene	5505965		<0.05	<0.05	NA	< 0.05	78%	50%	140%	73%	60%	130%	94%	50%	140%	
Methylene Chloride	5505965		<0.05	<0.05	NA	< 0.05	105%	50%	140%	96%	60%	130%	81%	50%	140%	
Trans- 1,2-Dichloroethylene	5505965		<0.05	<0.05	NA	< 0.05	72%	50%	140%	80%	60%	130%	92%	50%	140%	
Methyl tert-butyl Ether	5505965		<0.05	<0.05	NA	< 0.05	79%	50%	140%	72%	60%	130%	91%	50%	140%	
1,1-Dichloroethane	5505965		<0.02	<0.02	NA	< 0.02	85%	50%	140%	86%	60%	130%	91%	50%	140%	
Methyl Ethyl Ketone	5505965		<0.50	<0.50	NA	< 0.50	103%	50%	140%	107%	50%	140%	99%	50%	140%	
Cis- 1,2-Dichloroethylene	5505965		<0.02	<0.02	NA	< 0.02	84%	50%	140%	70%	60%	130%	88%	50%	140%	
Chloroform	5505965		<0.04	<0.04	NA	< 0.04	83%	50%	140%	75%	60%	130%	86%	50%	140%	
1,2-Dichloroethane	5505965		<0.03	<0.03	NA	< 0.03	97%	50%	140%	84%	60%	130%	82%	50%	140%	
1,1,1-Trichloroethane	5505965		<0.05	<0.05	NA	< 0.05	73%	50%	140%	87%	60%	130%	83%	50%	140%	
Carbon Tetrachloride	5505965		<0.05	<0.05	NA	< 0.05	71%	50%	140%	72%	60%	130%	85%	50%	140%	
Benzene	5505965		<0.02	<0.02	NA	< 0.02	84%	50%	140%	71%	60%	130%	88%	50%	140%	
1,2-Dichloropropane	5505965		<0.03	<0.03	NA	< 0.03	100%	50%	140%	78%	60%	130%	94%	50%	140%	
Trichloroethylene	5505965		<0.03	<0.03	NA	< 0.03	86%	50%	140%	69%	60%	130%	105%	50%	140%	
Bromodichloromethane	5505965		<0.05	<0.05	NA	< 0.05	98%	50%	140%	101%	60%	130%	98%	50%	140%	
Methyl Isobutyl Ketone	5505965		<0.50	<0.50	NA	< 0.50	107%	50%	140%	98%	50%	140%	95%	50%	140%	
1,1,2-Trichloroethane	5505965		<0.04	<0.04	NA	< 0.04	100%	50%	140%	90%	60%	130%	96%	50%	140%	
Toluene	5505965		<0.05	<0.05	NA	< 0.05	90%	50%	140%	86%	60%	130%	84%	50%	140%	
Dibromochloromethane	5505965		<0.05	<0.05	NA	< 0.05	96%	50%	140%	80%	60%	130%	105%	50%	140%	
Ethylene Dibromide	5505965		<0.04	<0.04	NA	< 0.04	85%	50%	140%	72%	60%	130%	99%	50%	140%	
Tetrachloroethylene	5505965		<0.05	<0.05	NA	< 0.05	89%	50%	140%	90%	60%	130%	91%	50%	140%	
1,1,1,2-Tetrachloroethane	5505965		<0.04	<0.04	NA	< 0.04	78%	50%	140%	91%	60%	130%	89%	50%	140%	
Chlorobenzene	5505965		<0.05	<0.05	NA	< 0.05	92%	50%	140%	95%	60%	130%	89%	50%	140%	
Ethylbenzene	5505965		<0.05	<0.05	NA	< 0.05	102%	50%	140%	96%	60%	130%	95%	50%	140%	
m & p-Xylene	5505965		<0.05	<0.05	NA	< 0.05	104%	50%	140%	100%	60%	130%	100%	50%	140%	
Bromoform	5505965		<0.05	<0.05	NA	< 0.05	96%	50%	140%	90%	60%	130%	81%	50%	140%	
Styrene	5505965		<0.05	<0.05	NA	< 0.05	98%	50%	140%	92%	60%	130%	93%	50%	140%	
1,1,2,2-Tetrachloroethane	5505965		<0.05	<0.05	NA	< 0.05	88%	50%	140%	97%	60%	130%	98%	50%	140%	
o-Xylene	5505965		<0.05	<0.05	NA	< 0.05	81%	50%	140%	89%	60%	130%	89%	50%	140%	
1,3-Dichlorobenzene	5505965		<0.05	<0.05	NA	< 0.05	105%	50%	140%	100%	60%	130%	104%	50%	140%	
1,4-Dichlorobenzene	5505965		<0.05	<0.05	NA	< 0.05	95%	50%	140%	102%	60%	130%	98%	50%	140%	
1,2-Dichlorobenzene	5505965		<0.05	<0.05	NA	< 0.05	92%	50%	140%	89%	60%	130%	103%	50%	140%	
n-Hexane	5505965		<0.05	<0.05	NA	< 0.05	102%	50%	140%	89%	60%	130%	101%	50%	140%	

Certified By:




Method Summary

CLIENT NAME: EXP SERVICES INC
PROJECT: Soil Characterization
SAMPLING SITE: Barton Street

AGAT WORK ORDER: 23H099326
ATTENTION TO: Jennifer Hayman
SAMPLED BY: CH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
pH, 2:1 CaCl ₂ Extraction	INOR-93-6075	modified from EPA 9045D, MCKEAGUE 3.11 E3137	PC TITRATE



Method Summary

CLIENT NAME: EXP SERVICES INC
PROJECT: Soil Characterization
SAMPLING SITE: Barton Street

AGAT WORK ORDER: 23H099326
ATTENTION TO: Jennifer Hayman
SAMPLED BY: CH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Hexachloroethane	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Gamma-Hexachlorocyclohexane	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Heptachlor	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Aldrin	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Heptachlor Epoxide	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Endosulfan I	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Endosulfan II	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Endosulfan	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	CALCULATION
Alpha-Chlordane	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
gamma-Chlordane	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Chlordane	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	CALCULATION
op'-DDE	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
pp'-DDE	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
DDE	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
op'-DDD	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
pp'-DDD	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
DDD	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	CALCULATION
op'-DDT	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
pp'-DDT	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
DDT (Total)	ORG-91-5113	modified from EPA 3570, 3620C & 8081B	CALCULATION
Dieldrin	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Endrin	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Methoxychlor	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Hexachlorobenzene	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Hexachlorobutadiene	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
TCMX	ORG-91-5112	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Decachlorobiphenyl	ORG-91-5113	modified from EPA 3570 & 3620C & 8081B	GC/ECD
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE



Method Summary

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 23H099326

PROJECT: Soil Characterization

ATTENTION TO: Jennifer Hayman

SAMPLING SITE: Barton Street

SAMPLED BY: CH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
wet weight OC	ORG-91-5113		BALANCE
Benzene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Toluene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Ethylbenzene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
m & p-Xylene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
o-Xylene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Xylenes (Total)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
F1 (C6 to C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Dichlorodifluoromethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: EXP SERVICES INC
AGAT WORK ORDER: 23H099326
PROJECT: Soil Characterization
ATTENTION TO: Jennifer Hayman
SAMPLING SITE: Barton Street
SAMPLED BY: CH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
1,2-Dichloropropane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Toluene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA SW-846 5035 & 8260D	(P&T)GC/MS
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS



Method Summary

CLIENT NAME: EXP SERVICES INC

PROJECT: Soil Characterization

SAMPLING SITE: Barton Street

AGAT WORK ORDER: 23H099326

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS



Method Summary

CLIENT NAME: EXP SERVICES INC

PROJECT: Soil Characterization

SAMPLING SITE: Barton Street

AGAT WORK ORDER: 23H099326

ATTENTION TO: Jennifer Hayman

SAMPLED BY: CH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Styrene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS



CLIENT NAME: EXP SERVICES INC
1266 SOUTH SERVICE ROAD, SUITE C1-1
STONEY CREEK , ON L8E 5R9
(905) 573-4000

ATTENTION TO: Jennifer Hayman
PROJECT: Soil Characterization

AGAT WORK ORDER: 23H099395

SOIL ANALYSIS REVIEWED BY: Sukhwinder Randhawa, Inorganic Team Lead

DATE REPORTED: Jan 08, 2024

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

***Notes**

Empty box for notes.

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.



Certificate of Analysis

AGAT WORK ORDER: 23H099395

PROJECT: Soil Characterization

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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CLIENT NAME: EXP SERVICES INC
SAMPLING SITE: Barton Street

ATTENTION TO: Jennifer Hayman
SAMPLED BY: CH

O. Reg. 406/19 - SPLP Metals

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2024-01-08

Parameter	Unit	SAMPLE DESCRIPTION:		SPLP1	SPLP2	SPLP3	SPLP4
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2023-11-29	2023-11-29	2023-11-29	2023-11-29
	G / S	RDL	5506211	5506212	5506213	5506214	
Antimony Leachate	µg/L	-	0.6	<0.6	<0.6	<0.6	<0.6
Arsenic Leachate	µg/L	-	5	<5	<5	<5	<5
Barium Leachate	µg/L	-	100	<100	<100	<100	<100
Beryllium Leachate	µg/L	-	0.8	<0.8	<0.8	<0.8	<0.8
Boron Leachate	µg/L	-	500	<500	<500	<500	<500
Cadmium Leachate	µg/L	-	0.20	<0.20	<0.20	<0.20	<0.20
Chromium Leachate	µg/L	-	10	<10	<10	<10	<10
Cobalt Leachate	µg/L	-	0.3	<0.3	<0.3	<0.3	<0.3
Copper Leachate	µg/L	-	6.9	<6.9	<6.9	<6.9	<6.9
Lead Leachate	µg/L	-	1.0	<1.0	<1.0	<1.0	<1.0
Molybdenum Leachate	µg/L	23	1.5	<1.5	<1.5	2.1	<1.5
Nickel Leachate	µg/L	-	10	<10	<10	<10	<10
Selenium Leachate	µg/L	-	5.0	<5.0	<5.0	<5.0	<5.0
Silver Leachate	µg/L	0.3	0.10	<0.10	<0.10	<0.10	<0.10
Thallium Leachate	µg/L	2	0.5	<0.5	<0.5	<0.5	<0.5
Uranium Leachate	µg/L	-	2	<2	<2	<2	<2
Vanadium Leachate	µg/L	-	0.6	1.3	0.9	1.4	1.8
Zinc Leachate	µg/L	-	20	<20	<20	<20	<20

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 1: Full Depth Background Site Condition - RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5506211-5506214 Leachate for metal testing was prepared in accordance with Ontario MECP Method E9003, which has been modified from SW846-1312 by Ontario MECP. MECP has recommended that Method E9003 be used for leachate testing of soil samples under O'Reg 406/19 by MECP.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Quality Assurance

CLIENT NAME: EXP SERVICES INC
PROJECT: Soil Characterization
SAMPLING SITE: Barton Street

AGAT WORK ORDER: 23H099395
ATTENTION TO: Jennifer Hayman
SAMPLED BY: CH

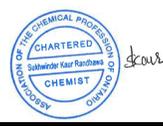
Soil Analysis

RPT Date: Jan 08, 2024			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	

O. Reg. 406/19 - SPLP Metals															
Antimony Leachate	5510732		<0.6	<0.6	NA	< 0.6	101%	70%	130%	101%	80%	120%	80%	70%	130%
Arsenic Leachate	5510732		<5	<5	NA	< 5	98%	70%	130%	99%	80%	120%	100%	70%	130%
Barium Leachate	5510732		<100	<100	NA	< 100	98%	70%	130%	101%	80%	120%	97%	70%	130%
Beryllium Leachate	5510732		<0.8	<0.8	NA	< 0.8	97%	70%	130%	102%	80%	120%	104%	70%	130%
Boron Leachate	5510732		<500	<500	NA	< 500	99%	70%	130%	107%	80%	120%	111%	70%	130%
Cadmium Leachate	5510732		<0.20	<0.20	NA	< 0.20	98%	70%	130%	100%	80%	120%	101%	70%	130%
Chromium Leachate	5510732		<10	<10	NA	< 10	97%	70%	130%	100%	80%	120%	100%	70%	130%
Cobalt Leachate	5510732		<0.3	<0.3	NA	< 0.3	97%	70%	130%	99%	80%	120%	102%	70%	130%
Copper Leachate	5510732		<6.9	<6.9	NA	< 6.9	96%	70%	130%	99%	80%	120%	104%	70%	130%
Lead Leachate	5510732		<1.0	<1.0	NA	< 1.0	97%	70%	130%	98%	80%	120%	100%	70%	130%
Molybdenum Leachate	5510732		<1.5	<1.5	NA	< 1.5	99%	70%	130%	103%	80%	120%	107%	70%	130%
Nickel Leachate	5510732		<10	<10	NA	< 10	98%	70%	130%	99%	80%	120%	101%	70%	130%
Selenium Leachate	5510732		<5.0	<5.0	NA	< 5.0	102%	70%	130%	104%	80%	120%	104%	70%	130%
Silver Leachate	5510732		<0.10	<0.10	NA	< 0.10	97%	70%	130%	103%	80%	120%	105%	70%	130%
Thallium Leachate	5510732		<0.5	<0.5	NA	< 0.5	101%	70%	130%	103%	80%	120%	104%	70%	130%
Uranium Leachate	5510732		<2	<2	NA	< 2	95%	70%	130%	99%	80%	120%	99%	70%	130%
Vanadium Leachate	5510732		1.2	1.2	NA	< 0.6	100%	70%	130%	95%	80%	120%	95%	70%	130%
Zinc Leachate	5510732		<20	<20	NA	< 20	96%	70%	130%	94%	80%	120%	95%	70%	130%

Comments: NA signifies Not Applicable.
 Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:



AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.



Method Summary

CLIENT NAME: EXP SERVICES INC

AGAT WORK ORDER: 23H099395

PROJECT: Soil Characterization

ATTENTION TO: Jennifer Hayman

SAMPLING SITE: Barton Street

SAMPLED BY: CH

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP/MS	
Arsenic Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP/MS	
Barium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Beryllium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Boron Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Cadmium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Chromium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Cobalt Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Copper Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Lead Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Molybdenum Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Nickel Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Selenium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Silver Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Thallium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Uranium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Vanadium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	
Zinc Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B ICP-MS	



Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: EXP Services Inc.
Contact: Jennifer Hayman
Address: 1266 S. Service Rd. Stoney Creek
Phone: 905 525 6069 Fax: _____
Reports to be sent to:
1. Email: jennifer.hayman@exp.com
2. Email: _____

Regulatory Requirements:

(Please check all applicable boxes)

Regulation 153/04 Regulation 406 Sewer Use
 Sanitary Storm
Table 1 Indicate One
 Ind/Com Res/Park Agriculture
 CCME
Soil Texture (Check One)
 Coarse Fine
Region _____
Indicate One _____

Project Information:

Project: Soil characterization
Site Location: Barton Street
Sampled By: CH
AGAT Quote #: _____ PO: HAM-23009539-A0
Please note: if quotation number is not provided, client will be billed full price for analysis.

Is this submission for a Record of Site Condition?

Yes No

Report Guideline on Certificate of Analysis

Yes No

Turnaround Time (TAT) Required:

Regular TAT 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

3 Business Days 2 Business Days Next Business Day

OR Date Required (Rush Surcharges May Apply): _____

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Invoice Information:

Bill To Same: Yes No

Company: EXP Services Inc.
Contact: _____
Address: _____
Email: AD@exp.com

Sample Matrix Legend

GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Field Filtered - Metals, Hg, CrVI, DOC										Potentially Hazardous or High Concentration (Y/N)								
							Metals & Inorganics	Metals - <input type="checkbox"/> CrVI, <input type="checkbox"/> Hg, <input type="checkbox"/> HWSB	BTEX, F1-F4, PHCs	VOC	PAHs	PCBS	PCBS: Aroclors <input type="checkbox"/>	Landfill Disposal Characterization TOLP: <input type="checkbox"/> M&I <input type="checkbox"/> VOCs <input type="checkbox"/> ABNS <input type="checkbox"/> B(a)P <input type="checkbox"/> PCBs	Regulation 406 SPLP Rainwater Leach SPLP: <input checked="" type="checkbox"/> Metals <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	Regulation 406 Characterization Package pH, ICPMS Metals, BTEX, F1,F4		Corrosivity: <input type="checkbox"/> Moisture <input type="checkbox"/> Sulphide							
1. SPLD 1	Nov 29/23	AM	1	S																					
2. SPLP 2																									
3. SPLP 3																									
4. SPLP 4																									
5.																									
6.																									
7.																									
8.																									
9.																									
10.																									
11.																									

Samples Relinquished By (Print Name and Sign): <u>Charlie Hill</u>	Date: <u>Nov 30/23</u>	Time:	Samples Received By (Print Name and Sign): <u>J. Fernandez</u>	Date: <u>Nov 30/23</u>	Time: <u>1:30pm</u>
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign): <u>R. Hernandez</u>	Date: <u>Nov 30</u>	Time: <u>4:30</u>
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign):	Date:	Time:

1. Definitions

1. The following Section of this Specification are of the abbreviated type and include incomplete sentences. Definite and indefinite articles have often been omitted and sentences are written in the form of direct instructions to the Contractor without using the phrase 'the Contractor shall.' Standard specifications and other quality references inserted govern materials and workmanship without using phrases 'conform with,' 'conformity therewith,' etc. Omitted words and phrases to be supplied in the same manner as they are when a note appears on the Drawings.
2. The Specifications are separated into Sections for reference convenience only. Such separation must in no instance make Owner or his Consultants arbiter to establish subcontract limits between Contractor and Subcontractor.
3. Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on Drawings and/or in Specifications, including all labour, materials, equipment, tools, services, and incidentals necessary and required to complete the work. Responsibility for breakdown into and extension of subcontracts, including co-ordination of same, rests entirely with the Contractor.
4. Standard Specifications referred to are editions in force at Tender Closing Date.

2. Terminology

1. Consultants are the team of Architects, Engineers and other experts commissioned by the Owner, directly or indirectly, to execute design, contract documents and supervision for the project, including any of their agents or employees.
2. Prime Consultant is the Architect.
3. Contractor is the Firm or Corporation who, having signed the Agreement, has the sole legal responsibility to carry out the work shown or described in the Contract Documents for the Owner, whether contractually assigned to a Subcontractor or supplier, or not.

3. Minimum Standards

1. Unless otherwise specified, work and material to conform or exceed the minimum standards set out in the editions of the Canadian Government Specification Board, Canadian Standards Associations, the Ontario Building Code, Underwriters' Laboratories of Canada, the Canadian Electrical Code, the Local Building Code in force, whichever is applicable.
2. Copies of Standard Specifications referred to in this Specification to be kept on the site.
3. The use of the name (or its abbreviation) of any of the following bodies, accompanied by the reference number of a specification of that body to mean that the entire specification of the body to apply as noted:

AISC: American Institute of Steel Construction;
ASTM: American Society for Testing Materials;
CEC: Canadian Electric Code;
CGSB: Canadian Government Specification Board;
CISC: Canadian Institute of Steel Construction;
CRCA: Canadian Roofing Contractors' Association;
CSA: Canadian Standards Association;
OBC: Ontario Building Code;
ULC: Underwriters' Laboratories of Canada;
CLA: Canadian Lumbermen's Association;
OIRCA: Certification for Roofing Contractors.

4. Cooperation

1. Each trade to cooperate with the trades of adjacent or affected work. Supply in good time requirements affecting adjacent and underlying work in writing and items to be set or built in. Similarly, heed requirements and build-in items provided by other trades.
2. Take necessary precautions to protect work of other trades from contamination, marring or other damage due to application or installation processes, methods and activities.
3. General Contractor and each trade to co-operate with Contractors which may be assigned or selected by the Owner to perform work under Cash Allowances. Owner reserves the right to assign non-unionized labour to perform work under Cash Allowances, at Owners discretion.

5. Coordination

1. Co-ordinate the work of all trades in such a manner that each trade co-operates with the trade of adjacent work.
2. Organize weekly job site meetings and send out notices stating time and place to Consultants, subcontractors, Suppliers and all others whose presence is required at the meetings.
3. Take note of all persons attending these meetings and submit to Consultants and Owner, Minutes of these Meetings showing any major decisions made and instructions or information required.
4. Co-ordinate the Work in this Contract with the work of others awarded work under Cash Allowances.

6. Building Dimensions and Co-ordination

1. Ensure that all necessary job dimensions are taken and all trades are coordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for co-ordination.

2. Verify that all work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the drawings, and ensure that work installed in error is rectified before construction resumes.
3. Check and verify all dimensions referring to the work and the interfacing of all services. Verify all dimensions, with the trade concerned when pertaining to the work of other trades. Be responsible to see that Subcontractors for various trades co-operate for the proper performance of the Work.
4. Avoid scaling directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant. Be responsible for any change through the disregarding of this clause.
5. All details and measurements of any work which is to fit or to conform with work installed shall be taken at the building.
6. Advise Consultant of discrepancies and if there are omissions on drawings, particularly reflected ceiling plans and jointing patterns for paving, ceramic tile, or carpet tile layouts, which affect aesthetics, or which interfere with services, equipment or surfaces. **DO NOT PROCEED** without direction from the Consultant.
7. Ensure that each Subcontractor communicates requirements for site conditions and surfaces necessary for the execution of the Subcontractor's work, and that he provides setting drawings, templates and all other information necessary for the location and installation of material, holes, sleeves, insets, anchors, accessories, fastenings, connections and access panels. Inform other Subcontractors whose work is affected by these requirements and preparatory work.
8. Prepare interference drawings to properly co-ordinate the work where necessitated. Refer to Section 01340.

7. Use of Premises Before Substantial Performance

1. The Owner shall have the right to enter and occupy the building, in whole or in part, for the purpose of placing fittings and equipment, or for other use, before completion of the Contract if, in the opinion of the Consultant, such entry and occupancy does not prevent or interfere with the Contractor in the performance of the Contract. Such entry shall in no way be considered as an acceptance of the Work in whole, or in part, nor shall it imply acknowledgment that terms of the Agreement are fulfilled.

8. Layout of Work

1. Layout work with respect to the work of all trades. Arrange mechanical and electrical work such as piping, ducts, conduits, panels, equipment and the like to suit the architectural and structural details.
2. Alterations necessary due to conflict and interference between trades, to be executed at no cost to the Owner unless notification is given in writing before Tender Closing Date.

9. By-Laws and Regulations

1. Nothing contained in the Drawings and Specifications are to be so construed as to be knowingly in conflict with any law, by-law or regulation of municipal, provincial or other authorities having jurisdiction.
2. Perform work in conformity with such laws, by-laws and regulations and make any necessary changes or deviations from the Drawings and Specifications subsequently required as directed and at no cost to the Owner unless notification is given in writing before Tender Closing Date.
3. Furnish inspection certificates and/or permits as may be applicable as evidence, that installed work conforms with laws, by-laws, and regulations of authorities having jurisdiction.

10. Protection

1. Take necessary precautions and provide and install required coverings to protect material, work and finishes from contamination, damage, the elements, water and frost.
2. Make good any damage or replace damaged materials, as directed. Repairs to be made by the trade having originally installed or fabricated the damaged material, finish or item. Protect electrical equipment from water and the elements.
3. Protect adjacent private and public property from damage and contamination.
4. Protect curbs and sidewalks from damage from trucking by means of boards and the like. Repair, or pay for repair of damage to existing roads and sidewalks.
5. Mark glass after glazing in an acceptable manner, and leave in place until final clean-up.
6. Protect floor finishes from construction traffic and transport of construction materials and equipment by means of 6 mm plywood panels.

11. Delivery, Handling and Storage of Materials

1. Schedule material delivery so as to keep storage at site to the absolute minimum, but without causing delays due to late delivery.
2. Store materials which will be damaged by weather in suitable dry accommodation. Provide heat, as required, to maintain temperatures recommended by material manufacturer.
3. Store highly combustible or volatile materials separately from other materials, and under no circumstances, within the building. Protect against open flame and other fire hazards. Limit volume of supply on the site to minimum required for one day's operations.

4. Handle and store material so as to prevent damage to material, structure and finishes. Avoid undue loading stresses in materials or overloading of floors.
5. Do not store material and equipment detrimental to finished surfaces within areas of the building where finishing has commenced or has been completed. All material storage within the building is subject to relocation, as directed.
6. Deliver package material in original, and Storage of unopened and undamaged containers with manufacturer's labels and seals intact.

12. Debris

1. Assign clean-up duties to a crew with own Foremen which will be of sufficient size to prevent accumulation of debris and dirt in any part of the structure or on the site.
2. Remove construction debris on a daily basis and legally dispose of same.
3. Under no circumstances, should debris, rubbish or trash be burned or buried on the site.

13. Cutting, Fitting and Patching

1. Required cutting to be done by General Contractor. Patching and painting of work to be executed by the General Contractor.
2. All sub-trades are to notify the General Contractors bidding as to the extent of the cutting, patching, and painting of their respective trades.
3. Drilling, cutting, fitting and patching necessary due to failure to deliver items to be built-in time, or installation in wrong location to be executed, as directed, at no cost to the Owner.
4. Give written notification prior to commencement of drilling and cutting of load bearing structural members and finished surfaces.
5. Cut holes with smooth, true, clean edges, after they are approved by applicable trade. Size holes and openings for hot water and steam pipes, so as to allow for expansion and contraction of such pipes.

14. Fastenings

1. Supply all fastenings, anchors and accessories required for fabrication and erection or work.
2. Metal fastenings to be of the same material as the metal component they are anchoring, or of a metal which will not set up an electrolysis action which would cause damage to the fastening or metal component under moist conditions.
3. Exposed metal fastenings and accessories to be of the same texture, color, and finish as base metal on which they occur. Keep to a minimum; evenly space and lay out.

4. Fastenings to be permanent, of such a type and size and installed in such a manner to provide positive anchorage of the unit to be secured. Wood plugs are not acceptable. Install anchors at required spacing to provide required load bearing or shear capacity.
5. Power actuated fastenings not to be used without prior written approval for specific use.

15. Surplus Materials

1. Surplus materials specifically so specified, to remain property of the Owner and be neatly stockpiled or stored, as directed.
2. All other surplus materials to become property of the Contractor; to be removed from the site and legally disposed of.

16. Setting of Work

1. Provide and pay for the services of a Land Surveyor, registered in the Province of Ontario to establish the building location and two (2) widely separated bench marks at the commencement of the work.
2. Lay out building lines for the work and provide substantial stakes, batterboards or monuments to preserve lines and levels.
3. Provide to the Consultant a survey plan on CAD indicating location of perimeter foundation walls relative to property lines and their top elevation, before construction proceeds on the foundation walls.
4. Verify on the site all grades, lines, levels, dimensions and location of hydrants, existing structures, manholes, overhead and buried utilities, existing trees, roadways, sidewalks and the like, shown on the drawings, and report omissions, errors, or inconsistencies, before commencing work.
5. Upon completion of layout work and before commencement of any excavation, give ample notification to allow for inspection of lines and levels. Such inspection does not in any way mitigate the Contractor's responsibility for accuracy of layout.
6. Preserve and protect bench marks, elevation datum and monuments and check periodically for accuracy until all work is complete. Remove same and their protection, as directed, and make good site.

17. Documents Required and General Duties

1. **At Commencement of Contract**
 - .1 Supply Performance Bond and Labour and Material Bond within ten (10) days of acceptance of the Tender.
 - .2 Supply Public Liability and Property Damage Insurance Certificates.
 - .3 Supply Certificates of good standing from Workers' Compensation Board for the General Contractor and all Subcontractors.

- .4 Supply Contract Sum Breakdown of all sub-trades or parts of work and general expense items.
- .5 Supply Construction Schedule.
- .6 Supply Schedule of Shop Drawing Submissions.
- .7 The Owner has paid for the cost of the Building Permit. Mechanical Subcontractor will pay the cost of other Fees related to the Work Specified under Mechanical Scope. Electrical Subcontractor will pay the cost of all permits and fees related to the Work specified under Electrical Scope.
- .8 The General Contractor is to pay all other fees and refundable deposits if applicable.

2. During Construction

- .1 Adjust Allowances, as required.
- .2 Organize Job Meetings in accordance with Section 01200.
- .3 Supply Monthly Progress Reports and Construction Schedule in accordance with Section 01200.
- .4 Confirm that payments are being made to subcontractors and suppliers by submission of receipts with the second and subsequent Progress Payment Application. No payment will be made for unincorporated material on the site, unless Bill of Sale in proper format is provided.

3. Upon Completion

1. Upon completion of work before the Final Certificate of Payment is issued, the following to be observed, executed and submitted:
 - .1 All deficiencies to have been completed in a satisfactory manner.
 - .2 All final clean-up to have been executed, as specified in Section 01710.
 - .3 Finishing Hardware, Inspection and Verification.
 - .4 Organize a Final Inspection tour at which to be present:
 - the Owner's authorized representative;
 - the Architectural, Structural, Mechanical and Electrical Consultants, and their supervisory personnel, if any;
 - the Contractor and his superintendent.
 - .5 Where the above procedure is impossible or where any deficiencies remain outstanding, the Owner's representative and the Consultant concerned, to inspect and accept the affected work and/or material upon notification by the Contractor, that all deficiencies involving this Consultant have been made good.
 - .6 A complete release of all liens arising out of this Contract, other than his own. If a subcontractor or supplier refuses to furnish a release of such a lien, furnish a bond satisfactory to the Owner to indemnify him against any claim under such a lien.
 - .7 Certificates of good standing from the Workers' Compensation board, for the General Contractor and all Subcontractors.
 - .8 All reference records, as specified, under Section 01720.
 - .9 Certificate of Inspection from Mechanical and Electrical Engineers.
 - .10 Copies of all Lists of Deficiencies with each Deficiency verified when complete by only this project's job Superintendent. The Final List of Deficiencies to be signed, completed by all concerned, if accepted.
 - .11 Statement of Completion from General Contractor.
 - .12 Final adjustment of all Allowances.

- .13 H.E.P.C. Inspection Certificate and all other Inspection Certificates required by Provincial, Municipal and other authorities having jurisdiction.
- .14 Balancing Reports.
- .15 As-Built Drawings. – Hardcopy mark ups and digital AutoCAD v2020 or higher.
- .16 Two hard copies of Operation and Maintenance Manuals. A digital copy (pdf file) of all closeout documents to be provided on a CD or USB memory stick format.

18. Progress Reports

1. Submit to the Architect, Monthly Progress Reports consisting of a concise narrative and a marked-up summary schedule showing physical percentage complete by item and in total. These progress calculations must agree with the Progress Payment Claims.
2. Keep permanent written daily records on the site on the progress of work. Record to be open to inspection at reasonable times and copies to be furnished upon request. Records to show notes of commencement and completion of different trades and parts of work; daily high and low temperatures and other weather particulars; number of men engaged on the site (including sub-trades) broken down in groups for each type of construction work, and particulars about excavation and shoring; erection and removal of form work; pouring and curing of concrete; floor finishing; placing and compaction of backfill, masonry work; roofing.
3. Daily progress to give particulars on commencement and completion of each trade or part of work; form work erections and removal; concrete pouring and curing; floor finishing; masonry work; roofing; waterproofing; finishing trades, tests and inspection and the like.

19. Inspection and Testing

1. The Owner will retain the services of Inspection and Testing Companies. The cost of inspection and testing will be deducted from the Inspection and Testing Allowance specified under Section 01020, "Allowances".
2. Where tests or inspections reveal work not in accordance with Contract requirements, the Contractor shall pay costs for additional tests or inspections as the Architect may require to verify acceptability of corrected work.
3. The Inspection and Testing by the Owner's Testing Company does not relieve the Contractor of his responsibility to provide his own quality control in order to meet or exceed the requirements of specified standards, codes, design criteria and referenced documents.

End of Section

1.1 Selection of Products

1. If requested by the Consultant, provide the following services and/or information:
 - .1 Assist the Consultant in determining qualified suppliers.
 - .2 Obtain proposals from suppliers.
 - .3 Make appropriate recommendations for consideration of Consultant.
 - .4 Notify Consultant of any effect anticipated by selection of product or supplier under consideration, on construction schedule and contract sum.
2. On notification of selection, enter into purchase agreement with designated supplier.

1.2 Cash Allowance

1. Expend cash allowance **only** on the Consultant's written instructions and with an Owner approved Cash Allowance Expenditure (CAE) form.
2. Include in Contract price the Contractor's charges for handling at site, including uncrating and storage, protection from elements and damage, labour, installation and finishing, testing, adjusting and balancing, and other expenses including overhead and profit on account of Cash Allowance in accordance with Article GC4.1 of the General Conditions of the Contract as amended.
3. Credit the Owner with any unused portion of Cash Allowances in the statement for final payment.
4. If a test made under payment by a specific allowance proves that the material or system is not in accordance with the Documents, then the subsequent testing including Owner's testing of replacement materials or systems shall be Contractor's expense and not taken from Cash Allowance.
5. Add or deduct any variation in cost from the Cash Allowance. No adjustment will be made to Contractor's expense.
6. The amount of each allowance includes the net cost of the product or service, delivery and unloading at the site.
7. All refunds, trade and/or quantity discounts which the Contractor may receive in the purchase of goods under allowances, to be extended to the Owner.
8. Receipted invoices covering all disbursements made by the Contractor under Allowances, to be submitted to the Consultant for audit.
9. Where the Cash Allowance stipulates "Supply Only," the Contract Price and not the Cash Allowances include the installation and hook-up costs. The installation and hook-up of some equipment and materials are specified under other Sections of the Specifications. The General Contract includes the installation and hook-up not specified elsewhere.

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10. Contractor's profit and overhead on all Cash Allowances to be carried in his lump sum amount, not in the Cash Allowances.
 11. All Cash Allowances will be dealt with in accordance with Article GC4.1 of the General Conditions.
 12. All expenditures under Cash Allowances must be approved by the Owner.
 13. Include in the Stipulated Price quoted, a Cash Allowance in the amount of **Two Hundred and Eighty Thousand Dollars, \$280,000**. To be allocated as follows:
 - .1 Inspection for roofing, waterproofing, air/barrier and steel field reviews.
 - .2 For Testing & Inspections (soil bearing, compaction of backfill around foundation walls and below slab on grade, compaction of sub-base for asphalt areas, reinforcing inspections, concrete testing, mortar and grout tests)
 - .3 For Hardware supply only.
 - .4 For Interior Signage: supply and installation.
 - .4 For Exterior Building Signage and: "Croatian National Home" Name and logo: supply and installation.
 - .6 For testing of excavation materials taken off site.
 - .8 For installation of Data Access Points.
 - .10 For Commissioning of mechanical equipment by third party.
 - .11 For Supply only Architectural Feature Lighting in Hall and Lobby. (include installation per Div. 15)
 - .12 For Mechanical Gas Servicing permit and connection by Gas Company
 14. Taxes HST not to be included in Cash Allowance amounts and will be carried separate from the General Contractor's Stipulated Sum Amount.
 15. Refer to Section 01005 for co-operation with others assigned to this Section.

1.3 Contingency Allowance

1. Include in the Stipulated Price quoted, a Contingency Allowance in the amount of **One Hundred Thousand Dollars, \$100,000.00**
2. Costs of Change Orders taken from Contingency Allowance will be issued in accordance to CCDC2 contract.
3. Credit the Owner with any unused portion of the Contingency Allowance in the statement for final payment.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Tender Form: Section 00100

1.2 Definitions

1. **Base Bid Tenders:** Materials and equipment are specifically described and named in this Specification to establish a standard of materials and workmanship to which the Tenderers must strictly adhere. Where manufacturer's trade names are used, the Tender Amount must be based on the use of such materials and equipment, as specified; no substitutions will be allowed.
2. **Alternative Price:** refers to supplying a specified alternative work in lieu of a specified base bid work. The credit or extra to the Stipulated Sum for alternative prices are to be completed in the Form of Tender.
3. **Separate Price:** refers to supply a price for work specified but not included in the Stipulated Sum. The cost of work specified as a separate price is to be completed in the Form of Tender.

1.3 Alternative Prices

1. Tenderers may include with their lump sum Tenders, alternative proposals based on the use of alternative material equivalent to the materials or equipment specified in quality and performance and provided clearances and dimensions shown on the drawings, are maintained. For all such alternative proposals, the Tenderer must include such proposals and the following information in letter accompanying his Tender, for consideration by the Architect at the time of opening Tenders. Under no circumstances must the Bid for an alternative material or equipment be included in the Tender Amount.
 - .1 Manufacturer's name and supplier's name.
 - .2 Change in price, if any.
 - .3 Reason for proposing alternative.
 - .4 Detail description of alternative assuming full responsibility that any equipment must not exceed the space requirements allocated on the drawings. This Contractor will be responsible for any additional installation cost, resulting from the acceptance of a substitute piece of equipment or product.
2. The Architect reserves the right to accept or reject proposed alternatives as he sees fit, and also to claim for the Owner, the financial benefit of a substitution, if a substitution is accepted.
3. A rejection by the Architect of the proposed alternative material is final, and the Architect does not become obligated to give any reason for his action.

1.4 Approved Equivalents

1. Products, materials or equipment specified in the Specifications may refer to “approved equivalents”.
2. If not specifically named within the specifications as an approved equivalent product, the Contractor must submit the request for an approved equivalent to the Architect in writing.
3. Submissions must be received either by mail or fax and provide detailed quality, performance or other appropriate data on the proposed equivalent.
4. Submissions must be received at the Architect’s office not later than five (5) days prior to Tender.
5. The Architect reserves the right to accept or reject submissions, without reason for his action.
6. Approved Equivalent materials or equipment may be included in the base bid Stipulated Sum.

End of Section

1.1 Project Meetings for Co-ordination

1. In consultation with the Consultant during the second week of construction, arrange for site meetings weekly or every 2 weeks as appropriate to the stage of construction, for project coordination. Such meetings shall fall at the same time each week the meeting is scheduled.
2. Responsible representatives of the Contractor's and Subcontractor's office and field forces and suppliers shall be obliged to attend.
3. Inform the Owner, Consultant, and those others whose attendance is obligatory, of the date of each meeting, in sufficient time to ensure their attendance.
4. Provide physical space for meetings, prepare an agenda, chair and record the minutes of each meeting. Relevant information must be made available to all concerned, in order that problems to be discussed may be expeditiously resolved. Identify "action by: _____".
5. Within three days after each meeting, distribute digital copies of the minutes to each invited person.

1.2 Pre-construction Meeting

1. Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
2. Include in the agenda the following:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Scheduling of Work. Schedule to include a detailed breakdown of mechanical and electrical works.
 - .3 Interference with ongoing business.
 - .4 Work by other Contractors.
 - .5 Schedule of submission of shop drawings and samples.
 - .6 Requirements for temporary facilities, site sign, offices, storage sheds, utilities.
 - .7 Delivery schedule of specified equipment.
 - .8 Site security.
 - .9 Contemplated change notices, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .10 Record drawings.
 - .11 Maintenance manuals.
 - .12 Take-over procedures, acceptance, warranties.
 - .13 Monthly progress claims, administrative procedures, photographs, holdbacks.
 - .14 Appointments of inspection and testing agencies or firms.
 - .15 Insurance, transcript of policies.
 - .16 Schedule for progress meetings.

1.3 Project Meetings for Progress of Work

1. Conduct progress meetings in accordance with the schedule and/or decisions made at Pre-construction meeting.
2. Inform the Owner, Consultant, project consultants, Subcontractors and suppliers and those whose attendance is obligatory, of the date of the meeting, in sufficient time to ensure their attendance.
3. Include in the agenda the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revisions to construction schedule.
 - .8 Progress during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Pending changes and substitutions.
 - .12 Review proposed changes for effect on construction schedule and on completion date.
 - .13 Other business.

1.4 Progress Records

1. Maintain a permanent written record on the site of the progress of the work using standard OGCA form. This record shall be available to the Consultant at the site, and a copy shall be furnished to same on request. The record shall contain:
 - .1 Daily weather conditions, including maximum and minimum temperatures.
 - .2 Dates of the commencement and completion of stage or portion of the work of each trade in each area of the project.
 - .3 Conditions encountered during excavation.
 - .4 Dates of erection and removal of formwork, in each area of the project.
 - .5 Dates of pouring the concrete in each area of the project, with quantity and particulars of the concrete.
 - .6 Work force on project daily per trade.
 - .7 Visits to site by personnel of Consultant, Jurisdictional Authorities and testing companies.

End of Section

1. General

1. Submit to Architect, for review, shop drawings, product data and samples specified.
2. Until submission is reviewed, work involving relevant product must not proceed.

2. Shop Drawings

1. Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate Sections.
2. Identify details by reference to sheet and detail numbers shown on Contract Drawings.
3. Maximum sheet size 24" x 36" as a PDF file.

3. Project Data

1. Certain specification Sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings.
2. Above will only be accepted if they conform to following:
 - .1 Delete information which is not applicable to project.
 - .2 Supplement standard information to provide additional information applicable to project.
 - .3 Show dimensions and clearances required.
 - .4 Show performance characteristics and capacities.
 - .5 Show wiring diagrams (when requested) and controls.

4. Coordination of Submissions

1. Review shop drawings, product data and samples prior to submission.
2. Verify:
 - .1 Field measurements.
 - .2 Field construction criteria.
 - .3 Catalogue numbers and similar data.
3. Coordinate each submission with requirement of work and Contract documents. Individual shop drawings will not be reviewed until all related drawings are available.
4. Contractor's responsibility for errors and omissions in submission is not relieved by Architect's review of submittals.
5. Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Architect's review of submission, unless Architect gives written acceptance of specified deviations.

6. Notify Architect, in writing at time of submission, of deviations from requirements of Contract documents.
7. After Architect's review, distribute copies.

5. Submission Requirements

1. Schedule submissions at least fourteen (14) days before dates that reviewed submissions will be required to be returned.
2. Submit a digital copy (PDF) of shop drawings, product data to Architect for review.
3. Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Number of each shop drawing, product data and sample submitted.
 - .5 Other pertinent data.
4. Submissions must include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name of:
 - .1 Contractor.
 - .2 Subcontractor.
 - .3 Supplier.
 - .4 Manufacturer.
 - .5 Separate detailer when pertinent.
5. Identification of product or material.
 - .1 Relation to adjacent structure or materials.
 - .2 Field dimensions, clearly identified as such.
 - .3 Specification Section number.
 - .4 Applicable standards, such as CSA or CGSB numbers.
 - .5 Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract documents.
6. Interference Drawings
 - .1 Prepare interference drawings for all work in confined space ie: ceiling space.

End of Section

1.1 Access

1. Provide and maintain adequate service roads to project site to provide safe and convenient access for deliveries.

1.2 Contractor's Site Office

1. Provide office adequately heated, lighted and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table, telephone, and facsimile machine. Pay telephone not acceptable.
2. Maintain in clean condition.
3. Provide and maintain in clean condition: two separate plans layout tables, minimum 1200 x 1800 each. One table shall be used by the General Contractor and subcontractors at their discretion. The second shall be provided for use by subcontractors and by the consultant or Inspection and Testing Companies during site visits or project meetings.

1.3 Storage Sheds

1. Provide adequate weathertight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.

1.4 Sanitary Facilities

1. Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
2. Post notices and take such precautions, as required, by local health authorities. Keep area and premises in sanitary condition.
3. When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval or Architect.

1.5 Parking

1. Provide, on site, sufficient temporary parking. Owner will not be responsible for any parking cost incurred by Contractor.

1.6 Site Enclosures

1. Provide around the construction site a temporary leased 1.8 m high modular chain link fence, complete with man and truck gates, which shall be locked when no work is in progress. Maintain fences in good repair during the construction period.

2. Provide siltation control fencing as part of site enclosure, as indicated in Section 01575, and/or required Municipal or Regional authorities. Maintain/restore/replace siltation control fencing as directed throughout the construction period to ensure proper function.

1.7 Enclosure of Structure

1. Provide temporary weathertight enclosures protection for exterior openings until permanently enclosed.
2. Erect enclosures to allow access for installation of materials and working inside enclosure.
3. Design enclosures to withstand wind pressure.

1.8 Power

1. Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.
2. Install temporary facilities for power such as pole lines and underground cables to approval of local power supply authority.
3. Electrical power and lighting systems installed under this Contract may be used for construction requirements with prior approval of Architect, provided that guarantees are not affected. Make good damage. Replace lamps which have been used over period of three (3) months.

1.9 Water Supply

1. Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.

1.10 Drainage

1. Refer to Section 01575 for site drainage and pumping requirements.

1.11 Scaffolding

1. Provide scaffolding in accordance with all by-laws and safety regulations. Scaffolding to be designed by professional engineer when of a complicated nature or when required by safety regulations. Remove promptly when no longer required.

1.12 Heat and Ventilating

1. Pay for cost 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 unless prior approvals given by the Architect.
2. Furnish and install 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 for storage, installation, curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
3. Maintain minimum temperature of 10 degrees C or higher where specified as soon as finishing work is commenced and maintained until acceptance of structure by Engineer.
4. 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 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements.
5. 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.
6. The Owner may permit the use of permanent system providing agreement can be reached on:
 - .1 Conditions of use, special equipment, protection and maintenance.
 - .2 Guarantees will not be affected.
 - .3 Approval of the Owner.

End of Section

1.1 Construction Safety Measures

1. Observe and enforce construction safety measures required by the National Building Code; the O.B.C.; The Provincial Government; Workers' Compensation Board; and Municipal authorities.
2. In particular, the Occupational Health and Safety Act (Ont. Re. 213/91), the Occupational Health and Safety Act, the regulations of the Ontario Ministry of Labour and Ontario Hydro Safety requirements shall be strictly enforced.
3. Contractor shall ensure that copies of all applicable construction safety regulations, codes and standards are available on the job-site throughout the period of construction. All workers are to be informed that these documents are available for reference at any time.
4. The Contractor shall ensure that all supervisory personnel on the job-site are fully aware of the contents of the Occupational Health and safety Act (Ontario Regulation 213/91 - Construction Projects) the Workers' Compensation Act" and, Bill 208 (Chapter 7, Standards of Ontario) "An Act to Amend the Occupational Health & Safety Act and the Workers' Compensation Act", and, that they comply with all requirements and procedures prescribed therein. These documents include, but are not limited to, the following construction safety requirements:
 - .1 Contractor to register with the Director of the Occupational Health and Safety Division before or within 30 days of the commencement of the project, (O.Reg. 213/91, sec 5).
 - .2 File a notice of project with a Director before beginning work on the project, (O.Reg 313/91,sec 6).
 - .3 Notification prior to trenching deeper than 1.2m, (O.Reg. 213/91,sec 7).
 - .4 Accident Notices and Reports, (O.Reg. 213/91, sec 8 through sec 12).
 - .5 General Safety Requirements, (O.Reg. 213/91, sec 13 through sec 19).
 - .6 General Construction Requirements, e.g. protective clothing, hygiene practices, housekeeping, temporary heat, fire safety, access to the job-site, machine and equipment guarding and coverings, scaffolds and platforms, electrical hazards, roofing, et al, (O.Reg. 213/91, sec 20 through sec 221).
 - .7 Establish a Joint Health and Safety Committee where more than 19 workers are employed for more than 3 months, (Bill 208, S.8(2) to S.8(14).
 - .8 Establish a Worker Trades Committee for all projects employing more than 49 workers for more than 3 months, (Bill 208, S-8a(1) to S.8b(4).
 - .9 Ensure that all activities arising out of (.07) and (.08) above are recorded and that minutes are available to an inspector of the Ontario Ministry of Labour.
5. The Contractor shall be considered as the "Constructor" in consideration of the rights and responsibilities for all construction safety requirements, procedures, facilities and inspection of all work performed by the Contractor, Subcontractors/Sub-trades and other Contractors engaged on this project.
6. In the event of a conflict between any of the provisions of the above authorities the most stringent provisions are to be applied.

1.2 Material Safety Data Sheet

1. Material safety Data Sheets (MSDS) must be available at the job-site for any product listed on the Hazardous Ingredients List prior to being used, installed or applied inside of the building.
2. A Material Safety Data Sheet is to be submitted to the Architect for any product which is known to create, or suspected of creating, a health hazard or discomfort during construction or upon commissioning of the project including, but not limited to, the following:
 - .1 adhesives
 - .2 solvents
 - .3 sealants, (caulking, vapour seals, etc.)
 - .4 sprayed-on fireproofing
 - .5 resilient flooring
 - .6 carpet, paint, varnish or other coatings
 - .7 exposed membrane waterproofing
 - .8 special coatings, (terrazo sealants, chafing coatings, etc.)
 - .9 solder, brazing and welding and other filler metal
 - .10 other products whose particles or vapours may become air borne after installation.
 - .11 any other product as directed by the Consultant.
3. Comply with WHMIS regulation, Workplace Hazardous Material Information System.

1.3 Fire Safety Requirements

1. Comply with requirements for Building Construction, the Ontario Building Code, the Ontario Fire Code, the requirements of Local Fire Authorities and of the requirements of the Office of the Fire Marshal.

1.4 Overloading

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

1.5 Falsework

1. Design and construct falsework in accordance with CSA S269.1-1975.

1.6 Scaffolding

1. Design and construct scaffolding in accordance with CSA S269.2-M1980.
2. Scaffolding to be designed by a Professional Engineer when required under the Occupational Health and Safety Act.

1.7 Materials Specifically Excluded

1. Asbestos and/or asbestos-containing products are not permitted. Submit Material Safety Data Sheets for any product suspected of containing asbestos if so requested by Consultant. Examples of some materials requiring close scrutiny and/or confirmation include:
 - .1 Transite drainage pipe - whether buried or above grade - not permitted.
 - .2 Composite floor tile containing asbestos - not permitted.
 - .3 Lay-in ceiling tiles containing asbestos - not permitted.
 - .4 Insulation and/or jacketing for pipes, ducts, motors, pumps, etc. - not permitted if any asbestos is present.

2. Solder for all piping is to be lead-free.
 - .1 "Lead Free" shall mean solder which contains less than 0.030% of lead when dissolved in fluoroboric and nitric acids and tested by inductively coupled argon plasma atomic emission spectroscopy. "Steelbond 281" and "Siverbrite" are acceptable solder products.
 - .2 The mechanical contractor shall provide an affidavit signed by the Principal of the company, on company letterhead, that all of the solder used on the project was either one of the two acceptable products or that the solder used (identified by brand name) meets or exceeds the testing criteria.
 - .3 The Owner shall undertake random testing of the soldered joints. Should testing prove that the solder used was not as specified, the Owner shall take action against the contractor to the full extent of the law.

3. All paint and finish coatings are to be lead and mercury-free. Submit Material Safety Data Sheets confirming that these products are free of all lead and/or mercury compounds.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. These specifications apply to all 16 divisions of the project specification. It is the responsibility of the contractor to apply these provisions wherever practical within specification limits to all products and services used on this project.
2. Recognized that currently specified materials and methods may conflict with the basic intention of this section. Where reasonable alternate materials and methods exist that are not specified here, and that do not compromise quality or create additional cost for the owner, notify the Architect of such alternate materials or methods. Do not proceed to use alternate materials or methods to those specified without the express approval of the Architect.
3. Elsewhere, apply the provisions of this section to all work. Exceptions can only be made when signed off by the Architect. Suitability of all products used is the responsibility of the contractor.

1.2 Compliance Specifications

1. The contractor must comply with all applicable health, safety and environmental regulations.

1.3 Beyond Compliance Specifications

1. These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Owner's intention to develop a specification which maximizes environmentally "friendly" materials and methods wherever possible within current technical and budget limitations.
2. Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore these specifications cover both material and methods.
3. The primary goal of beyond compliance specification is to reduce the use of products or methods which have negative health and environmental impacts both during and after construction. These considerations may include full life cycle impacts, associated with raw materials, manufacturing, transport, deconstruction and their eventual fate.
4. These specifications will specifically address primary categories of readily identifiable products, ingredients and methods.
5. These provisions apply to both indoor and outdoor applications equally.

1.4 Exceptions

1. These specifications recognize that not all substitutes are equal and therefore exceptions can be made based on substantive evidence of necessary and superior performance. Special considerations may be given to restricted substances when secondary provisions are made such as sealed in place (contained) applications. All such exceptions must be approved in writing by the Architect.

PART 2 - MATERIALS

2.1 Products or Substances to be Avoided or Limited in Use

1. No product containing the following substances may be used on this project when an equivalent product without or with a lower concentration of this substance is suitable and available. All products containing substances which are known to cause health effects including but not limited to cancer, mutagenic, neurological, or behavioral effects should be avoided if suitable substitutes not containing or containing lower concentrations are available. This provision shall be limited to information contained on Material Safety Data Sheets, therefore MSDS sheets must be reviewed for all products for which such sheets are required. Applications for exceptions must be accompanied by related MSDS and product application and performance sheets, clearly showing a need for the exception.

2.2 Volatile Organic Compounds

1. No product containing volatile organic compounds (in over simplified terms volatile petro chemical or similar plant derived solvents) may be used on this project when a suitable non VOC or failing that a low VOC substitute is available. Manufacturers may refer to the U.S. EPA definition of VOC's for guidance or alternatively use the low molecular weight organic compound descriptor.

Example: Paints, Coatings, Primer, Adhesives, Chalks, Firestops, etc.

2. Waterborne equivalents are available for most of the solvent borne products used in construction and in most cases would be the preferred alternative. Waterborne products may in some instances have high VOC contents; therefore the fact that a product is waterborne does not automatically make it acceptable.

2.3 Chlorinated Substances

1. Poly Vinyl Chloride (vinyl) and other chlorinated products should be avoided if suitable substitutes are available.

2.4 Plasticizers

1. Plasticisers which off-gas (low molecular weight) should be avoided.

2.5 Man Made Mineral Fibres

1. Products containing mineral fibres which can be emitted or abraded should be avoided.

Examples: duct liner, mineral fibre ceiling tiles, etc.

2.6 Radiation

1. Products or methods which result in the lowest emission of Electro Magnetic Fields are preferred.

2.7 Biocides

1. Products containing biocides (pesticides, miticides, mildewicides, fungicides, rodenticides, etc.) are not to be used if suitable alternatives are available. Highly stable, low human toxicity biocides such as Portercept may be acceptable substitutes. Biocide formulas which break down, emit powders or offgass should be avoided.

2.8 Heavy Metals

1. Heavy metals such as lead, cadmium, mercury etc. should be avoided.

2.9 Aluminum

1. Raw aluminum should be avoided, anodized or factory painted aluminum is acceptable. This is particularly applicable to surfaces which people can touch.

2.10 Ozone Depleting Substances

1. Products which contain or which use Ozone Depleting Substances such as Bromide, Chlorofluorocarbons (CFC) or Hydrofluorocarbons (HFC) etc. should be avoided if suitable substitutes are available.

2.11 Greenhouse Gasses

1. Products which contain, use or generate Greenhouse gasses such as CO₂ should be avoided if suitable substitutes are available.

2.12 Bituminous (tar) Products

1. Products containing tar compounds should not be used if suitable substitutes are available.

2.13 Chemical Compounds

1. Products containing the following chemical compounds should not be used if suitable substitutes are available: Neoprene, Latex, Butyl, ABS, Formaldehyde.

2.14 Adhesives

1. Adhesives containing solvents or other non preferred ingredients should be avoided if suitable substitutes are available, including systems designs which do not need adhesives or can use mechanical etc. fastening alternatives

2.15 Composite Products

1. Some composite products contain adhesives such as formaldehyde which are not preferred, and some composites such as Fibre Reinforced Plastics are not practical for recycling. These products should be avoided if suitable substitutes are available.

2.16 Cleaners and Solvents

1. Products, equipment, and methods which require the use of cleaners and solvents are not preferred if suitable substitutes are available. Examples of preferred products would include No Wax floors, or primerless caulks and adhesives, or products not requiring caulks and adhesives.

End of Section

1.1 Fires

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

1.2 Disposal of Wastes

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

1.3 Drainage

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

1.4 Site Clearing and Plant Protection

1. Protect trees and plants on site and adjacent properties, which are to be retained.
2. Wrap in burlap trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
3. Protect roots of trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

1.5 Pollution Control

1. Install and maintain temporary erosion and pollution control features as requested by local Municipal and Regional Authorities.
2. Install, maintain, restore, replace sediment control fence as required by Municipal and Regional authorities. The fence shall be in accordance with Municipal standards.
3. Install, maintain, restore, replace roadside catchbasin sediment protection at all street catchbasin in accordance with Municipal standards.
4. Install, maintain, restore, replace catchbasin sediment barrier immediately after installation of catch basins on the property in accordance with Municipal Standards.

5. Install and maintain a mud mat at the construction access, consisting of 30m x 5m x 0.45m clear stone and mud mats. Refer to site plan for location.
6. Control emissions from equipment and plant to local authorities' emission requirements.
7. Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

End of Section

1.1 General

1. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
2. Store volatile wastes in covered metal containers, and remove from premises daily.
3. Prevent accumulation of wastes which create hazardous conditions.
4. Provide adequate ventilation during use of volatile or noxious substances.

1.2 Materials

1. Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
2. Provide on-site dump containers for collection of waste materials, and rubbish.

1.3 Cleaning During Construction

1. Maintain project grounds, and public properties free from accumulations of waste materials and rubbish. Clean streets as often as required by the local authorities.
2. Remove waste materials, and rubbish from site.
3. Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.
4. Schedule cleaning operations so that resulting dust and other contaminants will not fall on wet, newly painted surfaces.

1.4 Final Cleaning

1. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all surfaces exposed to view; leave project clean and ready for occupancy.
2. Employ experienced workers, or professional cleaners, for final cleaning.
3. In preparation for Substantial Performance or Fitness for Occupancy status, whichever occurs first, conduct final inspection of interior and exterior surfaces exposed to view, and of concealed spaces.
4. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all sight-exposed interior and exterior finished surfaces; polish resilient and ceramic surfaces so designated to shine finish. Vacuum carpet.
5. Clean and polish glass and mirrors.

6. Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.
7. Broom-clean paved surfaces; rake clean other surfaces of grounds.
8. Clean exposed ductwork and structure.
9. Replace filters.
10. Clean bulbs and lamps and replace those burned out.
11. Clean diffusers and grilles.
12. Clean sinks, faucets, and water closets and controls.
13. Remove snow and ice from access to building, if applicable.
14. Maintain cleaning until project, or portion thereof, is occupied by Owner.

1.5 Removal of Temporary Facilities

1. Completely remove temporary facilities from site, including signs and foundations, making good any damage when no longer required.

End of Section

PART 1 - GENERAL

1.1 Requirements Included

1. Record documents, samples, specifications.
2. Equipment and systems.
3. Product data, materials and finishes, and related information.

1.2 Quality Assurance

1. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.3 Format

1. Organize data in the form of an instructional manual.
2. Binders: commercial quality, (8-1/2 x 11 inch) 219 x 279 mm maximum (2-1/2") 65 mm ring size.
3. When multiple binders are used, correlate data into related consistent groupings.
4. Cover: Identify each binder with type or printed title "Project Record Documents", list title of Project, identify subject matter of contents.
5. Arrange content 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. Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.4 Contents, Each Volume

1. Table of Contents: Provide title of project; names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
2. For each Product or System: list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
3. Product Data: mark 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. Typed Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

1.5 Submission

1. Submit one copy of completed volumes in final form 15 days prior to substantial performance. For equipment put into use with Owner's permission during construction, submit Operating and Maintenance Manuals within 10 days after start-up. For items of Work delayed materially beyond date of Substantial Performance, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.
2. Copy will be returned after inspection, with Consultant comments.
3. Revise content of documents as required prior to final submittal.
4. Submit 2 copies of revised volumes of data in final form within 10 days after final inspection.
5. For contract drawings (architectural, civil, landscaping, structural, mechanical, and electrical), transfer neatly as-built notations onto second set and submit both sets.
Submission to the Architect is a mandatory requirement of Total Completion of the Contract.

1.6 Record Documents and Samples

1. In addition to requirements in General Conditions, maintain at the site for Owner 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.
 - .9 AS-Building Survey of the foundations must be provided to the consultant showing setbacks from property lines and conformance to the approved site plan.
2. Store Record Documents and Samples in Field Office apart from documents used for construction. Provide files, racks, and secure storage.
3. Label 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 a 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 As-Built Conditions

1. Consultant will provide two (2) complete sets of white prints of project drawings and two (2) complete sets of specifications for the purpose of recording as-built conditions. Mark and record one set on an on-going basis as construction proceeds. **Near the end of the construction period transfer all marks neatly to second set for submission as project record documents.**
2. Refer to drawings/specifications for additional mechanical and electrical requirements.
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 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 Addenda and 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 catalog number of each project 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 Digital As-Built Drawings

1. Retain the services of a CAD drafting company acceptable to the consultant to prepare digital CAD As-Built documents for all Architectural and Engineering drawings.
2. After the consultant has found the Redlined As-Built drawings to be acceptable, transfer to digital file all information recorded on As-Built drawings. Layering of information as per consultant's instructions.

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. Panelboard 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 instruction. Include summer, winter, and any special operating instructions.
5. Maintain Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair and reassemble 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 lists, illustrations, assembly drawings, and diagrams required for maintenance.
10. Provide installed control diagrams by controls manufacturer.
11. Provide Contractor's co-ordination 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 balancing reports as specified in Division 15.
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 catalog 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 recommend schedule for cleaning and maintenance.
4. Additional Requirements: as specified in individual specifications sections.

1.11 Guarantees, Warranties and Bonds

1. Separate each warranty or bond with index tab sheets keyed to the List of Contents listing.
2. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal. Use Guarantee/Warranty Form as provided in Section 01721 whenever standard preprinted trade or manufacturer's Guarantee/Warranty forms are not available. Provide written form for each warranty specified in Section 01740.
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.

End of Section

1.1 Notes

1. To be made out on the letterhead of Guarantor or Warrantor which usually is a Subcontractor.
2. This format is to be used only when standard preprinted trade or manufacturer's forms are not available. Preprinted forms are to include all elements of information shown on this sample or as a minimum.
3. Comply with Requirements for Guarantee/Warranty as specified in Section 01720, Article 11.

To: Croatian National Home
615 Barton Street East
Stoney Creek, Ontario

Date: _____

SECTION _____

TITLE _____

GUARANTEE/WARRANTY TO:

OWNER Croatian National Home

PROJECT New Cultural Club – Croatian National Home

ARCHITECT Grguric Architects Incorporated

REFERENCE (to specifications or drawings)

TIME Period of Guarantee/Warranty: _____ years

GUARANTEE/WARRANTY Starting Date: Substantial Performance as certified by Architect

Date: _____

(Description of Guarantee/Warranty)

Upon written notification from the Owner or the Consultant that the above work is defective any repair or replacement work required shall be to the Consultant's satisfaction at no cost to the Owner.

This guarantee shall not apply to defects caused by the work of others, maltreatment of materials, negligence or Acts of God.

SUBCONTRACTOR

Signature

Date

Authorized Signing
Officer:

(Name Printed)

Title

Name of Firm:

Address:

Telephone Number

CONTRACTOR

Signature

Date

Authorized Signing
Officer:

(Name Printed)

Title

Name of Firm:

SEAL

Address:

Telephone Number

End of Section

1.1 Maintenance Manuals

1. On completion of project, submit to Architect two (2) copies of Operations Data and Maintenance Manual in English, made up as follows:
 - .1 Bind data in vinyl hard covered, 3 ring loose leaf binder for 215 x 280 mm size paper.
 - .2 Enclose title sheet, labelled "Operation Data and Maintenance Manual", project name, date and list of contents.
 - .3 Organize contents into applicable sections of work to parallel project's specification break-down. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
 - .4 A digital copy of all documents in the manuals must be provided on a CD or memory stick format to be PDF.

2. Include following information, plus data specified.
 - .1 Maintenance instructions for finished surface and materials.
 - .2 Copy of hardware and paint schedules.
 - .3 Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.
 - .4 Names, addresses and phone numbers of sub-contractors and suppliers.
 - .5 Guarantees, Warranties and bonds showing:
 - .1 Name and address of project.
 - .2 Guarantee commencement date (date of Final Certificate of Completion).
 - .3 Duration of guarantee.
 - .4 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.
 - .5 Signature and seal of Contractor.
 - .6 Additional material used in project listed under various Sections showing name of manufacturer and source of supply.

3. Neatly type lists and notes. Use clear drawings, diagrams or manufacturers' literature.

4. Include in the Manuals a complete set of final shop drawings indicating corrections and changes made during fabrication and installation.

End of Section

PART 1 – GENERAL

1.1 Bonds

1. Refer to Document 00200 Instruction to Bidders, Standard Contract Document CCDC No. 2, 2020 for bonding requirements for this project, both at the time of tender submission and throughout the duration of the construction period.

1.2 Standard Warranty

1. Refer to Standard Contract Document CCDC No. 2, 2020 for warranty requirements and conditions for the standard warranty which is required for the work of this contract.

1.3 Extended Warranties

1. Refer to individual specifications sections for requirements of extended warranties required for particular sections or items of work.
2. Extended warranties are required to be issued by manufacturers, fabricators, suppliers and/or installers, sometimes jointly, due to their unique position in the construction process and their ability to guarantee a particular section of work. Refer to individual requirements of extended warranties requested.
3. Unless specifically noted otherwise, all extended warranties shall commence on the date of Substantial Performance of the Work as certified by the Consultant.
4. Listed below is a summary of extended warranties required for individual Sections. This list, if inconsistent with the specified requirements of individual extended warranties, shall be deemed correct with respect to length of extended warranties. Extended warranties required shall include, but not be limited to, the following:

Extended warranties (total warranty period listed, including entire building warranty)

	Concrete floors	3 years
02490	Trees, Shrubs & Groundcover	1 year
02600	Asphalt Paving	2 years
06400	Architectural Woodworking	2 years
07250	Cementitious Fireproofing	2 years
07421	Aluminum Composite Panels	refer to section
07520	SBS Modified Bituminous Membrane Roofing	refer to section
07615	Preformed Metal Siding	5 years
07620	Sheet Metal Flashing & Trim	refer to section
07900	Sealants	5 years
07901	Joint Sealers for Roofing	2 years
08100	Commercial Steel Doors & Frames	refer to section
08211	Wood Doors	3 years
08520	Aluminum Windows and Doors	refer to section
08800	Glazing	5 years
09310	Ceramic Tile	3 years
09330	Floor Porcelain Tile	3 years

09510	Acoustic Unit Ceiling	2 years
09900	Painting	2 years
14240	Hydraulic Passenger Elevator	refer to section

End of Section

1.1 Description of Work

1. This Section includes parameters for the general design and performance for the work of Sections which comprise the building envelope including but not limited to, masonry cavity walls, metal cladding, soffits, windows, entrances and roofing.
2. Performance of the building envelope shall be guaranteed by the Contractor.

1.2 Design

1. **General:** Design and engineer as required, fabricate, erect, and/or install building envelope in compliance with the Ontario Building Code, other regulations and requirements of authorities having jurisdiction.
2. Take into account construction tolerance limitations, creepage, deflection and other movements of the structure.
3. Accommodate, by means of expansion and contraction provisions, any movement in the building envelope assemblies themselves and between the assemblies and the building structure. Allow for expansion and contraction of components caused by ambient temperature range, surface temperature variation of components, wind, seismic forces, structural deflection and racking; without causing misalignment of joints, breakage of joints and air/vapour barriers, water and air penetration through the assembly, glass breakage, or other defects detrimental to appearance or performance.
4. Method of attachment to the structure shall take into account site peculiarities so that site and air vibrations or normal temperature movements of the building do not loosen, weaken and/or fracture the connection between building envelope assembly components and the structure or between the components themselves.
5. Reinforce building envelope assembly components, as required, so that the members can safely sustain design loads.
6. Assemble and secure assemblies in manner which will keep stresses on sealants within the sealant manufacturer's recommended maximum performance levels.
7. **Rain Screen Principle:** Except where detailed otherwise, construct building envelope assemblies based on the "Rain Screen" principle as advocated by the National Research Council of Canada. All voids between the assembly components as well as those between components and the structure shall have:
 - .1 gaskets, baffles, overlaps, seals and compartmentalization as required to provide a barrier "Rain Screen" to effectively prevent excessive rain water entry into any of the building envelope cavities but to allow pressure equalization of cavity air spaces.

- .2 air barriers and seals are required to prevent entry of interior building air into building envelope cavities, and exterior air into the building. Air barriers and seals shall be able to withstand wind design pressures.
- .3 such provisions in the form of openings between cavities and the building exterior of sufficient cross sections to provide adequate pressure equalization. All openings shall be effectively baffled against direct rain water entry. Air spaces shall be baffled and compartmentalized to prevent chimney effect within the air spaces vertically and horizontally.
- .4 Thermal separators, isolators and seals placed to eliminate contact between interior humid air and a cold surface or structural component to prevent condensation and ice build-up on such surfaces during cold weather.

1.3 Water, Vapour and Moisture

1. Comply with the design and performance requirements specified in the building code, and as specified herein, including the following principles:
2. Drain to the exterior face of the assembly, any water entering at joints and any condensation occurring within the building envelope assembly.
3. Design, fabricate and install the assembly to be watertight to the interior under the interior and exterior design conditions in combination with movements occurring due to loads imposed.
4. At design conditions no water penetration to the building interior side of the assembly shall occur.
5. The requirements for an air barrier and a vapour barrier are intended to be provided at the same plane in the building envelope design unless otherwise indicated or specified. In such cases, the Drawings and Specifications refer to "air/vapour barrier". The definition of the air/vapour barrier for the purpose of these Specifications is "a continuous membrane including joints of membrane between components and to adjacent construction which prevents or retards penetration of moisture laden air and the diffusion of water vapour through it".
6. The maximum water vapour transmission of all components forming the vapour barrier shall be (1.72 ng/Pa x s x sq.m.) (0.3 Imperial Perms) unless specified otherwise.
7. At design conditions no condensation shall occur on room side surfaces.
8. Sound: Provide completed installations free from vibrations, wind whistles and noise due to thermal and structural movement and wind pressure.
9. Seismic: Fabricate and erect cladding assemblies to prevent damage due to earthquake forces as required by The Ontario Building Code.

1.4 Quality Control

1. **General:** Materials and workmanship shall be subject to inspection at any time. Cooperate in permitting access for inspection to all places where work is being done or stock is being stored.
2. Owner's quality control inspection and testing is specified in the technical sections and will be paid from Cash Allowance except as otherwise specified. Pay for inspections and retesting to verify acceptability of corrected work.
3. Allow sufficient time for testing, evaluation, alterations and retesting so as not to interrupt the Progress Schedule for the Project.
4. The Consultant may require testing of connections and special prefabricated inserts, as part of the work of this Section.

1.5 Sealants

1. Sealants used for the various building envelope assemblies shall be selected from those specified in the respective assembly Section, and shall be coordinated with the sealant being provided under other building envelope Sections. Preferably, one sealant by the same manufacturer shall be used throughout. If different sealants are selected, from those specified, it is the responsibility of the respective Section to ensure compatibility between selected sealant, substrates, and sealants of other Sections which come in contact with the selected sealant.

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.

1.2 Related Work Specified Elsewhere

1. Site Grading Section 02210
2. Excavation, Backfilling and Rough Grading Section 02220

1.3 Examination

1. Examine the Drawings, Specifications, and Bore Hole data which show soil conditions at boreholes in locations shown on Drawings. Visit the site and determine the work extent and nature of the existing conditions. In no circumstances will any claims against the Owner be allowed resulting from failure to ascertain the work herein described or implied.
2. Report to the Consultant in writing any conditions which will prejudice the proper completion of the work of this Section. Commencement of work constitutes acceptance of existing conditions.

1.4 Protection

1. Establish locations of all electrical, telephone, or other service installations existing in the areas of site preparation by contacting the service owners and obtaining their approval to work in such areas. Contact the Municipality, the Region of Halton and local utilities to review proposed scheduling, work activities and regulations pertaining to all work beyond the limits of the property including but not limited to parking areas, stormwater outlet and headwall and asphalt driveway entrances. Provide adequate markers or take protective measures to ensure that no damage will be caused under this Section. Repair or replace damaged work as required without cost to the Owner.
2. Electronically locate, map and record location of services prior to doing any excavation.

1.5 Dust Control

1. Provide and maintain to the Consultant's satisfaction, adequate system to avoid any nuisance caused by dust and dirt rising throughout the area of operations.

1.6 Silt Control

1. Provide and maintain to the Consultant's and to the Authorities' satisfaction, control systems to prevent silt from entering any storm drainage system. Refer to Site Services Drawing for details.

PART 2 - PRODUCTS

2.1 Materials

1. Not applicable.

PART 3 - EXECUTION

3.1 Disposal of Waste and Surplus Materials

1. Except where specified or indicated on Drawings to be retained on site, or to be reused, remove from the site, all waste and surplus materials resulting from site preparation work on a daily basis. Dispose of as required in accordance with local or provincial regulations. Under no circumstances shall the burning of rubbish be permitted on the site. Where items are to be reused, store on site where designated and provide temporary protection to same to prevent damage by construction operations.

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.

1.2 Related Work Specified Elsewhere

- | | |
|--|---------------|
| 1. Site Grading: | Section 02210 |
| 2. Excavation, Backfilling and Rough Grading | Section 02220 |
| 3. Topsoil and Finish Grading: | Section 02260 |

1.3 Definitions

1. Clearing consists of cutting off trees and brush vegetative growth to not more than a specified height above ground and disposing of felled trees and surface debris.
2. Close-cut clearing consists of cutting off or removing at or near flush with original ground surface standing trees, brush, scrub, roots, stumps and embedded logs and disposing of fallen timber and surface debris.
3. Clearing isolated trees consists of cutting off to not more than a specified height above ground of trees designated grubbing and disposing of felled trees and debris.
4. Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm diameter and disposing of all fallen timber and surface debris.
5. Grubbing consists of excavation and disposal of stumps and roots boulders and rock fragments to not less than a specified depth below original ground surface.

1.4 Protection

1. Prevent damage to fencing trees, landscaping, natural features, bench marks, existing buildings, existing pavement, utility lines, site appurtenances, water courses, root systems of trees which are to remain. Make good damage.
2. Apply approved tree paint to cuts or scars suffered by vegetation designated to remain.

PART 2 - PRODUCTS

2.1 Materials

1. Not applicable.

PART 3 - EXECUTION

3.1 Clearing

1. Clear trees, shrubs, uprooted stumps and surface debris not designated to remain.

2. Cut off trees, brush, and scrub as indicated or as directed at a height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations may be 1000 mm.
3. Cut off unsound branches and cut down dangerous trees overhanging area cleared.
4. Close Cut Clearing
5. Cut off trees, shrubs, stumps and other vegetation at ground level to within 100 mm of original ground surface.
6. Perform close cut clearing by hand so that existing insulation of fibrous material is not damaged.
7. Cut off unsound branches and cut down dangerous trees overhanging area cleared.

3.2 Isolated Trees

1. Cut off isolated trees indicated or directed by Consultant at a height of not more than 300mm above ground.
2. Grub out isolated tree stumps.
3. Underbrush Clearing
4. Clear underbrush from areas indicated at ground level.

3.3 Grubbing

1. Grub out stumps and roots to not less than 400 mm below original ground surface.
2. Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m³.

3.4 Removal and Disposal

1. Remove cleared and grubbed materials off site in a manner acceptable to Consultant and Municipal Authorities.
2. Usable timber and rocks become property of Contractor.

3.5 Finished Surface

1. Leave ground surface in a condition suitable for immediate grading operations or stripping of topsoil.

End of Section

PART 1 - GENERAL

1.1 Related Work

- | | |
|---------------------------------|---------------|
| 1. Clearing and Grubbing: | Section 02110 |
| 2. Site Grading: | Section 02210 |
| 3. Top Soil and Finish Grading: | Section 02260 |

PART 2 - PRODUCTS

1. Not applicable.

PART 3 - EXECUTION

3.1 Stripping of Top Soil

1. Remove top soil from areas to be excavated, paved and regraded.
2. Strip top soil when dry enough to prevent contamination of subgrade.
3. Stockpile top soil on site, where directed.
4. Remove from site existing grass and vegetation and surplus top soil, if any.

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.

1.2 Related Work Specified Elsewhere

- | | |
|--------------------------------|---------------|
| 1. Clearing and Grubbing: | Section 02110 |
| 2. Topsoil and Finish Grading: | Section 02260 |
| 3. Asphalt Paving: | Section 02600 |

1.3 Site Conditions

1. Refer to Section 00300.
2. Known underground and surface utility lines and buried objects are indicated on site plan. Confirm exact locations of utility lines and buried objects prior to machine excavation or grading.

1.4 Protection

1. Prevent damage to trees, natural features, bench marks, existing pavement, surface or underground utility lines which are to remain. Make good damage.

PART 2 - PRODUCTS

2.1 Materials

1. Fill material: Type "4" in accordance with Part 2 of Section 02220 – Excavation, Backfilling and Rough Grading.
2. Obtain approval of excavated or graded material used as fill for grading work. Protect approved material from contamination.

PART 3 - EXECUTION

3.1 Stripping of Topsoil

1. The original topsoil will be stripped from the site as part of the work described in Section 02120.

3.2 Grading

1. The Contractor shall use the information shown on the Drawings as well as the information observed during visits to the site during the Tender Period, as the basis for the "Existing Conditions" of the site.
2. Rough grade to levels, profiles, and contours allowing for surface treatment as indicated. Ensure that rough grading operations to not promote water ponding in construction areas. Level depressions with Type "4" fill if suitable compaction can be demonstrated.
3. Perform construction grading and/or pre-grading to allow proper construction access to the Work. Grade site to accommodate vehicle movement, materials, handling and storage and placement of granular base materials (to be used during the construction period).
4. Grade to prevent water ponding on site during construction period. Create additional ditches, swales, slopes, ponds, etc. as required by Contract Documents and Municipal Authorities for control of drainage, sedimentation and topsoil retention.
5. Rough grade to following depths below finish grades:
 - 150 mm for grassed areas.
 - 450 mm for flowerbeds.
 - 600 mm for shrub beds.
 - 540 mm for heavy duty asphalt paving.
 - 420 mm for medium duty asphalt paving.
 - 275 mm for concrete walks and/or unit paving.

Note that the rough grading elevations listed above are nominal.

6. Slope rough grade away from building 1:50 minimum.
7. Grade swales and ditches to profiles and depths indicated.
8. Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
9. Compact filled and disturbed areas to maximum dry density to ASTM D698-78, as follows:
 - 90% under landscape areas.
 - 98% under paved and walk areas and playing fields.
10. Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 Testing

1. Inspection and testing of soil compaction will be carried out by designated testing laboratory as directed by Consultant.
2. Costs of tests will be paid by a Cash Allowance specified in Section 01020.

3.4 Surplus Material

1. Remove surplus material from site in a manner acceptable to Consultant and Municipal Authorities.
2. Remove material unsuitable for fill, grading or landscaping from site in a manner acceptable to Consultant and Municipal Authorities.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

- | | |
|---|-------------------|
| 1. Excavation and Backfill for Mechanical and Electrical: | Divisions 15 & 16 |
| 2. Safety Requirements: | Section 01545 |
| 3. Environmental Protection: | Section 01575 |
| 4. Top Soil and Finish Grading: | Section 02260 |

1.2 Shoring, Bracing & Underpinning

1. Prevent movement or settlement, safeguard and maintain integrity of adjacent structures, earth, bench marks, services, walks, paving, trees, bearing piles, curbs, landscaping, adjacent grades. Provide bracing, shoring and underpinning required.
2. Shore and brace excavations to prevent failure in accordance with Canadian Construction Safety Code 1977 and applicable local regulations.
3. Make good and pay for any damage and be liable for any injury resulting from inadequate shoring, bracing or underpinning.

1.3 Utility Lines

1. Before commencing work, establish location and extent of underground utility lines in area of excavation. Notify Architect of findings.
2. Known underground and surface utility lines and buried objects are indicated on site plans. No guarantee is given of completeness and accuracy.
3. Make good and pay for damage to existing utility lines resulting from work.

1.4 Protection

1. Protect bottoms of excavations from softening. Should softening occur, remove softened soil and replace with footing concrete.
2. Protect bottoms of excavations from freezing.
3. Construction banks in accordance with local by-laws.
4. Provide adequate protection around bench markers, layout markers, survey markers, and geodetic monuments.
5. Provide protection to ensure no damage to existing facilities and equipment situated on site.
6. Effect approved measures to minimize dust as a result of this work.

7. Do not stockpile excavated material to interfere with site operation or drainage.

1.5 Compaction Densities

1. Compaction densities are percentages of maximum densities obtainable from ASTM D698-70.

PART 2 - PRODUCTS

2.1 Materials

1. See Soil Report for suitability of existing soil as fill. Excavated or graded material to be approved before use as fill. Protect such approved material from contamination.
2. **Type 1 Fill:** Clean, graded 20 mm clear crushed stone. Containing less than 10% passing the No. 4 sieve.
3. **Type 2 Fill:** Clean, natural river sand and gravel material, free from silt, clay, loam friable or soluble materials and organic matter, graded within the limits of MTC granular class "B" material.
4. **Type 3 Fill:** Concrete backfill 15 Mpa strength at 28 days complying with the requirements of Section 03300.
5. **Type 4 Fill:** Excavated pervious soil free from roots, rocks larger than 75 mm and building debris. If sufficient quantity of material is not available from excavation, use imported fill having same or better characteristics.
6. **Type 5 Fill:** Fine grain material such as clay, that is relatively impervious to the flow of water.

2.2 Stockpiling

1. Stockpile fill materials in areas designated by Architect. Stockpile granular materials in manner to prevent segregation. Protect stockpiled fill material from freezing.
2. Protect fill materials from contamination.

PART 3 - EXECUTION

3.1 Preparation

1. **Lines and Levels:** Establish accurate lines and levels as required. Supply batter board, line stakes and templates. Establish permanent reference lines and bench marks required.
2. Prevent damage to sides and bottoms of excavated pits and trenches from exposure to sun and rain which would cause cave-ins or softening of beds on which foundations and drains rest.

3. **Keep excavations free of water while work is in progress:** Prevent flow of water and earth fines into excavated pits and trenches. Seal or divert flow from springs that fill excavations.
4. Bail, pump out or divert water from excavations, from whatever cause, as it accumulates, and until the permanent drainage is operational and foundations are in place.

3.2 Excavating

1. Excavate to elevations and dimensions indicated for installation, construction and inspection of work.
2. Excavate to well defined lines to minimize quantity of fill material required.
3. Earth bottoms of excavations to be dry, undisturbed soil, level, free from loose or organic matter.
4. Excavation must not interfere with normal 45 deg. splay of bearing from bottom of any footing.
5. Correct unauthorized excavation at no extra cost as follows:
 - .1 Fill under bearing surfaces and footings with type 3 fill.
 - .2 Fill under other areas with Type 2 fill compacted to 100% density.
6. Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw. Seal cuts with approved tree wound dressing.
7. Remove paving, walks, rubble and other obstructions encountered in course of excavation.
8. Keep a record of founding elevations of footings. This record must be approved by the *Consultant* before claims for extra will be considered.
9. Extras will be paid only if, upon excavating to the specified founding elevations, it is found that conditions do not meet the requirements set forth in the *Contract Documents*. No extras will be paid if footings are lowered due to construction activity, over excavation, or through undermining by the installation of electrical and mechanical services.
10. Use hand methods to carry out final trimming of footing beds, prior to placement of reinforcement and concrete. Accurately level the bottom of footing excavations.
11. Remove water, disturbed soil or foreign matter from footing excavations before placing reinforcement or concrete.
12. Footings are not to be concreted until the soil at founding elevation is inspected and approved by the geotechnical engineer.

3.3 Backfilling

1. Do not commence backfilling until areas of *Work* to be backfilled have been inspected, and pipe and conduit joints tested and accepted by *Consultant*.
2. Areas to be backfilled shall be free from debris, snow, ice, water or frozen ground. Backfill material shall not be frozen or contain ice, snow or debris.
3. Prior to placing fill under slabs on grade, compact existing subgrade to obtain same compaction, as specified for fill. Remove “soft” material and fill with approved material.
4. Prior to installation of foundations compact existing subgrade to obtain bearing capacity. Remove soft material and fill with approved material.
5. Backfill simultaneously each side of walls and other structures to equalize soil pressures.
6. Request reviews by *Consultant* and geotechnical engineer of excavation prior to beginning backfilling.
7. Obtain *Consultant*’s acceptance prior to placing backfill against basement walls.
8. Where temporary unbalanced earth pressures are liable to develop on walls or the structures, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Architect.
9. Place and compact fill materials in continuous horizontal layers not exceeding 200 mm loose depth. Do not disturb or damage buried services, drainage system, waterproofing and dampproofing. Make good any damage.
10. Do not use frozen material for backfilling or filling.

3.4 Fill Locations & Compaction

1. **Type 1 Fill:**
 - .1 Use under interior concrete slabs on grade to a minimum compacted depth of 200 mm.
 - .2 Use under all exterior concrete slab on grade to a minimum compacted depth of 150 mm.
 - .3 Compact to at least 100% standard proctor maximum dry density.
2. **Type 2 Fill:**
 - .1 Use within building area, in trenches, pits and fill for over-excavated areas to underside of type 1 Fill.
 - .2 Compact to at least 100% standard proctor maximum dry density.
3. **Type 3 Fill:**
 - .1 Use under foundations where specified.
4. **Type 4 Fill:**
 - .1 Use at exterior side of perimeter walls to subgrade level.

- .2 Use on backside of retaining walls to subgrade level on high side for minimum 500 mm from wall. Compact to 95% standard proctor maximum dry density.

5. Type 5 Fill:

- .1 Use at perimeter of building at weeping tile location, above type 2 fill, in landscaped areas prior to placing top soil – See Section 02411.

3.5 Grading

1. Rough grade to levels, profiles, and contours allowing for surface treatment as indicated. Under paved areas, subgrade must be properly shaped and crowned to provide drainage of the sub-base to the catch basins and to the sub-drainage system. Cross fall to be 2% minimum.
2. Slope rough grade away from building 1:50 minimum.
3. Grade ditches to depth required for maximum run-off.
4. Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Moisture content of fill and existing surface to be approximately the same to facilitate bonding.
5. Compact filled and disturbed areas to standard proctor maximum dry density to ASTM D698-78 as follows:
 - .1 95% under landscaped area.
 - .2 100% under paved and walk areas and under sports field.
6. Do not disturb soil within branch spread of trees or shrubs to remain.

3.6 Inspection & Testing

1. Refer to Section 01005, Paragraph 19.

3.7 Surplus Material

1. Dispose of surplus material from site.
2. Dispose of material unsuitable for fill, grading or landscaping from site.

End of Section

PART 1 - GENERAL

1.1 Related Work in Other Sections

- | | |
|--|---------------|
| 1. Site Grading: | Section 02210 |
| 2. Excavation, Backfilling and Rough Grading : | Section 02220 |

1.2 Landscape Sub-Contractor's Work

1. The work of the following sections must be performed by only one subcontractor referred as the landscape sub-contractor.
 - Section 02260 Top Soil and Finish Grading
 - Section 02487 Sodding
 - Section 02490 Trees, Shrubs and Groundcovers

1.3 Quality Assurance

1. Should the source of topsoil be exhausted, test topsoil from new source, submit soil analysis report and recommendations for correction and obtain the approval from the Consultant before using.
2. Obtain approval of the topsoil in writing from the Consultant.
3. Test topsoil for NPK, Mg, Soluble salt content, organic matter, pH and permeability.
4. Submit 2 copies of the soil analysis report and recommendations for correction to the Consultant.

1.4 Product Delivery, Storage and Handling

1. Stockpile topsoil in locations designated by the Consultant.
2. Do not spread topsoil in a frozen or muddy condition.

1.5 Site Conditions

1. Should the source of topsoil be exhausted, test topsoil from new source, submit soil analysis report and recommendations for correction and obtain the approval from the Consultant before using.
2. Prevent damage to existing buildings, sidewalks, pavement, utility lines, servicing and other existing structures which are to remain.
3. Do not bury foreign material beneath areas to be landscaped. Dispose of debris prior to topsoil placement and remove from the site.

1.6 Product Delivery, Storage and Handling

1. Stockpile topsoil in locations designated by the Consultant.
2. Do not spread topsoil in a frozen or muddy condition.

PART 2 - PRODUCTS

2.1 Materials

1. Topsoil: From stockpile stripped from site.
2. Imported Topsoil: A fertile, friable natural loam; containing not less than 4% organic matter for lay loams and not less than 2% organic matter for sandy loams to a maximum of 15%, and capable of sustaining vigorous plant growth, free of subsoil contamination, roots and stones over 50mm in diameter, reasonably free of weeds (as determined by the Consultant), and having a pH ranging from 6.0 to 7.5.

PART 3 - EXECUTION

3.1 Preparation

1. All subgrade shall be approved by the Consultant before the placement of topsoil.
2. Fine grade the subgrade eliminating uneven areas and filling low spots. Remove all debris and all subsoil that has been contaminated with oil or gasoline.
3. Compact finished subgrade to 95% Standard Proctor Dry density for areas under sod or planting.
4. Scarify subgrade to a depth of 100mm.
5. Topsoil to be compacted to a firmness sufficient to show a heel imprint of not more than 3mm deep. The top 50mm of topsoil shall be of a fine texture suitable for placement of sod.
6. Manually spread topsoil around trees and plants to prevent damage by grading levelling equipment.
7. Float the area until surface is smooth. Cut smooth falls to catch basin rims and finish up flush.
8. Do not cover catch basins, valve covers or inspection pits
9. Fine grade the topsoil to ensure positive drainage away from buildings and sidewalks; provide positive drainage from curb edges.
10. Leave surface smooth, uniform and sufficiently firm to prevent sinkage pockets when irrigated.
11. Obtain approval of topsoil grading prior to the placing of plant material or sod.

3.2 Spreading of Topsoil

1. Spread dry topsoil during dry weather over approved, dry, unfrozen subgrade where sod is indicated.
2. Keep topsoil 20mm below finished grade for sodded areas.
3. Apply topsoil to the following minimum compacted depths:
150mm for seeded areas
150mm for sodded areas
450mm for flower beds
600mm for shrub beds
4. Fine grade topsoil eliminating rough and low areas and to ensure positive drainage.
5. Roll topsoil with a 50kg roller to compact and retain surface. Compact to 85% SPD

3.3 Raking-Out

1. Hand rake areas as a final surface preparation.
2. Coordinate the scheduling of hand raking to ensure that sodding can occur as soon as possible after hand raking.

3.4 Clean-Up

1. Make good any damage caused by topsoil spreading activities at no extra cost.
2. Clean up immediately any soil or debris spilled onto pavement or concrete.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Excavating, Backfilling and Rough Grading: Section 02220
2. Cast-in-Place Concrete: refer to structural drawings

PART 2 - PRODUCTS

2.1 Materials

1. **Pipe and Fittings:** 100 & 150 mm diameter corrugated, plastic drainage tubing to CGSB 41-GP-29M, Type 1 (non-perforated) for discharge lines, Type 2 (perforated) for collector lines.
2. **Filter Cloth:** "Terrafix" 270R or Mirafi 140.
3. **Coarse Filter Aggregate:** 15 mm pea gravel.
4. **Fine Filter Aggregate:** C.S.A. Fine Concrete Aggregate.

PART 3 - EXECUTION

3.1 Installation at Perimeter of Building

1. If drain is not on footing, place a min. 100 mm of coarse filter material.
2. Lay unwrapped perforated pipe directly on coarse filter material. Invert of pipe to be minimum of 250 mm below underside of floor slab. Provide pipes sloping to drains as shown on drawings. Minimum slope 1%.
3. Install minimum 150 mm of coarse filter material to sides and top of perforated pipe for perimeter drainage.
4. Install minimum 300 mm Granular "B" all around coarse filter material (sides and top).
5. Install minimum 150 mm coarse filter material cover on all sides of non-perforated pipe.
6. Ensure pipe interior and coupling surfaces are clean before laying.
7. Do not use concrete, masonry, stones, wood or any type of shim to establish pipe slope.
8. Connect pipes using manufacturer's recommended fittings and seal joints with sewer compound.
9. Protect pipe ends from damage and ingress of foreign material at each end of each day's work or work stoppage.

-
10. Place filter material after pipe installation has been inspected.
 11. Place filter material by hand in 150 mm lifts. Consolidate by tamping lightly. Prevent displacement of pipe.
 12. Backfill trench (1 m wide minimum) with Granular "B" lightly compacted to 95% standard density (except under paved areas: 98%) up to 700 mm below finished grade.
 13. In landscaped areas place 600 mm of impermeable backfill seal compacted clay prior to the placing of top soil.

3.2 Installation Under Paved Areas

1. Trench for weeping tile will be 300 mm wide and extend to a depth of 350 mm minimum in the subgrade below granular base.
2. Line trench with filter cloth. Filter cloth shall be wide enough to overlap 150 mm minimum after backfilling.
3. Place 40 mm of clear crushed aggregate and compact to 98% standard proctor maximum dry density.
4. Lay 150 mm diameter perforated pipe directly on compacted granular material. Minimum slope 0.5%.
5. Backfill trench up to subgrade elevation with clear crushed aggregate compacted to 98% standard proctor maximum dry density.
6. Fold filter cloth over compacted granular. Overlap 150 mm minimum.
7. Where weeping tile pipe joins into other piping or material at storm drains or catch basins and at all direction changes, use specifically designed fittings and seal joints with sewer compound in accordance with manufacturer's instructions.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

- | | |
|---------------------------------|---------------|
| 1. Site Grading: | Section 02210 |
| 2. Topsoil and Finish Grading : | Section 02260 |

1.2 Landscape Sub-Contractor's Work

1. The work of the following sections must be performed by one only subcontractor referred as the landscape sub-contractor.
 - Section 02260 Top Soil and Finish Grading
 - Section 02487 Sodding
 - Section 02490 Trees, Shrubs and Groundcovers

1.3 Quality Assurance

1. Laying of sod to be carried out by experienced personnel under the direction of a skilled foreman.

1.4 Delivery & Storage

1. Schedule deliveries in order to keep storage at jobsite to minimum without causing delays.
2. Deliver, unload and store sod on pallets.
3. Deliver sod to site within 24 h of being lifted and lay sod within 36 h of being lifted.
4. Do not deliver small, irregular or broken pieces of sod.
5. During wet weather allow sod to dry sufficiently to prevent tearing during lifting and handling.
6. During dry weather protect sod from drying and water sod as necessary to ensure its vitality and prevent dropping of soil in handling. Dry sod will be rejected.

1.5 Scheduling of Work

1. Schedule placing of topsoil and finish grading to permit sodding immediately.

1.6 Inspection

1. Obtain approval of the Consultant of the finish topsoil surface before proceeding with sodding.

PART 2 - PRODUCTS

2.1 Materials

1. **Nursery Sod:** Quality and source to comply with standards outlined in "Guide Specification for Nursery Stock," Section 17, 1978 Edition, published by Canadian Nursery Trades Association.
 - .1 Number one (#1) Kentucky Bluegrass/Fescue Sod: Sod grown from minimum 40% Kentucky Bluegrass, 30% Creeping Red Fescue.
2. **Water:** Potable.
3. **Herbicide:** Standard commercial (Canada Pest Control Products Act).
4. **Fertilizer:** Complete synthetic slow release fertilizer with maximum 35% water soluble nitrogen. Formulation ratio 20-10-10 brand name fertilizer for application during maintenance period.
5. **Topsoil:** For sodding and seeding, use existing topsoil stockpile as specified in Section 02260. Provide additional imported topsoil if required at no extra cost and as specified under Section 02490.
6. **Wooden Pegs:** 17 mm x 17 mm x 200 mm.

PART 3 - EXECUTION

3.1 Application of Fertilizer

1. Apply fertilizer before sodding.
2. Spread fertilizer with mechanical spreaders over entire area of topsoil at rate of 16 kg (100 m²) or area.
3. Mix fertilizer thoroughly into upper 50 mm of topsoil.

3.2 Finish Grading

1. Fine grade entire topsoil area to contours and elevations. Eliminate rough spots and low areas to ensure positive drainage.
2. Roll topsoil with 50 kg. roller, minimum 900 mm wide to compact and retain surface.
3. Leave surface smooth, uniform, firm against deep foot printing, with a fine loose texture.

3.3 Laying of Sod

1. Obtain approval of topsoil grade and depth before starting sodding.

2. Lay sod during growing season. Sodding during dry summer period, at freezing temperatures or over frozen soil is not acceptable.
3. Lay sod in rows, perpendicular to slope, smooth and even with adjoining areas, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with a sharp knife.
4. Provide close contact between sod and soil by means of light roller. Heavy rolling to correct irregularities in grade is not permitted.
5. Water immediately after sod laying to obtain moisture penetration through sod into top 100 mm of topsoil.
6. Provide adequate protection of sodded areas against erosion and mechanical damage. Remove protection after lawn areas have been accepted.
7. For slopes greater than 3:1 lay sod sections at right angles to slopes and secure with wooden pegs. Place 6 pegs per m², 100 mm below top edge and to prevent shifting of sod and drive pegs flush with top of sod soil.
8. Lay pieces of sod in turf stone apertures.

3.4 Maintenance

1. Ensure maintenance equipment suitable to Consultant.
2. Water sodded areas in sufficient quantities and at required frequency to maintain sub-soil immediately under sod continuously moist for depth of 75 to 100 mm.
3. Cut grass first time when it reaches height of 40 to 50 mm. Remove clippings which will smother grassed areas.
4. Mow grass once a week (every seventh day) during the growing season at a height of 60 mm.
5. Trim grass edges around planting beds, building walls, light standards, signs, trees, etc., in neat lines as to original layout.
6. Keep sodded areas clean, pick up all debris, papers, excess construction materials or similar materials from all sodded areas and remove from site.
7. Apply herbicide when broad-leaf weeds start developing in competition with grass. Apply herbicide in accordance with manufacturer's instructions when winds are less than 10 km/h, when air temperature is above 10 deg. C.
8. Beginning in early April, fertilize sodded areas with fertilizer for four (4) successive months with a complete slow release fertilizer. Formulation ratio 20-10-10, brand name fertilizer at a rate of 300 lbs/acre.

3.5 Acceptance

1. It is the Contractors responsibility to maintain the sod in good condition until accepted.
2. Sodded areas will be accepted at final inspection provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots and without weeds.
 - .3 No surface soil is visible when grass has been cut to height of 45 mm.
 - .4 Sodded areas have been cut twice.
3. Lawns sodded in fall will be accepted in following spring one (1) month after start of growing season provided acceptance conditions are fulfilled.
4. Replace any deteriorated sod with new sod at the direction of the Consultant.

End of Section

PART 1 - GENERAL

1.1 Source Quality Control

1. The work of the following sections must be performed by only one subcontractor referred to as the landscape sub-contractor.
 - Section 02260 Topsoil and Finish Grading
 - Section 02487 Sodding
 - Section 02490 Trees, Shrubs and Groundcovers
2. Obtain approval of plant material at source.
3. Notify consultant of source of material at least seven days in advance of shipment. No work under this section is to proceed without approval.
4. Acceptance of plant material at its source does not prevent rejection on site prior to or after planting operations.
5. Imported plant material must be accompanied with necessary permits and import licenses. Conform to Federal and Provincial regulations.

1.2 Shipment and Pre-Planting Care

1. Coordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting.
2. Tie branches of trees and shrubs securely and protect plant material against abrasion, exposure and extreme temperature change during transit. Avoid binding of planting stock with rope or wire which would damage bark, break branches or destroy natural shape of plant. Give full support to root ball of large trees during lifting.
3. Cover plant foliage with tarpaulin, and protect bare roots by means of dampened straw, peat moss, saw dust or other acceptable material to prevent loss of moisture during transit and storage.
4. Remove broken and damaged roots with sharp pruning shears.
5. Keep roots moist and protected from sun and wind. Heel-in trees and shrubs, which cannot be planted immediately, in shaded areas and water well.

1.3 Guarantee

1. The contractor hereby warrants that plant material as itemized on plant list will remain free of defects for one year.
2. End-of-Warranty inspection will be conducted.

1.4 Replacements

1. During warranty period, remove from site any plant material that has died or failed to grow satisfactorily as determined by consultant.
2. Replace plant material as soon as horticulturally acceptable.
3. Extend warranty on replacement plant material for a period equal to the original warranty period.
4. Continue such replacement and warranty until plant material is acceptable.

PART 2 - PRODUCTS

2.1 Materials

1. Water: potable and free of minerals, which may be detrimental to plant growth.
2. Stakes: T-bar steel stakes 50 x 50 x 6 x 2440 mm, wood 50 x 50 x 2400 mm.
3. Accessories: factory galvanized, cables, wire tighteners.
4. Guy wires: steel wire strand to CSA G4-M1977 at the following sizes:
 - .1 Shrubs and trees under 77 mm caliper use 2.4 mm wire.
 - .2 Trees 75 to 150 mm caliper use 3 mm wire.
5. Tree rings: fabricated from 3 mm galvanized wire encased in two ply reinforced 12 mm diameter rubber garden hose or equivalent.
6. Root ball burlap: 150 g Hessian burlap.
7. Wire baskets: to be ungalvanized metal.
8. Mulch: Submit samples prior to shipping to site:
 - .1 Shredded bark mulch.
9. Topsoil:
 - .1 For tree pits, planters, and shrub beds to be imported triple mix.
10. Antidesiccant: wax like emulsion to provide film over plant surfaces reducing evaporation but permeable enough to permit transpiration.

2.2 Plant Material

1. Conform to the horticultural standards of the Canadian Nursery Trades Associations with respect to grading and quality. Supplied in strict accordance with Plant List.

2. All plants shall be No. 1 Grade, nursery grown, under proper cultural practices with respect to fertile soil, ample spacing, regular cultivation, weed, pest control, adequate moisture and pruning, in accordance with good horticultural practices as advocated by the Canadian Nursery Trades Association. All such plants shall have been transplanted and/or root pruned regularly, but not later than nine (9) months prior to arrival on the site. The Contractor shall submit sources of plant material, in writing, if so requested by the Consultant.
3. Additional plant material qualifications:
 - .1 Plant material obtained from areas with milder climatic conditions from those of site acceptable only when moved to site prior to the breaking of buds in their original location and heeled-in, in a protected area until conditions suitable for planting.
 - .2 Use trees and shrubs with strong fibrous root system free of disease, insects, defects of injuries and structurally sound. Use trees with straight trunks, well and characteristically branches for species. Plants must have been root pruned regularly, but not later than one growing season prior to arrival on site.
 - .3 Cold storage: written approval from the consultant required for use of plant material which has been held in cold storage.
 - .4 Container grown stock: acceptable if containers large enough for root development. Trees and shrubs must have been grown in container for minimum of one growing season but not longer than two. Root systems must be able to "hold" soil when removed from container. Plants that have become root bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.
 - .5 Balled and burlapped: coniferous and broad-leafed evergreens over 500 mm tall must be dug with soil ball. Deciduous trees in excess of 3 m height must have been dug with large ball. Root balls must include 75% of fibrous and feeder root system. Secure root balls with burlap and heavy twine, rope or wire basket.
 - .6 Collected plant material: will not be permitted.
 - .7 Substitutions to plant material as indicated on planting plan not permitted unless written approval has been obtained as to type, variety and size. Plant substitutions must be of similar species and or equal size as those originally specified. Give timely notice, in writing, to the Consultant when applying for substitutions.

PART 3 - EXECUTION

3.1 Workmanship

1. Stake out location of trees and planting beds as per planting plan. Obtain approval prior to excavating.
2. Apply antidesiccant in accordance with material manufacturer's instructions.
3. Coordinate operations. Keep sit clean and planting holes drained. Immediately remove soil or debris spilled on pavement.

3.2 Planting Time

1. Plant deciduous plant material during dormant period before buds have broken. Plant material noted for spring planting only, must be planted in dormant period.
2. Plant material imported from region with warmer climate conditions may only be planted in early spring.
3. When permission has been obtained to plant deciduous plant material after buds have broken, spray plants with antidesiccant to slow down transpiration prior to transplanting.
4. Plant evergreens in spring before bud break. Apply antidesiccant to evergreens before digging.
5. When permission has been obtained, trees, shrubs and ground covers growing in containers may be planted throughout growing season.
6. Plant only under conditions that are conducive to health and physical conditions of plants.
7. Provide planting schedule. Extending planting operations over long period using limited crew will not be acceptable.

3.3 Excavation

1. Shrubs: excavate planting beds 450 mm deep and the full extend of bed areas as shown on plans. Dispose of excavated material off site.
2. Provide drainage for planting holes in heavy soil if natural drainage does not exist. Have method approved.
3. Protect bottom of excavation against freezing.
4. Remove water which enters excavations prior to planting. Ensure source of water is not ground water.

3.4 Planting

1. Loosen bottom of planting hole to depth of 150 to 200 mm.
2. Plant trees and shrubs vertically with roots placed straight out in hole. Orient plant material to give best appearance in relation to roads and walks.
3. With balled and burlapped root balls, loosen burlap and cut away minimum top 1/3 without disturbing root ball. Do not pull burlap or rope from under root ball. With container stock, remove entire container without disturbing root ball. Non-biodegradable wrappings must be removed.
4. Place plant material to depth equal to depth they were originally growing in nursery.
5. During planting of bare-rooted stock, first shake backfill of planting soil among the roots.

6. Tamp planting soil around root system in layers of 150 mm eliminating air voids. Frozen or saturated planting soil is unacceptable. When 2/3 of planting soil has been placed, fill hole with water. After water has completely penetrated into soil, complete backfilling.
7. Build 100 mm deep saucer around outer edge of hole to assist with maintenance watering.
8. When planting is complete, give surface of planting saucer dressing of organic 1:2:2 fertilizer at rate of 12 kg/100 m² for shrub beds or 40 to 50 g/mm of caliper for trees. Mix fertilizer thoroughly with top layer of planting soil and water in well.

3.5 Protective Wrapping

1. Protective wrapping installed by the nursery to prevent damage during shipping is to be removed upon planting to allow for inspection of the trunk.

3.6 Tree Support

1. Tree support is shown on planting details.
2. Where guy wires are used close to pedestrian ways fasten flags to wires to make them clearly visible.

3.7 Pruning

1. Prune trees and shrubs after planting, as directed, to compensate for loss of roots suffered during transplanting. Postpone pruning, of those trees where heavy bleeding may occur, until in full leaf. Employ clean sharp tools and make cuts flush with main branch, smooth dead and injured branches and branches that rub causing damage to bark. Trim out crown of trees and shrubs without changing their natural shape. Do not damage lead branches or remove smaller twigs along main branches.

3.8 Mulching

1. Obtain approval of planting beds before mulching material is applied. Loosen soil in planting beds and pits and remove debris and weeds. Spread mulch to minimum thickness of 50 mm. Mulch material susceptible to blowing must be moistened and mixed with topsoil before applying. When mulching is placed in fall, place immediately after planting. When mulch is placed in spring, wait until soil has warmed up.

3.9 Maintenance Before Acceptance

1. Perform following maintenance operations from time of planting to acceptance by Consultant:
 - .1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
 - .1 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.

- .2 Remove weeds monthly.
- .3 Replace or re-spread damaged, missing or disturbed mulch.
- .4 For non-mulched areas, cultivate as required to keep top layer of soil friable.
- .5 Apply pesticides in accordance with Federal, Provincial and Municipal regulations as and when required to control insects, fungus and disease. Obtain product approval from Consultant prior to application.
- .6 Remove dead or broken branches from plant material.
- .7 Keep trunk protection and guy wires in proper repair and adjustment.
- .8 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
- .9 Be responsible for protection of all planted areas, until all project work has been completed, approved and accepted.

3.10 Acceptance

1. Plant material will be accepted no sooner than the date at which the project is declared fit for occupancy provided that the following criteria are met:
2. Plant material has been planted for 90 days, exhibits healthy growing condition and is free from disease, insects and fungal organisms.
3. Plant material installed less than 90 days prior to frost will be accepted in following spring, 30 days after start of growing season provided that acceptance conditions are fulfilled.
4. All plant material will be inspected prior to acceptance. All plants must be in a healthy, vigorous, growing condition at time of inspection. All planting beds and tree pits shall be mulched, free of weeds, leaves, broken branches and debris, and in a neat and tidy condition.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Site Grading: Section 02210
2. Excavation, Backfilling and Rough Grading: Section 02220
3. Cast-in-Place Concrete: concrete curbs Refer to Structural Drawings

1.2 Extended Warranty:

1. Submit a warranty for asphalt paving installation, covering materials and labour and the repair or replacement of defective work, but for two (2) years total.

PART 2 - PRODUCTS

2.1 Materials

1. **Sub-Base:** Generally, use Fill type "4" where required to reach design elevations.
2. **Base:** 50 mm and 19 mm crusher run limestone.
3. **Heavy Duty Pavement for Parking and Driveways:** Hot mix, hot laid asphaltic concrete HL8 and HL3, mixture conforming to O.P.S.S. #1150.05.
4. **Medium Duty Pavement for Playground and Walkways:** Hot mix, hot laid asphaltic concrete HL8 and HL3, mixtures conforming to O.P.S.S. #1150.05.
5. **Joint Painting Material:** SS-1 emulsion in accordance with O.P.S.S. #1103.05.

PART 3 - EXECUTION

3.1 Preparation

1. Regard locations and instructions on drawings. Report any discrepancies or questions to the Consultant prior to proceeding with the work. In particular pay attention to the exact delineation of all edges of pavement and types of pavement;
2. Set out work in accordance with lines and levels shown on Drawings. Maintain such lines and levels through duration of work. Ensure positive drainage toward catch basins is maintained in all areas.
3. Compact sub-grade to a minimum of 98% Standard Proctor density.
4. Paint exposed edge of asphaltic joints, edge of manhole and catchbasin frames, curbs and similar items with SS-1 emulsion.

3.2 Installation

1. Inspect site grades prior to installation. Review the precise grade requirements required on the grading plan. Review with the Consultant prior to installation if any conditions exist that may cause deviations from grades shown on Drawings. Coordinate catchbasin elevations with those shown on Mechanical site plan.

2. **Pavement Section:**
 - .1 **Heavy Duty:**
 - minimum 350 mm compacted thickness of 50 mm crusher run limestone compacted to 100% Standard Proctor Maximum Dry Density (SPMDD), ASTM-D698 .
 - 150 mm compacted thickness Base course of 19 mm crusher run limestone compacted to 100% SPMDD.
 - 65 mm compacted thickness of granular asphalt HL8.
 - 40 mm compacted thickness of granular asphalt HL3.
 - .2 **Medium Duty:**
 - 200 mm compacted thickness of 50 mm crusher run limestone Sub-Base compacted to 100% Standard Proctor Maximum Dry Density (SPMDD), ASTM-D698.
 - 150 mm compacted thickness Base course of 19 mm crusher run limestone compacted to 100% SPMDD.
 - 50 mm compacted thickness of granular asphalt HL8.
 - 40 mm compacted thickness of granular asphalt HL3.

3. **Placing Granular Materials:**
 - .1 Exercise due care at all times to prevent granular materials from being contaminated by clay or other types of deleterious materials.
 - .2 Place materials immediately after sub-grade is inspected by the Architect and as follows:
 - .1 To required width and thickness indicated on Drawings in layers not exceeding 100 mm compacted thickness crusher run limestone.
 - .2 Grade each layer and compact to a minimum 100% standard Proctor density to a smoother surface conforming to required cross-section.
 - .3 Finished surface of granular material must not deviate more than 10 mm from designed grade.

4. **Placing Asphaltic Pavement:**
 - .1 Obtain Consultant's inspection of compacted granular base before commencing asphalt paving.
 - .2 Air temperature during placing of mixture must be minimum 7 deg. C and rising. Temperature of mixture when spread must be not less than 120 deg. C nor more than 150 deg. C. Do not increase temperature of mixture to offset long distance hauling.
 - .3 Compact asphaltic mixture as soon as it can bear roller without undue displacement and hairline cracking and continue until all roller marks are eliminated. Speed of roller must at all times be slow enough to avoid displacement

of mixture. Keep roller wheels slightly moistened by water to prevent adhesion of mixture. Excess water will not be permitted. Compact mixture with hot tampers in locations that are not easily accessible to machine roller.

.4 Rolling Procedure:

- .1 Initial and final rolling must be accomplished using self-propelled Class "B" roller.
- .2 Intermediate rolling must be carried out using self-propelled Class "C" roller or "D" roller. Intermediate roller must follow breakdown roller as closely as possible.
- .5 Upon completion of compaction each pavement course must be:
 - .1 Smooth and true to crown and grade with variation not more than 6 mm from thickness shown on Drawing. Do not place any asphaltic course less than 25 mm thick nor more than 75 mm thick.
 - .2 Free from depressions exceeding 3 mm as measured with 3 m straight edge paralleling centre line of driveways/aisles.
 - .3 Compacted to a density not less than 97% Marshall.

5. Joints:

- .1 Cut back bituminous course to its full depth in straight or curved lines as required to expose fresh, straight, vertical surface. Remove broken and loose material.
- .2 Asphalt must be placed in such a manner that joint must not be allowed to cool before adjacent asphalt course is applied.
- .3 Where paving is comprised of two or more courses, joints must overlap by not less than 600 mm.
- .4 Carefully place and compact hot asphaltic material against joints. Correct any unsatisfactory joint before proceeding with work.
- .5 Feathering of joints will not be permitted.

3.3 Inspection & Testing

1. Refer to Section 01005.
2. Field inspections during installation, and core samples of all asphalt areas will be taken as part of Inspection and Testing. If tests show asphalt to be substandard to that specified, all asphalt shall be removed and replaced at the Contractor's expense. Cash credits will not be accepted for work which does not fully comply with drawings and specifications.

3.4 Certification of Grades

1. The Contractor is required to provide as-constructed elevations of the parking area to verify that the parking lot has been constructed in accordance with the contract drawings.

3.5 Pavement Markings

1. Parking Spaces:

- .1 Lay out lines as indicated on drawings and apply 100mm yellow - wide for parking, use mechanical application equipment.
- .2 End limit of each line to have clean, sharp 90° corners with no over spray fogging.
- .3 Thickness of paint application to be consistent throughout.
- .4 Under-sprayed lines shall be repainted.

2. Handicapped Symbols, as indicated on the Drawings, and as follows:

- .1 1200mm x 1200mm- White symbol in blue box.

3. Emergency Fire Route Markings :

- .1 Lay out lines as indicated on drawings and apply.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Cast-In-Place Concrete: refer to Structural Drawings

1.2 References

1. CAN3-A23.1-M90, Concrete Materials and Methods of Concrete Construction.

1.3 Product and Maintenance Data

1. Provide product and maintenance data for concrete floor hardener for incorporation into manual specified in Section (01730 - Operation and Maintenance Manual).
2. Include application instructions for liquid hardener in Operation and Maintenance Manual.

1.4 Environmental Requirements

1. **Temporary Lighting:** minimum 1 200W light source, placed 2.5 m above floor surface, for each 40 m² of floor being finished.
2. **Temporary Heat:** Ambient temperature of 10°C minimum.
3. **Ventilation:** Sufficient to prevent carbon monoxide or high levels of carbon dioxide and other injurious gases from affecting concrete.
4. **Electrical Power:** Sufficient to operate equipment normally used.
5. **Work Area:** Water tight protection against rain and detrimental weather conditions.

1.5 Scope of Work

1. Provide liquid sealer and hardener at interior concrete slab-on-grade areas where indicated as sealed concrete (SC) on architectural drawings /room finish schedule and exclusive of surfaces receiving polished concrete finishes.

PART 2 - PRODUCTS

2.1 Curing–Sealing Compound (SC)

1. Where concrete curing agent/sealer/hardener is specified on drawings, provide Shur-Seal as manufactured by Paul M. Wolff Co. Inc. (714) 974-0630 or Sure Hard manufactured by Dayton Superior's Canada limited.

PART 3 - EXECUTION

3.1 Examination

1. Examine area and conditions under which the work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work and which do not conform to manufacturer's recommendations. Do not proceed until unsatisfactory conditions have been corrected.

3.2 Installation

1. On freshly painted concrete surfaces, no additional surface preparation will be required.
2. On areas where forms are recently removed, remove all form oil and breaking compound residue to assure penetration of the product into the surface.
3. When applying near windows, mask the glass.
4. Avoid contact with plant life, glass, aluminum, and other finished surfaces. Where contact occurs, immediately wipe with a damp cloth or flush with water.
5. Avoid contact with asphaltic concrete.
6. On previously sealed existing concrete floors, completely strip floor of sealers and contaminants prior to application. Apply as for freshly painted surfaces.

3.3 Application Requirements

1. Two applications are required. The first application at 200 ft²/gallon as the curing agent at the time of concrete placement. The second application at 400 ft²/gallon as final coat after final cleaning of the concrete.

3.4 Application

1. Curing Application:

- .1 Application should be made immediately following the final concrete finishing operation as soon as the concrete is firm enough to work on. This will help prevent temperature and hairline cracking.
- .2 Application shall be made with low pressure spray. All concrete surfaces shall be kept wet for 30-45 minutes.
- .3 After this period, when the treated surfaces become slippery under foot, lightly sprinkle the surfaces with water to aid penetration.

2. Finish Application:

- .1 Apply sealer with low pressure sprayer at 400 ft²/gallon coverage rate.

- .2 Lambs wool or fine bristle broom the sealer evenly across the concrete surface.
Do not allow puddling.
- .3 Allow sealer to dry into the surface after 30 minutes.
- .4 Keep standing water off concrete surface for 30 days. Do not wet scrub for 30 days.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Cast-In-Place Concrete: Refer to Structural Drawings
2. Structural Steel Framing Refer to Structural Drawings
3. Steel Joist Framing: Refer to Structural Drawings
4. Miscellaneous Metal Fabrication: Section 05500
5. Air Vapour Barrier Membrane: Section 07112
Note: in order to maintain continuity and quality control, the supply and installation of the full project scope of vapour barrier membrane is to be carried by a single trade.
6. Building Insulation: Section 07212

1.2 Reference Standards

1. CSA-S304.1-04 Design of Masonry Structures
2. CSA- A370-04 (R2009) Connectors to Masonry.
3. CAN/CSA-A371-04 (R2009) Masonry Construction for Buildings.
4. CSA A179-04 (R2009) Mortar and Grout for Unit Masonry
5. CSA-A82-06 Fired Masonry Brick From Clay or Shale
6. CSA A165 Series-04 CSA Standards for Concrete Masonry Units.
7. CSA G30.18-09 Carbon Steel Bars for Concrete Reinforcement
8. CAN/CSA-A3000-08 Cementitious Materials Compendium
9. ASTM A951/A951M-06 Standard Specification for Steel Wire for Masonry Joint Reinforcement
10. ASTM C216-07a Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)
11. ASTM C568-08a Standard Specification for Limestone Dimension Stone
12. ASTM A1064/A1064 Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
13. ASTM C331-05 Standard Specification for Lightweight Aggregates for Concrete Masonry Units
14. ASTM A153/A153M-09 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

1.3 Source Quality Control

1. Submit laboratory test reports certifying compliance of masonry units (and mortar ingredients) with specification requirements.
2. For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption for units proposed for use.
3. All masonry: mortar and grout is to be tested in accordance with CSA-S304.

1.4 Product Delivery, Storage and Handling

1. Ensure that materials are delivered to job site in dry condition.
2. Except where wetting of bricks is specified, keep materials dry until use.
3. Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
4. Store cement under cover. Keep dry and unfrozen.
5. Pile sand on platforms. Exclude foreign matter.
6. Materials stacked on floors of building shall not exceed structural design loads.

1.5 Cold Weather Requirements

1. Comply with Clause 6.7.2 of CSA-A371.

1.6 Hot Weather Requirements

1. Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

1.7 Protection

1. Until completed and protected by flashings or other permanent construction, keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain.
2. Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
3. Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.
4. When air temperature has dropped below 0 degrees C (eg. Overnight), ensure that materials are above freezing and free from ice when installed.

5. Prevent work from freezing for at least 48 hours by enclosure, artificial heat, or other acceptable method.
6. Provide adequate bracing to walls during erection to prevent damage due to winds or other lateral loads.
7. Make good any damage to masonry work until completion of the work.
8. Build masonry in enclosures heated by approved smokeless means, when temperature remains below 0 degrees C. All materials shall be above 4 degrees when installed.
9. Demolish and replace masonry work damaged by freezing.
10. Supplement CSA-A371 as follows:
 - .1 Maintain temperature of mortar between 5° C and 50° C until used.

1.8 Job Mock-up

1. Construct mock-up panel of exterior and interior masonry wall construction 2 m x 2 m showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, mortar, application of membrane air vapour barrier, insulation and workmanship. Mock-up may be part of construction.

1.9 Submittals

1. Make submittals in accordance with Section 01340.
2. Submit samples of:
 - .1 Masonry units (each type).
 - .2 Veneer anchors.
 - .3 Masonry reinforcement.
 - .4 Mortar Colours.
 - .5 Each masonry accessory.

PART 2 - PRODUCTS

2.1 Materials

1. Concrete Masonry Units:

Must be "Bubble Cure" or autoclave process, modular metric size conforming to CSA Standard A165 series.

Normal Weight - H/20/A/M, S/20/A/M.

Lightweight - H/20/C/M, S/20/C/M.

Use normal weight in below ground floor elevation. Use light weight for all above grade walls. All exposed corners to have bullnose units. All blocks be uniform in color, shade and texture. Special shapes as required.

2. Architectural Units:

- .1 **Architectural Masonry Cladding-Type 1:** Arriscraft Evolution Nutmeg
Size: 800mm x 190mm x 90mm.
- .2 **Architectural Masonry Cladding-Type 2:** Arriscraft Renaissance Blacksmith
Size: 590mm x 290mm x 90mm.
Acceptable equal: Shouldice Designer Stone
- .3 **Architectural Precast Concrete Accent -Type 1:**
Size: L1220mm x W190mm x D90mm.
- .4 **Architectural Precast Concrete Sill -Type 2:**
Size: L1200mm x H100mm x 150mm. slope top with underside drip edge cut.
- .5 **Architectural Precast Concrete Header -Type 1:**
Size: 1200mm x 190mm x 90mm.

Acceptable Alternate by: Day and Campbell Ltd, Ed's Precast Products, Parsons.

3. Clay Brick Masonry Units: By Canada Brick

- .1 **All units:** Clay Brick, Grade "SW", by Canada Brick, passing Test Methods specified in CSA-A82. Final selection to be confirmed by Architect. Metric Modular
- .2 **Brick Type "A"** (Canada Architectural Series Brick): Standard colour range. Allow for 50/50% brick blending from standard colour range.
- .3 **DATE STONE** – See drawing AD

Acceptable Alternate by: Thames Valley and Brampton Brick

6 Portland Cement:

- .1 Type 10, in accordance with CSA A3001.

7. Masonry Cement:

- .1 Type "S" and shall comply with CSA A3002.

8. Hydrated Lime:

- .1 Type "S", in accordance with CSA A179.

9. Aggregate:

- .1 Fine grain aggregate, grading in accordance with CSA A179. When 6mm joints are specified, grain shall pass through a 1.18 mm sieve.

10. Water:

- .1 Ensure that water contains no salts which may cause efflorescence.

11. Horizontal Masonry Reinforcing:

Welded truss type or ladder type, as specified from wire to ASTM A951, hot dipped galvanized after fabrication to ASTM A153-05, Class B2, minimum coating 457 G/m², wire size 4.76 mm diameter. Reinforcing as per the following:

- Single wythe walls Dur-O-Wal DW 100;
- Double wythe walls (up to 390 in width) Dur-O-Wal DW 120;
- Double wythe walls (greater than 390) Dur-O-Wal DW 220;
- Cavity Walls Blok-Lok- Blok truss II - BL37 to accommodate 95 mm cavity with 64 mm thick insulation. Use Blok-truss BL 30- or DW 100 if using Ferro slotted block ties. Similar reinforcing by Dur-O-Wal, Blok-Lok, and Hohmann & Barnard Inc. is acceptable.

12. Reinforcing Bars: billet steel to grade 400, deformed bars to CSA-G30.18.

13. Brick Ties:

- .1 Hook type box ties, 4.76 mm galvanized steel wire, to be used in conjunction with Block-Lok Block-Truss II BL 37 at concrete block back-up wall.
- .2 Ferro Slotted Rap-Ties 16 gauge sheet metal, hot tipped galvanized, with 4.76 mm hot tipped galvanized V-Ties – Use at concrete wall back-up, at wood parapet and where other ties are not practical.
- .3 Ferro slotted block ties, 16 gauge sheet metal, hot-dipped galvanized, with 4.76mm hot-dipped galvanized V-ties to accommodate 95 mm cavity with 64 mm thick insulation. To be used in conjunction with horizontal reinforcing as specified under paragraph 2.10.

14. Dampproof Course: Modified bitumen flashing membrane, Blueskin SA manufactured by Bakor, or approved equal.

15. Lateral Support Anchors:

.1 Vertical:

- .1 At intersection and abutting load bearing walls, use prefabricated corners and tees to match horizontal reinforcing.
- .2 At intersection of non-load bearing walls with load bearing or non-load bearing walls, use corrugated galvanized ties.
- .3 At wood parapet and similar conditions, use slotted Rap ties by Fero. Ensure ties extend a minimum of 50 mm into the brick or block outer wythe.
- .4 At connection with existing masonry, use joint stabilization anchors by Dur-O-Wall D/A 2200.
- .5 At control joints, use joint stabilization anchors by DUR-O-WALL D/A 2200.
- .6 At connection with steel structure use weld-on column assembly D/A 709 and D/A 701 by DUR-O-WALL. Supply welded anchor to steel trade for installation.

- .2 **Horizontal:** At underside of building structure use steel angles on both sides of partitions as specified in Section 05121 and detailed on structural drawings. Where not practical, use D/A 2200 joint stabilization anchors by DUR-O-WALL. Fasten to structure. Install at 800 mm O.C.

16. **Bolts and Anchors:** To CSA-A370.

17. **Natural Mortar:**

- .1 **Generally:** Use materials only as specified in CSA A179. Ensure that weather and aggregate used in mortar, other than in walls buried in earth, will not cause efflorescence.
- .2 **Mixes:** Mix mortars as specified in CSA A179 using the Proportion Specification.
- .3 **Mortar Types:**
 - .1 For masonry walls in contact with earth and bedding for bearing plates and lintels: Mortar Type "S".
 - .2 For load-bearing walls: Mortar Type "S".
 - .3 For brick: Mortar Type "N" (1:1:6) premixed "Betomix 1-1-6", portland cement, "S" type, hydrated lime as supplied by Daubois Inc., Jiffy Mortar Systems; Maxi-Mix 1-1-6 silo mortar; or approved equivalent. Mix on site with sand, water, and colour pigment.
 - .4 For all other masonry walls, use regular Type "N" mortar.
- .4 **Grout:** To CSA A179 Table 5.

18. **Colour Pigments:** Pigments constituted of ground coloured natural aggregates or metallic oxide pigments, color by architect, the ratio of coloring agent/density of portland/lime shall not exceed 10%.

19. **Mortar Dropping Control Device:** "Mor-Control" manufactured by Dur-O-Wal or Mortar-Net.

20. **Weepholes:** 90 mm x 90 mm x 10 mm purpose made PVC, designed to drain cavities to prevent insects from entering. Colour to be chosen by Architect from manufacturer's full range.

21. Metal flashing at top of foundation wall and at exterior lintels: 24 gauge prefinished sheet metal with Stelco or Dofasco series 8000 finish – color to match brick. With self adhering membrane flashing at underside (Blue Skin SA).

PART 3 - EXECUTION

3.1 Workmanship

1. Build masonry plumb, level, and true to line, with joints in proper alignment.
2. Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.
3. Set out and build masonry work to the respective dimensions called for on the drawings. Build and lay the block true to line, and level, align vertical joints. Keep angles, reveals, etc. square and plumb.
4. Assume complete responsibility for dimensions of this work.

5. Construct masonry fire rated assemblies in accordance with tested design specifications.
6. Make all joints uniform, in line, square and plumb, with mortar compressed to form joints as specified.
7. Course units to bring wall to required elevations using even, uniform, horizontal and vertical joints of maximum 10mm thickness. Horizontal joints brick soldier coursing to suit adjacent running bond.
8. Check and co-ordinate location of all anchors, connections and built-in items.
9. Bond units at intersection of walls by horizontal prefabricated “tee” or corner reinforcing units.
10. Lay each solid unit in full bed or mortar. Fill vertical joints. Slushing of joints not permitted.
11. Base course to be solid concrete masonry units laid in full mortar bed.
12. Lay each hollow unit in full bed or mortar for face shells. Butter vertical joints full. When laying closure units, butter vertical units already in place instead of units being placed.
13. Lay exposed masonry units using blocks having square, unbroken edges and corners.
14. Tolerances:
 - .1 Variation from mean plane: 6 mm when measured with 3000 mm straight edge.
 - .2 Variation from plumb: 6 mm on any vertical line up to 6000 mm high.
 - .3 Variation in wall opening sizes: 6 mm maximum.
 - .4 Variation of building lines from plan: in any bay or 6000 mm maximum – 12 mm or in 1200 mm or more, 20 mm.
15. Lay out masonry units carefully so as to run as often as possible in full and half unit dimensions. All exposed ends shall match the finish of the faces.
16. All units cut around pipes, ducts, openings, etc. shall be accurately and neatly cut with a power carborundum wheel, and remaining voids shall be slushed full with mortar.
17. Make joints flush and smooth on both sides excepts where they are to be exposed to view. When exposed to view, tool the joints concave, unless otherwise noted.
18. Lay and set up all units carefully so that both faces of the walls are true and even. Do not use chipped or cracked units where exposed to view, even where the defect would not impair strength or durability.
19. Take particular care to keep cavities, weep holes, vents and exposed faces of all units free of mortar.

3.2 Tolerances

1. Clause 6.2 of CAN3-A371 applies except as follows: Walls to receive thinset ceramic tile: plumb within 1:600.

3.3 Exposed Masonry

1. Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.

3.4 Jointing

1. Concave joints, allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, compressed, uniformly concave joints.
2. Raked joints, where split rib blocks are used, allow joints to set just enough to remove excess water, then rake joints uniformly to depth of rib and compress with square tool to provide smooth, compressed, raked joints of uniform depth.
3. Where joints are concealed in walls and where walls are to receive plaster, tile insulation, or other applied material, except paint or similar thin finish coating, strike flush.

3.5 Weepholes

1. Install weepers at regular intervals at both top and bottom of walls as indicated on Drawings. Ensure weepers are clear and unblocked mortar.

3.6 Joining of Work

1. Where necessary to temporarily stop horizontal runs of masonry, and in building corner, Step-back masonry diagonally to lowest course previously laid. Do not "tooth" new masonry. Fill in adjacent course before heights of stepped masonry reach 1200 mm.

3.7 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. Use masonry saw where necessary.

3.8 Building-In

1. Build in items required to be built into masonry by other trades.
2. Prevent displacement of built-in items during construction. Check for plumbness, alignment, and correctness of position, as work progresses.
3. Brace door jambs to maintain plumbness. Fill door frame with concrete.

3.9 Wetting of Bricks

1. Except during winter, wet clay brick having an initial rate of absorption exceeding 1g/min/100mm²; wet to uniform degree of saturation, to 24 hours before laying, and do not lay until surface is dry.

2. Similarly, wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.

3.10 Support of Loads

1. Where concrete fill is used in lieu of solid units, use 20 MPa concrete to Section 03300.
2. Install building paper below voids to be filled with concrete; keep paper 25 mm back from faces of units.

3.11 Provision for Movement

1. Leave 5 mm space below shelf angles.
2. Leave 6 mm space and do not use wedges between tops of non-load bearing walls and partitions and structural elements.

3.12 Loose Steel Lintels

1. Install loose steel lintels. Centre over opening width.

3.13 Control Joints

1. Except as noted following, control joints required at maximum of 6000 mm o.c. in continuous walls having no openings, intersections or column locations. Refer to elevations for locations on exterior walls and advise Consultant of variances prior to executing the work. Control joints are not shown for clarity on the drawings for interior walls. If in doubt, request assistance from the Consultant.
2. At doorway locations, unless indicated otherwise on elevation drawings, use one side of doorway beyond lintel. Use building paper to prevent that end of lintel to bond.
3. Use standard block with concrete filled end core to form key. Line one side of core with building paper before filling core to prevent bonding. Complete vertical separation, full height and thickness of wall are required.
4. Stop masonry reinforcing at each side of the joints. Caulking specified in Section 07900.
5. At expansion joints in brick and veneer, install Rapid Expansion joint DA 2015, to leave vertical joint free of mortar to allow for horizontal expansion.

3.14 Horizontal Reinforcing

1. Horizontal reinforcing at 400 mm o.c. (every 2nd course), except solid walls greater than, or equal to 340 mm in width. At 340 mm, or greater, horizontal reinforcing at 200 mm o.c. (every course). Use prefabricated corners and tees at all intersecting load bearing walls.

3.15 Vertical Reinforcing

1. Install vertical reinforcing to size and spacing as shown on Drawings. Fill voids with 20MPa concrete.

3.16 Brick Ties

1. Install specified brick ties at maximum 800 mm horizontal and 400 mm vertical spacing.

3.17 Bonding

1. Walls of two or more widths: bond using metal ties in accordance with subsection 9.4 of CSA-A371.
2. Procedure approval by Architect.
3. In cavity walls, keep all cavity spaces free of mortar and debris by placing a wood strip on the ties. Retain strip on a wire line and pull up level and clean off droppings prior to placing next course of ties. Install mortar control device at 300 mm o.c. horizontally, in a staggered pattern so as to overlap each other on each side. Install in every 2nd course above foundation and shelf angles.

3.18 Sound and Fire Separation

1. All load bearing and non-load bearing partitions shall carry to the underside of structure above, except for allowing for deflection of structure.
2. All openings in partitions, even above ceilings, shall be patched to maintain sound and fire separation.
3. In fire separations and sound separations, spaces between partition and structures to be firestopped or sound sealed under Section 07270.
4. Use U.L.C. labeled mortar for all patching in fire separations.

3.19 Dampproof Course Flashing

1. Install dampproof course flashing at ground floor elevation in all walls on foundations.

3.20 Testing

1. Masonry units to be tested in accordance with S304.1, Clause 15.1, for engineered masonry design, and in conformance with clause 15.1.2.
2. Mortar testing to be in accordance with S304.1, clause 15.2.
3. Grout testing to be in accordance with S304.1, clause 15.3.

3.21 Blockwork - General

1. Do not wet concrete block before laying.
2. Lay block with thicker end of face shell upward.
3. Lay interior block in running bond, concave tooled joints.
4. Use solid block or hollow block filled with concrete for top 2 courses under point bearing loads extending minimum 200 mm each side of bearing and where indicated.
5. Install special shaped units where indicated.
6. In block walls install continuous trussed wire reinforcement, as noted.
7. Where resilient base is indicated, tool the joints to within 100 mm of the floor. Cut joints flush behind the base.
8. Extend all walls/partitions to underside of steel/concrete deck unless shown otherwise on drawings and as required. Co-ordinate wall locations with structure above and prior to commencing work, advise Consultant of interference.
9. When masonry walls are not built at once, the ends of the walls are to be raked back at an angle, or terminated at a control joint. Tothing will not be permitted.

3.22 Mortar

1. Measure loose damp ingredients accurately by volume. Place water in mixer, add half volume of sand, add cement, add remainder of sand, add water for plasticity. Mix for at least four minutes. Keep mixer clean.
2. Incorporate colour into mixes in accordance with manufacturer's instructions.
3. Use clean mixer for coloured mortar.
4. 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 a ball. Allow to stand for not less than 1 hour nor more than 2 hours then remix with sufficient to produce mortar of proper consistency for pointing.

3.23 Concrete Core Fill

1. All concrete block walls shall have vertical grout core fill each side of openings and where shown and as detailed on the drawings.
2. Core fill in walls shall extend from bottom bearing surface to underside of bond beams or structure.

3. Grout core fill shall be placed with a trunk or chute in maximum lifts 2000 mm. Compaction shall be by interior mechanical vibrator. All fill shall be placed in accordance with CSA A23.1.
4. Fill minimum $\frac{1}{2}$ block core each side of frame from foundation to underside of lintels of all door openings over 1 metre wide.
5. Provide inspection openings in base of walls to be grouted. Make good to match adjacent block work after inspection and approval by Engineer.

3.24 Reinforced Block Lintels

1. Install reinforced concrete block lintels at all openings where steel lintels are not indicated in accordance with structural details.
2. Install shoring and bracing as required to openings prior to placing lintel units and concrete fill.

End of Section

PART 1 - GENERAL

1.1 Related Work

- | | |
|---|------------------------------|
| 1. Installation of anchors in concrete and masonry: | Section 04200 |
| 2. Structural Steel Framing: | Refer to Structural Drawings |
| 3. Steel Joist Framing: | Refer to Structural Drawings |
| 4. Metal Decking: | Refer to Structural Drawings |
| 5. Painting: | Section 09900 |

1.2 Scope

1. Provide all miscellaneous metal items except those listed above Under Article 1.1.

1.3 Reference Standards

- | | |
|-----------------------------------|---|
| 1. ASTM A167-99(2009) | Standard Specification for Stainless and Heat-Resisting Chromium - Nickel Steel Plate, Sheet and Strip. |
| 2. ASTM A325-09ae.1 | Standard Specification for Structural Bolts, Steel, Heat-Treated, 120/105 ksi Minimum Tensile Strength. |
| 3. ASTM A143/A143M-07 | Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement. |
| 4. ASTM A307-07b | Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength. |
| 5. ASTM A563-07a | Standard Specification for Carbon and Alloy Steel Nuts. |
| 6. ASTM A780/A780M-09 | Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings. |
| 7. CAN/CSA-S16-09 | Design of Steel Structures. |
| 8. CSA W59-03(R2008) | Welded Steel Construction (Metal Arc Welding). |
| 9. CSA-G40.20-04/G40.21-04(R2009) | General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels. |
| 10. ASTM A123/A123M-09 | Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products. |
| 11. CISC/CPMA 2-75 | Canadian Institute of Steel Construction/Canadian Paint Manufacturers Association-A Quick Drying Primer for Use on Structural Steel. |

-
- | | |
|----------------------|---|
| 12. CAN/CGSB-1.40-97 | Anticorrosive Structural Steel Alkyd Primer. |
| 13. ASTM A53/A53M-07 | Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless. |

1.4 Shop Drawings

1. Submit shop drawings in accordance with Section 01340 prepared and stamped by a Professional Engineer licensed to design structures in the Province of Ontario.
2. Clearly indicate materials, core thickness, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories.

PART 2 - PRODUCTS

2.1 Materials

1. Metals:
 - .1 **Steel sections and plates:** to CAN3 G40.21, Grade 350W for tubes and Grade 300W for plates and flat shapes.
 - .2 **Welding Materials:** to CSA W59.
 - .3 **Bolts and anchor bolts:** to ASTM A307, A325, and A563 as applicable.
 - .4 **Stainless Steel:** Type 302 or 304 alloy conforming to ASTM A167, No. 4 finish.
2. Primers, Coatings and Shop Painting
 - .1 **Interior Steel in Dry Areas:** Quick drying oil alkyd conforming to CISC/CPMA 2.75.
 - .2 **Exterior Steel, Interior Steel in Unheated Areas, Steel Embedded in Concrete:** Hot dip galvanized conforming to ASTM A123, minimum Z275 coating.
 - .3 **Galvanizing** of structural steel components and loose lintels: refer to Section 05120.
 - .4 **Galvanized Coating Touch-Up:** W.R. Meadows "Galvafroid" or Kerry Industries "Z.R.C." zinc rich coating or similar manufacturer containing minimum 90% zinc by weight.
 - .5 Apply one shop coat(s) of primer or coating as indicated above and according to manufacturer's recommendations. Do not prime aluminum, stainless steel or those components to be galvanized or encased in concrete.
 - .6 Use primer unadulterated, as provided by manufacturer. Paint on dry surfaces free from rust scale and grease. Do not paint when temperature is lower than 10 deg. Celsius and rising.
 - .7 Clean surfaces to be field welded; do not paint.
3. Fastenings
 - .1 Use nuts and bolts conforming to ASTM A307, A325, and A563 as applicable.
 - .1 For interior work, use cadmium-plated fastenings where other protection is not specified.
 - .2 For exterior work, use Type 300 or 400 stainless steel.

4. Anchors and Shims

- .1 For exposed anchorage of aluminum, if applicable, use stainless steel and otherwise to match metal anchored. For non-exposed work, anchors and shims may be galvanized steel.

5. Pipe

- .1 To ASTM A53, extra strong steel pipe for bollards.

6. Bituminous Paint

- .1 Alkali-resisting, use to insulate contact between dissimilar metals.

2.2 Fabrication

1. Build work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
2. Weld all connections where possible, and bolt where not possible unless indicated otherwise on drawings.
3. Use self-tapping shake-proof countersunk flat headed screws on items required to be assembled by screws or as indicated.
4. Where possible, work to be fitted and shop assembled, ready for erection.
5. Exposed welds to be continuous for length of each joint. File or grind exposed welds smooth and flush.
6. Weld all stainless steel by the Argon Arc Process. Grind smooth and polish joints, crevice-free, and flush without seams.

2.3 List of Miscellaneous Metal Fabrications

1. This Section includes, but is not limited to the following list. Note: **Galvanize all exterior items** and other items noted. Prime paint all interior items.
 - .1 Anchors, Bolts, Inserts, Sleeves for work in this Section.
 - .2 Bench Supports and Shelf Brackets.
 - .3 Stairs, railings, handrails.
 - .4 Hangers and Supports (for work in this Section).
 - .5 Lintels (if not by Structural Steel).
 - .6 Bollards
 - .7 Roof Access Ladder
 - .8 Shelf Brackets and Hooks

PART 3 - EXECUTION

3.1 General

1. Supply and install all miscellaneous metal work indicated on the Drawings and not indicated in work of other Sections in addition to items listed below.

3.2 Fabrication & Erection

1. Erect metal work square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
2. Insulate metals, where necessary, to prevent corrosion due to contact between dissimilar metals and between metals and masonry or plaster. Use bituminous paint, butyl tape, building paper or other approved means.
3. Provide suitable and acceptable means of anchorage, such as dowels, anchor clips, bar anchors, expansion bolts and shields, toggles.
4. Make field connections with items specified in Articles 2.1.4 and 2.1.5 or weld to CSA S16.
5. Hand items to be cast into concrete or built into masonry over to appropriate trades together with setting templates.
6. Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection.
7. Touch-up galvanized surfaces with zinc primer where burned by field welding. Spray or brush apply a minimum of three (3) coats of zinc-rich paint to achieve a dry film thickness of 8 mils. Apply a finish coat of aluminum paint to provide a colour blend with the surround galvanizing.

3.3 Wall Benches and Upper Shelf

1. Steel Angles, Steel Channel, Flat Bar Steel, Steel Rod as indicated on details.
2. Use secure round head fasteners or countersink holes for flat head screws.
3. Prime paint: Galvafroid.
4. Chamfer cut ends of Rod 2 mm

3.4 Railings and Guards

1. Provide railings and handrails, as shown on Drawings.
2. Galvanize all exterior railings after fabrication.
3. Wall brackets, as shown, at 1200 mm o.c. maximum.

4. Set railing standards in concrete with heated liquid sulphur to fill hole. Remove overflow immediately.

3.5 Vanity Brackets

1. Angle steel frame, as shown on drawings - shop prime painted.

3.6 Wall Brackets and Hooks

1. As shown on Drawings - prime paint.

3.7 Bollards

1. Supply and install galvanized steel bollards as shown on Drawings. Bollards shall be 150 mm x 9.5 mm thick wall at 1200 mm high, seamless steel pipe. Install 1200 mm into a concrete foundation. Fill bollard with 25 Mpa concrete and round top. Round top of footing also. For number of Bollards required - refer to Drawings.

3.8 Galvanized Steel

1. Galvanize steel members, fabrications, and assemblies after fabrication by the hot dip process in accordance with ASTM A123, minimum Z275 coating.
2. Galvanize bolts, nuts and washers and iron and steel hardware components in accordance with ASTM A123.
3. Safeguard products against steel embrittlement in conformance with ASTM A143.
4. Design features which may lead to difficulties during galvanizing shall be pointed out prior to dipping.
5. The composition of metal in the galvanizing bath shall be not less than 98.0% zinc.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Commercial Steel Doors and Frames Section 08100

1.2 Source Quality Control

1. Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.

PART 2 - PRODUCTS

2.1 Materials

1. **Wood Materials:** Material, straight, sawn square, true, dressed four (4) sides properly sized, shaped to correct dimensions from nominal sizes indicated or specified.
2. **Lumber: Use only grade marked lumber. Where left exposed, use best brand of lumber available.** Lumber and moisture content to conform to official grading rules of NLGA, for particular lumber and grade, and structurally conform to latest requirements of Ontario Building Code. Conform to Grading Standards, CSA Standard Softwood Lumber 2005. Moist content not greater than 19% at time of installation.
3. **Blocking, Cants, Bucks, Grounds and Nailing Strips:** Douglas fir Graded 122-C, construction or No. 2 Pine, pressure treated in accordance with CSA 080 Series 08.
4. **Plywood:** Douglas fir plywood to CSA 0121-08, good one side with waterproof adhesive.
5. **Rough Hardware:** Nails, screws, bolts, lag screws, anchors, special fastening devices and supports required for erection of all carpentry components. Use galvanized components where exposed to exterior atmosphere.

PART 3 - EXECUTION

3.1 General

1. Do all wood framing in accordance with the Ontario Building Code, Engineering Design in Wood and CSA 086 - 01.
2. Machine dressed work shall be slow fed using sharp cutters and finished members shall be free from drag, feathers, slivers or roughness of any kind.
3. Frame materials with tight joints rigidly held in place.
4. Design construction methods for expansion and contraction of the materials.
5. Erect work plumb, level, square and to required lines.
6. Be responsible for methods of construction for ensuring that materials are rigidly and securely attached and will not be loosened by the work of other trades.

3.2 Furring and Blocking

1. Supply and install furring and blocking, required.
2. Align and plumb faces of furring and blocking to tolerance of 1:600.

3.3 Rough Bucks, Nailers

1. Install wood bucks and nailers, as indicated, including wood bucks and linings around frames for doors and windows.
2. Except where indicated, otherwise, use material at least 38 mm thick secured with 9 mm bolts located within 300 mm from ends of members and uniformly spaced at 1200 mm between.
3. Countersink bolts where necessary to provide clearance for other work.

3.4 Roof Fascias, Cants, Nailers, Curbs

1. Install wood cants, fascia backing, nailers, curbs and other wood supports for roofing, sheet metal fork, roof mounted equipment.
Refer to Section 07520 Modified Bituminous Roofing.
2. In reference to section 07520 Modified Bituminous Roofing, subsection 3.4 Carpentry and Section 07620 Sheet Metal Roofing: all wood blocking work related to roofing including but not limited to parapets, walls and curbs is by Section 06100 Rough Carpentry. The general contractor is responsible to turn over this work in a dry condition to roofing contractor for making watertight as part of roofing work. After acceptance, the roofing contractor is responsible to maintain water tightness.

3.5 Supports for Mechanical Units

1. Install wood blocking for prefabricated curbs for mechanical units to allow for a level installation on sloping roof.

3.6 Pressure Treated Wood

1. Use wood pressure treated in accordance with CSA 080 for all wood members in contact with exterior walls and roofs.
2. Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
3. Fasten each slat to steel frames with 2 screws at top, bottom and at diagonal bracing.

3.7 Installation of Hollow Metal Frames

1. Set frames plumb and square in their exact location and at correct elevation. Firmly block and brace to prevent shifting. Shim up where required to ensure proper alignment dimensions from finished floor to head of frame. Install temporary wood spreaders at mid-height.

2. Where pressed steel frames are installed in concrete walls, secure frames to concrete using lead expansion shields and anchor bolts through pipe sleeves. Perform drilling of concrete as required. Fill recessed bolt heads flush to frame face with approved metal filler and sand smooth.
3. Install fire rated door frames in accordance with requirements of National Fire Code Volume 4, produced by The National Fire Protection Association (NFPA 80).

3.8 General

1. Supply and install all other carpentry shown on drawings or as required for completion of work. Co-operate with other trades in installing items supplied by other sections, cut openings in woodwork when so required and make good disturbed surfaces.

End of Section

PART 1 - GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for new rough carpentry in accordance with Contract Documents.

1.2 Related Sections

1. Section 07520 SBS Modified Bituminous Membrane Roofing
2. Section 07620 Sheet Metal Flashing and Trim for Roofing
3. Section 07901 Joint Sealers for Roofing

1.3 References

1. CSA B111 / ASTM F1667 - Wire Nails, Spikes and Staples
2. ANSI/ASME B18.6.1 - Slotted and Recessed Wood Screws
3. ASTM A307-Carbon Steel Bolts & Studs
4. CSA O121 - Douglas Fir Plywood
5. CAN/CSA O141 – Softwood Lumber
6. CSA O151 – Canadian Softwood Plywood
7. CAN/CSA-080 Series - Wood Preservation
8. CAN/CSA-O325.0 – Construction Sheathing
9. Graded lumber must be in accordance with rules and regulations of the National Lumber Grades Authority (NLGA).

1.4 Operations

1. Do not interrupt or delay *Owner's* operations.
2. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Provide perimeter barricades and tarpaulins, guardrails, overhead scaffolding and other necessary protection to ensure safety of occupants, public and site workers.
2. Temporarily protect interior spaces, where overhead work is proceeding, and provide dustproof and weatherproof partitions.

1.6 Shop Drawings

1. Submit shop drawings, stamped by a Professional Engineer, licensed in Province of Ontario, if members and securement are part of structural components.

1.7 Permits

1. If required, arrange and pay for all permits, notices and inspections necessary for the proper execution of work in this section.

1.8 Quality Assurance

1. Lumber shall be identified by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
2. Plywood shall be identified by grade mark in accordance with applicable CSA standards.

1.9 Lumber Requirements

1. Dimensions of lumber must conform to dressed sizes specified in CAN/CSA-0141. Dimensions specified and shown are nominal sizes.
2. Moisture content of lumber at time of installation must be S-DRY - maximum 19% moisture content.
3. Lumber must be sound and free of splits and deficiencies, which impair strength and durability.

1.10 Securement

1. Members shall be framed, anchored, fastened, tied and braced to provide necessary strength and rigidity.
2. All nails shall be long enough so that not less than half their required length penetrates into the second member.
3. Individual pieces must be secured with minimum of 2 fasteners at all corners.
4. Splitting of wood members shall be minimized by staggering nails in the direction of the grain and by keeping nails a minimum of 52 mm (2 in.) in from edges.

1.11 Waste Management and Disposal

1. Remove from site and dispose packaging materials at approved facilities.

PART 2 - PRODUCTS

2.1 Material

1. Wood Blocking: No.1 Exterior Grade, 52 x 52 mm (2 in. x 2 in.) 52 x 104 mm (2 x 4 in.), 52 x 152 mm (2 x 6 in.), 52 x 203 mm (2 x 8 in.), 52 x 254 mm (2 x 10 in.) and 52 x 305 mm (2 x 12 in.) and as noted on drawings/details.
2. Plywood Sheathing: 13 mm (1/2 in.) and 19 mm (3/4 in.), exterior grade, solid one side (G1S) unsanded, Veneer Grade B+. Moisture content of plywood shall not exceed 19% on a 'dry weight basis'.
3. Wood Cant: 75 x 75 mm (3 x 3 in.), No.1 Grade, Pressure Treated, exterior grade
4. Shims: Constructed from plywood sheathing or tapered wood blocking to provide minimum 10% slope to interior of roof surface, as indicated on drawings.
5. Wood Sleepers: Fabricated from wood blocking and plywood, configuration, sizes and length as detailed.
6. Fasteners: Are to be of sufficient length to penetrate concrete decks 52 mm (2 in.), metal decks 19 mm (3/4 in.) and wood decks 38 mm (1½ in.).
Acceptable Material:
 1. Nails: No. 10 spiral shank, hot dipped galvanized.
 2. Wood and Metal Deck Screws (Low profile head):
 1. Roofgrip #14 Buildex by ITW Construction Products
 2. #14 Heavy Duty Drill Point Fastener by Tru-Fast.
 3. Rawl #14 Deck Screw by Rawlplug Canada Ltd.
 3. Masonry anchors (Robertson head):
 1. Tapcon Plus, 6 mm (1/4 in.) diameter, Climaseal coated by ITW Construction Products.
 2. Tap-Grip heavy-duty self-tapping concrete anchors by Perma-Grip Fasteners.
 3. Rawl PERMA-SEAL TAPPER, 6 mm (1/4 in.) diameter by Rawlplug Canada Ltd.
 4. Steel: Flat head, self-tapping steel screw with coated finish, FM Approved. Fasteners to be of sufficient length to penetrate crest of metal deck 20 mm +/- 5 mm (3/4" +/- 1/4").
 5. Bolts, Washers and Nuts: Size as indicated on Drawings. Hot dipped galvanized, corrosion resistant finish, 12.5 mm (1/2") diameter unless otherwise noted.

PART 3 - EXECUTION

3.1 Preparation

1. Substrates shall be structurally sound to receive rough carpentry.
2. All wood framing shall be in accordance with Ontario Building Code or more stringent requirements noted within Contract Documents.

3.2 Installation

1. Cut and fit members accurately. Mitre all corners, leaving no space or unevenness greater than 3 mm (1/8 in.) between components. Lay out work to provide a uniform transition for insulation and membrane.
2. Install continuous plywood sheathing, wood blockings, cants, studs, nailers and continuous shims where required and detailed.
3. Shims to be of sufficient height to ensure a minimum ten percent (10%) positive slope is provided on all parapet walls and under cap flashings.
4. Erect members in position, align, level, square, plumb and secure permanently in place as specified. Brace work temporarily as required to maintain safely in place.

3.3 Fastening

1. Secure new wood with minimum of 2 fasteners at 457 mm (18 in.) on centre staggered, and as follows:
 1. Into masonry: masonry anchors.
 2. Into wood: wood screws.
 3. Into metal: metal screws.
2. Secure lumber as follows:
 1. All fasteners to be placed a minimum of 12 mm (1/2") from any edge. Install fasteners in two rows in direction of grain, with each fastener offset from one another not less than 457 mm (18") on centre.
 2. Offset and countersink all screw fasteners flush with surface of wood blocking being secured.
 3. Co-ordinate work to keep cutting and remedial work to a minimum.

3.4 Parapets/Perimeters/Walls/Curbs/Sleepers

1. Construct parapets, perimeters, walls, curbs and sleepers as detailed.
2. Provide new HVAC equipment wood sleeper supports. Width to be a minimum of 140 mm (5.5"). Length of sleeper to span between two framing members.

3. Where possible, maintain minimum height of 305 mm (12 in.) above finished roof surface for sleepers and curbs.
4. Install wood blocking for prefabricated curbs for mechanical units to allow for a level installation where deck is sloped.

3.5 Dividers and Movement joints

1. At dividers and movement joints, neatly cut plywood to required dimensions. Cutting shall be done by 'scoring' with carbide tipped utility tool/knife or circular saw with carbide blade. Smooth cut-edges with a wood rasp.
2. Secure plywood to substrate using appropriate fasteners, screws at 205 mm (8 in.) on centre each way and along perimeters. Maintain screws 13 mm (1/2 in.) from edges and maintain 3 mm (1/8 in.) gap between each piece of board.

3.6 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Rough carpentry: Section 06100
2. Painting: Section 09900

1.2 Reference Standards

1. Do millwork to Millwork Standards of the Architectural Woodwork Manufacturers' Association of Canada (AWMAC) Premium Grade.

1.3 Samples

1. Submit duplicate 300 x 300 mm samples of each type of paneling laminate, melamine and each type of solid wood or plywood to receive stain or natural finish.
2. Submit sample of each type of hardware specified in accordance with Section 01340.
3. Submit a typical prototype unit representative of the work of this section.

1.4 Shop Drawings

1. Submit shop drawings in accordance with Section 01340.
2. Clearly indicate details of construction, profiles, jointing, fastening and other related details.

1.5 Qualification

1. Millwork manufacturer to have not less than 5 years proven first class experience in institutional millwork and shall be a member of AWMAC.

1.6 Warranty

1. Submit a two (2) year warranty for the work of this section against defects in material and workmanship.

PART 2 - PRODUCTS

2.1 Materials

1. Softwood lumber: to CSA 0121-M1978 and National Lumber Grades Authority (NLGA) requirements, with maximum moisture content of 10% for interior work. Yard lumber select for natural finish of species, indicated to AWMAC premium grade.
2. Hardwood lumber: to National Hardwood Lumber Association (NHLA) requirements, moisture content of maximum 10% for interior work, of species indicated to AWMAC premium grade. Species: Maple, unless otherwise noted.

3. Hardwood plywood: to CSA 0115-1967 of thickness indicated, rotary cut face veneer, birch plywood, veneer core. Select veneers to provide book match veneer strips to be 240 mm wide minimum. Grade: Select White.
4. Nails and staples: to CSA B111-1974 galvanized for exterior work, interior high-humidity areas and for treated lumber; plain finish elsewhere. Use spiral thread nails except where specified elsewhere.
5. Particle Board core: to CAN3-0188.1-M, Grade R, 720 kg/m³ density in thicknesses indicated.
6. Melamine Composite Panels: NEMA LD 3, Grade VGL decorative laminate thermos-fused to both sides of panel board. Premium quality, colours selected by consultant from manufacturer's woodgrain line.
7. Book Match Veneer: strips to be 240 mm wide minimum.

2.2 Plastic Laminate – Countertops only

1. Conforming to CAN3-A172, General Purpose - standard grade (GP-S), 1.25 mm thick for tops, Post Forming - standard grade (PF-S) 1.25 mm thick for post forming. Balance all panels with 0.5 mm backing sheet (BK) by same manufacturer as face panel. Use waterproof adhesive capable of holding materials together without failure. Provide acid resistant grade where shown. Finish shall be "Velvatex" or "Suede" by Arborite, or equivalent manufactured by Formica, Durolam Ltd., "Wilson Art" as distributed by Meteor Plywoods Ltd., "Micarta" distributed by Montego Forest Products Ltd., "Nevamar" distributed by Cerasec Inc., or approved equivalent by Octopus Products Limited. Selections to be confirmed by Consultant.

- .1 For base price for plastic laminate colour and pattern use the following colours – Formica Cotta Stone and Formica Pietro Nero Granite. Note, the colours are not finalized.

2.3 Melamine Faced Particleboard

1. To CAN3-0.188.1-M78, Grade "R" particleboard sanded faces, 13 mm, 16 mm, and 19 mm thickness, faced with laminated plastic. Melamine resin impregnated cover sheet with coloured and/or pattern paper inner layer. Thermally fuse to rigid particleboard substrate. Melamine faces shall be 8 mil thickness. Wood grain pattern to be chosen by Consultant from manufacturer's full range of melamine colours. Allow for up to three (3) colours.
 - .1 Acceptable Material: Melamine faced particleboard as manufactured by Flakeboard, Formica or Arborite Division of Domtar Construction Materials Ltd., are of acceptable quality but colour/pattern requires approval prior to confirmation of full acceptance.
 - .2 For base price for melamine colour and pattern use the following colours – Formica Prestige Walnut and Formica Khaya Mahogany. Note, these colours are not finalized.

2.4 Edge Banding

1. Solid polyvinyl chloride (PVC), 3 mm thickness **minimum** x full width of panel edge, colour/pattern to match finished face of melamine panel or as selected by Consultant. All exposed edges of banding to be radiused to 2 mm radius after installation on panels. Submit sample of edge-banded panel with radiused edges to Consultant for approval prior to fabrication of architectural woodwork.
 - .1 Acceptable Material: Solid PVC edging as manufactured by "Woodtape" Edge-Banding.
 - .2 Acceptable Material: Solid PVC edging as manufactured by "Complast Inc."

2.5 Cabinet Hardware

1. Furnish and install all hardware to custom casework as follows:
 - .1 **Cupboard Doors - 19 mm thick:**

Hinges	200 Series 110° Salice
Roller Catches	807N 2G (SgDr) Onward
Elbow Catches	T03222 C15 (DhDr)
Door Pulls	CBH235-3 1/2" C32D
Cupboard Locks	8703/8704 14a National
 - .2 **Drawers - 19 mm thick.:**

Drawer Slides	KV1300X length to suit
Drawer Pulls	CBH235-3 1/2" C32D
Drawer Locks	8703 - 14a National
 - .3 **Shelving:**

Plaster strips	KV255 Zinc Knape & Vogt
Shelf Clips	KV256 Zinc Knape & Vogt
 - .4 **Cupboard Doors - 35 mm thick:**

Hinges	F179 76x76 Stanley C15
Roller Catches	504N Onward C26
Surface bolt	043-4 X Angle Strike C15
Door Pulls	CBH245-4 1/2" C32D
Cupboard Locks	BP140101140 Richelieu
 - .5 **Closet Rods and Flanges**

Rods: chrome finish, Ø 33 mm.
Flanges: chrome finish, closed flanges at both ends of rods.
Shelf and Rod Steel, white enamel, model No. 1797, manufactured by Hager Brackets.
 - .6 This section should also include accessories such as rubber door silencers (2 per drawer or door), and other items necessary for the completion of the millwork.

- .7 Cabinet Keying: Key all cabinet and drawer locks alike in each room, and different from other rooms.

2.6 Melamine Clad Cabinetwork

1. All cabinet frames, whether for base, wall or tall floor standing cases, shall be fabricated so each is a self-contained module. Front side top and bottom, exterior and interior surfaces shall be finished allowing future relocation of any module, into any bench arrangement, without need of any additional finishing.
2. Gables and panels shall be fabricated from 19 mm thick melamine surfaced panels with a P.V.C. edging applied to exposed edges. Standard cores are particle board.
3. Bottoms shall be fabricated utilizing the same materials and edge finish as gables. Front edge will be edged with P.V.C. edging. All other edges will be thoroughly sealed and moisture proofed prior to attachment to gables.
4. Rails shall be fabricated and machined to join the gables and form a rigid cabinet frame.
5. Tops (applies to wall and tall units only) shall be fabricated utilizing the same material and edge finish as gables. Front edge will be edged with P.V.C. edging.
6. Toe kick rail shall have a 100 mm x 19 mm section, machined to receive four screw nails for attachment to bottom front edge of gables. Cabinet base shall be plywood attached to melamine cabinet separately, ensuring the melamine OSB centre core gables do not come in contact with the floor.
7. Backs in base cupboards shall be fabricated from a 6 mm thick melamine surfaced panel.
8. Backs in wall and tall cabinets shall be fabricated from 6 mm thick melamine surfaced panels securely glued and screw nailed into the check out provided in the backs of gables, tops, and bottoms.
9. All shelves shall be adjustable at 13 mm increments, and each will be supported by a shelf support resting in four pilaster strips attached to the gables.
10. Doors shall be fabricated from 19 mm thick melamine surfaced panels. All four edges shall be P.V.C. edging.
11. Drawer fronts shall be fabricated utilizing the same material and edge finish as doors. All four edges shall P.V.C. edging. Fronts will be secured to drawer bodies with five screw nails through the front of the drawer body into the core of the drawer front.
12. Drawer bodies shall consist of box construction fabricated from 13 mm birch plywood with solid birch edge, front, sides and back with a 6 mm hardboard bottom dadoed and glued into box members. Joint front, sides and back with carefully fitted glued and tenoned joints. Alternately, Blum Metabox drawer body and side can be used.

13. Teacher Closet Doors, millwork codes T1 and T2: 44 mm thick solid core wood doors with melamine door face finish both sides and stained birch wood on all four edges. Note: for keying system purposes, these doors have standard door hardware carried under door hardware cash allowance. Door jambs are thickened solid wood to match door thickness and to suit hardware hinges and mortise catch.

14. **Finish:**

- .1 Melamine surfaced panels shall be finished both sides in the same colours, patterns, and grain as selected by the Consultant.
- .2 Solid hardwood glazed doors and drawer bodies shall be sanded, then sealer coated, and sanded with two finish coats of catalytic type acid resistant varnish.

2.7 Shop Fabrication

1. Shop install cabinet hardware.
2. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
3. Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

2.9 Plastic Laminated Tops

1. 19 mm thick particle board core with post-forming grade plastic laminate finish bonded with resorginal formaldehyde resin glue to a particleboard core. All countertop front face to return vertically 35 mm \pm . All front and backsplash edges to be rounded.
2. Underside to receive a backing sheet, sanded one side and bonded same as surfacing material.
3. Exposed edges to be finished with same material as used for the top.
4. Drip grooves to be cut into underside of the top where exposed edges occur.
5. Splash backs, curbs and curb shelves are to be of similar construction as the tops.
6. At all wall termination, provide backsplash return.

2.10 Solid Surface Tops + Windowsills

1. To be 19mm solid phenolic sills from solid surfaces series, Corian manufactured by the DuPont Company. Solid surface to be nonporous, homogeneous material. Acceptable alternate: Formica
2. Covering panels should be 1/2 inch thick cast, nonporous, filled polymer, not coated, composite construction with through body colours, as indicated on drawings. Bullnose edge treatment to have 13 mm full bullnose.

3. Joint adhesive: Manufacturer's standard one or two-part adhesive kit to create inconspicuous, nonporous joints.
4. Sealant: Manufacturer's standard mildew-resistant, UL-listed silicone sealant in colours matching components.
5. **Solid Surface Windowsills** - See drawings for locations and sizes.
6. Colour by Architect from standard colour palette.

2.10 Moulding and Trims

1. Fabricate mouldings in maximum practical lengths to profile shown. Solid birch to receive varnish finish unless noted otherwise. Install with concealed fasteners.

PART 3 - EXECUTION

3.1 Installation

1. Set and secure all material and components in place, rigid, plumb and square.
2. Provide heavy duty fixture attachments for wall mounted cabinets.
3. Use draw bolts in countertop joints.
4. At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.
5. Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.
6. After installation, fit and adjust operating hardware for wood and laminated plastic cabinet doors, drawers and shelves.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Masonry Section 04200
2. Excavation, Backfilling and Rough Grading Section 02220

1.2 Scope

1. Apply waterproofing on exterior face of all walls where adjacent interior floor elevation is lower than the exterior grade elevation.

1.3 Qualifications and Quality Assurance

1. Waterproofing shall be carried out by applicators skilled and with previous similar experience in this work in strict accordance with manufacturer's printed instructions. Submit proof of experience upon Consultant's request.
2. Manufacturer's representative shall be called by the applicator to inspect the substrate prior to commencement of work.
3. Manufacturer's representative shall be retained by installer to provide technical assistance on an as-needed basis during course of installation of membrane.

1.4 Environmental Conditions

1. Do not proceed with waterproofing application during rainy or inclement weather.

1.5 Submittals

1. Submit samples and manufacturer's literature before ordering materials and proceeding with the work.

1.6 Delivery, Storage & Handling

1. Deliver and store materials in original containers with manufacturer's labels and seals intact.
2. Store solvent base liquids away from excessive heat and open flame.
3. Store emulsion liquids at above freezing temperatures, free from contact with cold or frozen surfaces.

1.7 Protection

1. Take extra care to provide ample protection of materials and work of this section from damage by weather, backfiring operations and other causes.

2. Apply protection board as soon as possible after installation of membrane.

PART 2 - PRODUCTS

2.1 Materials

1. Materials shall be the following types supplied by Grace Construction Products:
 - .1 Bituthene 5000 Membrane.
Acceptable alternate: MEL-ROL/LM, by W.R. Meadows used in conjunction with a rolled matrix drainage system.

PART 3 - EXECUTION

3.1 Conditions of Surfaces

1. Before commencing work, ensure environmental and site conditions are suitable for installation of waterproofing membrane.
2. The substrate shall be clean and dry, free from surface water, ice snow or frost, dust, dirt, oil, grease, curing compounds or any other foreign matter detrimental to the adhesion of the waterproofing membrane.
3. Notify Consultant and Contractor in writing of unsuitable surfaces and working conditions. Commencement of work shall imply acceptance of surfaces and working conditions.

3.2 Membrane Application

1. **Application:** Apply Bituthene 5000 as per manufacturer's specifications.
2. Peel back bottom flap of filter fabric and place core behind discharge pipe. Wrap loose filter fabric over and around discharge pipe. Tuck excess filter fabric behind pipe. Fold excess filter fabric at top termination down between drainage composite and membrane. Wrap outside corners with filter fabric from horizontal drainage composite and adhere overlapping fabrics.
3. For detailed information on the installation of the Bituthene waterproofing system, refer to the Application Procedures Section of the Grace Waterproofing Products Manual or W.R. Meadows Products Manual.

3.3 Clean-Up

1. Promptly as the work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing work.

End of Section

PART 1 - GENERAL

1.1 Section Includes

1. **Note: in order to maintain continuity and quality control, the supply and installation of the full project scope of vapour barrier membrane is to be carried by a single trade.**
2. Materials and installation methods of the primary air/vapour barrier membrane system.
3. Materials and installation methods of dampproof coursing and through-wall flashing membranes.
4. Materials and installation methods for the adhesion of rigid and semi-rigid insulating materials.

1.2 Related Sections

- | | |
|--|---------------|
| 1. Masonry: | Section 04200 |
| 2. Building Insulation: | Section 07212 |
| 3. Firestopping and Smoke Seal: | Section 07270 |
| 4. SBS Modified Bituminous Membrane Roofing: | Section 07520 |
| 5. Sealants: | Section 07900 |
| 6. Aluminium Windows and Doors: | Section 08520 |

1.3 Submittals

1. Prior to commencing the Work, submit documentation from an approved independent testing laboratory certifying that the air leakage and vapour permeance rates of the air/ vapour barrier membranes, including primary membrane and transition sheets, exceed the requirements of the National Building Code.
2. Prior to commencing the Work submit copies of manufacturers' current ISO certification.
Membrane, primers, sealants, adhesives and associated auxiliary materials shall be included.
3. Prior to commencing the Work submit references clearly indicating that the membrane manufacturer has successfully completed projects on an annual basis of similar scope and nature for a minimum of fifteen years. Submit references for a minimum of ten projects.
4. Prior to commencing the Work submit manufacturers' complete set of standard details for the air/vapour barrier membrane systems showing a continuous plane of air tightness throughout the building envelope.

1.4 Quality Assurance

1. Submit in writing, a document stating that the applicator of the primary air/vapour barrier membranes specified in this section is recognized by the manufacturer as suitable for the execution of the Work.
2. Perform Work in accordance with the manufacturer's written instructions of the air/vapour barrier membrane and this specification.
3. Maintain one copy of manufacturer's written instructions on site.
4. At the beginning of the Work and at all times during the execution of the Work, allow access to Work site by the air/vapour barrier membrane manufacturers' representative.
5. Components used in this section shall be sourced from one manufacturer, including sheet membrane, air/vapour barrier sealants, primers, mastics and adhesives.

1.5 Mock-Up

1. Construct mock-up in accordance with Section 01340 - Shop Drawings, Product Data & Samples.
2. Provide mock-up of air/vapour barrier materials under provisions of Division 1.
3. Where directed by consultant, construct typical exterior wall panel, 2 m long by 2 m wide, incorporating substrate, window frame, attachment of insulation, and; showing air/vapour barrier membrane application details.
4. Allow 24 h for inspection of mock-up by consultant before proceeding with air/vapour barrier work. Mock-up may remain as part of the Work.

1.6 Pre-Installation Conference

1. Convene one week prior to commencing work of this section, under provisions of Division

1.7 Delivery, Storage and Handling

1. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
2. Store role materials on end in original packaging.
3. Store liquid air/vapour barrier material, adhesives and primers at temperatures of 5°C and above to facilitate handling.
4. Keep solvent away from open flame or excessive heat.
5. Protect rolls from direct sunlight until ready for use.

1.8 Co-ordination

1. Ensure continuity of the air/vapour barrier membrane system throughout the scope of this section.

1.9 Alternates

1. Submit requests for alternates in accordance with Division 1.
2. Alternate submission format to include:
 - .1 Submit evidence that alternate materials meet or exceed performance characteristics of Product requirements and documentation from an approved independent testing laboratory certifying that the air leakage and vapour permeance rates of the air/ vapour barrier membranes, including primary membrane and transition sheets, exceed the requirements of the National Building Code.
 - .2 Submit copies of manufacturers' current ISO certification.
 - .3 Submit references clearly indicating that the membrane manufacturer has successfully completed projects on a annual basis of similar scope and nature for a minimum of fifteen years.
 - .4 Submit manufacturers' complete set of standard details for air/vapour barrier membrane systems showing a continuous plane of air tightness throughout the building envelope.
3. Submit requests for alternates to this specification a minimum of ten (10) working days prior to tender closing for evaluation. Include a list of ten projects executed over the past ten years.
4. Acceptable alternatives will be confirmed by addendum. Substitute materials not approved in writing prior to tender closing shall not be permitted for use on this project.

PART 2 - PRODUCTS

2.1 Membranes

1. Transition and continuous wall envelope barrier membrane (Self-Adhering): Basis of design is Blueskin SA as manufactured by Henry, a SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, or approved equal,. For application temperatures down to - 12°C use Blueskin® SA LT. Membrane shall have the following physical properties:
 - .1 Thickness: 1.0 mm (40 mils);
 - .2 Air leakage: <0.005 L/s•m² @ 75 Pa to ASTM E283-91;
 - .3 Water vapour permeance: 2.8 ng/Pa.m².s (0.05 perms) to ASTM E96;
 - .4 Low temperature flexibility: -30°C to CGSB 37-GP-56M;
 - .5 Elongation: 200% to ASTM D412-modified.

Approved Equal: Air-Shield LM by W.R. Meadows of Canada and AquaBarrier AVB / AquaBarrier AVB LT by IKO Industries.

2. Through-wall flashing membrane and dampproof course (Self-Adhering): Blueskin TWF as manufactured by Henry, a SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, having the following physical properties:
 - .1 Film Thickness: 0.225mm (9.0 mils);
 - .2 Puncture Resistance (film); 180N minimum;
 - .3 Tear Resistance (film); 58N MD;
 - .4 Air leakage: <math><0.005 \text{ L/s}\cdot\text{m}^2 \text{ @ } 75 \text{ Pa}</math> to ASTM E283-91;
 - .5 Water vapour permeance: 2.8 ng/Pa.m².s (0.05 perms) to ASTM E96;
 - .6 Low temperature flexibility: -30°C to CGSB 37-GP-56M.

Approved Equal: Air-Shield Thru-Wall Flashing by W.R. Meadows of Canada and AquaBarrier TWF by IKO Industries.

2.2 Primers

1. Primer for self-adhering membranes: For all temperatures, Blueskin Primer as manufactured by Henry, a synthetic rubber based adhesive type, quick setting, having the following physical properties:
 - .1 Colour: Blue;
 - .2 Weight: 0.8 kg/l;
 - .3 Solids by weight: 35%;
 - .4 Drying time (initial set): 30 minutes.

Approved Equal: S.A.M. Adhesive / S.A.M. Adhesive LVC by IKO Industries

2. Primer for self-adhering membranes: For temperatures above -4°C, Aquatac™ Primer as manufactured by Henry, or approved equal, a polymer emulsion based adhesive type, quick setting, having the following physical properties:
 - .1 Colour: Aqua;
 - .2 Weight: 1.0 kg/l;
 - .3 Solids by weight: 53%;
 - .4 Water based, no solvent odours
 - .5 Drying time (initial set): 30 minutes at 50%RH and 20°C.

2.3 Adhesive

1. Liquid air seal mastic and insulation adhesive: Air-Bloc 21 or 230-21 Insulation Adhesive as manufactured by Henry, a synthetic, trowel applied, rubber based adhesive type, having the following characteristics:
 - .1 Compatibility: With air/vapour barrier membrane, substrate and insulation.
 - .2 Air leakage: 0.013 L/s^om² @ 100 Pa.;
 - .3 Water vapour permeance: 1.7 ng/Pa.m².s. (0.03 perms);

- .4. Long term flexibility: CGSB 71-GP-24M;
- .5 Chemical resistance: Alkalis and salt.

PART 3 - EXECUTION

3.1 Examination

1. Verify that surfaces and conditions are ready to accept the Work of this section. Notify in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrate.

3.2 Preparation

1. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spawled areas in substrate to provide an even plane. Strike masonry joints flush.
2. New concrete should be cured for a minimum of 14 days and must be dry before air/vapour barrier membranes are applied.
3. Where curing compounds are used they must be clear resin based without oil, wax or pigments.

3.3 Primer for Transition and Through-wall Flashing Membrane (Self-Adhering Type only)

1. Apply primer to poured concrete, metal and glass-faced wallboard substrates at rate recommended by manufacturer. Primer not required on concrete block.
2. Allow primer to dry prior to application of the membrane.

3.4 Transition Membrane (Self-Adhering Type)

1. Align and position Blueskin, or approved equal, self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 50 mm overlap at all end and side laps.
2. Tie-in to window frames, aluminium screens, hollow metal doorframes, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in drawings.
3. Promptly roll all laps and membrane with a counter top roller to effect seal.

3.5 Through-wall Flashing & Dampproof Coursing (Torch Applied)

1. Where torch applied through-wall flashing & dampproof coursing are indicated on drawings, install Blueskin TG membrane on primed and prepared surfaces in accordance with manufacturer's written instructions. Approved equal AquaBarrier TG by IKO Industries
2. For through-wall flashing ensure membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the consultant.

3. Apply through-wall flashing membrane along the base of masonry veneer walls, over windows, doors and all other wall openings. Membrane shall form continuous flashing and shall extend a minimum of 200 mm up the back-up wall.

3.6 Through-wall Flashing Membrane (Self-Adhering Type)

1. Align and position the leading edge of Blueskin® TWF self-adhering through-wall flashing membrane with the front horizontal edge of the foundation walls or self angles, partially remove protective film and roll membrane over surface and up vertically.
2. Press firmly into place. Ensure minimum 50mm overlap at all end and side laps.
3. Promptly roll all laps and membrane to effect the seal.
4. Ensure all preparatory work is complete prior to applying Blueskin® TWF.
5. Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the consultant.
6. Apply through-wall flashing membrane along the base of masonry veneer walls, over windows, doors and all other wall openings. Membrane shall form continuous flashing and shall extend up a minimum of 200 mm up the back-up wall.

3.7 Heat Sensitive Transition Membrane (Self-Adhering Type)

1. Align and position Blueskin® SA self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 50 mm overlap at all end and side laps.
2. Tie-in to window frames, aluminium screens, hollow metal doorframes, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in drawings.
3. Promptly roll all laps and membrane with a countertop roller to affect seal.

3.8 Inspection

1. Notify consultant when sections of work are complete so as to allow for review prior to installing insulation.

3.9 Protection of Finished Work

1. Blueskin is not designed for exposure. Good practice requires covering within 7 days after application.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

- | | |
|---------------------------------|---------------|
| 1. Masonry: | Section 04200 |
| 2. Air Vapour Barrier Membrane: | Section 07112 |
| 3. Aluminum Composite Panels | Section 07421 |
| 4. Prefinished Metal Siding | Section 07615 |

Note: in order to maintain continuity and quality control, the supply and installation of the full project scope of vapour barrier membrane is to be carried by a single trade.

PART 2 - PRODUCTS

2.1 Insulation

- Perimeter Foundation Insulation:** Extruded expanded polystyrene to CAN/CGSB-51.20-M87, Type 4, butt or shiplapped edges. For use at perimeter of building and at perimeter of basement areas above and below grade as well as at miscellaneous detail locations calling for rigid insulation.
 - Thickness 75 mm (2.0 in.) (RSI 1.76/R 10.0) - where so indicated.
 - Acceptable Material: "Styrofoam SM" as manufactured by Dow Chemical Canada Inc.
 - Acceptable Material: "Celfort 300" as manufactured by Celfortec Inc.
- Cavity Wall Insulation - Masonry:** Expanded polystyrene insulation to CAN/CGSB-51.20-M87, Type 4 butt or ship lapped edges. For use in cavity wall construction above and below grade.
 - Thickness 100 mm or as indicated.
 - Acceptable Material: "Cavitymate" Type 3 as manufactured by Dow Chemical Canada Inc.
 - Acceptable Material: "Celfort 300" as manufactured by Celfortec Inc. or approved equal.
- Cavity Wall Insulation – Metal Panel:** water-repellent and semi-rigid thermal insulation to CAN/ULC-S702-97, formed of bonded basalt fibres. For use in cavity wall construction or portions thereof with metal panel or siding cladding.
 - Acceptable Material: 100mm "CavityRock MD" as manufactured by Rockwool Inc.
 - Acceptable Material: 100mm "MB PLUS" as manufactured by Fibrex Insulations Inc.

2.2 Adhesive

1. Type A: to CGSB 71-GP-24M plus Amdt-Nov.-83, compatible with respective rigid insulation, air, vapour and waterproofing membranes and recommended by manufacturers. Use Bakor 230-21 rigid insulation adhesive with Blueskin air-vapour barrier.

PART 3 - EXECUTION

3.1 Workmanship

1. Install insulation after building substrata materials are dry, thoroughly clean and capable of providing a firm, uniform bonding surface.
2. Install insulation to maintain continuity of thermal protection to building elements and spaces.
3. Fit insulation closely around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
4. 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 longest possible lengths to reduce number of joints.
5. In multiple layer applications offset both vertical and horizontal joints.
6. Do not enclose insulation until it has been inspected.
7. Install semi rigid board to manufacturer's requirements.

3.2 Rigid Insulation

1. **Cavity Walls Above Grade**
Press insulation in full contact with air/ vapour barrier membrane by installing plastic wedges "Wedge-Lok" between the masonry reinforcing and the insulation. Wedges at 400 mm o.c. vertically and horizontally. Apply adhesive on board edges and press boards tightly to prevent air infiltration between boards.
2. **Cavity Walls Below Grade**
Apply adhesive to insulation board by bead method with 4 mm diameter beads at 350 mm o.c.
3. **Perimeter Insulation**
Apply adhesive to insulation board by spot method with daubs 40 mm diameter x 25 mm high at 200 mm o.c. each way.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Metal Stud System: Section 09111

1.2 Samples

1. Submit duplicate 300 x 300 mm size representative samples of insulation materials in accordance with Section 01340.

PART 2 - PRODUCTS

2.1 Insulation

1. Mineral Fibre: to CSA A101-M83, Roxul AFB Stud Sound Insulation - thickness as indicated on drawings.
2. Approved Equal: Dow Corning sound batt and Roxul Sound Insulation.

2.2 Vapour Barrier Film

1. Polyethylene film to CAN2-51.33-M77, 6 mil thick. Tape for sealing as recommended by manufacturer.

2.3 Accessories

1. Sealant: to CGSB 19-GP-21M.
2. Adhesive: compatible with Vapour Barrier Film.

PART 3 - EXECUTION

3.1 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.

End of Section

PART 1 - GENERAL

1.1 Summary of Work

1. This Section specifies foamed-in-place insulation.

1.2 Related Requirements

- | | |
|----------------------------------|---------------|
| 1. Air Vapour Barrier Membrane | Section 07112 |
| 2. Building Insulation | Section 07212 |
| 3. Aluminum Composite Panels | Section 07421 |
| 4. Sheet Metal Flashing and Trim | Section 07620 |
| 5. Masonry | Section 04200 |

1.3 Reference Standards

1. ASTM International (ASTM).
 - .1 ASTM D2842-[2006], Standard Test Method for Water Absorption of Rigid Cellular Plastics.
 - .2 ASTM E96/E96M-[2010], Standard Test Methods for Water Vapor Transmission of Materials.
 - .3 ASTM E2178-[2003], Standard Test Method for Air Permeance of Building Materials.
2. Canada Green Building Council (CaGBC).
 - .1 LEED® Canada-NC [2009], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations including all Addendums.
3. National Research Council of Canada (NRC).
 - .1 Canadian Construction Materials Centre (CCMC) Reports.
4. Underwriter's laboratories of Canada (ULC).
 - .1 CAN/ULC S102-[2010], Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC S127-[2007], Standard Corner Wall Method of Test for Flammability Characteristics of Non-Melting Building Materials.
 - .3 CAN/ULC-S705.1-[2001], Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material – Specification.
 - .4 CAN/ULC-S705.2-[2005], Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Application.
 - .5 CAN/ULC-S774-[2009], Standard Laboratory Guide for the Determination of Volatile Organic Compound Emissions from Polyurethane Foam

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-Application Meeting: Convene pre-application 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 application recommendations.
 - .1 Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
 - .1 Owner;
 - .2 Consultant;
 - .3 Spray polyurethane foam insulation applicator;
 - .4 Manufacturer's Technical Representative;
 - .5 Manufacturer's third-party quality assurance provider.
 - .2 Ensure meeting agenda includes review of methods and procedures related to medium density closed-cell spray polyurethane foam insulation application including co-ordination with related work.
 - .3 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.
2. Product Data: Submit product data including manufacturer's literature for medium density closed-cell spray polyurethane foam insulation components and accessories, indicating compliance with specified requirements and material characteristics.
 - .1 Submit list on spray polyurethane foam insulation manufacturer's letterhead of materials, components and accessories to be incorporated into work.
 - .2 Include details of insulation joints with sealants.
 - .3 Include product names, types and series numbers.
 - .4 Include contact information for Manufacturer and their representative for this Project.
3. Test Reports:
 - .1 Submit test reports showing compliance with specified performance characteristics and physical properties including thermal performance.
4. Field Reports: Submit third party inspection agency's field reports within ten (10) days of agency representative's site visit and inspection.
5. Sustainable Design (LEED).
 - .1 LEED Submittals: Not Applicable

6. Applicator Qualifications:

- .1 Submit letter on spray polyurethane foam insulation manufacturer's letterhead verifying applicators' license for work similar to work of this Section.

1.6 Closeout Submittals

1. Operation and Maintenance Data: Supply maintenance data for foamed-in-place insulation for incorporation into manual.
2. Record Documentation:
 - .1 List materials used in foamed-in-place insulation work.
 - .2 Warranty: Submit warranty documents specified.

1.7 Quality Assurance

1. Sustainability Standards Certification (LEED).
 - .1 LEED Canada-NC submittals: Not applicable
2. Mock-up: Construct full size 3 x 3 m mock-up of spray polyurethane foam insulation using proposed procedures, materials and quality of work where directed by Consultant.
 - .1 Include window and frame and sill, insulation, building corner condition, junction with roof system and how materials interface with sealants.
 - .2 Purpose: To judge quality of work and material application.
 - .3 Allow Consultant 24 hours minimum prior to inspection of mock-up.
 - .4 Do not proceed with work prior to receipt of written acceptance of mock-up by Consultant.
 - .5 When accepted, mock-up will demonstrate minimum standard of quality required for work of this Section.
 - .6 Approved mock-up will remain part of finished work.
3. Applicator Qualifications: Verify that applicator of spray polyurethane foam insulation is currently licensed by manufacturer.

1.8 Delivery, Storage and Handling

1. Delivery and Acceptance Requirements:
 - .1 Deliver material in accordance with manufacturer's recommendations.
2. Deliver closed-cell spray polyurethane foam insulation materials and components in manufacturer's original packaging with identification labels intact and in sizes to suit project.
3. Storage and Handling Requirements: Store materials off ground and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

4. Packaging Waste Management:

- .1 Separate and recycle waste packaging materials.
- .2 Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper and plastic material in appropriate on-site storage containers for recycling in accordance with Waste Management Plan.

1.9 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: One (1) year commencing on Date of Substantial Performance of work.
 - .1 Warranty: includes coverage of applied closed-cell spray polyurethane foam insulation which:
 - .1 Fail to achieve air tight and watertight seal.
 - .2 Exhibit loss of adhesion or cohesion.
 - .3 Do not cure.

PART 2 - PRODUCTS

2.1 Manufacturer

- 1. Manufacturer:
 - .1 Icynene Inc., Mississauga, Ontario
 - .2 BASF Canada
 - .3 IPI Canada
 - .4 Elastochem

2.2 Description

- 1. Spray applied medium density closed-cell spray polyurethane foam insulation. Thickness required as per drawings and details.

2.3 Design Criteria

- 1. Thermal Resistance: To CAN/ULC-S770, 1.93 minimum RSI at 50 mm thickness.
- 2. Vapour Permeability: To ASTM E96, 56 ng/Pa.s.m² at 50 mm thickness.
- 3. Water Absorption % by Volume: To ASTM D2842, 0.40 %.

4. Flame Spread: To CAN/ULC S102 (S127), 290.
5. VOC's: To CAN/ULC-S774: Pass.

2.4 Materials

1. Medium density closed-cell spray polyurethane foam insulation to CAN/ULC-S705.1.
2. Acceptable Material:
 - .1 Icynene Inc., ICYNENE MD-C- 200-v2
 - .2 Walltite Eco v.3 CT by BASF Canada
 - .3 ISOFOAM - SPF by IPI Canada
 - .4 Insulthane Extreme LTTR R06.03 per inch @ 4"

2.5 Accessories

1. Joint Sealants:
 - .1 Ensure sealants are compatible with spray polyurethane foam insulation.
2. Air/Vapour Barriers:
 - .1 Ensure air-vapour barrier is compatible with spray polyurethane foam insulation. Refer to Section 07112 Air Vapour Barrier Membrane.
3. Fire Stop:
 - .1 Ensure Fire Stop materials are compatible with spray polyurethane foam insulation. Refer to Section 07212 Rigid Insulation.

PART 3 – EXECUTION

3.1 Applicators

1. Use only spray insulation licensed applicators for 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 closed-cell spray polyurethane foam insulation application in accordance with manufacturer's written recommendations.
 - .1 Visually inspect substrate in presence of Consultant.
 - .1 Ensure substrates are clean of oil or excess dust.
 - .2 Ensure that there is no surface spalling.
 - .3 Ensure sealants completely fill gaps in substrate and at joints.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with application only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.3 Preparation

1. Remove loose or foreign matter, which might impair adhesion of materials.
2. Fill open joints and voids in concrete greater than 25 mm.
3. Ensure substrates are free of surface moisture prior to application of closed-cell spray polyurethane foam insulation.

3.4 Application

1. Apply medium density, closed-cell spray polyurethane foam insulation to CAN/ULC-S705.2.
2. Site mix liquid components in accordance with manufacturer's written recommendations.
3. Spray apply medium density closed-cell polyurethane foam insulation evenly in 15 mm to 50 mm thick increments as indicated.
 - .1 Thickness: 15 mm minimum, 50 mm maximum.
4. Perform work in accordance with manufacturer's written recommendations.

3.5 Field Quality Control

1. Field Inspection: Will be carried out by the Consultant.
 - .1 Schedule site visits to review work at stages listed:
 - .1 Twice during progress of work at 25% and 60% complete.
 - .2 Upon completion of work, after cleaning is carried out.
 - .3 Report deficiencies immediately to Consultant.
 - .4 Obtain reports within ten (10) days of review and submit immediately to Consultant.
 - .2 Site Application Tolerances:
 - .1 Thickness: ± 6 mm of thickness indicated.
2. Manufacturer's Services:
 - .1 Co-ordinate manufacturer's services.
 - .1 Have manufacturer's technical representative review work involved in handling, application and protection of closed-cell spray polyurethane foam insulation, and submit written reports in acceptable format to verify compliance of work with Contract conditions.
 - .2 Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for product application review in accordance with manufacturer's written recommendations.
 - .1 Report any inconsistencies from manufacturer's recommendations immediately to Consultant.
 - .3 Schedule site visits to review work at stages listed:

- .1 After delivery and storage of closed-cell spray polyurethane foam insulation, and when preparatory work on which work of this Section depends is complete, but before application begins.
- .2 Upon completion of work, after cleaning is carried out.

3.6 Cleaning

1. Progress Cleaning: Perform cleanup as work progresses.
 - .1 Leave work area clean at end of each day.
2. Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment.
3. Waste Management:
 - .1 Co-ordinate recycling of waste materials.
 - .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.

3.7 Protection

1. Protect applied materials from damage during construction.
2. Repair damage to adjacent materials caused by medium density closed-cell spray polyurethane foam Insulation application.

End of Section

PART 1 - GENERAL

1.1 Description of Work

1. The work of this section shall include, but is not limited to: Interior fireproofing, concealed from view and direct contact

1.2 Related Work

- | | |
|----------------------------------|------------------------------|
| 1. Fire Stopping and Smoke Seals | Division 07270 |
| 2. Building Insulation | Division 07212 |
| 3. Structural Steel Framing | Refer to Structural Drawings |
| 4. Steel Joist Framing | Refer to Structural Drawings |
| 5. Metal Decking | Refer to Structural Drawings |
| 6. Mechanical Division 15 | |
| 7. Electrical Division 16 | |

1.3 Quality Assurance

1. Installer: Contractor shall be approved by manufacturer, and be experienced in installing specified products, and is approved by the manufacturer of the fireproofing products. A manufacturer's willingness to sell products to an installer engaged by contractor, does not in itself confer qualification on the buyer.
2. Single Source: Obtain spray applied fireproofing products from a single source for each product required. Provide secondary materials, which are acceptable to the fireproofing manufacturer which, are included in the tested and/or listed designs.
3. Fire Resistance: Provide fireproofing materials that have been listed and classified by one or more of the following testing authorities: Underwriters Laboratories of Northbrook, IL and/or Underwriters Laboratories of Scarborough, Ontario; 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 UL requirements for application and adhesion characteristics. Provide certifications from fireproofing manufacturer of compatibility of fireproofing and painted systems. Restrictions published by UL shall apply.
8. Remedial Work: Steel surfaces with incompatible primers or paint shall be either removed, lathed, or otherwise remedied within the requirements of UL, so that adequate and approved bonding can occur, acceptable to authorities having jurisdiction.

1.4 Project Conditions

1. Environmental Limitations: Do not apply sprayed fireproofing material when ambient or substrate temperatures are 40 deg. F. (4 deg C) 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.
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. 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

1.5 Sequencing

1. Sequence and coordinate application of sprayed fireproofing with other related work specified in other Sections to comply with the following requirements:
2. Provide temporary enclosure for interior applications to prevent deterioration of applied materials exposed to unfavorable environmental conditions.
3. Avoid exposure of fireproofing to unnecessary damage or abrasion.
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.

1.6 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.

1.7 Submittals, References and Applicable Standards

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. Performance Certification: Submit manufacturer's verification of performance criteria, fire performance and compliance with applicable standards.
3. Applicable Standards and Test Methods:

Products Submitted shall be tested in accordance with the following ASTM test methods:

- .1 E 119 Fire Test of Building Construction and Materials
- .2 E 84 Test for Surface Burning Characteristics of Building Materials
- .3 E 136 Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C
- .4 E 605 Thickness and Density of Sprayed Fire Resistive Materials Applied to Structural Members
- .5 E 736 Cohesion/Adhesion of Sprayed Fire Resistive Materials Applied to Structural Members
- .6 E 759 Effect of Deflection of Sprayed Fire Resistive Materials Applied to Structural Members
- .7 E 760 Effect of Impact on Bonding of Sprayed Fire Resistive Materials Applied to Structural Members
- .8 E 761 Compressive Strength of Sprayed Fire Resistive Materials Applied to Structural Members
- .9 E 859 Air Erosion of Sprayed Fire Resistive Materials Applied to Structural Members
- .10 E 937 Corrosion of Steel By Sprayed Fire Resistive Materials Applied to Structural Members
- .11 AWCI "Inspection Procedure for Field Applied Sprayed Fire Protection Materials", and the current UBC Standard on: "Thickness and Density Determination for Spray Applied Fire Protection"
- .12 G 21 Determining Resistance of Synthetic Polymeric Materials to Fungi

1.8 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. Not covered in this warranty are failures due to damage by others.
2. Warranty Period: 2 years, from date of substantial completion.

PART 2 - PRODUCTS

2.1 Manufacturers

1. Manufacturers of fire resistive materials having product considered acceptable for use:
 - .1 AD Fire Protection Systems
 - .2 Cafco Industries Inc.
 - .3 Grace Canada Inc.

2.2 MATERIALS

1. **Concealed Cementitious Fireproofing:** meeting the below listed minimum physical properties, for use in locations not subject to physical contact or abuse; eg. Southwest Vermiculite Co. Inc. and licensed manufacturers of Type 5 GP (AD Fire Protection Systems).
 - .1 Physical Properties: Minimum values unless otherwise indicated, or higher values required to attain designated fire resistance ratings, measured per standard ASTM test methods referenced above in section 1.08, Part C.
 - .1 E 84: Flame Spread 0, and Smoke Developed 0.
 - .2 E 136: Passes, and is determined non-combustible
 - .3 E 605: Density shall be a minimum of 15 pcf.
 - .4 E 736: Cohesion/Adhesion shall be 200 psf, with 150 psf minimum acceptable level; if primed steel is used, comply with requirements published by U.L.I.
 - .5 E 759: No cracking, spalling or delamination
 - .6 E 760: Impact: No delamination, cracking or spalling
 - .7 E 761: Compression shall be 5.0 lb/sq. in.
 - .8 E 859: Erosion shall be 0.00 gr/sq.ft. maximum
 - .9 E 937: Corrosion: No evidence of corrosion allowed
 - .10 G 21: Mold Resistance: No evidence of growth
 - .2 Structural members not meeting minimum size requirements specified in a design shall receive a thickness of fireproofing consistent with the member's W/D ratio.

-
2. **Exposed Fireproofing:** For exposed applications of sprayed fire-resistive materials, provide manufacturers standard products complying with requirements for materials and composition having the following minimum physical properties measured per ASTM standard test methods referenced above; eg. Southwest Vermiculite Co. Inc. and licensed manufacturers of Type 5 GP (AD Fire Protection Systems).
- .1 Physical Properties:
- .1 E 84: Flame Spread 0, and Smoke Developed 0
 - .2 E 136: Passes, and is determined non-combustible
 - .3 E 605: Density shall be a minimum of 22 pcf.
 - .4 E 736: Cohesion/Adhesion shall be 500 psf for products with a minimum density of 22 pcf, and 1000 psf for products with density above 35 pcf.
 - .5 E 759: No cracking or delamination
 - .6 E 760: Impact: No delamination, cracking or spalling
 - .7 E 761: Compression shall be 100 psi for products with a minimum density of 22 pcf, and 300 psi for products with densities over 35 pcf.
 - .8 E 859: Erosion shall be 0.00 gr/sq.ft.
 - .9 E 937: Corrosion: No evidence of corrosion allowed
 - .10 G 21: Mold Resistance: No evidence of mold growth
3. **Refractory Mineral Wool Fire Protection:** Rigid boards of 9 pcf nominal density; produced from asbestos free materials by combining refractory mineral wool manufactured from slag with thermosetting resin binders to comply with ASTM C612 for Class 4 and as follows:
- .1 Thermal Conductivity (R Value): 4.35 at 75 degrees F (23.9 degrees Celsius).
 - .2 Surface Burning Characteristics: Flame Spread and Smoke Developed ratings of 15 and 5, respectively.
 - .3 Manufacturer and Product Name: eg. Cafco-board Mineral Wool Board Fire Protection by Cafco Industries Inc.
4. **Fastening Accessories:** For each fire resistive assembly in which mineral wool board fire protection serves as rigid fire protection, provide a board fastening system complying with the related UL design or other acceptable testing and inspecting organization's report.
5. **Miscellaneous Materials:** Provide the following materials as standard with each of the fireproofing systems, as recommended by the manufacturer for each condition and substrate.
- .1 Primers: It is not recommended that any structural steel primers are used on any steel surfaces, unless tested and listed by ULI in designs proposed to be used. Compatible primers may be used, providing the fireproofing manufacturer can verify such compatibility in accordance with UL requirements.
 - .2 Adhesives: Provide adhesives as necessary, to comply with manufacturer requirements for adhesion of fireproofing. Acceptable adhesives are:
 - .1 TC 55 water based acrylic adhesive

- .2 Type DK Spatter Coat
- .3 Reinforcements: Provide fiberglass mesh or wire lath for areas where adhesion is not compatible and for application of fireproofing to steel joists.
- .4 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.
- .5 Top Coats: Use as required and recommended by fireproofing manufacturer or compatible products.

PART 3 – EXECUTION

3.1 Pre-Installation Examination:

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. Structural steel shall be unprimed. Steel roof and floor decking shall be galvanized only.
2. Any objects such as hangers, piping attachments, and other suspended retainer devices shall be properly secured.
3. Ducts, piping, and other equipment shall not be placed or suspended until the Fireprotection materials are in place.

3.2 Preparation:

1. Clean any substrate not ready to receive fireproofing. Consult with manufacturer if conditions exist not easily remedied.
2. Apply adhesives as necessary.
3. Cover all work subject to oversprays during application. Provide temporary enclosure when necessary to temporarily confine fireproofing and protect the environment.
4. Assure maintenance of ambient temperatures, and/or heat and ventilation when required.

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, admixtures and specific procedures regarding special conditions.
2. Coat substrates with adhesives if necessary.

3. Extend fireproofing materials in full thickness per approved design, to be protected. Unless otherwise recommended, install fireproofing complete in each area, prior to another.
4. Provide a uniform surface matching UL requirements for designs approved. Apply products at the minimum densities required, or greater.
5. Cure fireproofing to prevent premature drying; protect from freezing as listed in Section 1.05 of this specification.
6. Exposed to View Applications: Where exposed to view, provide appearance of Fireprotection as follows:
 - .1 Provide a troweled surface of appearance previously determined prior to installation
 - .2 Surfaces shall be within tolerances of 1/16 inch
 - .3 Mask edges of termination's so as to achieve neat and sharp edges.

3.4 Field Quality Control:

1. Testing Agency: The owner shall engage and the contractor and applicator shall approve a qualified independent testing agency to perform field quality inspections of applied fireproofing, and prepare reports.
 - .1 Testing shall be done in accordance with the AWCI "Technical Manual 12 - A, Standard Practice for the Testing and Inspecting of Field Applied Sprayed Fire - Resistive Materials" and ASTM E 605.
 - .2 Tests shall be done on thickness, density and adhesion
 - .3 Variances shall be corrected with the testing agency present, and when the applicator is performing work in the same area, to allow for expedient corrections.
 - .4 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. Areas not to receive fireproofing but are finished surfaces shall be masked.
2. All patching of damaged fireproofing shall be completed by applicator.

3.6 Protection:

1. Provide final protection and maintain conditions in a manner acceptable to Consultant and authorities having jurisdiction.
2. Ensure fire protection is not damaged at time of Substantial Performance of the Work.

End of Section

PART 1 - GENERAL

1.1 Related Work

- | | |
|--|---------------|
| 1. Masonry: | Section 04200 |
| 2. Rough Carpentry (Architectural) Plywood: | Section 06100 |
| 3. Gypsum Board: | Section 09250 |
| 4. Firestopping and Smoke Seals for Mechanical Work: | Division 15 |
| 5. Firestopping and Smoke Seals for Electrical Work: | Division 16 |

Note: Firestopping and Smoke Seals within mechanical and electrical assemblies are specified in Divisions 15 and 16. All other firestopping and smoke seals are the responsibility of this Section.

1.2 Reference

1. ASTM E814 - Test Method of fire tests of through-penetration firestops, Factory Mutual.
2. CAN4-S101M - Standard Methods of Fire Endurance Tests of Building Construction and Materials.
3. CAN4-S115M - Standard Method of Fire Tests of Firestop Systems.
4. ULC - List of Equipment and Materials.

1.3 System Description

1. Firestopping Materials: CAN4-S115M ASTM E814 to achieve a fire protection rating as noted on Drawings.
2. It is the intent of this Section that in conjunction with Divisions 15 and 16 a competent, single source be responsible for the firestopping and smoke seals of the entire project.

1.4 Submittals

1. Submit a product data to requirements of Section 01340.
2. Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation, ULC design references.
3. Submit proposed type of fireproofing system for each location for approval by Architect. Fireproofing System must be appropriate to achieve expected appearance and finish.

1.5 Quality Assurance

1. Manufacturer: Company specializing in manufacturing products of this Section with minimum five years documented experience.

2. Applicator: Approved, licensed and supervised by the manufacturer of firestopping materials. Company with minimum five years documented experience.
3. Product: Manufactured under ULC Follow-up Program. Each container or package shall bear ULC label.

1.6 Regulatory Requirements

1. Conform to applicable code for fire protection ratings.
2. Provide certificate of compliance for authority having jurisdiction indicating approval.

1.7 Delivery, Storage & Handling

1. Deliver and store materials in a dry, protected area, off ground in original, undamaged, sealed containers with manufacturer's labels and seals intact.

1.8 Project & Site Conditions

1. Application temperature and ventilation as per Manufacturer's instructions.

1.9 Sequencing & Scheduling

1. Sequence work to permit installation of firestopping and smoke seal materials to be installed after adjacent work is complete and before closure of spaces.

PART 2 - PRODUCTS

2.1 Materials

1. A/D Firebarrier Firestop Systems, by A/D Fire Protection Systems Inc., capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115 and not to exceed opening sizes for which they are intended.
2. Mineral Wood Backing Insulation: ULC labelled, preformed non-combustible material (A/D Firebarrier Mineral Wool) by A/D Fire Protection Systems Inc.
3. Retainers: Clips to support mineral wool.
4. Firestopping Sealant: ULC labelled, single component silicone bases, A/D Silicone Firebarrier Sealant by A/D Fire Protection Systems Inc.
5. Firestopping Seal: ULC labelled, single component water-base seal, A/D Firebarrier Seal by A/D Fire Protection Systems Inc.
6. Firestopping Foam: ULC labelled, two components silicone foam, A/D Firebarrier RTV Foam by A/D Fire Protection Systems Inc.

7. Firestopping Mortar: ULC labelled, non-combustible fibre reinforced, foamed cement mortar, A/D Firebarrier Mortar by A/D Fire Protection Systems Inc.
8. Damming Material: In accordance with tested assembly being installed as applicable and as acceptable to authorities having jurisdiction.

PART 3 - EXECUTION

3.1 Examination

1. Examine surfaces to receive work of this Section and report any defects which may affect the Work of this Section.
2. Verify that openings are ready to receive the Work of this Section.
3. Confirm compatibility of surfaces to receive firestopping and smoke seal materials.
4. Beginning of installation means acceptance of existing surfaces and substrate.

3.2 Preparation

1. Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
2. Prepare surfaces in contact with firestopping materials and smoke seals to manufacturer's instruction.

3.3 Application

1. Install firestopping and smoke seal material and components in accordance with ULC listing 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. Apply in sufficient thickness to achieve rating to uniform density and texture.
4. Provide temporary forming if required.
5. Tool or trowel exposed surfaces to a neat finish where required.
6. Remove excess material promptly as work progresses and upon completion.
7. Protect installed material until cured or set.

3.4 Cleaning

1. Clean adjacent surfaces of firestopping and smoke seal materials.

3.5 Field Quality Control

1. Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.6 Scheduling

1. Firestop and smoke seal at:
 - .1 Penetrations through fire separations (rated and non-rated); masonry, concrete, and gypsum board partitions and walls.
 - .2 Top of fire separations (rated and non-rated); masonry and gypsum board partitions.
 - .3 Intersection of fire separation masonry and gypsum board partitions.
 - .4 Control and sway joints in fire separation masonry and gypsum board partitions and walls.
 - .5 Penetrations through fire separation floor slabs, ceilings and roofs, if applicable.
 - .6 Openings and sleeves installed for future use through fire separations.
 - .7 Refer to AD drawings for locations of fire separations.
 - .8 Refer to AD725 for detail of top of wall fire separation assembly.

3.7 Sound Seal

1. At top of all non fire separations masonry partitions compress mineral wool and fill space between masonry and structure. Apply sealant on at least one side of the sound separation.

End of Section

PART 1 - GENERAL

1.1 Scope of Work

1. Work in this section shall include design, fabrication, supply and installation of a custom made, preformed, prefinished, aluminum composite, dry joint modular wall and soffit system, sub girt system, fastening hardware and flashings.

1.2 Related Work

- | | |
|--------------------------------|---------------------|
| 1. Structural Steel Framing | Structural Drawings |
| 2. Air Vapour Barrier Membrane | Section 07112 |
| 3. Building Insulation | Section 07212 |

1.3 Quality Assurance

1. Supplier/ installer shall have minimum 10 years proven experience and must have completed at least 5 major projects in the specified aluminum composite material panel system.

1.4 References

1. ASTM A653 "Standard Specification for Sheet Steel, Zinc Coated (Galvanized) by the Hot Dip Process".
2. ASTM B209 Aluminum Sheet and Plate
3. ASTM B221 Extruded Aluminum Shapes.
4. ASTM E283-99 Air Infiltration and Exfiltration.
5. ASTM E331-00 Water Infiltration.
6. ASTM E330-02 Wind Load Resistance

1.5 Design and Performance Requirements

1. Design, fabricate and erect a pressure equalized wall panel system to meet the following requirements.
 - .1 Rain Penetration: prevent rain penetration through wall system. Design system based on "Rain Screen Principle" per the National Research Council. Incorporate means of draining to the exterior.
 - .2 Wind load: Design wall system to resist wind loads, positive and negative, expected in this geographical region (OBC climatic data, 100 years probability) without causing rattling, vibration or excessive deflection of panels, overstressing of fasteners, clips and other detrimental effects on system.

- .3 Structural and thermal movement: Accommodate movement of supporting structural framing and movement caused by thermal expansion and contraction of system component parts without causing bowing, buckling, delamination, oil canning, and failure of joint seals, excessive stress on fasteners or any other detrimental effects.
2. Panel flatness tolerance: Fabricate panels not exceeding the following tolerances:
 - .1 Rises and falls across the panel, (local bumps and depressions) will not be accepted.
 - .2 1.5 mm in a concave/ convex direction, measured perpendicular to the normal plane.
3. Panel removal: System/ procedure to allow removal of individual panels within wall system.
4. Maximum deviation from vertical and horizontal alignment of erected panels: 6 mm in 6 m.
5. Testing: Provide wall assembly that has been tested and certified to conform to the following criteria:
 - .1 Structural: Provide systems that have been tested in accordance with ASTM E330 at a design pressure of 60 psf and have been certified to be without permanent deformation or failures of structural members.

1.6 Samples

1. Submit samples in accordance with Section 01340.
2. Submit duplicate, minimum 130 x 180 mm samples of each colour selected.

1.7 Shop Drawings

1. Submit shop drawings in accordance with Section 01340.
2. Indicate elevations, profiles, dimensions and thickness of panels and joint details.
3. Indicate attachment clips, system extrusions, fastening, anchor and installation details.

1.8 Maintenance Data

1. Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual.

1.9 Mock up

1. Submit mock-up in accordance with Section 01340.
2. Erect mock-up panel approximately 3m long x 2m high in location as directed by architect.

3. Mock-up panel shall include all components of the wall system and will be incorporated into work once approved.

1.10 Maintenance Data

1. Protect panel face with a plastic film adhered to panel in accordance with panel manufacturer's recommendation.
2. Store components and materials in accordance with panel manufacturer's recommendations.

1.11 Duranar XL Panel Finish Warranty

1. Provide a manufacturer's written warranty: Furnish panel manufacturer's written warranty covering failure of factory-applied exterior finish on composite metal panels within the warranty period; warrant finish per ASTM D 4214 for chalk not in excess of 8 NBS units and fade not in excess of 5 NBS units. Warranty period for finish: 10 years after the date of Substantial Completion.

1.12 Material and Workmanship Warranty

1. Warranty against defects or deficiencies shall be for a period of one year from date of substantial completion.

PART 2 - PRODUCTS

2.1 Panels

1. Aluminum Composite Material (ACM) Panel
 - ACM Panel -Type 1**– colour by Architect from standard chart
 - ACM Panel -Type 2**– colour by Architect from standard chart
 - ACM Panel -Type 3**– colour by Architect from standard wood / timber series chart
- .1 Composition: Two sheets of aluminum sandwiching a core of extruded thermoplastic formed in a continuous process without the use of glues or adhesives between dissimilar materials. Bond integrity testing to adhere to ASTM D1781-76
- .2 Aluminum face sheets: Aluminum alloy 3003, thickness: 0.51 mm
- .3 Panel thickness: 4 mm
- .4 Panel weight: 5.28 kg/sq.m.
- .5 Tolerances:
 - .1 Panel bow: Maximum 0.8% of panel dimension (width or length).
 - .2 Panel Dimensions: Take site measurements before proceeding with production unless dimensions can be guaranteed by General Contractor.
 - .3 Panel lines, breaks and angles to be sharp and true; panel surfaces to be free from warp or buckle.
- .6 Panel System: rout and return dry vented joints, pressure-equalized rainscreen design, with 12.5 mm wide panel joints with splines, using proprietary aluminum extrusions.

-
- .7 Acceptable material and manufacturer:
 - .1 Accumet 2000 supplied by Flynn Canada
 - .2 Reynobond ACM supplied by Kanalco Ltd.
 - .3 Alucobond SL-2000 supplied by Sobotec Ltd.
 - .4 Alpolic ACM, supplied by ACM Panelworx.
 - .5 Alumax Aluminum Composite Panels ACP
 - .6 Alcotex ACM by Ontario Panelization.

 - 2. Panel finish: Duranar XL, three coat, coil-coated finish containing Kynar 500 polyvinylidene fluoride resin. Colours: to consultant's selection. Allow for three different colour selections including one wood grain look.

 - 3. Panel and Wall Accessories
 - .1 Provide proprietary aluminum extrusions to manufacturer's standard profiles for a complete installation.

 - 4. Fasteners: as recommended by panel manufacturer, concealed and non-corrosive. No Exposed fasteners permitted.

 - 5. Extrusions and extrusion clips for attaching panels to the sub-structure: Purpose made aluminum.

 - 6. Extrusions shall be full length around panel perimeter for panel reinforcement and alignment. Intermittent clips are unacceptable.

 - 7. Joint filler strip: Same material and color as panels. Use of caulking at joints is not acceptable.

 - 8. Plastic shims, shall be used as thermal separator between extrusions and sub-girts.

 - 9. Sub-girts: To be manufactured from G-90 galvanized steel and shall be designed to accommodate expansion and contraction, dynamic movements and design load requirements.

 - 10. Flashing: Pre-finished aluminum to match panels.

PART 3 – INSTALLATION EXECUTION

3.1 Panel System

- 1. Before proceeding, examine work of other sections upon which this section depends.
- 2. Erect panels and joint filler strip in accordance with manufacturer's details to meet specified design criteria and performance.
- 3. Finished work shall be securely anchored, free of distortion, free of surface imperfections and uniform in colour.

4. Use concealed fastenings only.
5. Install panels plumb, true, level and in alignment to established lines and elevations.

3.2 Clean up

1. Remove protective plastic film from panels.
2. Repair and touch-up with colour matching high grade enamel minor surface damage.
3. Replace damaged panels and components which cannot be satisfactorily repaired.

End of Section

Part 1 - GENERAL

1.1 Section Includes

1. Section includes for provision of labour, materials, equipment and services for the supply and installation of the SBS Modified Bituminous Membrane Roofing in accordance with Contract Documents.

1.2 Related Sections

1. Section 06110 Rough Carpentry for Roofing
2. Section 07620 Sheet Metal Flashing and Trim
3. Section 07901 Joint Sealers for Roofing

1.3 References

1. CGSB-37-GP-56M / ASTM D6164 / ASTM 6163 - Membrane, Modified, Bituminous, Prefabricated and Reinforced for Roofing.
2. CGSB 37-GP-9M / ASTM D41 - Primer, Asphalt for Asphalt Roofing, Dampproofing and Waterproofing.
3. CAN/ULC-S701 / ASTM C578 -Thermal Insulation, Polystyrene, Boards and Pipe Covering
4. CAN/ULC-S702 / ASTM C612 – Mineral Fibre Thermal Insulation for Buildings.
5. CAN/ULC-S704 - Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
6. CAN/ULC-S107 – Fire Test of Roof Covering.
7. ASTM E108/ANSI/UL 790–Standard Test Methods for Fire Tests of Roof Coverings.
8. CAN/CSA A123.21 – Dynamic Wind Uplift Resistance of Roof Membrane Systems.
9. CSA A231.1 / CSA A231.2 - Precast Concrete Paving Slabs.
10. CAN/CSA B149.1- Natural Gas and Propane Installation Code.
11. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
12. ASTM C1177- Glass Mat Gypsum Substrate for Use as Sheathing.
13. ASTM C1278 – Fiber Reinforced Gypsum Panels
14. Canadian Roofing Contractors Association (CRCA) – Specification Manual.

1.4 Shop Drawings and Other Submittals

1. Submit to *Consultant* for review, shop drawings, prior to commencement of work. Provide six (6) copies of the shop drawings. Indicate on shop drawings all insulation layers, slopes, crickets, insulation sumps and drainage patterns.
2. Submit Shop Drawings for: Tapered Insulation indicating on shop drawings all insulation layers, slopes, crickets, insulation sumps and drainage patterns.
3. Submit Shop Drawings for: Gas Line Supports and Roof Access Ladders, stamped by Professional Engineer licensed in province of Ontario.
4. **Submit Material List and Shop Drawings to *Consultant* for review prior to ordering materials and commencing Work.**
5. Construction Schedule: Submit required within 10 days of contract award.

1.5 Quality Assurance

1. Skilled trades and *Contractors* having a minimum of five (5) years related experience shall execute roofing Work.
2. *Contractors* shall be approved applicators of system specified. Documentation shall be provided prior to commencing Work.

1.6 Roof System Compliance

1. Roof system meets requirements of CAN/ULC-S107 "Fire Tests of Roof Coverings", Class A as listed in the ULC Directory.
2. Roof system is based on a 2-ply SBS Modified Bituminous Membrane System by Soprema Inc. IKO Industries is an acceptable alternate.
3. Alternatives from other manufacturers will be considered upon submittal and review of technical data sheets and fire resistance test results, and warranty specimen demonstrating product equality.

1.7 Insulation Requirements

1. Polyisocyanurate Roof Insulation Manufacturers shall be members of Polyisocyanurate Insulation Manufacturers Association (PIMA). Manufacturers shall submit documentation listing their LTTR values based on CAN/ULC and ASTM test methods for 2014.
2. When insulation thickness exceeds 69 mm (2.7 in.), it shall be installed in multiple layers. Minimum thickness for bottom layer shall be 33 mm (1.3 in.) and 38 mm (1.5 in.) for top layer.

3. In multiple layer applications, if thicknesses greater than 38 mm (1.5 in.) are required, thicker layer shall be installed in bottom followed by minimum 38 mm (1.5 in.) top layer.
4. Curing Time: Insulation shall be cured and delivered to site in accordance with Polyisocyanurate Insulation Manufacturers Association (PIMA).

1.8 Warranty

1. Provide Standard Form of Warranty including all labour, material and workmanship and a Preventative Maintenance Manual.
2. Warranty shall be for a **period of two (2) years** from date of Substantial Performance, as certified by *Consultant*.
3. Provide **fifteen (15) year** roof membrane manufacturer's Warranty for labour, materials and workmanship with from date of Substantial Performance. This warranty to start after the 2 year warranty has expired.
4. Repair leaks into building or roofing assembly within 24 hours of notification. Repair all roof membrane deficiencies, including ridges, blisters, splits and bare spots.
5. Carry out all repair work during warranty period as directed by *Consultant* and at no additional cost to *Owner*. *Contractor* shall extend Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship.
6. Defects shall include but will not be limited to: leaking; failure to stay in place; lifting; blow off; deformation; and breaking of weathertight seals.

1.9 Delivery, Storage and Handling

1. All materials shall be delivered, stored and handled in accordance with the Contract Documents, be in original manufacturer wrapping with labels intact and clearly identifying the product.
2. All modified bitumen membranes that will be used for installation on a daily basis must be stored at a minimum of 15°C (58°F) for a period of at least 4 hours prior to application. Stand rolled materials on end and protect edges.
3. Materials transported, stored or handled in a manner that contradicts Contract Documents, shall not be installed at the Place of the Work, shall be marked and removed from site.
4. Insulation, vapour retarders and roofing membranes must be kept dry under protective coverings or stored in trailers.
5. **Plastic wrapping installed at the factory is not to be used as an outside storage cover.** Emulsions must be maintained at temperatures above freezing.

6. Immediately remove and dispose of wet materials off site. Do not hoist materials with straps/ropes that damage materials. Use specialty supports.
7. Hoist material to roof surface on a daily basis, for same day use. **Do not 'drop' materials during handling and installation.**

1.10 Environmental Requirements

1. Do not install roofing when temperature remains below 0°F (-18°C) for torch applications and 23°F (-5°C) for asphalt applications.
2. Removal and installation of any roof components during inclement weather is not permitted.

1.11 Scaffolding, Ladders and Conveyances

1. Provide scaffolding, ladders and conveyances required for execution of Work and in accordance with the Contract Documents. Provide all hoisting equipment and barricades required to complete the Work.
2. Construct and maintain scaffolding in accordance with authorities having jurisdiction. If required, have scaffolding designed and stamped by Professional Engineer licensed in Province of Ontario.

1.12 Safety Barriers and Fire Protection

1. *Contractor* shall provide upstanding barrier protection at all perimeters, eaves and parapets. **Mesh, screen and tarpaulins shall also be provided to** prevent debris from blowing or falling over edge. Barriers shall be adequately constructed and secured to prevent toppling over.
2. Fire extinguishers must be on site within 3 m (10 ft.) and at same level as torch applicator. Maintain adequate fire watch (as recommended by membrane manufacturer) after each days roofing operations cease.
3. Torches must never be placed near combustible or flammable products. Torches should never be used where flame is not visible or cannot be easily controlled.
4. Never apply the torch directly to old and wood surfaces. Maintain adequate fire watch (as recommended by membrane manufacturer) during work and after each days roofing operations cease.
5. **Maintain minimum two (2) hour fire watch after torch applications have been completed.** Provide additional protection as required.
6. **Prior to leaving site, use digital thermometer to scan roof surface temperature for 'any hot spots' and address them accordingly.**

1.13 Protection

1. On a daily basis, provide interior protection to equipment, services, material, floors and walls by use of polyethylene or drop sheets, tape, tarps, plywood sheathing or other means to effectively protect contents.
2. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned shall be replaced at no cost to *Owner*.
3. Protect work of other sections from damage while performing roofing work. Provide tarpaulins and other coverings, as required, to protect lower and adjacent walls, finishes and surfaces. Additional protection shall be provided if instructed by *Consultant*.
4. Work is to be performed on occupied buildings. Take all reasonable precautions to protect against entry of elements and persons to unauthorized areas.
5. Prevent precipitation and debris entering openings and drains during work. Prevent damage to site, roads, curbs and building elements.
6. Protect finished roof surfaces with minimum 13 mm (1/2 in.) plywood sheathing with 25 mm (1 in.) polystyrene insulation board on underside.
7. Damaged areas and surfaces shall be repaired to satisfaction of *Consultant* at no additional cost to *Owner*.

1.14 Temporary Facilities

1. Provide temporary storage facilities for materials, tools and equipment. Location to be approved by *Owner*.
2. Provide temporary washroom facilities for workers. Secure portable washrooms to adjacent fences or walls to prevent toppling over.
3. Ground work stations shall be fully enclosed by temporary fencing and be manned at all times.
4. **Disposal bins shall be located minimum 2 m (6'-6") away from building walls.**

1.15 Fastenings

1. Fasteners, anchors and adhesives shall be of appropriate size and type and must be used in sufficient quantity to provide positive and permanent anchorage of component.
2. Fastenings which cause spalling or cracking of material to which anchorage is being made are not permitted. **Powder-actuated** fastening devices are not permitted on this project. Only low velocity plunger-type devices are permitted.

1.16 Wiring Within Roof Assembly

1. If electrical wiring is encountered within roof assembly, Consultant and Owner shall be contacted immediately.

Part 2 - PRODUCTS

2.1 Material

1. Primer:
 1. Asphalt Cutback Primer
 2. Self-Adhesive Membrane Primer: Elastocol Stick by Soprema Inc.
Approved equal: S.A.M. Adhesive by IKO Industries
 3. Modified Membrane Primer: Elastocol 500 by Soprema Inc. Approved equal by IKO Industries
 4. Metal Deck Primer: Rustguard Q.D. Shop Coat Primer by Devoe Coatings.
2. Thermal Barrier: Fibreglass mat faced panel with a specially treated gypsum core that resists moisture. Minimum 13 mm (1/2") thickness. Accepted products:
 1. Dens-Deck Prime Roofboard by Georgia-Pacific
 2. Approved Alternate
3. Mechanical Fasteners For Thermal Barrier and Base Layer Insulation:
Factory Mutual (FM) Class 1, No.12 coated screws and 75 mm (3 in.) galvanized metal plate. Fasteners to be of sufficient length to penetrate through crests of metal deck 19 mm (3/4 in.).
4. Vapour Retarder:
 1. On Metal Decks: Sopravap'r and Elastocol Stick Primer by Soprema Inc.
Approved equal: M.V.P. and S.A.M. Adhesive by IKO Industries
 2. Concrete Decks: Elastophene SP 2.2 by Soprema Inc.
Approved equal: Torchflex TF 95 –SF-Base by IKO Industries
5. **Base Insulation:** 79 & 75 x 1220 x 1220 mm (3.1 in. & 3.0 in. x 4 ft. x 4 ft.), comprising of rigid closed cell polyisocyanurate foam core, bonded with **all fibre glass reinforced facer on each side**. Minimum long-term thermal resistance for 2014 material (LTTR) of RSI 1.00 (R 5.7) per 25 mm (1 in.) thickness. Provide 63 mm & 50 mm (2-1/2 in. & 2 in.) for 1220 x 1220 mm (48 x 48 in.) to create sump at drain.
 1. SOPRA-ISO by Soprema Inc.
 2. IKOTherm III by IKO Industries
 3. AC Foam III by Atlas Corporation Ltd.
 4. H-Shield by Hunter Panels

Note: All polyisocyanurate insulation boards shall be provided by one manufacturer with same production dates and lot numbers and letter submitted regarding claimed R-values.

6. Insulation / Overlay Board Adhesive: A high elastomeric, two part component, one step low rise foamable adhesive that contains no solvents.

1. Duotack by Soprema Inc.
2. Millennium Adhesive by IKO Industries

7. Tapered Insulation, Crickets, Backslope and Sumps: Fabricated from rigid closed cell polyisocyanurate foam core, bonded with **all fibre glass reinforced facer on each side** to layouts and slopes (0.5%, 0.75%, 1.0%, 2.0% or 4.0%) as indicated on drawings. Minimum thickness 13 mm (1/2 in.). 1220 x 1220 mm (4 x 4 ft.). **Provide 2440 x 2440 (8 x 8 ft.) tapered sump at 1% at all drain locations)**

Acceptable Suppliers:

1. Accu-Plane Enterprises Inc.
2. Posi-Slope Enterprises Inc.
3. SOPRA-ISO Tapered by Soprema Inc.]\
4. IKOTherm III Tapered by IKO Industries

Filler pieces shall not exceed 63 mm (2.5 in.) per layer and same as tapered.

8. Overlay Board/Membrane Base Sheet: 14.7 x 914 x 2440 mm (9/16 in. x 3 ft. x 8 ft.) a high performance panel comprised of a non-woven polyester base sheet factory laminated to a high density mineral fibre insulation board, with thermofusible top surface.

1. Xpress Board HD by Soprema Inc.
2. High density mineral wool fibre board and Modiflex MP-180-FS Base by IKO Industries installed on-site

9. Protection Board for Flashings: 6.4 x 1220 x 1524 mm (1/4 in. x 4 ft. x 5 ft.) semi-rigid protection board composed of a mineral fortified asphaltic core formed between two saturated fibreglass felts.

1. Sopraboard by Soprema Inc.
2. Protectoboard by IKO Industries

10. Modified Bituminous Membrane Base Sheet Flashings:

1. Sopralene Flam Stick and Elastocol Stick Primer.
Approved equal: Armourbond Flash HD and S.A.M. Adhesive by IKO Industries

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2. Sopralene Flam 180 by Soprema Inc. (Flanges, End Laps, Patching).
Approved equal: Torchflex TP-180- FF Base by IKO Industries
 11. Modified Bituminous Membrane Liquid Flashings: Polyurethane/bitumen resin 'Alsan Flash' and 152 mm (6 in.) wide fabric reinforcement by Soprema Inc. Approved Equal: MS Detail by IKO Industries
 12. Modified Bituminous Membrane Cap Sheet and Cap Sheet Flashings: Sopralene Flam 250 FR GR by Soprema Inc. (Grey Colour). Approved Equal: Prevent TP HD Cap by IKO Industries
 13. Mastic: Sopramastic by Soprema Inc. Approved equal: AquaBarrier Mastic by IKO Industries.
 14. Pitch-Pans:
 1. Sopramastic Block and Sopramastic PF sealant by Soprema Inc.
 2. ChemCurb System by Chem Link, which shall include sealer and filler.
 3. Fabricated from 0.71 mm (24 gauge) stainless steel, 102 mm (4 in.) high with 152 mm (6 in.) wide flanges, all seams continuously soldered. Allow 52 mm (2 in) gap all around protrusion for pitch-pan filler.
 15. Sopraguard Tape: Self-adhesive, flame-stop tape with glass mat reinforcement.
Approved equal: Modiflex Roof Tapes by IKO Industries
 16. Round Top Cap Nails: Ardox spiral shank with 25 mm (1 in.) steel washer
 17. Bulk Granules: Coloured granules in bulk to match cap sheet.
 18. Rough Carpentry: As per Section 06 10 00 – Rough Carpentry.
 19. Metal Flashing: As per Section 07 62 00 – Sheet Metal Flashing and Trim.
 20. Sealants: As per Section 07 92 00 – Joint Sealers.

2.2 Roofing Accessories

1. **Roof Drains:** Prefabricated Aluminum Roof Drain complete with nuts and bolts, clamping ring, aluminum locking drain strainer and mechanical (MJ) connections, minimum 75 mm (3 in.) diameter **or to suit maximum on site diameter**.
Acceptable Material:
 1. RD-4A Vandalproof Roof Drain and T-7 Aluminum Control Flow by Thaler Metal Industries Ltd.
 2. ABD-CR-SU Heavy Duty Aluminum Body and Aluminum Control Flow by Altra Metal Specialties Inc.
 3. Approved Alternate

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2. **Drain/Plumbing Couplings:** 'Fernco Flexible Coupling', of appropriate size and type to suit site conditions by Fernco Connectors Ltd.
 3. **Vent (Soil) Pipe Sleeves:** 1.6 mm (0.64 in.) thick, 75 or 102 mm (3 or 4 in.), one piece spun aluminum pre-insulated stack jack. To be minimum of 305 mm (12 in.) above finished roof surface. Diameter to suit site conditions. Acceptable Material:
 1. SJ-38 Insulated Stack Jack Flashing by Thaler Metal Industries Ltd.
 4. **Storm Collars and Clamps:** Fabricated from same material as exhaust stacks and sleeves, with continuously soldered seams and extending a minimum of 52 mm (2 in.) down face of sleeve. Allow 6 mm (1/4 in.) gap between storm collar and sleeve.
 5. **Precast Concrete Pavers:** 52 x 610 x 610 mm (2 x 24 x 24 in.) "Brooklin Roof Ballast' slabs with Built-In Pedslab Pedestal System", as manufactured by Brooklin Concrete Products Limited. Colour to be natural with standard diamond texture.
 6. **Paver / Gas Line Support Pedestals:** 25 mm (1 in.) "Roofmate" as manufactured by Dow Chemical Canada Ltd. or Foamular 250 by Owens-Corning.
 7. Sprayed polyurethane foam insulation: one component polyurethane foam insulating sealant.
 1. ENERFOAM by Abisko Manufacturing Inc.
 2. Duotack by Soprema Inc.
 3. Millennium Adhesive by IKO Industries
 8. Mineral Batt Insulation: Rockwool Mineral Batt, of size and thickness to suit site requirements.
 9. Aprons: Fabricated from 0.87 mm (0.034 in.) galvanized metal flashings to profile detailed.
 10. Butyl Tape: 3 mm x 13 mm (1/8 x 1/2 in.) wide elastomeric butyl rubber.
 11. Termination Bar: 3 mm x 25 mm (1/8 x 1 in.) 11 gauge extruded aluminum.

Part 3 - EXECUTION

1.1 Workmanship

1. Do work in accordance with Canadian Roofing Contractors Association Roofing Specifications Manual (CRCA) and Manufacturer's requirements **except as specified within Contract Documents and to approval of Consultant.**
2. More stringent requirements shall govern.

1.2 Examination and Preparation

1. Examine site conditions and surfaces to ensure that they are in satisfactory condition for the commencement of Work of this section.
2. Ensure that substrates are smooth, clean and dry. Clean surfaces of all substances, which may be detrimental to new roof system. Clean adhesives with solvent and allow vapours to dissipate prior to membrane application.
3. Application of the Work, or any part of it will constitute acceptance of conditions upon which work is to proceed.

1.3 General Requirements

1. Complete new roof system, including vapour retarder, insulations and membrane and membrane flashings to each day's termination point and install temporary water cut-off. Remove water cut-off when work resumes.
2. No materials will be installed during inclement weather, rain or snowfall.
3. **Phased construction is not acceptable.**

1.4 Primer

1. All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence.
2. Apply primer to curbs, wall, wood and metal at a minimum rate of 0.2 to 0.3 litres/m² (0.5-0.75 gal / 100 sq. ft.) with roller or spray. Do not allow primer to puddle.
3. Prevent primer from entering building interior through openings and joints in metal decks, by installing self-adhesive membrane at roof perimeters, walls, curbs and other roof openings.
4. Allow primer to cure prior to application of new roofing membrane or membrane flashings as detailed. Do not accelerate drying time by use of flame.
5. Self-adhesive membranes must be applied same day as primer.

1.5 Thermal Barrier (Canopies Only)

1. Apply thermal barrier in urethane adhesive. Use designed applicator and apply Duotack at 20 mm (3/4 in.) wide ribbons at 305 mm (12 in.) on centre in field of roof and at 150 mm (6 in.) for 2440 mm (8 ft. perimeters) and at 100 mm, (4 in.) at 3050 mm (10 ft.) corners.
2. Thermal barrier shall be immediately placed into adhesive bead before a film (skin) starts to form on the adhesive bead. Install new thermal barrier panels with sides and ends supported by deck flutes and with panels placed together with moderate contact. Cut boards cleanly, avoid breaking boards to conform to roof layout.

3. Stagger end joints of adjacent rows of boards. Use largest pieces possible but no piece shall be smaller than 305mm x 305mm (12 in. x 1 in.). Fill in voids larger than 6 mm (1/4 in.) with spray foam or batt insulation.

1.6 Vapour Retarder

1. At all roof perimeters, walls, curbs, dividers, movement and control joints and penetrations, **provide 200 mm (8 in.) self-adhesive reinforcing vapour retarder to seal openings/gaps at junction of wall and deck, to prevent primer/asphalt seepage into building.**
2. **Roll out vapour retarder on clean and fully primed surface.** Peel back first 1000 mm (3 ft.) of release paper and adhere vapour retarder in place. Hold vapour retarder tight and peel off remaining release film diagonally.
3. Apply additional rolls in similar fashion and maintain 75 mm (3 in.) side laps and 150 mm (6 in.) end laps. **Side laps shall bear on solid wood or crest of deck.** Roll vapour retarder onto deck and ensure all laps are sealed.
4. Seal vapour retarder to all penetrations by use of self-adhesive vapour retarder for all occasions. Prime surfaces as required.
5. **Vapour retarder shall provide a continuous and watertight seal if being used as a temporary roof.**

1.7 Base Insulation

1. Install first layer of base insulation over vapour retarder and mechanically secure into substrate to Factory Mutual FM 1-90 requirement layout pattern of five (5) fasteners per 1220 x 1220 mm (4 x 4 ft.) board, as per layout on drawing. Maintain fasteners a minimum of 150 to 305mm (6 to 12 in.) from all perimeters and corners. Provide 50% more fasteners for 2440 mm (8 ft.) perimeters and 75% more at corners for 3660 mm (12 ft.) each way.
2. Ensure fasteners adequately engage and penetrate crest of metal deck 19 mm (3/4 in.) or embedded into wood deck 25 mm (1 in.). Fasteners that do not engage the substrate, shall be removed and re-installed. **Do not overdrive or underdrive fasteners.**
3. Apply second and subsequent layers of insulation in urethane adhesive. Use designed applicator and apply Duotack at 20 mm (3/4 in.) wide ribbons at 305 mm (12 in.) on centre in field of roof and at 150 mm (6 in.) for 2440 mm (8 ft. perimeters) and at 100 mm, (4 in.) at 3050 mm (10 ft.) corners.
4. Insulation shall be immediately placed into adhesive bead before a film (skin) starts to form on adhesive bead.

5. **Stagger all joints in insulation boards within each adjacent layer and between lower and upper layers. Walk insulation into low rise adhesive to achieve solid bond, immediately after placement.**
6. Score and cut boards as required at all undulations in substrate to allow for full contact and walk in place to ensure full adhesion. At junction with wood blocking at parapets, walls and curbs, neatly trim insulation to suit profile of wood assembly and to provide a tight/butt joint.
7. Base insulation shall be reduced 13 mm (1/2 in.) for 1220 mm (4 ft.) centred at drain sump as noted on drawings. Transition shall be 'shaved' to provide a smooth surface for tapered insulation or overlay board.
8. Install insulation boards ensuring panels are tightly butted and end joints between panels are staggered 610 mm (24 in.), each way.
9. Cut insulation boards to fit snugly at all perimeters, roof openings, etc., but not oversized to damage the vapour barrier during installation.
10. Do not lay more insulation boards than can be covered with roof membrane base sheet on same day. Insulation, which is damaged by moisture, shall be marked and promptly removed from site.

1.8 Tapered Insulation

1. Tapered insulation shall be applied over base insulation and under overlay board.
2. Install tapered insulation, sumps, crickets and backslope in low rise foam adhesive. Use designed applicator and apply adhesive at 20 mm (3/4 in.) wide ribbons at 305 mm (12 in.) on centre in field of roof and at 150 mm (6 in.) for 2440 mm (8 ft.) perimeters and at 100 mm (4 in.) at 3050 mm (10 ft.) corners.
3. Insulation shall be immediately placed into adhesive bead before a film (skin) starts to form on the adhesive bead.
4. **Tapered sump shall be installed in its entirety same day.** Under no circumstance shall sump be installed in more than one application as to build-in a high point within sump area.
5. Install insulation ensuring panels are tightly butted and walk insulation low rise foam adhesive to achieve solid bond, immediately after placement.
6. Do not lay more insulation than can be covered with base sheet / overlay board on same day.

1.9 Overlay Board / Membrane Base Sheet

1. Top layer of base insulation shall be free of rust, dust or any residue that may hinder adherence of the base sheet / overlay board.

2. Apply overlay board in urethane adhesive. Use designed applicator and apply Duotack at 20 mm (3/4 in.) wide ribbons at 305 mm (12 in.) on centre in field of roof and at 150 mm (6 in.) for 2440 mm (8 ft. perimeters) and at 100 mm, (4 in.) at 3050 mm (10 ft.) corners.
3. Allow adhesive to slightly rise and then embed insulation into place and weigh down till good adhesion is attained.
4. Stagger side and end joints to adjacent boards and to underlying insulation joints. Immediately after placement, walk boards into adhesive to achieve solid bond.
5. Gradually peel back silicone release paper at laps, pressing down on membrane with an aluminum applicator to ensure good contact and adhesion. Heat weld exterior 25 mm (1 in.) edge of side lap with a hot-air gun or torch flame.
6. Where there is no factory lap, seal butt ends with a minimum 150 mm (6 in.) torch grade membrane base sheet centred over the lap to provide a watertight seal.
7. Roll side and end laps to ensure adequate adhesion in the self-adhesive laps of membrane. Laps shall be installed to shed water, commencing from low point and working upslope.
8. Do not lay more boards than can be covered with roof membrane base sheet on same day. Boards that are damaged shall be marked and promptly removed from site.

1.10 Protection Board on Perimeter Flashings, Mechanical Curbs, Sleepers, etc.

1. Install protection board in adhesive and mechanically fasten to substrate.

1.11 Roof Membrane Base Sheet Flashings

General Application Guidelines

1. Torch off poly of underlying membrane base sheet prior to primer application.
2. Apply appropriate primer to surfaces that are to receive membrane flashings at rates recommended by manufacturer. Allow primer to 'flash off' prior to membrane flashing application.
3. Apply membrane base sheet flashings in general conformance with details commencing from low point and working up-slope. Maintain minimum 75 mm (3 in.) side and 150 mm (6 in.) end laps. Laps shall be installed to shed water. Side laps shall be staggered minimum 305 mm (12 in.) from underlying membrane base sheet laps.
4. Apply base sheet in maximum 1 m (3.25 ft.) wide strips. Extending minimum of 150m (6 in.) beyond toe of cant (or vertical transition) and onto field of roof.
5. At wall and curbs, provide mechanical fasteners within laps of base sheet flashing,

prior to applying succeeding sheet. Fasteners shall be installed at maximum 100 mm (4 in.) on centre commencing from 200 mm (8 in.) above roof membrane.

6. Extend modified bituminous base sheet over parapet, perimeter and eaves down outside face of walls 38 mm (1 ½ in.) onto lower substrate. Secure membrane flashing with large head galvanized nails at 150 mm (6 in.) on centre.
7. At exterior face of parapets / perimeters, apply self-adhesive base sheet flashing, to provide continuous cover over exposed wood and joints between substrates as detailed. Overlap self-adhesive base sheet under overhang of membrane base/cap sheet flashings at top edge of parapets / perimeters.
8. Repair defects in applications with additional piece of self-adhesive base sheet. Carry out repairs to satisfaction of *Consultant*.

Torching Applications

9. **Fully torch base sheet flashing to underlying membrane base sheet.** Provide 3 mm (1/8 in.) 'bitumen bleed-out' at all side and end laps.

Self-Adhesive Applications

10. Apply self-adhesive base sheet flashing onto primed surfaces and roll into place with adequate pressure to ensure full contact and adhesion with substrate. Membrane must be rolled into place using manufacturer's approved roller.
11. Peel back 100 to 150 mm (4 to 6 in.) of silicone release paper to hold membrane in place. Gradually peel back remaining silicone release paper, pressing down on membrane with an aluminum applicator to ensure good contact/adhesion.
12. Heat weld exterior 25 mm (1 in.) of all side and end laps providing a 3 mm (1/8 in.) bitumen bleed out.
13. Thoroughly and effectively roll membrane (using manufacturer's recommended steel roller) to attain full contact and adhesion.

1.12 Reinforcement Gussets

1. Apply gussets at every angle, on inside and outside corners in accordance with manufacturer's requirements.
2. Install self-adhesive or thermofusible gussets before application of membrane base sheet flashing,
3. Install self-adhesive or thermofusible gussets over base sheet flashing and before application of membrane cap sheet flashing.

1.13 Roof Membrane Cap Sheet

1. Base sheet application shall be reviewed by manufacturer and *Consultant* prior to proceeding with membrane cap sheet.

2. Apply membrane cap sheet commencing from centre of drain or low end and working upslope. **Fully torch cap sheet** to base sheet and extend to edge of perimeter, after base sheet flashing has been completed.
3. Provide 3 mm (1/8 in.) 'bitumen bleed-out' at all side and end laps. Maintain minimum 75 mm (3 in.) side and 152 mm (6 in.) end laps. Laps shall be installed to shed water.
4. Maintain minimum 50% stagger from base sheet. Use chalk line to maintain neat and straight lines. Do not walk on or step into newly applied membrane.
5. Apply loose granules in areas where excess heat welding has occurred. Apply heat to affected area, place granules and embed them into warm membrane.
6. Apply membrane cap sheet without voids, wrinkles, buckles, fishmouths or any evidence of a lack of full adhesion. Repair defects to satisfaction of *Consultant*.

1.14 Roof Membrane Cap Sheet Flashings

1. Apply membrane cap sheet flashings in general conformance with details commencing from low point and working up-slope.
2. Membrane base sheets/flashings with a poly on top face shall have poly burned off prior to applying cap sheet flashings. Maintain minimum 50% stagger from base sheet flashing. Use chalk lines to maintain neat and straight lines. Do not walk on or step into newly applied membrane.
3. Fully torch modified bituminous cap sheet flashing to attain full bond.
4. Terminate cap sheet 13 mm (1/2 in.) back from outside edge of parapet blocking and past base sheet flashing 52 mm (2 in) onto flat of roof.
5. Provide 3 mm (1/8 in.) bleed out at all side laps. Maintain minimum 75 mm (3 in.) side and 152 mm (6 in.) end laps. Laps shall be installed to shed water.
6. At wall terminations, install and secure termination bar to adequately restrain the flashings. Secure termination bar at maximum 305 mm (12 in.) on centre. Apply sealant bead along entire length of termination bar.
7. Repair defects in applications with additional piece of torch grade base sheet. Carry out repairs to satisfaction of *Consultant*.

1.15 Drains

1. Cut opening through membrane base sheet, insulation, thermal barrier, vapour retarder and centre drain over pipe. Apply mastic on underside of flange.
2. Insert drain body into new drain pipe until flange is flush with roof membrane. Secure new drains with mechanical (MJ) connection and underside with deck clamp.

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3. **Note: Overlay board to be completely cut-out under drain flange.**
 4. Flash drain flange with one ply of torch grade base sheet. Extend membrane a minimum of 305 mm (12 in.) beyond the edge of drain flange. Membrane cap sheet to be extended continuously through drain area.
 5. Install clamping ring, control flow and aluminum strainer over raised bosses and install screws to tighten ring against membrane and flashings until secure.
 6. Ensure roof drains are clear of debris and free draining at project completion.

1.16 Sleeves

1. Provide all required vents, stacks and conduit sleeves and supports to suit site conditions.
2. At existing vent pipes, extend pipe with same material to 25 mm (1 in.) above top edge of sleeve. At existing exhaust stacks, extend pipe as required to allow for rain collar installation.
3. Prime stack flanges, top and bottom and set underside of flange in bed of mastic on membrane and position evenly around projection. Flash in flanges with one ply of torch grade base sheet. Extend membrane a minimum of 305 mm (12 in.) beyond the edge of drain flange.
4. Where stacks are installed on top of curbs, entire 'boxed curb' shall be covered with adequately secured overlay board and completely covered with torch grade membrane base sheet and cap sheet.

1.17 Parapets/Perimeters/Walls/Sleepers/Curbs

1. At mechanical units, provide new wood sleepers as detailed that extend over minimum 3 joist supports to maximum length required to support units or match existing. Butt new insulation to sleepers by neatly cutting perimeter to fit profile of sleeper.
2. Provide 2-ply membrane flashings over all sleepers to fully encapsulate wood and in accordance with this section.
3. Construct parapet, perimeters, wall and curbs as detailed with new wood members constructed in accordance with Section 06 10 00 – Rough Carpentry.
4. Provide 2-ply membrane flashings at all noted locations in accordance with this section and as detailed.
5. Provide metal cap flashings at sleepers and curbs prior to re-installing units.

1.18 Dividers/Movement/Control Joints

1. At all roof dividers, movement and control joints, construct as detailed with new wood members and frame in accordance with Section 06 10 00 – Rough Carpentry.
2. Provide 2-ply membrane flashings at all noted locations in accordance with this section and as detailed.

1.19 Overflow Scuppers

1. Where indicated on drawings, install new scuppers and secure to substrate.
2. Flash in scupper flanges with one-ply of self-adhesive base and one ply torch grade cap sheet.

1.20 Storm Collars

1. Install storm collars complete with clamping ring and sealant over stacks where caps cannot be installed.

1.21 Electrical/Mechanical and Gas Line Penetrations

1. At pipe/conduit penetrations, provide prefabricated pitch-pan system, adhesive and mastic or insulated sleeve. Provide minimum 25 mm (1 in.) gap between penetration and inner face of pitch-pan.
2. Clean and seal the base of the penetration top the membrane and extend minimum 25 mm (1 in.) above the pitch-pan.
3. Adhere pitch-pan system to roof membrane with a continuous 6 mm (1/4 in.) sealant bead on underside of pitch-pan and all end joints. Embed onto membrane and press in place until sealant overflows from all sides. Apply continuous sealant bead at exterior face of all end joints and at junction of pitch-pan to membrane
4. Completely fill pitch-pan with required pourable sealer/mastic, with high point in the middle and sloped to exterior edge to adequately drain moisture over perimeter.

1.22 Precast Pavers

1. Install new precast paver to required layout. Saw cut to fit at corners/walls or core hole where required to fit penetrations and field dimensions. No piece shall be smaller than 152 mm (6 in.) x 610 mm (2 ft.).
2. Set pavers on pedestals and adequately balance pavers so that 'rocking' does not occur. Pedestal shall be minimum 152 mm (6 in.) wide by 305 mm (12 in.) long. Maintain continuous drainage under all pavers.

1.23 Pitch – Pan Pockets

1. New pitch-pan pockets are to be provided at penetrations where specified sleeves are not suitable. All surfaces shall be clean dry and free from all deleterious material. Galvanized metal penetrations and painted metal must be prepared using a grinding machine to bare metal. PVC pipe must be sanded with sandpaper.
2. All metal surfaces and the pitch-pan pocket must be cleaned with non-greasy solvent such as acetone or Methyl Ethyl Ketone (MEK). Place pitch-pan pocket at desired location and mark outside edge for reference. Pitch pocket shall be placed with minimum 25 mm (1 in) clearance from inside of pitch pocket and penetration.
3. Seal base of penetration with sealant to prevent potential of mastic flowing through openings. Apply sealant over entire granulated surface of membrane where pitch pocket will be installed, to avoid any water infiltration between pitch pocket and membrane.
4. Position pitch-pan pocket and apply a liberal bead of sealant at outside perimeter of pitch pocket. Use the tip of a trowel to adhere sealant to the membrane. Dispense an initial amount of mastic (equivalent to half of the nozzle), outside of the pitch pocket, to assure a homogeneous mixture of parts A and B.
5. Fill assembled pitch pocket with mastic until full, with a high point at middle and tapered to outside edge to allow for water flow over pitch-pocket.

1.24 Mechanical Equipment

1. *Contractor* shall be responsible to remove and re-install roof mounted mechanical equipment and services necessary to facilitate application of new roof system. This includes temporary removal and replacement of all associated ductwork. Do not disconnect H.V.A.C. without approval of *Owner*.
2. Mechanical pipes and gas lines must be disconnected and sufficiently supported. Use treated wood blocks located on concrete pavers resting on top of pedestals to temporarily support equipment.
3. During roof replacement operations, all H.V.A.C. ducts are to be adequately supported. Temporary removal of gas piping is responsibility of *Contractor* and must be re-installed in accordance with applicable regulations and authorities having jurisdiction.
4. *Contractor* must provide for adjustments to ducting, duct supports and piping to suit new roof elevations and new mesh and mastic repairs to match existing duct coatings.
5. At wall junctions, ductwork is to be sealed with transition membranes that are secured to wall with termination bar or metal flashings and provide a watertight junction.

6. Submit certificate from licensed mechanical contractor stating that all modifications/connections comply with Building Automation System and that it is fully functional.

1.25 Electrical Equipment

1. *Contractor* must disconnect all wiring and junction boxes required to facilitate installation of new roof system. Prior to disconnecting electrical systems, obtain approval from *Consultant* or *Owner*. Provide minimum 48 hours' notice for clearance.
2. Submit certificate from licensed electrical contractor stating the all modifications/connections comply with the Electrical Safety Authority (ESA).

1.26 Quality Control

1. *Owner* may retain an independent *Consultant* to carry out periodic supervision during construction.
2. If requested by *Consultant*, take cut-test samples of roofing membrane and membrane flashings, wrap and label samples, identify locations and submit to *Consultant* for review and testing.
3. *Contractor* shall make an allowance for **minimum of one cut test per day** and all required patching to match existing assembly. Samples must be a minimum 305 x 305 mm (12 x 12 in.) and include all new roof components including asphalt pour and gravel. Failed test results will require remedial work acceptable to *Consultant* and may entail complete removal and replacement of failed areas.

1.27 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*. Remove all stains, asphalt, caulking or other adhesive from all surfaces.

End of Section

PART 1 - GENERAL

1.1 Related Work

- | | |
|--|---------------------|
| 1. Metal Decking: | Structural Drawings |
| 2. Rough Carpentry: | Section 06100 |
| 3. Masonry: | Section 04200 |
| 4. Air Vapour Barrier Membrane: | Section 07112 |
| 5. Aluminum Composite Panels: | Section 07421 |
| 6. SBS Modified Bituminous Membrane Roofing: | Section 07520 |
| 7. Building Insulation | Section 07212 |

1.2 Design Criteria

1. Design metal siding system to provide for thermal movement of component materials caused by ambient temperature range of 100 degrees C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.
2. Include expansion joints to accommodate movement in wall system and between wall system and building structure, caused by structural movements, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.
3. Design members to withstand dead load and wind loads calculated in accordance with NBC and applicable local regulations, to maximum allowable deflection of /180th of span.
4. Provide all necessary interior reinforcing girts to withstand all loads as described in item .3.
5. Design wall system to accommodate specified erection tolerances of structure.
6. Maintain following installation tolerances:
 - .1 Maximum variation from plane or location shown on approved shop drawings: 10mm/10m of length and up to 20mm/100m.
 - .2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75mm.

1.3 Samples

1. Submit duplicate 300 x 300 mm samples of each siding wall system, representative of materials, finishes and colors, in accordance with Section 01340.

1.4 Shop Drawings

1. Submit shop drawings in accordance with Section 01340.
2. Indicate arrangement of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural support members or support wall.
3. Clearly detail and indicate locations of all Z clips, J-closures and edge trims.

4. Describe in shop drawing details, suitable accommodation for the removal and joining of future cladding as described in 1.2.7 of this section and on drawings.

1.5 Acceptable Manufacturers

1. Peerless Enterprises or VicWest Steel Inc. or Agway Metals Inc.

1.6 Extended Warranty

1. Submit a warranty for metal siding system, covering materials and labour and the repair or replacement of defective work, but for five (5) years total.

PART 2 - PRODUCTS

2.1 Materials

1. Prepainted Steel: Galvanized sheet steel minimum 0.76 mm (22 ga) thickness, complying with ASTM A526-80 with Z275 designation for zinc coating. Prepainted in 8000 Series Colour: from standard colour selection group.
2. Siding profile VicWest Steel AD300R and AD300SR: for soffits and around clear story windows: Or similar by Flynn or Agway Metals Inc.

Type 1	AD300R – with rib
Type 2	AD300SR – no rib
3. For copings and flashings, provide prefinished metal 24 gauge thickness, colour from standard colour selection group.
4. Screws: to CSA B35.3-1962, head color same as exterior sheet, dished to CSA B35.3-1962.
5. Powder actuated fasteners: galvanized, peened ballistic point, plastic cap of same color as exterior sheet.
6. Sealants: in accordance with Section 07900, paragraph 2.1.4, colour selected by Architect. Allow for one (1) colour from manufacturers full range to match adjacent metal.
7. Gaskets: soft pliable arctic grade vinyl, extruded profile.
8. Touch-up paint: as recommended by panel manufacturer and Baycoat, compatible with prefinished coating.
9. Isolation coating: alkali resistant bituminous paint or epoxy resin solution.
10. Insulation: Semi-rigid. Fiberglass AF 530.

2.2 Components

1. Exterior sheet: factory preformed coated metal, to profiles and thicknesses as indicated.
2. Exterior corners: of same profile, material and finish as adjacent siding material, shop cut and brake formed to required angle, concealed corner brace, hairline exposed joint, pop rivet connections with painted head to match siding.
3. Exposed joint ends of siding sheet shop cut clean and square, backed with tight fitting filler lapping back if joint, exposed components color matched to siding.
4. Accessories: cap flashings, drip flashings, internal corner flashings, copings and closures for head, jamb, eaves, soffits sill and corners, of same material and finish as exterior siding, brake formed to shape. Exposed cut edges of metal profiles will not be accepted.
5. Sub-girts: zinc coated to ASTM A525-78a, G90 coating designation, profile as indicated to accept exterior sheet with structural attachment to building frame.

PART 3 - EXECUTION

3.1 Preparation

1. Protect metal surfaces in contact with concrete, masonry mortar, plaster or other cementitious surface with isolation coating.

3.2 Installation

1. Install sub-girts to masonry walls through air vapour barrier membrane.
2. Install exterior finish siding to internal sub-girts with concealed fasteners.
3. Install insulation using adhesive and ensure a continuous thermal barrier.
4. Provide notched and formed closures, sealed to arrest direct weather penetration at vertical profiles for exterior siding. Ensure continuity of "pressure equalization" of rain screen principle.
5. Provide alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten wall system to building structure.
6. Supply and install flashing at connection between roof and preformed metal siding.

3.3 Control Joints

1. Construct control joints, as indicated.
2. Use cover sheets, of brake formed profile, of same material and finish as adjacent material.

3. Use mechanical fasteners to secure sheet Expansion Joints materials.
4. Assemble and secure wall system to structural frame so stresses on sealants are within manufacturer's recommended limits.

3.4 Cleaning

1. Wash down exposed surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.
2. Remove excess sealant with recommended solvent.

End of Section

PART 1 - GENERAL

1.1 Section Includes

1. This Section includes for provision of all labour, materials, equipment and services for sheet metal flashing and trim Work in accordance with Contract Documents.

1.2 Related Sections

1. Rough Carpentry for Roofing Section 06110
2. SBS Modified Bituminous Membrane Roofing Section 07520
3. Joint Sealers for Roofing Section 07901

1.3 References

1. ASTM A653M- Sheet Steel, Zinc Coated (Galvanized) by the Hot Dipped Process, General Requirements.
2. CAN/CGSB 37-GP-9M / ASTM D41- Asphalt Primer.
3. Canadian Sheet Steel Building Institute (CSSBI) Bulletin No. SSF-3, Core and Maintenance of Pre-finished Sheet Steel Building Products.
4. Canadian Roofing Contractors Specification Manual- 'FL' Series Details.
5. SMACNA Architectural Sheet Metal Quality Assurance Manual - 2015

1.4 Operations

1. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to *Owner*.

1.6 Submittals

1. Submit samples of flashing and sheet metal type and colour to *Consultant* and *Owner* for review prior to commencing work.

1.7 Mock-Up

1. Locate mock-ups at specific areas designated by *Consultant*.
2. Fabricate mock-ups in minimum 2440 mm (8 ft.) lengths with reviewed materials, approved methods including, joints, seams, expansion joints, starter strips and fasteners.

3. Mock-up, if accepted, shall represent the minimum standard for work. Mock-up may be included as part of final work.

1.8 Quality Assurance

1. Flashing and Sheet Metal Work shall be executed in accordance with SMACNA Architectural Sheet Metal Quality Assurance Manual - 2015 by skilled trades having a minimum of five (5) years related experience.

1.9 Warranty

1. Provide minimum two (2) year Warranty from date of Substantial Performance, as certified by *Consultant*. Warranty shall be submitted against defects in workmanship and materials.
2. *Contractor* must extend the Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship. Defects will include but will not be limited to leaking, failure to stay in place, lifting, deformation and breaking of weathertight seals.
3. Provide all additional Warranties that may be available from manufacturer.

Part 2 - PRODUCTS

2.1 Material

1. Prefinished Steel Sheet: Galvanized steel, 0.71 mm (24 gauge) core nominal thickness, zinc coated (galvanized) to designation G90 by the hot dip process, with a prefinished coat. Profiles as detailed.
2. Pre-finished Coat and Primer: 8,000 series finish, factory applied coating on high grade primer. Colour to be approved by Consultant/Owner selected from standard colours listed in General Colour Card.
3. Starter (Hook) Strips: Fabricated from prefinished steel sheet, 0.87 mm (22 gauge) core nominal thickness. Minimum 100 mm (4 in.) wide face **or as detailed** and shall extend onto wall substrate minimum 38 mm (1-1/2 in.) and be continuous.
4. Termination Bar: 3 mm x 25 mm (1/8 x 1 in.) extruded aluminum bar.
5. Fasteners: In accordance with Section 06 10 00 – Rough Carpentry.
6. Touch-up paint: As supplied and recommended by sheet steel manufacturer.
7. Exposed Sheet Metal Fasteners: Self-Drilling Hex Head with washer and colour coded cap
8. Cap, Counter and Fascia Metal to be fabricated to layouts and details shown on drawings and to extent required.

9. Overflow Scuppers: Overflow (Where Shown on Drawings): Fabricated from 0.71 mm (24 gauge) stainless steel. To be a minimum 203 mm wide x 104 mm high (8 x 4 in.) with continuously soldered seams with a 152 mm (6 in.) wide apron/flanges. Bottom edge to extend 38 mm (1-1/2 in.) past wall and top edge 25 mm (1 in.) with open end.
10. Sealants: In accordance with Section 07900.

Part 3 - EXECUTION

3.1 Fabrication

1. Shop fabricate flashing, sheet metal and trim in accordance with requirements of SMACNA and the Contract Documents. Form sheet metal on bending brake, shaping, trimming and hand seaming on bench.
2. Fabricate cap flashings, counter flashings, closures, starter strips, and other miscellaneous sheet metal work with prefinished sheet metal in general accordance with applicable CRCA 'FL' series specifications and / or as indicated on Drawings.
3. Form sections square, true, and accurate to size. Flashings shall be free from distortion, oil canning, twists, buckles, discolouration and other defects detrimental to appearance and performance.
4. Double back all edges a minimum of 13 mm (1/2 in.).
5. Form joints with S-locks and make allowances for movement. Mitre and form standing seams at all corners. Make allowance for movement at joints.
6. Provide a counter flashing and an intermediate vertical flashing where the cap flashing is greater than 610 mm (24") above the top of the roofing membrane. Form vertical flashings in 1220 mm (4 ft.) maximum lengths.
7. Fabricate cap flashings, counter flashings and starter strips to details shown and where required.
8. Fabricate metal in 2400 mm (8 ft.) maximum lengths with an unbroken face less than 225 mm (9 in.). Form flashings with an exposed unbroken face exceeding 225 mm (9 in.) and a girth greater than 610 mm (24 in.) in 1220 mm (4 ft.) maximum lengths.
9. **Provide horizontal stiffening rib "V" on all face metal exceeding 225 mm (9 in.) in girth and where shown on drawings.**
10. Provide an 'S-Lock' joint at all end joints and at all horizontal joints between the cap flashing and the vertical flashing and between the vertical flashing and base counter flashing.

11. Where soldered joints are absolutely necessary and where approved for use in pre-painted metal, clean paint off both surfaces before soldering for minimum area necessary.
12. Sheet metal coming in contact with a metal of a different type must be back painted with two (2) coats of isolation coating.

3.2 Sheet Metal Flashing and Trim

1. Provide a continuous starter strip for all metal cap and counter flashings and gravel stops secured at a maximum 406 mm (16 in.) on centre in a zig-zag-pattern.
2. Install flashings and sheet metal that includes but not limited to; cap flashings, counter flashings, curb and sleeper counter flashings, starter strips and other miscellaneous trim work in accordance with Contract Documents.
3. Parapet and perimeter cap flashings shall be installed with a **minimum 10% positive slope** to interior of roof. Slope to be provided by installation of continuous wood shims, plywood and wood blockings as detailed and in accordance with Section 06 10 00 – Rough Carpentry.
4. Saw cut new reglets or re-use existing (where approved by *Consultant*), into masonry surfaces to accommodate installation of sheet metal flashings. Reglet is to be a minimum 19 mm wide x 25 mm deep (3/4 in. x 1 in.).
5. Install sheet metal work with concealed fasteners. Install exposed fasteners only when and where permitted by *Consultant*. Install fasteners in an approved manner as to prevent water penetration at point of fastening and to be evenly and neatly distributed. Provide fasteners with washers.
6. At reglets, return top edge of flashings into reglets 25 mm (1 in.). Secure flashings with pin grips, spaced at maximum 406 mm (16 in.) on centre and apply sealant bead to shed water.
7. Provide continuous termination bar at top edge of membrane flashings where indicated on Drawings and at locations where membrane flashings terminate at base of a wall and no other means of mechanical securement is specified or indicated. Fasten termination bar to substrate at a maximum 305 mm (12 in.) on centre with appropriate fasteners.
8. Fasteners are to be located a minimum of 305 mm (12 in.) above roof membrane – where possible.
9. End joints of adjacent lengths shall be completed using 'S-Lock' joints. This shall be accomplished by inserting the end of one length in a 25 mm (1 in.) deep "S" lock formed in the end of the adjacent length. Concealed portion of the "S" lock shall extend 25 mm (1 in.) outwards and shall be nailed to substrate. Face nailing of joints will not be permitted.
10. Top edge of counter flashing shall be inserted under cap flashings.

11. Provide three exposed fasteners on interior side of cap flashing, evenly spaced per 2400 mm (8 ft.) length.

3.3 Overflow Scuppers

1. Where indicated on drawings, install new scuppers and secure to substrate. Refer to drawings for details on scupper materials.
2. Flash in scupper flanges in accordance with appropriate roof section.

3.4 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.

End of Section

PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Sheet Metal Flashing and Trim: Section 07620
2. Aluminum Window and Doors: Section 08520

1.2 Environmental Conditions

1. Sealant and substrata materials to be minimum 5 deg. C.
2. Should it become necessary to apply sealants below 5 deg. C, consult sealant manufacturer and follow their recommendations.

1.3 Warranty

1. Contractor hereby warrants that caulking work will not leak, crack, crumble, melt, shrink, run lose adhesion or stain adjacent surfaces in accordance with General Conditions, but for five (5) years total.

PART 2 - PRODUCTS

2.1 Materials

1. Primers: type recommended by sealant manufacturer.
2. Joint Fillers:
 - .1 General: compatible with primers and sealants, outsized 30 to 50%.
 - .2 Polyethylene, urethane, neoprene or vinyl: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.
 - .3 Neoprene or butyl rubber: round solid rod, Shore A hardness 70.
 - .4 Polyvinyl chloride or neoprene: extruded tubing with 6 mm minimum thick walls.
 - .5 Bond breaker: pressure sensitive plastic tape which will not bond to sealants.
 - .6 Sealant Type A: One component, chemical curing, conforming to CAN2-19.13-M82, Class C-2-25-B-N; multi-component, chemical curing, conforming to CAN2-19.24-M80, Type 2, Class B.
 - .7 Sealant Type B: Multi-component, chemical curing mildew resistant conforming to CGSB 19-GP-22M.
 - .8 Sealant type C: Multi-component, acrylic emulsion base, conforming to CGSB 19-GP-17M.
 - .9 Sealant type D: One component, polyurethane base, chemical curing, conforming to CAN2-19.13-M82, Class C-1-25-B-N; or multi-component, chemical curing, conforming to CAN2-19.24-M80, type 1.
3. Color of Sealants: to be selected by Consultant. Allow for a total of three (3) colours for Type A, two colours for Type B, two colours for Type C and one colour for Type D. Locations as directed on site by Consultant.

4. Joint cleaner: xylol, methylethyl-ketone or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.
5. Vent tubing: 6 mm inside diameter extruded polyvinyl chloride tubing.

PART 3 - EXECUTION

3.1 New Work

1. Caulk where specified in 3.4 and everywhere required.
2. Remove dust, paint, loose mortar and other foreign matter. Dry joint surfaces.
3. Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.
4. Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.
5. Prepare concrete, masonry, glazed and vitreous surfaces to sealant manufacturer's instructions.
6. Examine joint sizes and correct to achieve depth ratio 1/2 of joint width with minimum width and depth of 6 mm, maximum width 25 mm.
7. Install joint filler to achieve correct joint depth.
8. Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
9. Apply bond breaker tape where required to manufacturer's instructions.
10. Prime sides of joints to sealant manufacturer's instructions immediately prior to caulking.

3.2 Application

1. Apply sealants, primers, joint fillers, bond breakers, to manufacturer's instructions. Apply sealant using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.
2. Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Neatly tool surface to a slight concave joint.
3. In masonry cavity construction, vent caulked joints from cavity to 3 mm beyond external face of wall by inserting vent tubing at bottom of each joint and maximum to 1500 mm o.c. vertically. Position tube to drain to exterior.
4. In precast concrete panel facing, vent space behind panels by inserting vent tubing at bottom of each vertical caulked joint and at every second intersection of horizontal and vertical joints. Position tube to drain to exterior.

5. Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints.

6. Use sealants specified in the following locations:

Type A: Joints between windows or door frames and adjacent building components; control and expansion joints and all other locations where sealing is required, except in locations designated for Type B, C and D. Ensure that sealant chosen (from the several specified under "MATERIALS") for each location is recommended by manufacturer for use on surfaces encountered.

Type B: Joints between splash backs and walls.

Type C: Joints between interior metal door frames and partitions.

Type D: Joints in horizontal surfaces between concrete slabs, pavers and precast concrete panels.

End of Section

1. GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for joint sealers in accordance with Contract Documents.

1.2 Related Sections

1. Section 06110 Rough Carpentry for Roofing
2. Section 07520 SBS Modified Bituminous Membrane Roofing
3. Section 07620 Sheet Metal Flashing and Trim

1.3 References

1. Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualifications Board for Joint Sealant.
2. CAN/CGSB-19.24 - Multi-Component, chemical curing sealing compound.
3. CAN/CGSB-19.13 - Single Component, elastomeric, chemical curing sealing compound.
4. CGSB 19-GP-14 - Sealing Compound, One-Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
5. CAN/ULC-S115-05 Standard Method of Fire Tests of Firestop Systems.
6. ULC List of Equipment and Materials, Firestop Systems and Components.

1.4 Operations

1. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to *Owner*.

1.6 Submittals

1. Submit samples of sealant type and colour to *Consultant* and *Owner* for review prior to commencing work.

1.7 Quality Assurance

1. Skilled trades with minimum five years related experience shall execute Work.

1.8 Mock-Up

1. Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, sealant and tooling. Mock-up may be included as part of finished work.

1.9 Warranty

1. Provide minimum two (2) year Warranty from date of Substantial Performance, as certified by *Consultant*. Guarantee shall be submitted against defects in workmanship and materials.
2. *Contractor* must extend Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship. Defects will include but will not be limited to; joint leakage, hardening, cracking, crumbling, melting, bubbling, shrinkage, running, sagging, change of colour, loss of adhesion, loss of cohesion and staining of adjoining or adjacent materials on surfaces.
3. Provide all additional Warranties that may be available from manufacturer.

1.10 Environmental Requirements

1. Conform to manufacturer's recommended temperatures, relative humidity and substrate moisture content for application and curing of sealants.
2. Materials must be stored at minimum of 20°C (68°F) immediately prior to application. Sealant applications must be carried out when ambient temperature is above 0°C (32°F).

2. PRODUCTS

2.1 Material

1. All materials in a sealant system shall be compatible with each other and with substrate.
2. Colour(s) of sealants shall be selected to match adjacent substrate and shall be approved by *Consultant* or *Owner*.
3. Elastomeric Sealants: One part elastomeric, non-sag urethane based sealant, for masonry to masonry, masonry to metal junctions. Acceptable Material:
 1. Dymonic as manufactured by Tremco Incorporated.
 2. Vertical Wall Joints - Three-component, chemically curing, epoxidized polyurethane sealant, 'Dymeric 240' by Tremco Incorporated.

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4. Silicone sealants: Silicone based sealant, for metal to metal junctions and glazing. Acceptable Material:
 1. Spectrum 2 as manufactured by Tremco Incorporated.
 2. Dow Corning 999-A Silicone Building & Glazing Sealant by Dow Corning Canada Inc.
 5. Butyl sealants: Butyl rubber and polyisobutylene blend sealant. Butyl sealant to be compatible with modified bituminous membrane flashings. Acceptable Material:
 1. Tremco Butyl Sealant as manufactured by Tremco Incorporated.
 2. Modified Membrane manufacturer's approved sealant.
 6. Firestop Sealant: By Tremco, Dow Corning Canada Inc., GE Silicone, 3M Corporation or approved equal, to CAN/ULC-S115-05.
 7. Joint Backing: Polyethylene, urethane, neoprene or vinyl, extruded foam recommended by sealant manufacturer. Circular shape with diameter 25% greater than joint width before installation.
 8. Primer: As recommended by sealant manufacturer to assure adhesion of compound and to prevent staining of substrate materials.
 9. Joint Cleaner: Non-corrosive and non-staining type, compatible with joint forming materials and sealant as recommended by sealant manufacturer.
 10. Bond Breaker Tape: Polyethylene bond breaker tape, which will not bond to sealant.

3. EXECUTION

3.1 Removal of Existing Sealants

1. Remove existing sealants, backing material, dust, oil, grease, oxidation, millscale, coatings and all other loose material by cutting, brushing, scrubbing, scraping and grinding.
2. Rake out joints, cracks and crevices to receive sealant, to a depth measuring half the joint width. Clean out existing reglets to satisfaction of *Consultant*.

3.2 Preparation

1. Examine joint sizes and conditions to establish correct depth to width ratio for joint backing and sealant. Clean joint surfaces of deleterious material and substances including dust, rust, oil grease, and other matter that may impair work.
2. Ensure joint surfaces are dry and frost free. Prepare substrate as recommended by sealant manufacturer ensuring adjacent surfaces are not damaged.

3. Commencement of Work implies acceptance of existing conditions and assuming full responsibility for finished condition of the Work.

3.3 Priming

1. 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. Prime copper, concrete and masonry surfaces to receive sealant.

3.4 Application

1. Install joint backing all joints prior to applying sealants. Diameter of backing material shall be 25% more than width of joint.
2. **Maintain minimum 2:1 width to depth ratio for sealant.**
3. Apply bond breaker tape where joints are of insufficient size to install joint backing or at 90° junctions or where required by sealant manufacturer or *Consultant*. Ensure bond surface area meets the minimum required size recommended by sealant manufacturer.
4. Where required, mix materials in strict accordance with sealant manufacturer's instructions. Apply sealant using appropriate gun with proper size nozzle.
5. Apply sealant in continuous beads, in solid contact to underlying surfaces with sufficient pressure to fill voids and joints solid.
6. Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities. Superficial skin bead is not acceptable.
7. Tool exposed surfaces before skinning occurs to attain concave shape using approved tools.
8. Cure sealant in accordance with the manufacturer's requirements. Do not cover up sealants until proper curing has taken place.

3.5 Clean-up

1. Clean adjacent surfaces immediately and leave work neat and clean.
2. Remove excess and droppings using recommended cleaners as work progresses.
3. Remove bonding tape after initial set of sealant.
4. Remove all excess material, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.

End of Section

PART 1 - GENERAL

1.1 Work Included

1. A single manufacturer shall fabricate products included within the scope of this Section.
2. Manufacturer shall be a member in good standing of the Canadian Steel Door Manufacturers Association (CSDMA).
3. Supply only of steel frame products including frames, transom frames, sidelight and window assemblies with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, as scheduled or detailed by the Architect.
4. Supply only of flush steel doors with provision for glazed, paneled or louvered openings, insulated and un-insulated, fire labeled, with or without temperature rise ratings and non-labeled, as scheduled or detailed by the Architect.
5. Supply only of steel panels, similar in construction to steel doors, with flush or abetted bottoms for steel frames, transom frames, sidelight and window assemblies, fire labeled and non-labeled, as scheduled or detailed by the Architect.
6. Doors and frames shall be prepared for, but not limited to, preparation for continuous hinges, heavy weight hinges, cylindrical locks, rim and concealed vertical rod/ mortise lock case exit devices, surface door closers and concealed overhead stops.

1.2 Related Work

1. Building-in of frame product into unit masonry, previously placed concrete, structural or steel or wood stud walls.
2. Supply and installation of wood, plastic or composite core doors.
3. Supply and installation of builders' hardware except as specified for acoustic assemblies.
4. Drilling and tapping for surface mounted or non-templated builders' hardware.
5. Caulking of joints between frame product and other building components.
6. Supply and installation of gaskets or weather-strip.
7. Supply and installation of louvers or vents.
8. Supply and installation of glazing materials.
9. Site touch-up and painting.
10. Wiring for electronic or electric hardware.
11. Field measurements.

12. Fasteners for frame product in previously placed concrete, masonry or structural steel.
13. Steel lintels, posts, columns or other load-bearing elements.
14. Field welding.

1.3 Requirements of regulatory agencies

1. Install fire labeled steel door and frame product in accordance with NFPA-80, current edition, unless specified otherwise.

1.4 References

1. ANSI A115.IG-1994 Installation Guide for Doors and Hardware
2. ANSI A250.4-1994 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.
3. ASTM A653-M97 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. ASTM A924-M97 Standard Specification for General Requirements for Sheet, Metallic-Coated by the Hot-Dip Process.
5. ASTM B117-95 Method of Salt Spray (Fog) Testing.
6. ASTM C177-97 Test Method for Steady-State heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
7. ASTM C518-91 Test method for Steady State Heat Flux Measurements and Thermal Transmission properties by means of the heat Flow Meter Apparatus.
8. ASTM C578-95 Specification for Rigid, Cellular polystyrene Thermal Insulation.
9. ASTM C665-95 Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
10. ASTM D1735-92 Practice for Testing Water Resistance of Coating Using Water Fog Apparatus.
11. CAN4-S104-M80 Fire Tests of Door Assemblies.
12. CAN4-S105-M85 Standard Specification for Fire Door Frames Meeting the performance required by CAN4-S104.
13. CAN4-S106-M80 Standard Method for Fire Tests of Window and Glass Block Assemblies.

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14. CGSB 41-Gp-19Ma Rigid Vinyl Extrusions for Windows and Doors
 15. CGSB 82.5-M88 Insulated Steel Doors.
 16. CSA A101-M83 Mineral Fiber Thermal insulation for Buildings.
 17. CSA W59-M89 Welded Steel Construction (Metal Arc Welding)
 18. ISO 9001:1994 Quality Systems – Model for Quality Assurance.
 19. NFPA-80, 1999 Fire Doors and Windows
 20. CSDMA Dimensional Standards for Commercial Steel Doors and Frames.
 21. Manufacturers Standard and Galvanized Sheet Gauges
 22. Fleming Fire Labeling Specifications
 23. ULC List of Equipment and Materials, Volume 2

1.5 Testing and Performance

1. Door constructions covered by this specification shall be certified as meeting Level “A” (1,000,000 cycles) and Twist Test Acceptance Criteria (deflection not to exceed 6.4 mm /13.6kg force, total deflection at 136.1kg force not to exceed 63.5 mm and permanent deflection not to exceed 3.2 mm) when tested in strict conformance with ANSI-A250.4-1994. Test shall be conducted by an independent nationally recognized accredited laboratory.
2. Fire labeled product shall be provided for those openings requiring fire protection and temperature rise ratings, as determined and scheduled by the Architect. Doors, frames, transom frames and sidelight assemblies shall be tested in strict accordance with CAN4-S106. Product shall be listed by Underwriters Laboratories of Canada under an active Factory Inspection Program and shall be constructed as detailed in Follow-Up Service procedures issued to the manufacturer.
3. Should any door or frame specified by the Architect to be fire rated, not qualify for labeling due to design, hardware, glazing or any other reason, the Architect shall be so advised before manufacturing commences.
4. Core materials for exterior doors shall attain a thermal resistance rating of RSI 1.06 (R6.0) when tested in accordance with ASTM C177 or ASTM C518.
5. Product shall be manufactured by a firm experienced in the design and production of standard and custom commercial steel door and frame assemblies, the integration of builders’ or electronic hardware and glazing materials and their impact on the scope of work.

6. Manufacturer shall be assessed and registered as meeting the requirements of Quality Systems under ISO 9001.
7. Product quality shall meet standards set by the Canadian Steel Door Manufacturers Association.

1.6 Test Reports

1. All alternates to this specification shall be submitted to the Architect for acceptance ten (10) days prior to bid date, complete with test reports from independent, nationally recognized testing authorities, certifying that:
 - .1 Steel door and frame assemblies furnished under this section meet the acceptance criteria of ANSI-A250.4-1994, Level "A".
 - .2 Insulated door cores furnished in exterior doors under this Section meet the specified thermal resistance rating.
2. All reports shall include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of the test.

1.7 Submittals

1. Submit shop drawings in accordance with the General Conditions of the Contract.
2. Indicate each type of door, frame, steel, core, material thickness, mortises, reinforcements, anchorages, locations of exposed fasteners, openings (glazed, paneled or louvered) and arrangement of standard builders' hardware.
3. Include a schedule identifying each unit, with door marks or numbers referencing the numbering in Architect's schedules or drawings.
4. Provide confirmation in writing that all aspects to reinforcing, construction, and gauge of metal are met as written in this section.

1.8 Warranty

1. All steel door and frame product shall be warranted from defects in workmanship for a period of one (1) year from date of shipment.
2. All steel door and frame product shall be warranted against rust perforation for a period of five (5) years when the installed and finish painted with a commercial quality paint to the manufacturers recommendations.
3. Finish paint adhesion on all door and frame product shall be warranted for a period of five (5) years when the product has been properly cleaned and finish painted with a commercial quality paint applied as recommended by the paint manufacturer. This warranty shall not exceed that provided by the paint manufacturer.

PART 2 - PRODUCTS

2.1 Doors

1. Materials

- .1 Doors shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designation ZF75, known commercially as paintable Galvanneal.
- .2 Door Cores:
 - Honeycomb:
Structural small cell (25.4 mm maximum) kraft paper "honeycomb". Weight: 36.3 kg per ream (minimum), density: 16.5 kg/m³ (minimum), sanded to the required thickness.
 - .1 Polystyrene:
Rigid extruded, fire retardant, closed cell board, density 16kg/m², thermal values: RSI 1.06 minimum, conforming to ASTM C578.
 - .2 Temperature Rise Rated (TRR):
Solid slab core of non-combustible, inorganic composite to limit temperature rise on the "unexposed" side of door to 250°C at 30 or 60 minutes, as required by governing building code requirements and determined and scheduled by the Architect.
- .3 Adhesives:
 - .1 Honeycomb Cores and Steel Components:
Heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement or ULC approved equivalent.
 - .2 Interlocking Edge Seams:
Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved equivalent.
 - .3 Polystyrene Cores:
Heat resistant, epoxy based, low viscosity, contact cement.
 - 4. Primer:
Rust inhibitive touch-up only.
 - 5. Exterior Top Caps:
Rigid polyvinylchloride (PVC) extrusion.

2. Construction

- .1 General:
 - .1 This section is based on doors and frames as manufactured by Fleming. Doors and frames by other manufacturers are acceptable subject to be similar to the one specified and meeting the terms of this section.
 - .2 Doors shall be swinging, 44.4 mm thick of the types and sizes indicated on the schedules or drawings.
 - .3 Exterior doors shall be lock seam, flush.
 - .4 Face sheets for exterior doors shall be fabricated from (16) gauge steel.
 - .5 Longitudinal edges of exterior doors shall be mechanically interlocked, fully welded, ground smooth with no visible seams. Do not fill seams.

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- .6 Face sheets of interior doors shall be fabricated from 18 gauge steel, except for heavy traffic doors (noted **HT** in Door Schedule) face sheet to be 16 gauge. **Note HT at all interior and exterior exit stair doors at both levels.**
 - .7 Longitudinal edge of heavy traffic doors (noted **HT** in Door Schedule) shall be mechanically interlocked, fully welded, ground smooth with no visible seams. Do not fill seams.
 - .8 Interior doors shall be stiffened, insulated and sound deadened with honeycomb core laminated under pressure to each face sheet.
 - .9 Stiffened, insulated and sound deadened with core where Temperature Rise Rated (TRR) fire labeled doors are specified.
 - .10 Longitudinal edges of interior doors shall be mechanically interlocked, adhesive assisted with edge seams visible.
 - .11 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.
 - .12 Formed edges shall be true and straight with a minimum radius for the thickness of steel used.
 - .13 Lock and hinge edges shall be beveled 3 mm in 50 mm unless builders' hardware or door swing dictates otherwise.
 - .14 Top and bottom of doors shall be provided with inverted, recessed, 16 gauge steel end channels, welded to each face sheet at 150 mm on center maximum.
 - .15 Exterior doors shall be provided with factory installed flush PVC top caps. Fire labeled exterior doors shall be provided with factory installed flush steel top caps.
 - .16 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or hardware Suppliers' schedules or details, fire labeled doors shall be provided for those openings requiring fire protection ratings and temperature rise ratings, as determined and scheduled by the Architect.
 - .17 Exterior doors shall be internally reinforced with 20 gauge continuous; interlocking steel stiffeners at 150mm O.C. max, with voids between stiffeners filled and insulated with 24kg/m³ density loose batt type fiberglass material to suit fully welded design.
- .2 Hardware Preparations:**
- .1 Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
 - .2 Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
 - .3 Doors shall be factory reinforced only for surface mounted hardware.
 - .4 Templated holes 12.7mm diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than 12.7mm diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.
 - .5 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.

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- .6 Hinge and pivot reinforcements shall be 10 gauge steel minimum high frequency type reinforcing.
 - .7 Hinge reinforcements for acoustic doors and doors in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.
 - .8 Lock, strike and flush bolt reinforcements shall be 12 gauge steel minimum.
 - .9 Reinforcements for concealed closers and holders shall be 12 gauge steel minimum.
 - .10 For surface mounted hardware, reinforcements shall be 16 gauge steel minimum.
 - .11 All pairs of fire labeled doors shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
 - .12 Pairs of doors up to 2450mm x 2450mm, to 1½ hour fire rating maximum shall be provided without astragals. Lock edge seam of such doors shall be tacked-welded and ground smooth. All other fire labeled pairs shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
 - .13 Where electrically or electronically operated hardware is specified on the Architects' schedules or details of the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and interconnected with CSA Approved 12.7mm diameter conduit and connectors.
 - .14 Prepare doors to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.
 - .15 Doors and Frames shall be prepared for, but not limited to preparations for heavy weight oversized Butt Hinges, Continuous Hinges, Cylindrical Locksets, Concealed Vertical Rod and Mortise Lock Case Exit Devices, Surface Door Closer and concealed Overhead Stops.
- .3. Glazing:
 - .1 Where 6mm thick glazing materials are specified on the Architects schedules or details, doors shall be provided with 20 gauge steel glazing trim and snap-in glazing stops.
 - .2 Where other than 6mm glazing is specified on the Architect's schedules or details, doors shall receive 20 gauge steel trim and screw fixed glazing stops. Screws shall be #6 x 32mm oval head scrulox (self-drilling) type at 300mm on center maximum.
 - .3 Glazing trim and stops shall be accurately fitted, butted at corners, with removable glazing stops located on the 'push' side of the door.
- .4 Louver Preparations:
 - .1 Where specified on the Architect's schedules or details, non-labeled doors shall be prepared on accordance with the louver manufacturer's details.
 - .2 Where specified on the Architect's schedules or details, fire labeled doors shall be prepared for UL listed sight-proof fusible link louvers in accordance with the louver manufacturer's details.
 - .3 Louvers shall be supplied and installed by others.

- .5 Finishing:
 - .1 Remove weld slag and splatter from exposed surfaces.
 - .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.
 - .3 On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.
 - .4 Primer shall be fully cured prior to shipment.

2.2 Panels

- 1. Panels shall be fabricated from the same materials, construction and finished in the same manner as doors as specified in Section 2.1.

2.3 Frame Product

1. Materials

- .1 Steel:

Frame product shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designated ZF75, known commercially as paintable Galvanneal.
- .2 Primer:

Rust inhibitive touch up only.
- .3 Miscellaneous:
 - .1 Door Silencers:

GJ-64, Single Stud rubber/neoprene type
 - .2 Thermal Breaks:

Rigid polyvinylchloride (PVC) extrusion
 - .3 Fiberglass:

Loose batt type, density: 24kg/m³ (minimum), conforming to ASTM C665

2. Construction

- .1 General:
 - .1 All steel frame product shall be as manufactured by Fleming of the types, sizes and profiles indicated on the Architects' schedules or details.
 - .2 Exterior frames shall be thermally broken, Fleming *Therma-Frame* Series, fabricated from 16 gauge steel.
 - .3 Exterior frame product shall be supplied profile welded (PW)
 - .4 Interior and exterior sections of thermally broken frames shall be separated by a continuous PVC thermal break.
 - .1 Thermally broken sections shall not be assembled by means of screws, grommets or other fasteners and welds shall not cause thermal transfers between interior and exterior surfaces of the frame sections.

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- .2 Closed sections (mullions and center rails) of thermally broken frames shall be factory insulated with 24kg/m³ loose batt type fiberglass material.
 - .5 Insulation of open sections (jambs, heads and sills) on exterior frame product shall be provided and installed by the contractor responsible for installation.
 - .6 Interior frames shall be Fleming F-Series, fabricated from 16 gauge steel.
 - .7 Interior frame product shall be supplied profile welded (PW)
 - .8 Knocked-down and knocked-down drywall frames shall not be acceptable.
 - .9 Jambs, heads, mullions, sills and center rails shall be straight and uniform throughout their lengths.
 - .10 Frame product shall be square, free of defects, wraps or buckles.
 - .11 Corner joints shall be profile welded (PW) (continuously welded on the inside of the profiles' faces, rabbets, returns and soffit intersections with exposed faces filled and ground to a smooth, uniform, seamless surface)"
 - .12 Joints at mullions, transom bars, sills or center rails shall be coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.
 - .13 All steel mullions will be fabricated from the same materials as specified for the steel frames. Steel mullions will be fabricated as a fully assembled three piece unit consisting of a front, back and full height one piece attachment clip as per Fleming F Series. The attachment clip will completely fill the stop area of the mullion on both sides and span the void between each side forming a grid channel like structure. Mullions used as hinge mullions or strike mullions between doors will be filled with grout by the general contractor either prior to or following installation of the frame. The head of the frame shall have an opening sufficient for the grout to be poured in to the mullion.
 - .14 Mullions shall be fabricated with continuous 20 gauge galvanized steel internal reinforcing clips.
 - .15 Frame product shall be fabricated with integral door stops having a minimum height of 16mm.
 - .16 Glazing stops shall be formed 20 gauge steel, 16mm height channel, accurately fitted, butted at corners and fastened to frame sections with #6 x 32mm oval head scrulox (self-drilling) type screws at 300mm on center maximum.
 - .17 Where required due to site access, as indicated on the Architects' schedules or details, when advised by the contractor responsible for coordination or installation, or when shipping limitations so dictate, frame product shall be fabricated in sections for splicing in the field.
 - .1 Field spliced jambs, heads and sills shall be provided with 16 gauge steel splice plates securely welded into one section, extending 100mm minimum each side of splice joint.
 - .2 Field splices at closed sections (mullions or center rails) shall be 16 gauge steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100mm minimum into closed sections when assembled.
 - .3 Field splice joints shall be welded, filled and ground to present a smooth uniform surface by the contractor responsible for installation after assembly.

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- .18 Each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and handling. Spreaders shall be removed by the contractor responsible for installation prior to anchoring of frame to floor.
 - .19 Each door opening shall be prepared for GJ-64 or equivalent, single stud door silencers, three (3) for single door openings, two (2) for double door openings. Silencers shall be shipped loose for installation by the contractor after finish painting.
 - .20 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or Hardware Suppliers' schedules or details, fire labeled frame product shall be provided for those openings required fire protection ratings as determined and scheduled by the Architect.
- .2 Hardware Preparations
- .1 Frame product shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templated provided by the hardware supplier.
 - .2 Frame product shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
 - .3 Frame product shall be reinforced only for surface mounted hardware.
 - .4 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
 - .5 Frames shall be prepared for 114.3mm standard weight hinges (minimum).
 - .6 Hinge and pivot reinforcements shall be 10 gauge steel minimum reinforcing, high frequency type shall be provided.
 - .7 Hinge reinforcements for acoustic frames and frames in excess of 2450mm rabet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.
 - .8 Strike reinforcements shall be 16 gauge steel minimum.
 - .9 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 12 gauge steel minimum.
 - .10 Mortised cutouts shall be protected with 22 gauge steel minimum guard boxes.
 - .11 Where electrically or electronically operated hardware is specified on the Architects schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on templates, shall be provided and interconnected with CSA Approved 12.7mm diameter conduit and connectors.
 - .12 Prepare frames to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.
- .3 Anchorage:
- .1 Frame product shall be provided with anchorage appropriate to floor, wall and frame construction.
 - .2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.

- .3 Frame product installed in unit masonry partitions shall be provided with 4.0mm diameter steel wire anchors, 18 gauge steel adjustable stirrup and strap or "T" type anchors as conditions dictate.
 - .4 Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 16 gauge steel floor anchors. Each anchor shall be provided with two (2) holes for mounting to the floor and shall be securely welded to the inside of the jamb.
 - .5 Floor anchors for thermally broken exterior frames shall be designed so as not to permit thermal transfers from exterior to interior surfaces of the frame sections.
 - .6 Frame product installed in drywall partitions shall be provided with 20 gauge steel snap-in or "Z" type stud type anchor.
 - .7 Jamb of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4mm diameter, located not more than 150mm from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcements and directly opposite on the strike jamb. Each preparation shall be provided with 16 gauge anchor bolt guides.
 - .8 Anchor bolts and expansion shell anchors for the above preparations shall be provided by the contractor responsible for installation.
 - .9 After sufficient tightening of the anchor bolts, the heads shall be welded do as to provide a non-removable application. Welded bolt head and dimple shall be filled and ground to present a smooth uniform surface by the contractor responsible for installation, prior to finish painting.
 - .10 Where indicated on the Architects' schedules or details, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 12 gauge steel formed channel, mounting angles welded to inside of frame head and adjusting brackets. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on site, by contractor responsible for installation.
- .4 Finishing:
- .1 Remove weld slag and spatter from exposed surfaces.
 - .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.
 - .3 On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.
 - .4 Primer shall be fully cured prior to shipment.

2.4 Sizes and Tolerances

1. All sizes and tolerances shall be in accordance with the Canadian Steel Door Manufacturers Association "Recommended Dimensional Standards for Commercial Steel Doors and Frames" as follows:
 - .1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of +1.6mm, -0.8mm.

- .2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of $\pm 1.2\text{mm}$.
- .3 Unless builders' hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3mm clearance at jambs and head. A clearance of 19mm between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be $\pm 1.2\text{mm}$.
- .4 Manufacturing tolerances on formed frame profiles shall be $\pm 0.8\text{mm}$ for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbet shall be $\pm 1.6\text{mm}$ and $\pm 0.4\text{mm}$ respectively. Hardware cutout dimensions shall be as per template dimensions, +0.4mm, -0.

2.5 Hardware Locations

1. Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified in 2.4.
2. Top of upper hinge preparation for 114.3mm hinges shall be located 180mm down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 114.3mm hinges shall be located 310mm from finished floor as defined in 2.4.3. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts. For dutch door frames, top and bottom hinge locations shall be as above, with the tops of intermediate hinges located at 930mm and 1403mm from finished floor.
3. Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be centered 1033mm from finished floor. Strikes for deadlocks shall be centered at 1200mm from finished floor. Strikes for panic or fire exit hardware shall be located as per device manufacturer's templates.
4. Push and/or pulls on doors shall be centered 10701mm from finished floor.
5. Preparations not noted above shall be as per hardware manufacturer's templates.
6. Hardware preparation tolerances shall comply with the ANSI A115 series standards.

PART 3 - EXECUTION

3.1 Site and Protection of Materials

1. The contractor responsible for installation shall remove wraps or covers from door and frame product upon delivery at building site.
2. All materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported in writing to the supplier. All damage shall be noted on the carriers' Bill of Landing.
3. Contractor responsible for installation shall ensure all materials are properly stored on planks or dunnage in a dry location. Product shall be stored in a vertical position, spaced with blocking to permit air circulation between them. Materials shall be covered to protect them from damage from any cause.

4. Contractor shall notify the supplier in writing of any errors or deficiencies in the product itself before initiating any corrective work.

3.2 Installation

1. Install doors and frames in accordance with the Door and Hardware Institute "Installation guide for doors and hardware".
2. Set frame product plumb, square, aligned, without twist at correct elevation.
3. Frame Product Installation Tolerances:
 - .1 Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be $\pm 1.6\text{mm}$.
 - .2 Squareness tolerance, measured through a line 90° from one jamb at the upper corner of the product, to the opposite jamb, shall be $\pm 1.6\text{mm}$.
 - .3 Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be $\pm 1.6\text{mm}$.
 - .4 Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be $\pm 1.6\text{mm}$.
4. Fire labeled product shall be installed in accordance with NFPA-80.
5. Secure anchorages and connections to adjacent construction.
6. Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install wood spreaders at mid points of frame rabbet height and at floor level to maintain frame widths. Provide vertical support at center of head for openings exceeding 1250mm in width. Remove wood spreaders after product has been built-in.
7. Frame product in unit masonry shall be fully grouted in place.
8. Install doors maintaining clearances outlined in Section 2.4.
9. Install louvers and vents.
10. Adjust operable parts for correct clearances and function.
11. Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.
12. Any grout or other bonding material shall be cleaned from products immediately following installation.
13. Exposed field welds shall be finished to present a smooth uniform surface and shall be touched-up with a rust inhibitive primer.
14. Exposed surfaces that have been scratched or otherwise marred during shipment, installation or handling shall be touched-up with a rust inhibitive primer.

15. Finish paint in accordance with Section 09900.
16. Install glazing materials and door silencers.

End of Section

PART 1 - GENERAL

1.1 Related Work

- | | |
|---------------------------------------|---------------|
| 1. Commercial Steel Doors and Frames: | Section 08100 |
| 2. Glazing: | Section 08800 |
| 3. Painting: | Section 09900 |
| 4. Finish Hardware (Supply) | Section 01020 |

1.2 Samples

1. Submit one (1) 300 x 300 mm corner cutaway sample of each type of wood door and each colour of door facing material.
2. Show door construction, core, glazing detail and faces.

1.3 Shop Drawings

1. Submit shop drawings in accordance with Section 01340.
2. Clearly indicate door types and cutouts for lights.

1.4 Warranty

1. Contractor hereby warrants that wood doors will not warp, twist, show core lines, split, delaminate or sag in accordance with General Conditions, but for **three (3)** years.

PART 2 - PRODUCTS

2.1 Manufacturers

1. Manufacturers of wood doors having Product acceptable for use:
 - .1 Baillargeon.
 - .2 Cambridge Door Co.
 - .3 Door-Lam.
 - .4 VT Industries (Harrison Doors Limited).
 - .5 Weyerhaeuser.

2.2 Materials

1. Solid Core Flush Doors – Non-Rated: to CAN/CSA-O132.2; 44 mm thick; constructed as follows:
 - .1 Core: AWMAC Particleboard Core Type; 448 kg/m³ solid lumber stiles and rails bonded to core.
 - .2 Face Assembly Adhesive: Type 1 – Waterproof
 - .3 Core Assembly Adhesive: Type 11 – Water-resistant.
 - .4 Door Faces: Standard decorative laminate to ANSI / NEMA LD 3, Grade VGS;

0.7 mm thick; colours and patterns as selected by Consultant from manufacturer's complete range. Finish to be suede finish by Wilsonart, Formica, Nevemar Arborite or Equivalent.

2. Solid Core Flush Doors – Fire Rated: to CAN/CSA-O132.2; 44 mm thick; fire rated as indicated; constructed as follows:
 - .1 Core: homogeneous incombustible mineral core; ULC labeled; solid lumber stiles and rails bonded to core with reinforced inner blocking for hardware mounting 140 mm top and bottom, 250 mm at center.
 - .2 Face Assembly Adhesive: Type 1 – Waterproof
 - .3 Core Assembly Adhesive: Type 11 – Water-resistant.
 - .4 Door Faces: Standard decorative laminate to ANSI / NEMA LD 3, Grade VGS; 0.7 mm thick; colours and patterns as selected by Consultant from manufacturer's complete range. Finish to be suede finish by Wilsonart, Formica, Nevemar Arborite or Equivalent.

2.3 Fabrication

1. Fabricate doors and panels to CSA 0132.2.
2. Provide 13 mm minimum thick edge strips of wood factory painted or stained and varnished to match plastic laminate.
3. Prepare doors for glass. Provide glazing stops factory painted or stained and varnished to match plastic laminate.
4. Prepare doors to receive hardware. Provide sufficient blocking and reinforcing to accommodate heavy weight oversize butt hinges, cylindrical locksets, rim and concealed vertical rod / mortise lock case exit devices, magnetic locks, surface door closers and concealed overhead stops. Coordinate with Finish Hardware.
5. Doors to be undercut to accommodate continuous hinges where required.
6. Apply laminate facings in accordance with AWMAC Quality Standards and as specified in Section 06400.

PART 3 - EXECUTION

3.1 Installation

1. Install doors and hardware in accordance with manufacturer's instructions and AWMAC standards.
2. Adjust hardware for correct function.

3.2 Adjustment

1. Re-adjust doors and hardware just prior to completion of building to function freely and properly.

End of Section

PART 1 - GENERAL

1.1 Related Work

- | | |
|---------------------------------|---------------|
| 1. Final cleaning: | Section 01710 |
| 2. Sealants: | Section 07900 |
| 3. Glazing: | Section 08800 |
| 4. Air Vapour Barrier Membrane: | Section 07112 |

1.2 Design Requirements

1. This specification section is based on following aluminum glazing types:
 - .1 **Fixed window** - typical unit:
 - .1 E.g. Alumicor - RainBlade 2990 Series, 153mm System Depth – Dual IGU, complete with receptor head, sill and jambs.
 - .2 Typical for punched openings fixed windows.
 - .3 Acceptable – Old Castle, Kawneer
 - .2 **Operators:** Alumicor- UniVent 1375 AW Insert Vent Awning Vent. Handle Finish in Black. Open out with interior insect screen. 87.3mm depth. ADA handle with roto-operator and multi-point locking hardware.
Acceptable - Kawneer or approved equal by Oldcastle,
 - .3 **Curtain wall:**
 - .1 E.g. Kawneer 1600 UT, Alumicor 2600 Series, System depth 190mm with 133.3mm back member and 160mm with 101.6mm back member at masonry backing. Refer to drawings.
 - .2 Typical for Lobby glazing including interior openings, clerestory windows, entrances and stairwell glazing.
 - .3 Acceptable - E.g. Kawneer 1600 UT, New Castle
 - .4 **Finish:** Black 3P – LT601-70
2. Typical window venting: Outward swinging Awning vent.
3. Design all framing and glazing to withstand design loads as per the Ontario Building Code and regulations of authorities having jurisdiction.
4. Work of this Section must be designed by a Professional Engineer licensed to design structures in the Province of Ontario.
5. Design and locate all sealants, gaskets, air/vapour seals, thermal barriers and separations, drainage slots and holes, as shown or specified or as required to obtain design requirements. Ensure all components and assemblies exterior to air barrier drain to building exterior.
6. Provide aluminum closer angles and trims to suit installations. **DO NOT RELY ON WIDER THAN 13MM CAULKING SEALS AT INTERIOR OR EXTERIOR OF WINDOW FRAMES**

AND ADJACENT FINISH. MATCHING ALUMINUM CLOSERS AND TRIMS TO BE UNSED.

7. Curtain Wall:

- .1 Design curtain wall framing to provide free and noiseless movement of all components due to structural erection or dead loads, without buckling of any component and/or transmitting of stress to any other member.
- .2 Design curtain wall glazing system and framing to prevent thermal shock and pressure fracture damage to glass.
- .3 Design pressure plates and glass retainers to place uniform pressure on glass, to prevent any distortion of glass.
- .4 Heavy duty institutional application aluminum door package, thermally broken with insulated sealed units at exterior locations. E.g. Kawneer 350 Medium, or Alumicor Canadiana or equal by other approved aluminum window manufacturers.
- .5 Doors to be thermally broken and to have insulated sealed units at exterior location only.

8. Aluminum Exterior Doors - Aluminum Doors and Frames:

- .1 This specification is based upon Alumicor Limited doors – Canadiana 44.5mm thick, 25.4mm wide double glazed sealed units. Wide Stiles. See door types on drawings.
- .2 Acceptable Equal Alternates: Kawneer and Windspec.”
- .4 Finish: Black 3P – LT601-70

9. Interior Aluminum Screens are non-thermally broken, 45 mm x minimum 100 mm aluminum frame, 6.4 mm single glazed, eg. Alumicor 800 Series with Canadiana Entrance Doors or Kawneer Trifab 400 with standard entrances.

1.3 Shop Drawings

1. Submit shop drawings in accordance with Section 01340 and to be prepared and stamped by a Professional Engineer licensed to design structures in the Province of Ontario.
2. Clearly indicate materials and large scale details for head, jamb and sill, profiles of components, elevations of unit, fully dimensioned layouts positioning brackets and anchorage details, glazing details, and location of isolation coating, description of related components and exposed finishes and fasteners.

1.4 Certificates

1. Submit manufacturer's certificate, certifying compliance with specification requirements, for:
 - .1 windows.
 - .2 finishes.
 - .3 insect screens.
 - .4 infiltration/exfiltration rates.
 - .5 thermal transfer resistance of frames.
 - .6 locking hardware.

1.5 Performance

1. In addition to all requirements of these specifications, the design of glazing shall take into consideration the characteristics of the mullions and effects of the connection and sealants at the frame junctions. Provide thermal breaks between exterior and interior components and sufficient metal on interior side of glass.
2. Fenestration shall meet CAN/CSA – A440 windows:
 - .1 Air Leakage: A3
 - .2 Water Leakage: B7
 - .3 Wind Load Resistance: C5
 - .4 Condensation Resistance: fixed frame: 53 minimum glass: 53 minimum
 - .5 Window shall also meet the requirements for blocked operation, ease of operation, sash strength, stiffness and resistance to forced entry.
3. Submit manufacturer's certificate, certifying compliance with the above-noted requirements.

1.6 Quality Assurance

1. All design, fabrication and installation of this work to be carried out by qualified workers and trades experienced in the application and erection of the products, systems and assemblies specified.
2. Make provisions to drain to the exterior face any water entering in at joints and any condensation occurring within curtain wall construction while maintaining air seal between interior and exterior. Drain holes shall adequately drain all water.
3. At design conditions, no water penetration to interior side of assembly shall occur.
4. Curtain wall systems shall be designed, fabricated, and installed under design conditions to be watertight in combination with movements occurring due to wind loads imposed on the system.
5. Formed aluminum components shall be sheet of alloy and temper suitable for their purpose and finish.

1.7 Warranty

1. Provide written warranty stating that aluminum windows are guaranteed against leakage, defects and malfunction under normal usage for a period of five (5) years from the date of completion.

1.8 Maintenance Material

1. Provide data for maintenance and cleaning in accordance with general conditions.

PART 2 – PRODUCTS

2.1 Manufacturers

1. Equivalent Manufacturers for the work of this section:
 - .1 Kawneer Company Canada
 - .2 Alumicor Limited
 - .3 Oldcastle Glass
 - .4 Sherwood Windows Ltd.

2. Refer to requirements for equivalent products in section 01030.

2.2 Materials

1. Extrusions shall be 6063 T54 alloy and temper. Finish: Black 3P – LT601-70
2. Formed aluminum components shall be sheet of alloy and temper suitable for their purpose and finish.
3. Fasteners shall be 300 series stainless steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.
4. Weathering and glazing gaskets shall be extruded, black, closed cell or dense elastomer of durometer appropriate to the function.
5. Glazing tapes shall be macro-polyisobutylene, highly adhesive and elastic with built in shim.
6. Exterior Sills: extruded aluminum, minimum 3 mm thick, complete with joint covers, jamb drip deflectors, chairs, anchors, anchoring devices. All lower level sills to have exterior corners rounded to 6mm radius.
7. Sealants: in accordance with Section 07900, paragraph 2.1.3. Color to match window frame.
8. Foam Sealants: Urethane expanding foam sealant.
9. Bedding Compound: to CGSB 19-GP-14M.
10. Isolation Coating: alkali resistant bituminous paint.

2.3 Finish

1. Exposed aluminum sections shall be given an anodic oxide treatment in accordance with Aluminum Association specification AA-M12C22A31. Finish: Black 3P – LT601-70

2.4 Fabrication

1. Fabricate framing from extrusions of size and shape shown on shop drawings. Interior and exterior extruded aluminum framing sections shall be integrated with a glass reinforced nylon thermal break to form a rigid composite assembly without the use of fasteners or other thermal bridging elements.

2. Composite frame assembly shall have a minimum of 1100 lbf/4 in. (4815N/ 100 mm) resistance to shear between the aluminum and the thermal break materials.
3. Dry shrinkage of the thermal break shall not exceed 0.10% of the framing member length.
4. Fixed framing shall be designed for screw spline corner construction. 518 ISOPORT frameless vent operating sash extrusions shall be tubular with mitred, clip, adhesive, stake joint construction.
5. All framing joints shall be accurately machined, assembled, and sealed to provide neat weathertight connections. Coupling mullions shall be designed to provide a functional split to permit modular construction and allow for thermal expansion. Glass stops shall be lock-in screwless type.
6. All glazing pockets shall be vented, pressure equalized and drained to the exterior.
7. Elastomeric air seal gasket shall be installed around the full perimeter of glass and sealed at corners with silicone sealant. Air seal gasket must provide adhesion with silicone sealant.
8. Insulated Panels – Anodized or Prefinished aluminum cover sheet, mineral wools semi-rigid insulation in galvanized steel back pan to be held in place with stick pins clips and continuously sealed to frame. Panel finish: Duranar XL, three coat, coil-coated finish containing Kynar 500 polyvinylidene fluoride resin. Colour: to consultant's selection. Interior panel finish is anodized aluminum unless noted otherwise.

2.5 Isolation Coating

1. Isolate aluminum from following components, by means of isolation coating:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze or small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.6 Glazing

1. Prepare windows to receive 25 mm thick double glazed insulating glass specified under Section 08800.

PART 3 - EXECUTION

3.1 Preparation

1. Protect adjacent surfaces from damage resulting from work under this specification.

3.2 Installation

1. Install the windows in accordance with the manufacturer's instructions. Install the windows plumb, level and true relative to building structure. Do not exceed 3mm in 3050 mm (1/8" in 10'0") variation from plumb and level. Foam insulate between the frame members and the window opening using a single component polyurethane foam, insulating sealant.

3.3 Sill Installation

1. Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces.

3.4 Caulking

1. Seal joints between frame members and other non-operating components with sealant to provide weathertight seal at outside.
2. Seal joints between windows and windowsills with sealant. Bed sill expansion joint cover plates and drip reflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.

3.5 Clean Up

1. Clean glass at the factory. Final cleaning of glass to remove job site soiling shall be the responsibility of the owner. Leave all surfaces reasonably clean, free from sealants, caulking or other foreign material. Remove all surplus materials and debris resulting from the work of this Trade.

3.6 Protection and Cleaning

1. Aluminum shall be isolated from concrete, mortar, plaster or dissimilar metals with bituminous paint or epoxy solution. Framing shall be protected from other building materials during and after installation until acceptance.

End of Section

PART 1 - GENERAL

1.1 Related Work

- | | |
|---------------------------------------|---------------|
| 1. Final Cleaning: | Section 01710 |
| 2. Commercial Steel Doors and Frames: | Section 08100 |
| 3. Aluminum Windows and Doors: | Section 08520 |

1.2 Submittals

1. Submit a 300 x 300 sample of all glass products in accordance with Section 01340.

1.3 Warranty

1. Contractor hereby warrants glass against defects and failure, including leakage, under normal conditions of use, in accordance with Division 1, but for five (5) years total

PART 2 - PRODUCTS

2.1 Material

1. Exterior Tempered Safety Glass: All exterior Vision Glass to exterior doors, windows and screens to be sealed insulating units conforming to CAN/CGSB-12.8. Exterior lite 6 mm tempered grey float glass, 12 mm air filled space, inner lite 6 mm clear tempered float glass conforming to CAN/CGSB-12.3. All units to receive Low Emissivity coating on inner pane (3rd surface).
2. Exterior feature at Lobby Curtain Wall – “CROSS” in curtain wall to be coloured plate glass – colour by architect. Refer to front elevation drawing for location.
3. Interior Tempered Safety Glass: 6 mm tempered clear float glass complete with etched tempered glass designation visible.
4. Polished Plate or Float Glass: To CAN/CGSB-12.3 clear.
5. Low E Glass: to CAN/CGSB-12.4; tempered clear, sputtered coating; eg. PPG Vitro Solarban 67 or equivalent by AGC Glass.
6. Fire Rated Glass (FG): Technical Glass Products - 6mm thick fire-rated glazing by FireLite. Model: FireLite NT – rated for 60 minutes. Each piece to be permanently labelled with logo and UL logo and fire rating. Approved equal by Pyran Platinum as manufactured by SCHOTT and SAFTI FIRST model SuperLite II-XL 60.
7. Setting blocks: neoprene, 80 durometer hardness, 102 mm x 6 mm width to suit glass.
8. Glazing tape: preformed butyl with continuous spacer, 10-15 durometer, hardness, paper release, black color, 3 x 10 mm.
9. Gasket: black neoprene "U" cavity type with lock strip.

PART 3 - EXECUTION

3.1 Installation

1. Double Sealed Units

- .1 Install glass as per aluminum window manufacturer's instruction to provide complete rain screen and air/ water barrier.

2. Other Glass

- .1 Clean and dry surfaces.
- .2 Apply glazing tape to fixed stops. Place setting blocks at 1/3 points.
- .3 Set glass on setting blocks against tape.
- .4 Apply glazing tape to glass.
- .5 Install stops.
- .6 Install glass in doors and screens with neoprene gasket.
- .7 Clean glass prior to building occupancy in accordance with Section 01710.

End of Section

PART 1 - GENERAL

1.1 General Finish Notes

1. The Material and Colour Schedule will be issued by the Consultant after tender. It shall be read in conjunction with the Drawings, Specifications, Room Schedule and Door Schedule. Colour and material references named will be based on one manufacturer, as carried by the Contractor or, in the case that no specific manufacturer is carried, based on the Consultant's choice.
2. Approved alternative manufacturers will be acceptable only as indicated in the specifications. However, approved alternate products submitted must match the products named in the Specification to the Consultant's selection. Alternate products other than those named in the specifications will not be allowed unless previously approved by the Consultant.
3. Consult Architect prior to painting any surface not included in the formulae as listed.
4. Final colour for exterior painted surfaces and prominent interior areas shall be approved on the job site by the Architect.
5. Paint samples: Contractor to submit paint samples for all areas required to "Match Adjacent Finish".
6. All similar paint formulations are to be identical when dry. Variations in tone, texture or sheen shall not be accepted.
7. Submit two 300 mm x 300 mm paint samples of each colour required for approval by the Architect.
8. Exact locations of accent paint called for in the Material and Colour Schedule, to be issued after Contract award, not specifically identified on the drawings are to be verified on site with the Architect.

1.2 Exterior Finish Notes

1. All exposed metal (doors, frames, lintels, stairs, handrails, mechanical equipment, etc.) to be painted except for prefinished metal louvres, stainless steel, and aluminum. Mechanical equipment is to be painted whether delivered to the site pre-painted or not (exhaust fans, goosenecks, exhaust stacks, supports, HVAC units, HRU units, etc.). Colours to match adjacent material—generally either to match brick or tan to match flashing or siding material. Do not paint exposed white PVC pipe covers on interior. Architect will advise on jobsite which other items mentioned above, if any, do not require painting.
2. All unfinished metal work provided by landscaping is to be painted by Section 09900.

1.3 Interior Finish Notes:

1. All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (except stainless steel or anodized aluminum) to be painted to match the surfaces on which they occur unless noted otherwise on the colour schedule, prefinished in suitable colour or directed by the Architect. If prefinished equipment is damaged, it shall be re-painted. Painting to be by formulations specified in Section 09900.
2. All interior fitments, casework, millwork, etc. to be melamine unless otherwise noted. Refer to Sections for specific requirements regarding materials, construction, finishes and hardware. Note that drawer and cupboard interiors are to be considered as exposed surfaces and will therefore be finished.
3. Do not paint over nameplates, identification tags, etc.
4. Make good all existing surfaces and finishes that are damaged during construction.

1.4 Abbreviations Legend

1. Refer to Room Finish Schedule for abbreviations Legend.

End of Section

PART 1 - GENERAL

1.1 Related Work

- | | |
|-----------------------------|---------------|
| 1. Gypsum Board: | Section 09250 |
| 2. Mineral Fiber Insulation | Section 07213 |

1.2 Reference Standards

1. Do work to CSA A82.31, except where specified otherwise.

PART 2 - PRODUCTS

2.1 Materials

1. Non-load bearing channel stud framing: to ASTM C645, roll formed from 0.59 mm thickness electro-galvanized steel sheet for screw attachment of gypsum lath and metal lath. Knock out service holes at 150 mm o.c.
2. Floor and ceiling tracks: to ASTM C645-76 in width to suit stud sizes, 30 mm legs for floor track, 50 mm for ceiling track.
3. Metal channel stiffener: 38 mm size, 2 mm thick cold rolled galvanized steel.
4. Furring channels (channels, hangers, tie wire, insert, anchor): CSA A82.30 (R-1971).
5. Metal Accessories: CSA A82.30-1965 (R-1971).

PART 3 - EXECUTION

3.1 Stud Partitions

1. Align partition tracks at floor and underside of structure above and secure at 600 mm o.c. maximum. All partitions to extend to underside of structure above.
2. Place studs vertically at 400 o.c. 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.
3. Erect metal studding to tolerance 1:1000.
4. Attach studs to bottom track using screws.
5. Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs, ensure web openings are aligned.

6. Install steel frames and anchor frames securely to studs using minimum of three (3) anchors per jamb for jambs up to 2100 mm high and a minimum of four (4) anchors per jambs for jambs over 2100 mm high.
7. Provide two (2) studs at each side of openings wider than stud centre specified.
8. Install, cut to length, piece of runner horizontally over door frames and at top and bottom of rough opening in glazed partitions.
9. Provide 38 mm x 89 mm vertical and horizontal wood studs secured between metal studs for attachments of bathroom fixtures, accessories, cabinet work, and other fixtures, including grab bars, towel rails, attached to steel stud partitions.
10. Install steel stud or furring channel between studs for attaching electrical and other boxes.
11. Extend all partitions to underside of deck above for sound and fire separation. Fill deck flutes with rockwool.
12. Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.

3.2 Ceiling Furring

1. Install runners level to tolerance of 3 mm over 3.5 m. Provide runners at interruptions of continuity and change in direction.
2. Frame with furring channels, perimeter of openings to accommodate access panels, light fixtures, diffusers, grilles, etc.
3. Furr for bulkheads within or at termination or ceilings.
4. Install furring channels at 400 mm o.c. maximum.

3.3 Wall Furring

1. Install steel furring, as indicated.
2. Frame opening and around built-in equipment on four (4) sides with channels.
3. Box-in beads, columns, pipes, and around exposed services.

3.4 Fire-rated Assemblies

1. If required, install Metal Stud System and Furring in accordance with appropriate ULC Design and with supplement to the National Building Code of Canada 2015.

End of Section

PART 1 - GENERAL

1.1 Related Work

- | | |
|---|---------------------|
| 1. Masonry: | Section 04200 |
| 2. Mineral Fiber Insulation | Section 07213 |
| 2. Metal Stud System: | Section 09111 |
| 3. Supply of access doors for mechanical and electrical devices | Divisions 15 and 16 |

1.2 Reference Standards

1. Do work to CSA A82.31-1977, except where specified otherwise.

PART 2 - PRODUCTS

2.1 Gypsum Board

1. Plain: to CSA A82.27-M1977 standard, 16 mm or 19 mm thick or as indicated, tapered edges.
2. Plain: to CSA A82.27-M1977, Fire-rated Type X, 16 mm thick or as indicated, tapered edges.
3. Plain: to CSA A82.27-M1977 standard, 13 mm water resistant, tapered edges.
(W.R.G.B. in Finish Schedule)
4. Plain: to CSA A82.27-M1977, walls 5/8" dens-shield or as indicated, tapered edges.

2.2 Fastenings and Adhesives

1. Screws: to CSA A82.31-1977.
2. Adhesive: to CGSB 71 GP 25M.
3. Laminating Compound: to CSA A82.31-1077.
4. Concrete Anchors: Phillips Red Head TW-614 or equivalent. Do not use powder activated fasteners for ceiling support.
5. Tie Wire: #16 ga. galvanized soft annealed steel wire.

2.3 Accessories

1. Casing Beads and Corner Beads: 0.5 mm base thickness commercial sheet steel with G90 zinc finish to ASTM A 525-78 A.
2. Joint compound and tape: Compound to CSA A82.31-1977, asbestos-free. Perforated 50 mm gypsum board joint tape.
3. Caulking: Acoustical sealant.

2.4 Insulation Blanket

1. 38 mm thick mineral wool batts ULC labelled, if indicated on drawings.

PART 3 - EXECUTION

3.1 Gypsum Board Application

1. Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.
2. Install metal studs plumb and true to sizes and locations indicated on drawings.
3. Apply single and double layers gypsum board to metal furring or framing, using screw fasteners and laminating adhesive. Maximum spacing of screw 300 mm oc.
4. Apply gypsum board to concrete block surfaces, where indicated, using laminating adhesive.
5. Apply type X gypsum board where indicated, in accordance with U.L.C. requirements and with supplement to the National Building Code of Canada to obtain the required fire protection, fire rating and fire separation.

3.2 Insulation and Blanket Application

1. Where indicated on drawings, staple blanket to wallboard in accordance with ULC design requirements. Blanket shall be continuous and tightly fitted between studs and at perimeter.

3.3 Accessories

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 secure. Mitre and fit corners accurately, free from rough edges.
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.

3.4 Access Doors

1. Install access doors to electrical and mechanical fixtures specified in respective Sections.
2. Rigidly secure frames to furring or framing systems.

3.5 Taping and Filling and Sound Seal

1. Seal with acoustical sealant at ceilings, floors, wall intersections and all penetrations such as electrical outlets.
2. Above partitions fill flutes of steel deck with rock wool and cover with non-sagging sealant on at least one side of the partition.
3. Finish face panel joint 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.
4. Finish corner beads, control joints and trim as required with two (2) coats of joint compound and one (1) coat of taping compound, feathered out onto panel faces.
5. Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.
6. Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
7. Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Sealants: Section 07900

1.2 Reference Standards

1. Do tile work to Installation Manual 200-1979, "Ceramic Tile," produced by Terrazzo Tile and Marble Association of Canada (TTMAC).

1.3 Environmental Conditions

1. Main minimum 13 deg. C air temperature at tile installation area for 24 hours prior to, during and 48 h after installation. Do not proceed without the correct tiles or if substrate conditions are not suitable.

1.4 Maintenance Material

1. Provide one FULL box of additional tiles of each type and color of tile required for project for maintenance use. Store where directed. Clearly identify each box.
2. Maintenance material to be of same production area as installed material.

1.5 Extended Warranty:

1. Submit a warranty for entire wall tile installation, covering materials and labour and the repair or replacement of defective work, but for three (3) years total.

PART 2 - PRODUCTS

2.1 Thin-Set Mortar

1. Latex-Portland Cement Mortar to ANSI A118.4

2.2 Wall Tile

1. **Glazed Wall Tile (GWT-1) + (GWT-2):** to CAN2-75, 1-M77, Type 5, Class MR-4, 100 x 400 x 5 mm size, cushion edges, glazed surfaces, coved base pattern, Beltile Rainbow Series as supplied by Centura. Colours as selected by Consultant up to a maximum of four (4) colours including accent colour. Allow for 25% accent colours from full range of Rainbow Series. Allow stack bond installation.
4. Tile complete walls to underside of ceiling with stack bond pattern unless indicated otherwise. Patterns and accent stripes to be selected by Architect.

2.3 Grout

1. Wall Grout: to ANSI A118.6; polymer-modified unsanded grout; eg. Mapei Keracolor U, multiple colours, max. two (2) colours for any room, as selected by Consultant.

2. Floor Grout: to ANSI A118.6; polymer-modified sanded grout; eg. Mapei Keracolor S, multiple colours, max. two (2) colours for any room, as selected by Consultant. Mold resistant grout in shower areas.

2.4 Accessories

1. Tile Edging - Schluter – Jolly for edge protection. Typical at all exposed GWT edges.
2. Control Joints – Schluter – Dilex –KSN for floors and walls with Tiles.

PART 3 - EXECUTION

3.1 Workmanship

1. Apply tile to clean and sound surfaces.
2. Fit tile around corners, fitments, fixtures, drains and other built-in objects to maintain uniform joint appearance. Cut edges smooth, even and free from chipping. Edges resulting from splitting, not acceptable.
3. Maximum surface tolerance 1:800 for walls, floors.
4. Make joints between tile uniform, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
5. Lay out tiles so perimeter tiles are minimum 1/2 size.
6. Sound tiles after setting and replace hollow-sounding units to obtain full bond.
7. Make internal angles square, external angles rounded.
8. Use round edged tiles at termination of wall tile panels, except where panel butts projecting surface or differing plane.
9. Allow minimum 24 hours after installation of tiles before grouting.
10. Clean installed tile surfaces after installation and grouting cured.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Sealants: caulking Section 07900
2. Ceramic Tile: Section 09310

1.2 Reference Standards

1. Do tile work to Installation Manual 200-1979, "Ceramic Tile," produced by Terrazzo Tile and Marble Association of Canada (TTMAC), except where specified otherwise.

1.3 Maintenance Material

1. Provide maintenance data for tile work for incorporation into Maintenance Manual specified in Section 01720.
2. Provide 12 additional tiles of each type and color of tile required for project for maintenance use. Store where directed. Clearly identify each box.
3. Maintenance material to be of same production area as installed material.

1.4 Environmental Requirements

1. Air temperature and structural base temperature at tile installation area must be above 13 degrees C for 24 hours before, during and 24 hours after installation.

1.5 Extended Warranty:

1. Submit a warranty for entire flooring tile installation, covering materials and labour and the repair or replacement of defective work for three (3) years total.

PART 2 - PRODUCTS

2.1 Tiles

1. Designation **PT**: 300 mm x 600 mm porcelain tile to CAN 2-75-1M77.
 - .1 Acceptable material: TAU Integra Series, distributed by Centura. Size 300 mm x 600 mm, plus baseboard trim 600 mm x 150 mm bullnosed base, matte finish. Allow 3 colors from manufacturer's full line. Tile pattern to be provided by architect.
 - .2 Acceptable Alternates: Empire Stone Series by Olympia.
Porcelalto Solid and Grani Series Allow for all price groups and (10 % group 3 & 4) By Daltile.
Division9 – Forum Collection

2.2 Accessories

1. **Stair Nosing:** Schluter – TREP-TAP 50 AE; colour black, slip resistant stair nosing.
Location: Stair 1S1.
2. Control Joints – Schluter – Dilex –KSN for floors and walls with Tiles.

2.3 Setting Materials

1. **Cement Mortar:** Mixture of 1 part Portland cement, 4 parts dry sand and 1/10 hydraulic lime. Materials shall conform to the following:
2. **Portland Cement:** To CAN3-A, Type 10.
3. **Hydrated Lime:** To ASTM C-206 or 207, Type 5.
4. **Sand:** To CSA A82.56, passing 1.6 mm sieve.
5. **Water:** Potable, containing no contaminants which cause efflorescence.
6. **Thin Set Mortar:** field mixed, blended sand-Portland cement-latex mortar, “Kerapoxy” by Mapei, distributed by Midgley and West, Hamilton Ontario.
 - .1 Acceptable Alternates: “Laticrete 4237 distributed by Ceratec Inc., or Flextile 52 thin set.
 - .2 Latex Additive: “Cemtex” by Master Builders, Laticrete 2022” distributed by Ceratec Inc.

2.4 Grout

1. Sanded, Portland cement based with Plastijoints acrylic additive, Kerncolour / Floor by Mapei or similar by Laticrete. Colour as selected by Architect.

PART 3 - EXECUTION

3.1 Workmanship

1. Apply tile to clean and sound surfaces.
2. Fit tile units around corners, fitments, fixtures, drains and other built-in objects to maintain uniform joint appearance. Make cut edges smooth, even and free from chipping. Edges resulting from splitting not acceptable.
3. Maximum surface tolerance: 1:800.
4. Make joints between tiles uniform and approximately 3 mm wide, (maximum 4 mm) plumb, straight, true, even and with adjacent units flush. Align patterns.
5. Lay out units so perimeter tile are minimum 1/2 size.

6. Install floor tiles as per pattern. Pattern will be supplied by architect at a later date.
7. Sound tiles after setting and replace hollow sounding units to obtain full bond.
8. Make internal angles square, external angles chamfered at 45° with narrow tile strip.
9. Construct base, as indicated on drawings, with rounded top edge.
10. Use bullnose edged tiles at termination of wall tiles, except where tiles abut projecting surface or differing plane.
11. Seal grouted joints with sealer.
12. Clean installed tile surfaces after installation cured.
13. Keep building expansion joints free of mortar or grout.
14. Tiles must be flush with adjacent dissimilar finishes. Add leveler at lower floor finishes to porcelain tile at all door openings, feather back as required to eliminate visible elevation difference around doorways. Typical at all locations.
15. Install steel floor termination strip at all door openings where porcelain tile meets VCT.

3.2 Setting System

1. Install porcelain floor tiles in accordance with TTMAC applicable thinset detail.

End of Section

PART 1 - GENERAL

1.1 Reference Standards

1. Fabrication: to ASTM 365-78 and CAN/GSB-92.1-M77.
2. Installation: to ASTM C636-76, except where specified otherwise.

1.2 Design Criteria

1. Maximum deflection 1/360 of span to ASTM 365-78 deflection test.

1.3 Samples

1. Submit two each 300 x 300 mm samples of each individual tile and grid type in accordance with Section 01340.

1.4 Warranty

1. Submit an extended warranty covering materials and labour and the repair or replacement of defective work but for two (2) years total.

PART 2 - PRODUCTS

2.1 Materials

1. Ceiling Types:

Ceiling Type 1 (ACT-1): Panels: 610 mm x 1220 mm x 15mm, medium textured non directional fissured, square lay-in, Cortega #823 by Armstrong. Suspension system: 15/16" Prelude ML, white, by Armstrong.

Ceiling Type 2 (ACT-2): Panels: 610 mm x 610 mm x 15 mm, fine textured, beveled tegular 15/16", Dune #1776 by Armstrong. Suspension system: 15/16" Prelude ML, white, by Armstrong.

Ceiling Type 3 (ACT-3): Panels: 610 mm x 1220 mm x 15mm, Clean Room VL, unperforated #870". by Armstrong. Suspension system: 15/16" Prelude ML, white, by Armstrong.

Alternate: Equivalent ceiling types by CGC and Celotex are acceptable.

2. **Hangers:** 2.6 mm galvanized soft annealed steel wire.
3. **Accessories:** splices, clips, retainers, etc., to complement suspension system components.

2.2 Installation

1. Co-ordinate suspension system with related components.
2. Install acoustic units parallel to building lines with edge unit not less than 50% of unit width.

3. Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.
4. Support suspension system main runners at 1200 oc maximum with hangers from structure. Assembly shall support super-imposed loads. Maximum permissible deflection, 1/360 of span.
5. Attach cross member to main runner to provide rigid assembly.
6. Install suspension assembly to manufacturer's written instructions.
7. Install flush edge moulding at junction of acoustic unit ceiling and other materials around entire length of joint. Secure to construction. Butt joints neatly, square and true in alignment.
8. Set acoustic units in place.
9. Set all ceiling levels by the use of transit or laser level.
10. Provide to Owner one (1) complete carton of each type of ceiling tile.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. Cast-in-Place Concrete: concrete floors Refer to Structural Drawings
2. Concrete Floor Finishes: hardeners and sealers Section 03346

1.2 Maintenance Data

1. Provide data for maintenance of resilient flooring for incorporation into Maintenance Manual.

1.3 Environmental Requirements

1. Maintain minimum 20 deg. C air temperature at flooring installation area for three (3) days before, during and for seven (7) days after installation.

PART 2 - PRODUCTS

2.1 Materials

1. **Vinyl composition tile (VCT):** to ASTM F 1066-1995 a, Type A design, asbestos free, 3 mm thick, 300 mm x 300 mm size Standard Excelon, Imperial Texture for field and Multicolour for accent and pattern by Armstrong. Allow for total of five (5) colours from full line.
Acceptable Alternate: Mannington Commercial: Designer Essentials Series full range.
2. **Luxury Vinyl composition tile (LVT):** Wear layer: urethane aluminum oxide topcoat cured by UV process, 0.76 mm wear layer thickness. Tile size per selection. ASTM F1700, Class III, Type B. To meet ASTM F-1514 and ASTM F-925. 10 Year Commercial Warranty.
 - a. Basis of Design: Mannington Commercial, Access –Wood or Spacia First 20 – Wood series, full selection. **Tile thickness 3 mm min.**
 - b. **Acceptable Alternates:**
Polyflor LVT – Commercial Wood Series
Armstrong Flooring – LVT Natural Creations – Classics
Centura – AmericanBiltrite – Sonata Series - Full line of wood grains.
Interface – Criterion Classic Collection
3. **Resilient rubber base (RB):** top set coved, 3 mm thick, rubber, 150 mm high minimum 1200 mm long, including premoulded end stops and external corners. Acceptable materials: non-shrink Rubber Wall Base with toe as manufactured by Johnsonite. Colours: Three (3) from full Johnsonite "Coloright" colour line.
4. **Stair Treads at Stair 0S1 and Stair 2S:** thermostat vulcanized rubber; 6 mm thick tapering to 3 mm thick, full width and depth of stair tread in one piece; ribbed pattern; 50 mm wide inlaid strip on nosing for visually impaired design; 50 mm return down edge of tread with tapered thickness; eg. Johnsonite VIHD; colour as selected by Consultant.

5. **Stair Nosing:** thermoset vulcanized rubber insert; 50 mm horizontal return, 50 mm return down edge of tread, full width of stair tread in one piece ridge pattern; 50 mm wide inlaid strip on nosing for visually impaired design; eg. Schluter – TREP-TAP 50 AE; colour black.
6. **Base Accessories:** Pre-moulded end stops and external corners, of same material, size, and colour as base.
7. **Transition Strips:** thermoset vulcanized rubber, smooth, purpose made to accommodate wheeled traffic and prevent tripping; tapered designs to suit nature of transition; colour as selected by Consultant.
8. **Primers and adhesives:** waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade. Use Johnsonite 990 Solvent Free Environmentally Safe White Acrylic Cove Base Adhesive for rubber base.

PART 3 - EXECUTION

3.1 Inspection

1. Ensure concrete floors are dry, by using test methods recommended by tile manufacturer, and inspect for negative alkalinity, carbonization or dusting.
2. Commencement of work indicates acceptance of conditions by flooring installer.

3.2 Subfloor Treatment

1. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with subfloor filler.
2. Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured.
3. Ensure of smooth transition between any raised surfaces at door ways. Prepare subfloor with leveling compound to ensure smooth transition. Typical where VCT meets PT floors.

3.3 Tile

1. Apply adhesive uniformly using recommended notched trowel in accordance with Flooring Manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
2. Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles - minimum half tile width or as indicated by drawings and Finish Schedule.
4. Cut tile and fit neatly around fixed or excessively heavy objects.
5. Install flooring in pan type floor access covers and all clean out covers, where applicable. Maintain floor pattern.

6. Terminate flooring at center line of door in openings where adjacent floor finish or color is dissimilar.
7. Install metal edge strips at unprotected or exposed edges where flooring terminates.
8. At doorways to incrapack units, extend tile and base fully into door opening to incrapack classroom.

3.4 Base Application

1. Set base in adhesive tightly against wall and floor surfaces. Use lengths as long as practicable and not less than minimum 500 mm long.
2. Install straight and level to variation of 1:1000.
3. Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
4. Miter internal corners. Use premoulded corner pieces at all external corners and ensure full adhesion through to ends of corner pieces. See detail for termination at door frames.
5. Leave in the building one (1) complete carton of each of two (2) colours of floor tile and twelve (12) tiles of each of the remaining colours. Colours of extra tile to be specified by Architect.

3.5 Initial Maintenance after Installation

1. Broom sweep or vacuum thoroughly.
2. Do not wet mop, wash, scrub, or strip the floor. These procedures will be done by the Owner.

3.6 Protection of Work

1. Following broom sweeping, protect new floors with 0.15 mm thick Polyethylene cover and lay planking in all necessary traffic areas to minimize damage by other trades. Maintain until just before final inspection.

3.7 Preparation for Inspection

1. Only if so notified by Architect, and in the presence of the Owner, scrub the floor using a neutral detergent and a floor machine of 170-250 rpm capability equipped with a scrub brush or a scrubbing pad (3M blue or equal).
2. Lightly rinse and allow to dry. Note: Do not flood the floor with rinse water, scrubbing, or stripping solutions. Final re-washing, if required, and waxing will be done by owner.

End of Section

PART 1 - GENERAL

1.1 Related Work

- | | |
|---------------------------------------|---------------|
| 1. Door Schedule | Drawings |
| 2. Commercial Steel Doors and Frames: | Section 08100 |
| 3. Finishes and Colour Notes | Section 09000 |

1.2 Reference Standard

1. CAN/CGSB-85.100-93: Painting.
2. Underwriters Laboratories of Canada: List of Equipment and Materials.
3. Ontario Painting Contractors' Association (OPCA) Architectural Specification Manual.

1.3 Product Data

1. Submit to Architect, for review, product data for all formulas, including manufacturer's trade names.
2. Paint Manufacturer will provide periodic reviews and reports to Architect regarding work in this Section and adherence to manufacturer's product specifications.

1.4 Qualifications

1. Manufacturer: use only paint manufacturers and products listed in the OPCA Architectural Painting Specification Manual – Paint Product Recommendation section.
2. Applicators: company specializing in the work of this Section, and with a minimum of ten years documented experience. Employ only qualified journeymen and apprentices having a provincial Tradesmen Qualification certificate of proficiency.

1.5 Environmental Requirements

1. Do not apply paint finish in areas where dust is being generated.
2. Conform to requirements of OPCA Manual.
3. Comply with the requirements of Section 01570 Health and Environmental Specifications.

1.6 Extent of painting

1. For new construction, for rooms shown in room finish schedule to have painted walls, paint all non prefinished surfaces unless indicated otherwise, and repaint prefinished surfaces where indicated.

1.7 Finishes and Colours

1. Allow for up to 10 colours total from all formulations for this project. Doors, door frames, walls and ceilings will have different colors. Colors may change from room to room.

1.8 Warranty

1. Provide a two (2) year warranty on completion stating that the work has been performed with respect to the standards and requirements incorporated in the OPCA specification manual latest edition.

PART 2 - PRODUCTS

2.1 Materials

1. Acceptable products: Per Chapter 5 OPCA Manual as listed.
2. Paint materials for each paint system to be products of a single manufacturer.
3. Use low-VOC and low-odour paints only.

PART 3 - EXECUTION

3.1 Preparation of Surfaces in new Construction

1. Prepare surfaces to receive paint per Chapter 3 OPCA Manual.
2. Prepare wood surfaces to CGSB 85-GP-1M.
 - .1 Use CGSB 1-GP-126M vinyl sealers over knots resinous areas.
 - .2 Apply wood paste filler to nail holes and cracks.
 - .3 Tint filler to match stains for stained woodwork.
3. Touch up shop paint primer on steel with CGSB 1-GP-40M to CGSB 85-GP-14M.
4. Prepare galvanized steel and zinc coated surface to CGSB 85-GP-16.
5. Prepare wallboard surfaces to CGSB 85-GP-33M. Fill minor cracks with plaster patching compound.

3.2 Application

1. Sand and dust between each coat to remove defects visible from distance up to 1.5 m.
2. Finish closets and alcoves as specified for adjoining rooms.
3. Apply each coat at the proper consistency. Each coat of finish should be fully dry and hard before applying the next coat, unless the manufacturer's instructions state otherwise.

3.3 Mechanical and Electrical Equipment

1. Paint exposed conduits, pipes, hangers and other mechanical and electrical equipment occurring in finished areas as well as inside cupboards and cabinet work. Colour and texture to match adjacent surfaces, except as noted otherwise. Coordinate with mechanical trades applying banding and labeling after pipes have been painted. Do not paint white PVC covers on exposed mechanical water, drain and other lines
2. Paint gas piping standard yellow where visible on roof or in service spaces.
3. Paint surfaces inside of ductwork and elsewhere behind grilles where visible using primer and one coat of matte black paint.
4. Paint both sides and edges of plywood backboards for equipment before installation.
5. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

3.4 Paint Systems

1. System references listed are based on Chapters 4A and 4B of OPCA Manual and are OPCA Premium Grade, unless noted otherwise.

3.5 Interior Finishes

1. Wood, where applicable: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade.
2. Wood, where applicable, INT-1E, lacquer finish semi gloss.
3. Gypsum board - Ceilings and bulkheads - INT. 4-B, Latex Flat Finish, Premium Grade.
4. Gypsum board – partitions INT-4B latex semi-gloss, Premium Grade.
5. Gypsum board – partitions where noted GF in room finish schedule. INT 4A, alkyd gloss finish, Premium Grade.
6. Concrete Block: INT. 8-A, Latex Semi-Gloss Finish, Premium Grade.
7. Concrete Block – Where noted GF in room finish schedule: INT.8B, Alkyd Gloss finish, Premium grade.
8. Structural Steel and Miscellaneous Metal:
 - .1 Primed: INT. 12-A, Alkyd Semi-Gloss Finish, Premium Grade, four coats.
 - .2 Galvanized: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade, four coats.
9. Galvanized metal: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade, four coats.
10. Galvanized steel deck: INT 13E, Alkyd dry fall.

3.6 Exterior Finishes

1. Wood: EXT. 1-A-Gloss, Premium Grade.
2. Metal:
 - .1 Primed: EXT. 11-A-Glos, Premium Grade.
 - .2 Galvanized: EXT. 12-A-Gloss, Premium Grade.

End of Section

PART 1 - GENERAL

1.1 Related Includes

1. Multi-component intumescent coating.

1.2 Related Work

- | | |
|------------------------------|---------------------|
| 1. Structural Steel Framing: | Structural Drawings |
| 2. Metal Decking: | Structural Drawings |
| 3. Painting: | Section 09900 |

1.3 References

1. CAN/ULC-S102-03: Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.4 System Description

1. Intumescent Coating: multi-component seamless intumescent coating system, consisting of a primer, intermediate, finish and tinted top coats, applied to sufficient thicknesses to achieve required fire resistance ratings and W/D factors.

1.5 Submittals

1. Submit Product Data sheets as specified in Section 01340.
2. Product Data: include information on physical properties, installation instructions, and general requirements for each intumescent material required.

1.6 Samples

1. Submit samples as specified in Section 01340.
2. Verification Samples: 300 x 300 mm size sample of each type of intumescent coating, applied to a rigid backing, in the colour and finish indicated.

1.7 Closeout Submittals

1. Submit closeout submittals as specified in Section 01720.
2. Operation and Maintenance Data: Include procedures for stain removal, repairing surface, and cleaning.

1.8 Quality Assurance

1. Application: person or firm experienced in the manufacture and application of intumescent coating systems, with 10 years documented experience.
2. Arrange for manufacturer's representative to be present at start of installation.

1.9 Regulatory Requirements

1. Conform to applicable fire and building codes for flame spread, fuel contributed and smoke development ratings in accordance with CAN/ULC-S102.

1.10 Delivery, Storage and Handling

1. Store Products in a dry, enclosed area protected from exposure to moisture.
2. Maintain temperatures between 16° C and 32° C.

1.11 Site Conditions

1. Do not install coating when ambient temperature is below 4° C or above 43° C.
2. Maintain this temperature range 7 days before, during and 48 hours after installation of wall coating.
3. Ensure adequate ventilation is maintained during and after coating material application. Comply with WHMIS requirements and manufacturer's instructions.

PART 2 - PRODUCTS

2.1 Manufacturers

1. Manufacturers of intumescent coatings having Products considered acceptable for use:
 - .1 A/D Fire Protection Systems Inc.
 - .2 Cafco Industries Inc.
2. Substitutions: Refer to Instructions to Bidders Section 00200 and Section 01030.

2.2 Materials

1. Primer: use only manufacturer approved primer. Adhesion and compatibility characteristics in accordance with ASTM D3359-90 Method A and /or ASTM D4541-95.
2. Intermediate Coat(s) – Interior Applications: A/D Firefilm III, thin-film intumescent fire-resistant coating system for structural steel.
3. Top Coat: Carbocrylic 3350 or Sanitile 155 acrylic paint, applied to a minimum dry film thickness of 2 to 4 mils. For Carbocrylic 2250 and Sanitile 155, use spray application only.

2.3 Mixing

1. Thoroughly mix ingredients in proper quantities needed for immediate use, in accordance with manufacturer's instructions.
2. Provide uniformity of mix and colouration.

3. Discard mixed material 45 minutes after initial mixing at an air temperature of 25° C.

PART 3 - EXECUTION

3.1 Examination

1. Verify that site conditions are ready to receive work.
2. Verify structural steel has been prepared using SSPC SP-6, Commercial Blast Cleaning method.
3. Beginning of installation means acceptance of site conditions.

3.2 Preparation

1. Clean substrate surface free of foreign matter.
2. Spray apply surface primer to a dry film thickness of 0.02 mm. Conform to manufacturer's instructions. Allow to cure.
3. Use scaffolding or a scissor-lift to assist the application process. Mask the spray area as required to protect adjacent areas from over-spray. Materials recommended for masking include rip-proof thin plastic tarps, spray adhesive and duct tape. Protecting the work area from the elements of weather is an integral part of the application process.
4. Ambient air and steel temperatures should be not less than 10°C. Relative humidity in the work area of 40 to 60 per cent is recommended for optimum drying and recoat times. Enclosure, heat and/or moisture control may be required to maintain acceptable conditions. High humidity at the site will hinder drying and will extend recoat/topcoat time. Air movement and thinner coats will assist drying.

3.3 Application

1. Apply coatings in accordance with SSPC Steel Structures Painting Manual, Volume 2.
2. Spray apply intermediate coating to primed substrate in multiple coats, to a dry film thickness sufficient to achieve required fire resistance rating and W/D factor of steel member being protected, Refer to UL Directory or relevant fire test design information to determine the minimum dry film thickness required for the size and orientation of steel element to be protected and for the required fire resistance rating.. Allow each coat to cure prior to applying subsequent coats. A/D Firefilm III can be applied when the previous coat has a minimum Shore "D" hardness of 50, measured at 21°C.
3. Spray apply finish coating over cured intermediate coating to a minimum dry film thickness of 0.02 to 0.04 mm.
4. Frequent thickness measurements with a wet film gauge is recommended during the application process to ensure uniform thickness.

5. Terminate in straight lines, at masking tape line.
6. Cure Products in accordance with manufacturer's directions.
7. Prevent contamination during application and prior to completion of curing process.
Close area of application for a minimum of 24 hours after application.

3.4 Field Quality Control

1. Field inspection will be performed by an independent inspector.
2. Inspect dry film thicknesses with a positector or similar dry film thickness testing device.
Variance from specified thicknesses shall be in accordance with SSPC PA-2.

3.5 Protection

1. Protect intumescent coatings from damage and wear during construction with temporary covering.
2. Remove temporary covering and clean intumescent wall system prior to final inspection.
Clean materials in accordance with manufacturer's guidelines.

End of Section

PART 1 - GENERAL

1.1 Shop Drawings

1. Submit shop drawings in accordance with Section 01340.

PART 2 - PRODUCTS

2.1 Fixtures

1. Bicycle Racks:

Heavy duty high quality steel; Mainframe C.R.W. 2 3/8" OD H.S. 3/4, Lock support ASTM A-36 3/4" H.R. Roundbar. Galvanized steel finish, Capacity: 6 bikes. One year guaranteed against defects in workmanship and materials. Basis of design: CORA EXPO 7510 'W' Series Bicycle Rack, by CORA BIKE RACK 1-800-354-8624. Alternates: refer to Section 01030. Quantity: refer to Site Plan.

2. Insulated Rolling Grille Door:

- .1 Model: Mini Rollup Shutter RF40 manufactured by Dynamic Closures Corporation. Foam filled Aluminum Slats.
- .2 Extruded 8mm horizontal aluminum rods. Rods vertically spaced 44mm o.c. by 16mm wide, aluminum links alternately spaced 229mm apart horizontally and separated by 13mm aluminum spacer sleeves on every other rod.
- .3 Pattern: Brick. Bottom Bar: Heavy extruded tubular aluminum. Guides: Heavy extruded aluminum shape 64mm by 37mm with upset shoulders for curtain retention. Each guide will be fitted with vinyl stripping for quiet operation and to cushion both sides of curtain.
- .4 Support angle: steel angle of recommended size by manufacturer. Counterbalance: Helical torsion spring assembly set in steel pipe of recommended size by manufacturer to support curtain with a maximum deflection of 76mm per foot of curtain width.
- .5 Finish-Exposed Aluminum Parts: Mill Dark Bronze Paint. Centered keyed cylinder both sides of bottom bar. Operation: Hand crank from coil side of curtain.
- .6 Quantity: 1 at Bar exterior opening.
- .7 Size: 1300mm high x 1524mm wide
- .7 Alternates: refer to Section 01030.

3. Below Ground Waste Management/Recycling Systems:

- .1 Acceptable Products:
 - .1 MOLOK Waste Management System
 - .2 Ground-Hog Below Ground Waste System
 - .3 EarthBin Waste System
- .2 Refer to Architectural Detail Drawing for location and details.

-
4. **Roof Hatch:** The Bilco Company – Bil-Guard 2.0 – 36"x36" Roof Hatch with Safety Railing System with light gray powder coat finish. Model 2R2F
Accepted equal by:
1. Access Doors Canada
 2. Maxam Metal Products – Galvannealed Steel - Model RHS-2 R20 – 36"x36"
 3. Global Industrial
- Roof Hatch to be thermally broken.
Key access lock from underside.
5. **Pedestrian Braille Pads Exterior**
Concrete Walkway Tactile Indicators by Advantage Tactile Systems or equivalent - Armor-Tile 12"x12" x 10' wide strip. Location: refer to site plan. At all depressed curbs.
6. **Insulated Metal Panel Freezer + Frige** – Quadcore KS Flat interior panel ss manufactured by Kingspan. Acceptable Alternatives: CF Partition Wall by Metl-Span with light mesa profile; Mesa DM44 by Vicwest with mesa profile
- .1 Profile:
 - a. Exterior: Flat
 - b. Interior: Flat
 - .2 Embossing:
 - a. Exterior: Smooth
 - b. Interior: Smooth
 - .3 Gauge:
 - a. Exterior: 22ga
 - b. Interior: 22ga
 - .4 Walk-in-Freezer Size Width: 4100mm long x 2300mm deep x 2400mm high
 - .5 Keg Fridge Size: Width: 5400mm long x 2300mm deep x 2400mm high
 - .6 Wall Panel Thickness: 100mm
 - .7 Ceiling Suspension System: 100mm x 75mm x 5mm extruded aluminum tee with white powder coat finish.
2. **Insulated Cold Storage Door (ICS)** – Glace-Guard Entrance Door model ET-400 as manufactured by Thermostop Inc, 3775 Losch Blvd., Longueuil, (Quebec), J3Y 5T7, Tel: 450-678-8666, Fax: 450-678-7765 or Approved equal.
- .1 Size: 900mm wide X 2135mm high
 - .2 Thickness and insulation value: 100mm thick. R-32.
 - .3 Panel manufacturing process: The inner core consists of rigid polyurethane, foamed in place under high pressure between two metal skins. To avoid mould, no wood material is used in the construction of the panel.
 - .4 Insulation: CFC-free rigid foamed-in-place polyurethane. 41.0 kg/m³ minimum density.
 - .5 Metal skins and finish: Standard 26ga. steel skins, White.
 - .6 Single Door. Door panel framing is made of aluminum extrusions equipped with non-conductive thermal break material.
 - .7 Door frame and thermal barrier: Entrance door frame is made shock-proof 4 mm exterior and interior extruded aluminum angles. The exterior extruded aluminum angle has a built-in nonconductive resin thermal break and is ready to receive hardware and other components.

- .8 Perimeter magnetic gasket : A full perimeter magnetic vinyl gasket ensures the door is airtight and vapour-proof on the perimeter joint.
- .9 Bottom door gasket: Extruded aluminum retainer with double blade seal gasket to assure airtight joints.
- .10 Hinges : Heavy duty self-closing and reversible high pressure die-cast zinc flanges, 5 mm) thick galvanized steel strap. Silver grey finish.
- .11 Pull handle : High pressure die-cast zinc cylinder locking handle, complete with emergency inside release system. Brushed chrome finish.
- .12 Mechanical door closer: Heavy gauge steel mechanical door closer, complete with extra-wide hook. Chrome finish.

PART 3 – EXECUTION

3.1 Installation

1. Install where indicated on drawings and as per manufacturer's instructions.

3.2 Demonstration and Training

1. Provide demonstration of operation to the Owner and his representatives.
2. Provide training for operation, maintenance and repairs.

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.

1.2 Related Work

1. Washroom Accessories: Section 10800

1.3 Submittals

1. Shop Drawings: Submit shop drawings in accordance with Section 01340, for Consultant's review before fabrication, indicating material, finish, dimensions, details of connections and fastenings, elevations, plans, sections, thicknesses, hardware and other pertinent information.
2. Samples: Submit samples of finish hardware and powder-coated sample in selected colour and finish in accordance with Section 01340, for approval of Consultant.

PART 2 - PRODUCTS

2.1 Material Description

1. Manufacturers of toilet partitions having product considered acceptable for use:
 - a. Bradley Corporation
 - b. Global Steel Products Corporation
 - c. Hadrian Manufacturing
 - d. ASI Group Watrous
- .1 Construction: Doors, Panels and Pilasters shall be constructed of two sheets of panel flatness Type 304, #4 brushed finish stainless steel, laminated under pressure to a "Verticle" (1/2") honeycomb core for impact resistance, rigidity and sound deadening. Formed edges to be welded together and interlocked, under tension, with a roll-formed oval crown locking bar, mitred, welded and ground smooth at the corners. Honeycomb to be of virgin, long fiber paper with a maximum 12.5mm (1/2") cell size.
- .2 Doors: Shall be 25mm (1") thick with cover sheets not less than 22ga. (0.8mm).
- .3 Panels: Shall be 25mm (1") thick with cover sheets not less than 22ga. (0.8mm).
- .4 Pilasters: Shall be 32mm (1.25") thick with cover sheets not less than 20 ga. (0.9mm). Pilaster tops shall be reinforced with 20 ga. channel to create extra strength and twist-free rigidity along with minimizing damage by handling and/or shipping.
- .5 Headrail: Shall be 25mm (1") by 41mm (1.625") extruded anodized aluminum with double-ridge anti-grip design. Wall thickness to be 1.5mm (0.060") and shall be

securely attached to wall and pilasters with manufacturer's fittings in such a way as to make a strong and rigid installation. All joints in headrails shall be made at pilaster.

- .6 Hardware and Fittings: All panel and pilaster brackets and all door hardware shall be chrome plated zinc die castings, standard. Fasteners are 12 x 1-3/4" and 12 x 5/8" TR-27 6-lobe security screws. Doors shall be equipped with a gravity type hinge mounted on the lower pilaster hinge bracket. Door hinges shall be the wraparound type and adjustable to permit the door to come to rest at any position when not latched. Each door to be fitted with a door bumper and a concealed latch, with face mortised flush with edge strip of door. Barrier-free doors shall include thumbturn lever to activate latch without fingertip grip application. Both standard and barrier-free latches shall have a turn slot designed to allow emergency access from exterior.

PART 3 – EXECUTION

3.1 Installation

1. Install compartments in accordance with reviewed shop drawings and in a neat, rigid manner free of defects.
2. Install units secure, accurately positioned, plumb, level, square and free from sag and distortion.
3. Perform drilling of steel, masonry and concrete necessary to install this work.
4. Ensure spaces between panels and pilasters, between panels and walls and between pilasters and walls are of uniform consistent width and sized to ensure it is not possible to see persons using the compartments.
5. Coordinate installation with the work of trades providing ceilings, wall and floor finishes, shower accessories and other adjacent components and construction.

3.2 Adjustment

1. Upon completion of the work or when directed, remove all traces of protective coating or paper.
2. Clean exposed surfaces and fittings.
3. Test hinges, locks and latches and where necessary, adjust and lubricate. Set hinges so that doors stand open maximum 30 degrees when compartment is not in use. Ensure that partitions are in working order.

End of Section

PART 1 - GENERAL

1.1 Section Includes – N/A

1.2 Related Work

1. Cast-in-Place Concrete: concrete for base pier

1.3 Referenced Standards

1. ASTM B209M-06: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
2. ASTM B22 1M-06: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
3. CAN/CSA-G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 Submittals

1. Submit shop drawings and Product Data as Specified in Section 01340.
2. Shop Drawings: indicate total height, dimensions, anchorage, mounting system, and special details.
3. Product Data: indicate hardware, fittings and pulley systems.

PART 2 - PRODUCTS

2.1 Manufacturers

1. Manufacturers of flagpoles having Product considered acceptable for use:
 - .1 John Ewing & Co.
 - .2 All-Canadian Flagpole Co. Inc.
 - .3 New Century Flags
2. Flag poles to be 40 feet high with internal halyard.

2.2 Materials

1. Aluminum Tubing: to ASTM B221M, 6063 alloy, T6 temper.
2. Cast Aluminum: to ASTM B221M, 6061 alloy, T6 temper.
3. Sheet Aluminum: to ASTM B209M, 3003 alloy, H14 temper.

2.3 Manufactured Items

1. Flagpole: seamless aluminum conical pole with base and cam cleat internal halyard system; 12.19 metres high.

2.4 Components

1. Pole: seamless, 3.0 mm thick aluminum tubing; cone tapered above cylindrical butt section, not less than 25 mm in every 1.68 metres.
2. Finial: 150 mm OD aluminum ball with flush seam.
3. Truck: cast aluminum single stationary truck.
4. Cam Cleat: manually operated cam cleat, including flush access door with cylinder lock and continuous piano hinge.
5. Halyard: #10 braided polypropylene, with two chrome plated bronze swivel snaphooks, plastic covered counterweight and beaded sling.
6. Foundation Sleeve: 1.5 mm thick galvanized corrugated steel tube with 4.75 mm thick steel base plate and support plate; 19 mm OD x 450 mm long ground spike with steel centering wedges.
7. Accessories: cadmium plated. Eye-bolts, screws and nuts, stainless steel; cleats, aluminum.

2.5 Shop Finishing

1. Aluminum: anodized to Aluminum Associations Specifications AA-M12C22A31, Class II Clear Anodic Oxide treatment, No. 17.
2. Galvanizing: to CAN/CSA-G164-M, hot dipped method, minimum 610 g/m² zinc coating.

PART 3 - EXECUTION

3.1 Examination

1. Verify existing conditions are ready to receive work.
2. Verify anchors embedded in concrete are located in the correct positions.
3. Beginning of installation implies acceptance of existing conditions.

3.2 Preparation

1. Supply anchors for securement in concrete pier. Refer to drawings.

3.3 Installation

1. Install flagpole in accordance with approved Shop Drawings and manufacturer's written instructions.
2. Refer to drawings for foundation details.

End of Section

PART 1 - GENERAL

1.1 Work Included

1. Supply and install exterior signage as specified and listed. All signage may not be shown on the drawings.
2. Supervision, inspection and checking of signage as installed on site.

1.2 Reference Standards

1. All fire route signage to be fabricated in strict accordance with the signage standard of the Municipality where the site is located. All other exterior signage such as stop signs, one-way signs, do not enter signs, etc., shall be to M.O.T. standard.

1.3 Signage List

1. A full Signage list is included with this document for the Tender of Signage.

1.4 Guarantee

1. Submit a written Guarantee to the Owner, that all work of this Tender shall be free from defects in workmanship and materials for a minimum period of one (1) year from date of approved completion.
2. All defects (excluding vandalism) in materials and workmanship that become apparent during the Guarantee period shall be made good or material replaced at no cost to the Owner.

1.5 Inspection

1. Upon completion of the signage installation, the Signage supplier shall submit written certification that all the signage for the project has been correctly supplied and installed in accordance with the drawings schedules, and signage specification.

PART 2 - PRODUCTS

2.1 Mounting Hardware

1. Furnish all signage with the necessary screws, bolts, and other fasteners of suitable size and type, to anchor signage into position for long life under hard use.
2. Exterior Fire route and School signs shall be permanently mounted on a strong flanged hot dipped rolled high tensile galvanized steel U-Channel posts. These posts are to have 10mm (3/8") dia. Holes spaced 25mm (1") on centre for easy sign mounting. Signs to be mounted to flanged side of post. All exterior signs are to come completed with galvanized steel mounting hardware, necessary to properly mount sign for exterior use. All signage and placement must comply with the latest by-laws per the local Municipality.

2.3 U-Posts

1. Hot dipped rolled light temple galvanized steel
2. Type: Flanged, 10 mm dia. holes at 25 mm o.c.
3. Height: 3658 mm overall

2.4 Free standing posts

1. Material: 25 mm x 25 mm galvanized steel hollow sections, primed + 2 coats exterior grade enamel
2. Base: 100lb weight concrete base.
3. Modified height: bottom of base to top of port: 1525 mm

2.5 Exterior traffic signs

1. Material: Aluminum
2. Mounting height: 2.0 to bottom of sign

PART 3 - SIGNAGE LIST

3.1 General

1. All styles, quantities and locations to be confirmed prior to ordering.
2. For signage list quantities, refer to drawing A1.00 and A1.01 Site Plan & Site Details

3.2 "Stop" signs

600 mm x 600 mm, red background, white lettering, white border, core drilled in concrete.

3.3 "Do not enter" signs

As per Municipal standards. Core drilled in concrete.

3.4 "Fire department connection" signs - DFR

300mm x 450 mm, red background, white letters and borders
Mount on building

3.5 "Fire route" signs

As per Municipal standards. Mounted on U-posts.

3.6 "Handicapped" signs

300 mm x 600mm white background, black border and letters, blue handicapped symbols and border, red circle and diagonal bar. Core drilled in concrete.

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.

1.2 Related Work Specified Elsewhere

1. Toilet Partitions: Section 10165
2. Electrical conduit and wiring to junction boxes and hand dryers: Division 16

1.3 Referenced Standards

1. ASTM A167-87: Specification for Stainless and Heat Resisting Chromium -Nickel Steel Plate, Sheet and Strip
2. ASTM A525: Standard Specification for General Requirements for Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process (Metric)
3. CAN/CSA-G164-M92: Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 Shop Drawings

1. Submit shop drawings in accordance with Section 01340, for Consultant's review before fabrication. Shop drawings of units for use by the handicapped shall be distinctly marked and cross-referenced to the corresponding article in the specifications.

1.5 Quality Standard

1. This specification section is based generally on Bobrick equipment. Similar equipment and accessories by ASI Group Watrous and American Specialties Inc. are also acceptable.

PART 2 - PRODUCTS

2.1 Materials – Generally

1. Ferrous Steel: Sheet, cold-rolled furniture steel, double annealed, mill stretched and leveled, and fully pickled. Otherwise, steel shall be hot-rolled or cold-rolled of alloy to suit needs of fabrication, use, and appearance.
2. Stainless Steel: Type 304, conforming to ASTM A167-87, No. 4 finish.
3. Galvanized Steel: For sheet, Z275 zinc coating designation in accordance with ASTM Specification A525. For irregular sections, hot dip galvanized to comply with CSA G164.
4. Anchors and Fastenings: Where exposed, use stainless steel and otherwise to match metal anchored. Where non-exposed, use the same as that specified for exposed, or use

galvanized steel. Anchors and fastenings shall be of the type appropriate for the substrate to which accessory unit is secured.

2.2 Products

1. **Handicapped Grab Bars (GB):** Series B5806 by Bobrick
 - .1 GB-1: 750 mm x 750 mm "L" shaped grab bar beside water closet mounted as per OBC requirements.
GB-2: 600 mm long bar behind water closet. Installed as per drawings.
 - GB-3: 900 mm fold up type grab bar beside barrier-free water closet.
 - GB-2: Two (2) 600 mm long grab bar for accessible urinal, mounted vertically.
 - .2 All bars to have concealed mounting hardware.
 - .3 Quantity: refer to drawings.
 - .4 All bars to withstand horizontal and vertical pull of 2.2 kN
2. **Hand Dryers (HD):** refer to Electrical Div. 15 and architectural drawings for locations.
3. **Toilet Tissue Dispenser (TPD):** B-2888 Surface Mounted Toilet Tissue Dispenser. Satin Finish, two rolls. Quantity: as per drawings.
4. **Paper Towel Dispensers (PTD):** NA
5. **Soap Dispenser: SD**–B-2112 Surface Mounted Horizontal Manual Liquid Soap Dispenser. Quantity: 7 at all washrooms as noted on drawings.
6. **Mirrors:**
 - .1 **(M1)** - stainless steel frame, vandal resistant mounting, 6 mm glass mirror with 15 year guarantee against silver spoilage. Size: 1200mm high x 3200mm long. Quantity: Refer to drawings at Female Washroom.
 - .2 **(M2):** Handicapped mirror B-293 series by Bobrick, tilt mirror, stainless steel. Size: 600 x 910 mm. Quantity: Refer to Drawings.
 - .3 **(M3)** - stainless steel frame, vandal resistant mounting, 6 mm glass mirror with 15 year guarantee against silver spoilage. Size: 1200mm high x 2800mm long. Quantity: Refer to Drawings at Male Washroom.
 - .4 **(M4)** - B-290 2435 series by Bobrick stainless steel frame, vandal resistant mounting, 6 mm glass mirror with 15 year guarantee against silver spoilage. Size: 600mm high x 1000mm long. Quantity: refer to drawings at staff washroom.
7. **Sanitary Napkin Disposal (ND):** Model B-270 by Bobrick
 - .1 Stainless steel
 - .2 Quantity: at all female washrooms and unisex washrooms and stalls. Refer to drawings.
8. **Mop and Broom Holder (MH):** Model B-223 x 24

.1 Quantity: 2

9. Vandal Resistant Clothes Hooks (CH): Model B-983

- .1 Stainless steel
- .2 Quantity: 4 as per drawings, one per barrier-free or universal washroom stall and one per kitchen staff washroom. Mounting height to be 1200 max.

10. Steel Shelf (WSH): Model B-295 x 18

- .1 Stainless steel
- .2 Quantity: 3 as per drawings, one per barrier-free stall and Universal washroom. Mounting height to be 1200 max.

2.3 Component Minimum Requirements

1. **Construction** Fabricate with materials, component sizes, metal gauges, reinforcing, anchors and fasteners of adequate strength to withstand intended use.
2. Where specified as frameless, provide stainless steel accessories with one-piece fronts having 90 degree formed returns at their edges and openings.
3. Where accessory fronts are framed, frame edges, both inside and outside, with 90 degree formed returns continuously welded and ground smooth at the corners. Doors shall also have 90 degree formed returns as specified.
4. Unless otherwise specified, hinges shall be semi-concealed stainless steel piano hinges extending full-length of hinged element. Provide hinged elements with concealed, mechanically-retained rubber bumpers for silent closing, and shall close flush with faces of fronts or frames.
5. Ensure that work will remain free of warping, buckling, opening of joints and seams, distortion and permanent deformation.
6. No exposed fixings permitted. Cut edges and openings square and smooth. Chamfer corners of edges and cut-outs 1.6 mm.
7. **Assembly** Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.
8. Fasten work with concealed methods, unless otherwise indicated on Drawings.
9. Weld all connections where possible, bolt where not possible and cut off bolts flush with nuts. Countersunk bolt heads, and provide method to prevent loosening of nuts. Ream holes drilled for fastening.
10. Welded joints shall be tight, flush, and in true planes with base metals. Make welds continuous at joints where entry of water into voids of members or assemblies is possible.

11. Provide for differential movements within assemblies and at junctions of assemblies with surrounding work.
12. Welds in exposed locations shall be ground and polished smooth.
13. **Finish Work:** Provide holes and connections for related work installed under other Sections of this specification, if applicable.
14. Cleanly and smoothly finish exposed edges of materials, including holes.

PART 3 - EXECUTION

3.1 Inspection of Site

1. Take site measurements to ensure that work is fabricated to fit surrounding construction around obstructions and projects in place, or as shown on drawings, and to suit service locations.

3.2 Installation

1. Install all accessories in accordance with manufacturer's instructions at their recommended mounting heights unless noted otherwise on drawings.
2. Securely fasten accessories plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding work. Install in locations shown and specified herein. Mounting heights as shown or in accordance with the OBC in the case of barrier-free accessories.
3. Work shall include anchor bolts, bolts, washers and nuts, lag screws, expansion shields, toggles, straps, sleeve brackets, clips, and other items necessary for secure installation, as required by loading and by Jurisdictional Authorities.
4. Attach work at wood by screws through countersunk holes in metal.
5. Attach work to masonry with lead plugs and non-corrosive fastenings, to support load with a safety factor of 3. Perform all drilling necessary to install the work.
6. Insulate between dissimilar metals or between metals and masonry or concrete with bituminous paint, to prevent electrolysis.
7. Coordinate installation with the work of other trades adjacent to accessories to achieve the reveals or other edge conditions shown, where their front faces are flush with the finished wall surfaces.
8. Owner to supply and install remainder of washroom accessories not specified here (toilet paper dispensers, etc.). Cooperate with Owner as required.

3.3 Cleaning Up and Adjustment

1. Upon completion of the work, or when directed, remove all traces of protective coatings or paper.
2. Test mechanisms, hinges, locks and latches, and where necessary, adjust and lubricate and ensure that accessories are in perfect working order.

End of Section

PART 1 - GENERAL

1.1 Description of Work

1. This section covers and includes the furnishing and installing of passenger hydraulic elevator equipment as hereinafter described. Refer to Division 1 for general project requirements.
2. All terms of this specification shall have their meaning defined in the American Society of Mechanical Engineers Safety Code for Elevators and Escalators A17.1 and hereinafter referred to as the ANSI A17.1 Code, including all revisions and authorized changes to date.

1.2 Related Work by Others

1. General contractor shall provide the following in accordance with the requirements of the ANSI A17.1 Code plus applicable Model Building Code. For specific rules, refer to ANSI A17.1, Section 300 for hydraulic elevators. State or local requirements must be used if more stringent.
 - .1 Clear, plumb hoistway, with variations not to exceed 1/2" at any point. Minimum two hours of fire resistance rating of hatch walls.
 - .2 75° Bevel guards on all projections, recesses or setbacks over 2" (4" for A17.1 2000 areas) except for loading or unloading.
 - .3 Supports for rail brackets at pit, each floor and roof. Maximum allowable vertical spacing of rail supports, without backing. Divider beams between hoistway at each floor and roof, for guide rail bracket supports.
 - .4 Supports for holeless jack synchronization cables to hatch walls in overhead. Hoist beam to be provided.
 - .5 Light outlet, in center of hoistway (or in the machine room) as indicated by elevator contractor.
 - .6 Recesses, supports, and patching, as required, to accommodate hall button boxes, signal fixtures, etc.
 - .7 All barricades outside elevator hoistways as required.
 - .8 Dry pit reinforced to sustain normal vertical forces from rails, holeless jack units and buffers. Pit floor to be level and free of debris.
 - .9 Convenience outlet and light fixture in pit with switch located adjacent to the access door.
 - .10 Where access to the pit is by means of the lowest hoistway entrance, vertical ladder of non-combustible material extending 42" minimum, 48" minimum for A17.1-2000 areas, above sill of access door or handgrips shall be provided to the same height.
 - .11 Enclosed and protected machine room.
 - .12 Access to the machine room and machinery space as required by the governing code or authority.
 - .13 Lighting, convenience outlets, heating, cooling and ventilation of machine room, and machinery space. Machine room temperature to be maintained between 55 and 90 degrees F.
 - .14 A fused disconnect switch for each elevator and light switch located per the National Electrical Code (NFPA No. 70), and where practical, located inside the machine room adjacent to the door.
 - .15 Suitable copper feeder, ground and branch wiring circuits for signal system and

- power operated door, included main line switch. Feeder and branch wiring circuits for car light and fan, including main line switch.
- .16 Clear access above ceiling, or metal/concrete raceways in floor, for oil line and wiring duct from machine room, if machine room is remote from elevator hoistway.
 - .17 Convenience outlet and telephone outlet on control panel.
 - .18 Cutout through machine room wall, 8" x 16", for oil line and wiring duct. Coordinate with elevator contractor at the building site.
 - .19 All conduit and wire runs remote from either the machine room or the hoistways.
 - .20 Heat, smoke or products of combustion sensing devices connected to elevator machine room terminals when such devices are required. Make contacts on the sensors should be sided for 120 volt D.C.
 - .21 Furnish and install finished flooring in elevator cab.
 - .22 Entrance walls and finished floors are not to be constructed until after door frames and sills are in place. Consult elevator contractor for rough opening size. When drywall construction is used, the general contractor shall supply the drywall framing so that the wall fire resistance rating is maintained.
 - .23 Where drywall or sheet rock construction is used for front walls, it shall be of sufficient strength to maintain the doors in true lateral alignment. Drywall contractor to coordinate with elevator contractor.
 - .24 Door frames are to be anchored to walls and properly grouted in place to maintain legal fire rating (masonry construction).
 - .25 The interface of the elevator wall with the hoistway entrance assembly shall be in strict compliance with the elevator contractor's requirements.
 - .26 Filling and grouting around entrances by general contractor as required.
 - .27 For sill support by the elevator contractor, hoistway capable of accepting anchor stud type fasteners must be provided.
 - .28 When fixtures are mounted in drywall, wall thickness may increase. The general contractor must coordinate requirements with the elevator contractor.
 - .29 Where openings occur, all walls and sill supports must be plumb.

1.3 Quality Assurance

1. The elevator contractor is a company specializing in manufacturing and installing elevator equipment with not less than five years successful experience.
2. All designs, clearances, construction, workmanship and material, unless specifically excepted, shall be in accordance with the requirements of the ANSI code, handicap accessibility, Americans with Disabilities Act and all codes having legal jurisdiction. The ANSI A17.1 Code shall govern except where codes having legal jurisdiction include more rigid requirements or conflict with the ANSI A17.1 Code.
3. The elevator shall follow design and manufacturing procedures, certified in accordance with International Organization for Standardization (ISO9001-2000) to meet product and service requirements for quality assurance for new products.

1.4 Submittals

1. The elevator contractor shall, after structural and architectural drawings are furnished, submit complete working drawings, showing the location of all equipment, loads, and all other information necessary to render a totally functional elevator to the owner.

2. The elevator contractor shall provide finish samples upon request.
3. The elevator contractor shall provide wiring diagrams.
4. The elevator contractor shall provide Renewal Parts Catalogs and Maintenance Instructions.

1.5 Temporary Use

1. Temporary use of the car shall be negotiated with the elevator contractor if required and shall be in accordance with the terms and conditions of the elevator contractor's temporary acceptance form.

1.6 Warranty

1. The elevator contractor shall guarantee the material and workmanship of the equipment installed by him under these specifications and make good any defects not due to ordinary wear or to improper use which may develop within one year after the completion of the installation or acceptance thereof by beneficial use, whichever is earlier.

1.7 Proprietary Information

1. Any proprietary material, information or data contained in the equipment, or any component or feature thereof, remains the property of the elevator contractor. This includes, but is not limited to, tools, devices, manuals, software, source codes, access codes, object codes, passwords and remote monitoring feature, which is deactivated if elevator contractor maintenance is discontinued.

1.8 Maintenance

1. The elevator included in these specifications shall receive regular maintenance on each unit for a period of 12 months after the completion of work described herein or acceptance thereof by beneficial use, whichever is earlier.
2. Trained employees shall make periodic examinations and perform work including necessary adjusting, greasing, oiling and replacing parts to keep the elevator in operation, except parts that require replacement because of accidents, vandalism, misuse or negligence by parties other than the manufacturer.
3. The elevator contractor shall perform all work under this Agreement, except emergency minor adjustment call-back service, on overtime. The elevator contractor shall provide emergency minor adjustment call back service, 24 hours 7 days a week.
4. Should the owner request that examinations, cleaning, lubrication, adjustments, repairs, replacements or emergency minor adjustment callback service (unless included above) be performed on other than the elevator contractor's regular working hours of his regular working days, the elevator contractor shall absorb the straight time labor charges and the owner shall compensate the elevator contractor for the overtime premium, travel time and expense at his normal billing rates.

5. The elevator control system can incorporate a built-in remote diagnostic module to relay the constant status of the elevator and control system to a 24 hours 7 days a week central monitoring facility. The remote monitoring device is capable of transmitting information on the current status of the elevator, including any malfunction, system error or shutdown.

PART 2 - PRODUCTS / OPERATIONS

2.1 Acceptable Manufacturers

1. Hole-less Hydraulic Dual Upright Passenger Elevator subject to compliance with requirements, provide products of one of the following manufacturers or approved equivalent:
- .1 Schindler Elevator Corporation (Basis of Design – 330A product)
 - .2 Thyssen Krupp
 - .3 Delta Elevator
 - .4 Vertechs Elevator
 - .5 Southwestern Elevator
 - .6 Alcor Elevators
 - .7 Brock Elevator

2.2 Elevator System and Components

1. Elevator Equipment Summary:

Building:	New Cultural Centre
Customer:	Croatian National Home
Location:	Stoney Creek, ON
Date:	2026-Feb
Building Type:	Banquet Hall
Application:	Telescopic Holeless Dual Piston
Service:	General Purpose Passenger
Quantity:	1
Capacity:	2500 lbs
Speed:	100 fpm
Travel:	7.25m (23'-9")
Landings:	3
Front Openings:	3
Rear Openings:	0
Operation:	Microprocessor Single Car Automatic Operation
Machine Room:	Adjacent to elevator hoistway.
Platform Size:	7'-0" wide x 5'-7" deep
Cab Height:	8'-0"
Guide Rails:	16 lb. per foot
Hoistway Entrances:	3'-6" wide x 7'-0" high SSSO doors
Power Supply:	208 Volts 3 Phase 60 Hz
Contract Maintenance:	12 months with emergency callback, 24 hours 7 days a week

2. Additional Features:

- Anti-Stall Feature
- Braille and Audible Signals
- Door Open and Close Stall Protection
- Emergency Lighting
- Firefighter's Service, sensors by others
- Independent Service Feature
- Infrared Light Curtain Door Protection
- Low Oil Return
- Overload Sensors
- Phase Protection
- Start Type: Soft Start
- Cab Pads and Fasteners: 1 set(s)
- Certificate Frame
- Digital Hall Position Indicator at main floor(s)
- Hoistway Access Switch at top floor(s)
- Locking Service Panel in Car Operating Panel
- Pressure Switch
- Remote Monitoring Capable
- Battery powered lowering Rescue Feature
- Telephone (ADA compliant)
- Key switch at hall lobby floor**

2.3 Materials and Components

1. Stainless steel and bronze shall have #4 satin or #8 mirror finish as specified herein. Baked enamel colors, if specified, shall be chosen by the architect from elevator manufacturer's standard color selections.
2. Aluminum used for threshold and hoistway entrance sills shall be extruded; aluminum used for exposed frames in suspended ceilings shall be anodized.
3. Plastic laminates shall be general purpose type and meet flame spread ratings as required by code. Pattern shall be selected from the elevator contractor's standard selection.
4. Motors, pumps, valves, fluid tank, hydraulic fluid, microprocessor controller, controls, pushbuttons and wiring shall be UL or CSA approved.
5. Spring buffers, attachment brackets and anchors shall be designed and sized according to code with safety factors.
6. Pump shall be of the positive displacement screw type, designed for steady discharge with minimal pulsations.
7. A muffler shall be provided to reduce noise transmission.
8. A holeless dual jack system that utilizes two mechanically synchronized jacks shall be provided. The jacks are located at each side of the car and connected to the elevator structure. An external mechanical assembly shall be used to synchronize the jack section movement as the elevator travels up and down the hoistway, if two or more jack stages are applied.

2.4 Cab

1. Cab shall be 8'-0" high from finished floor to underside of canopy.
2. The cab walls shall be steel, baked enamel finish with plastic laminate raised panels.
3. The base, frieze and reveals will be #4 stainless steel.
4. The ceiling shall be suspended with exposed frame with aluminum eggcrate lay-in panels. The lighting shall be fluorescent.
5. Front returns shall be of integral construction. Transoms shall run full width of cab and will be finished in #4 stainless steel.
6. Cab doors shall be flush design both sides, rib construction, finished in #4 stainless steel.
7. A one speed exhaust fan shall be mounted in cab transom or canopy.
8. A 1 1/2" round diameter in #4 stainless steel handrail shall be mounted on the side walls.
9. The threshold shall be extruded aluminum.
10. The cab finish flooring shall be furnished and installed by others.
11. There will be 1 set of quilted, soil resistant and fire-retardant pads with appropriate fasteners furnished.
12. A certificate frame shall be provided.

2.5 Hoistway Entrances

1. Hoistway door and frame construction shall be UL rated, with required fire rating. Doors shall be of rigid flush panel construction and contain sound-deadening material. Frames shall be securely fastened at the corners to form a unit frame. Frames shall be bolted.
2. Exposed areas of the corridor frames shall be finished in #4 stainless steel on all floors.
3. Doors shall be finished in #4 stainless steel on all floors.
4. Sills shall be extruded aluminum on all floors.

2.6 Cab Fixtures

1. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons and illuminating indications shall be included for each floor served, and emergency buttons and switches shall be provided as per code. Switches for car light and accessories shall be provided.
2. The following cab fixtures shall also be provided:
Car Lantern(s)

Digital Car Position Indicator
Locking Service Panel in Car Operating Panel
Certificate Frame - Telephone (ADA compliant)

2.7 Hall Fixtures

1. An up button and down button at intermediate floors and a single button at each terminal floor at a height to comply with handicap requirements.
2. The following hall fixtures shall also be provided:
 - .1 Digital Hall Position Indicator at main floor(s)
3. Hall Fixtures shall be finished in #4 stainless steel. Fixture cover plates shall be mounted with tamper resistant screws in the same finish as the fixture.

PART 3 - EXECUTION

3.1 General

1. Prior to commencing elevator installation, inspect hoistways, hoistway openings, pits and machine rooms as constructed. Verify that hoistway, pit, machine room and openings are of correct size and within tolerance and are ready for work of this section. Notify General Contractor in writing of any dimensional discrepancies or other conditions detrimental to the proper installation or performance of elevator work. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer. Arrange for temporary electrical power to be available for installation work and testing of elevator components.

3.2 Installation of Elevator System

1. Components will be arranged in machine room so equipment can be removed for repairs or replaced without dismantling or removing other equipment components.
2. Coordinate elevator work with work of other trades, for proper time and sequence to avoid construction delays.
3. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.
4. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort. Adjust doors to prevent opening of doors at any landing on the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing. Adjust automatic floor leveling feature at each floor to achieve within 1/4" of the landing.

3.3 Permits and Tests

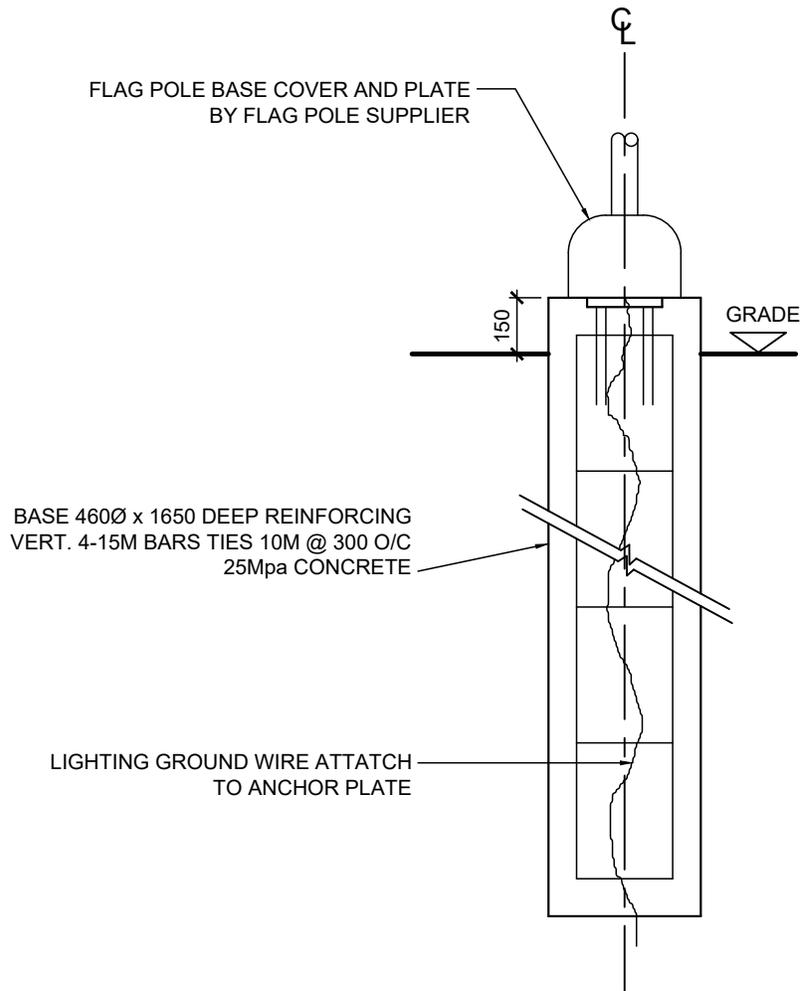
1. The elevator contractor shall obtain and pay for all necessary Municipal and State permits and relating to the installation of the elevator at his expense, shall make all tests as

required by governing codes in effect at the time of the award. The elevator contractor shall be reimbursed for any permits, tests or equipment necessitated by governing authorities after the date of the award.

End of Section

List of Architectural Detail Drawings

206	Flag Pole Base Detail
211	Date Stone
401	Wall Control Joint Detail Interior Side
401A	Interior Expansion Joint Detail
425A	Expansion Joint Detail With Drywall
425	Expansion Joint Detail
604	Millwork Type MM1
604A	Millwork Type MM1
604B	Millwork Type MM1
605	Millwork Type MM2
606	Millwork Type MM3 – Bar
606A	Millwork Type MM3 – Bar
607	Millwork Type MM4 – Rolling Shutter
607A	Millwork Type MM4 – Rolling Shutter
640	Millwork Type S1 – Base Sink
640A	Millwork Type S1 – Base Drawings
641	Millwork Typical Base Cabinet
642	Millwork Type MM2 – Section
643	Millwork Type S2 – Base Sink
644	Millwork Type MM1 – Typical Section
645	Millwork Type MM1 – Typical Section
646	Millwork Type MM1 – Typical Section
647	Millwork Type MM1 – Typical Section
648	Millwork Type MM1 – Typical Section
649	Millwork Type B1 – Base Cabinet
650	Millwork Type U1 – Upper Cabinet
900	Vinyl/ Rubber Base Detail
901	Porcelain Tile Base Detail



SECTION DETAIL
SCALE: 1:20

NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON

FLAG POLE BASE DETAIL
(REFERENCE: A1.00)

PROJ: 2021-39

SCALE: 1:5

DRAWN: R.P.

DATE: 2026-02-02

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**AD
206**

NOTE: YEAR SHOWN TO BE CONFIRMED
AT TIME OF FABRICATION



LOCATION AS PER BUILDING ELEVATIONS

NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON

DATE STONE
(REFERENCE: A3.00)

PROJ: 2021-39

SCALE: 1:5

DRAWN: R.P.

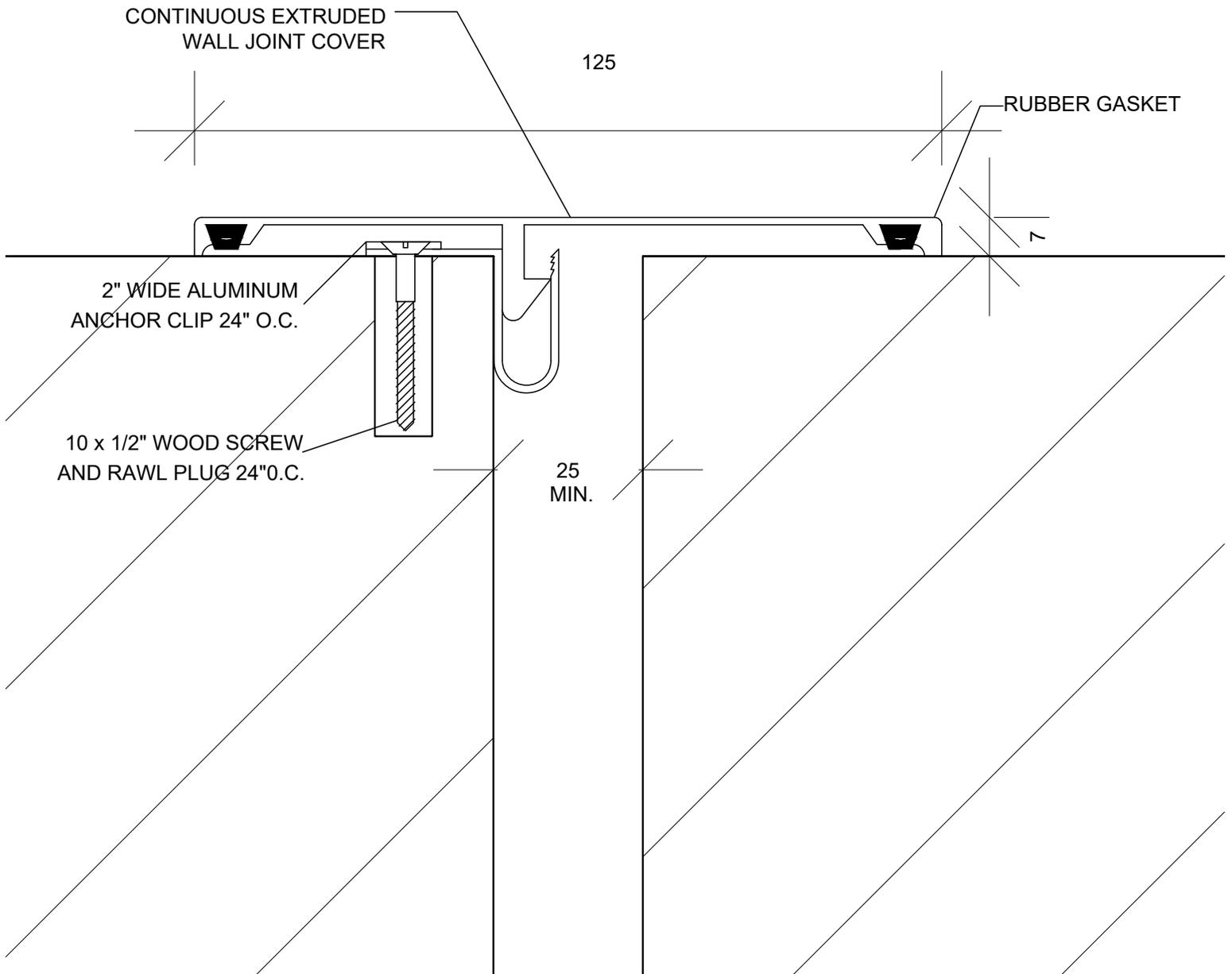
DATE: 2026-02-02

**GRGURIC
ARCHITECTS
INCORPORATED**

Web: www.2gai.com

**AD
211**

LOCATION OF EXPANSION JOINTS
TO BE PROVIDED BY ARCHITECT DURING CONSTRUCTION
(REFER TO SPEC)



NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON

INTERIOR EXPANSION JOINT DETAIL

PROJ: 2021-39

SCALE: AS NOTED

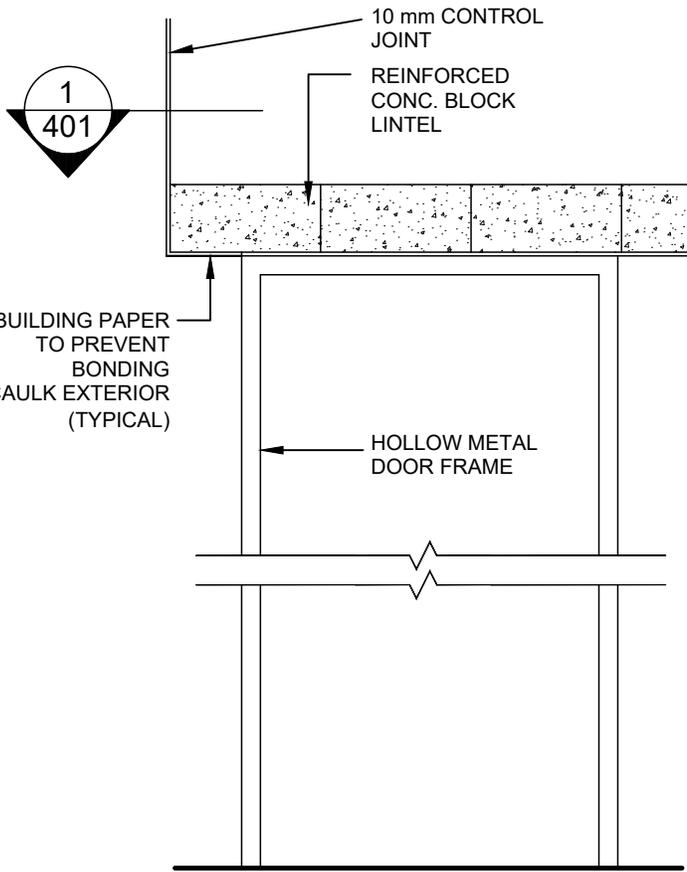
DRAWN: R.P.

DATE: 2026-02-02

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INCORPORATED**

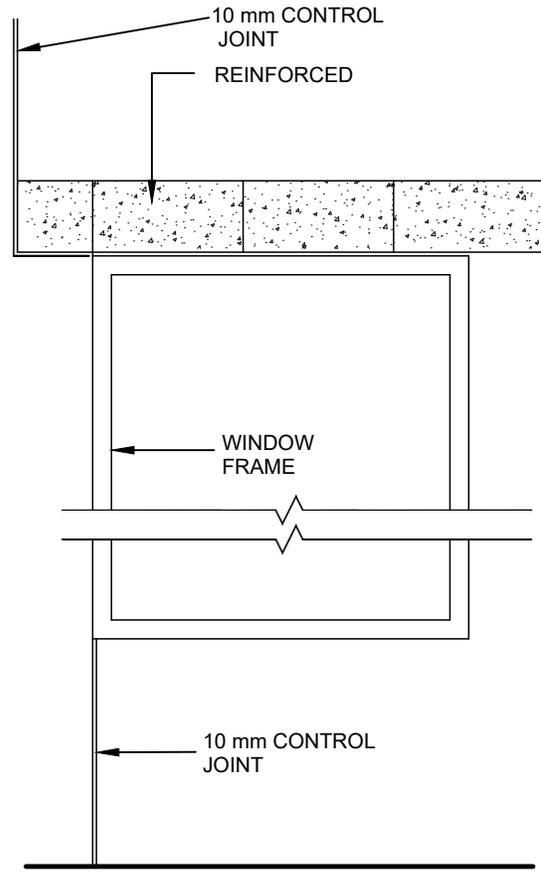
Web: www.2gai.com

**AD
401A**



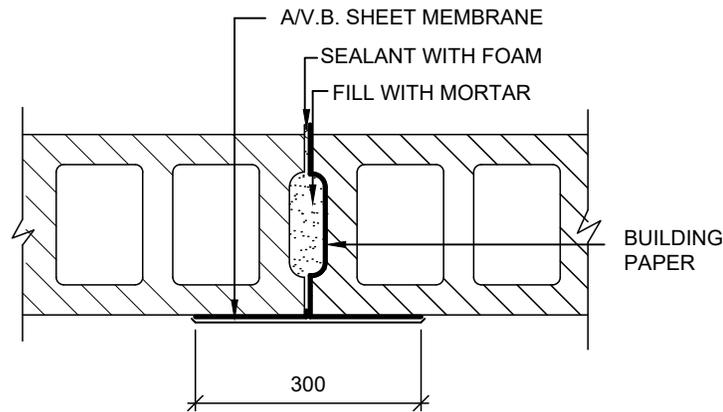
DOOR CONTROL JOINT

SCALE 1 : 20



WINDOW CONTROL JOINT

SCALE 1 : 20



PLAN DETAIL

SCALE 1 : 10



NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON

WALL CONTROL JOINT DETAIL INTERIOR SIDE

PROJ: 2021-39

SCALE: AS NOTED

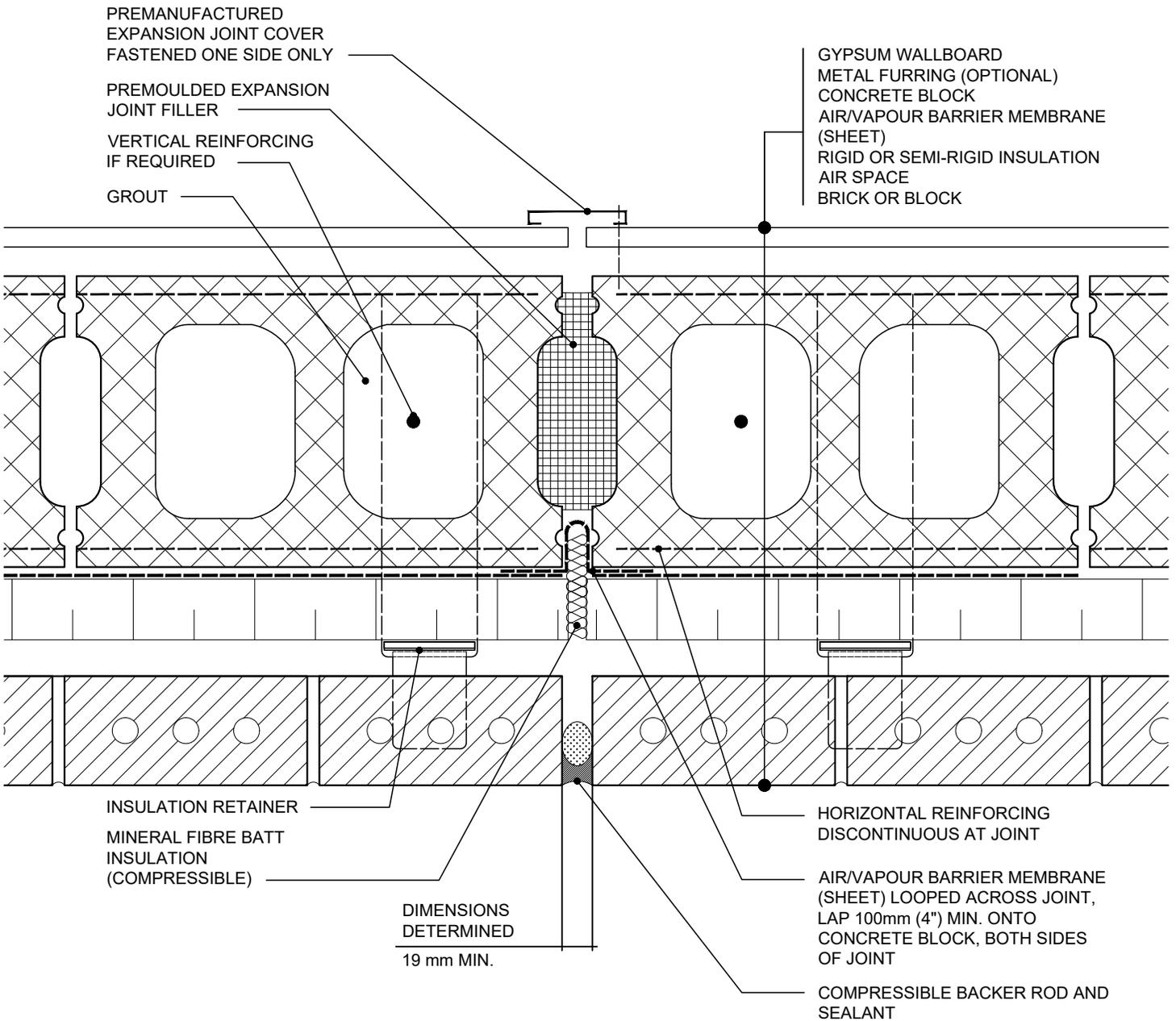
DRAWN: R.P.

DATE: 2026-02-02

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**AD
401**



NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON

**EXPANSION JOINT
DETAIL WITH DRYWALL**

PROJ: 2021-39

SCALE: AS NOTED

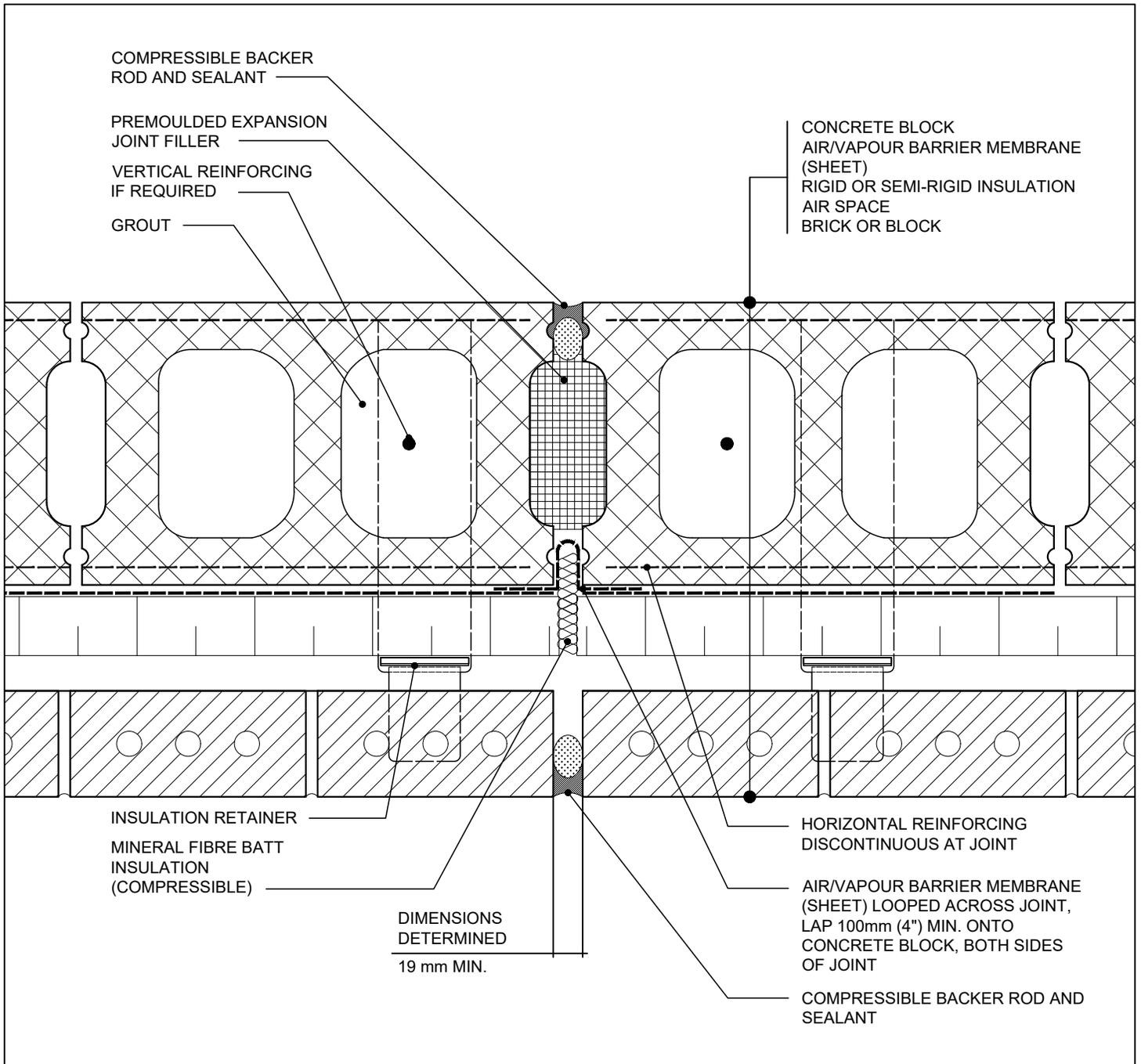
DRAWN: R.P.

DATE: 2026-02-02

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**AD
425A**



NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON

**EXPANSION JOINT
DETAIL**

PROJ: 2021-39

SCALE: AS NOTED

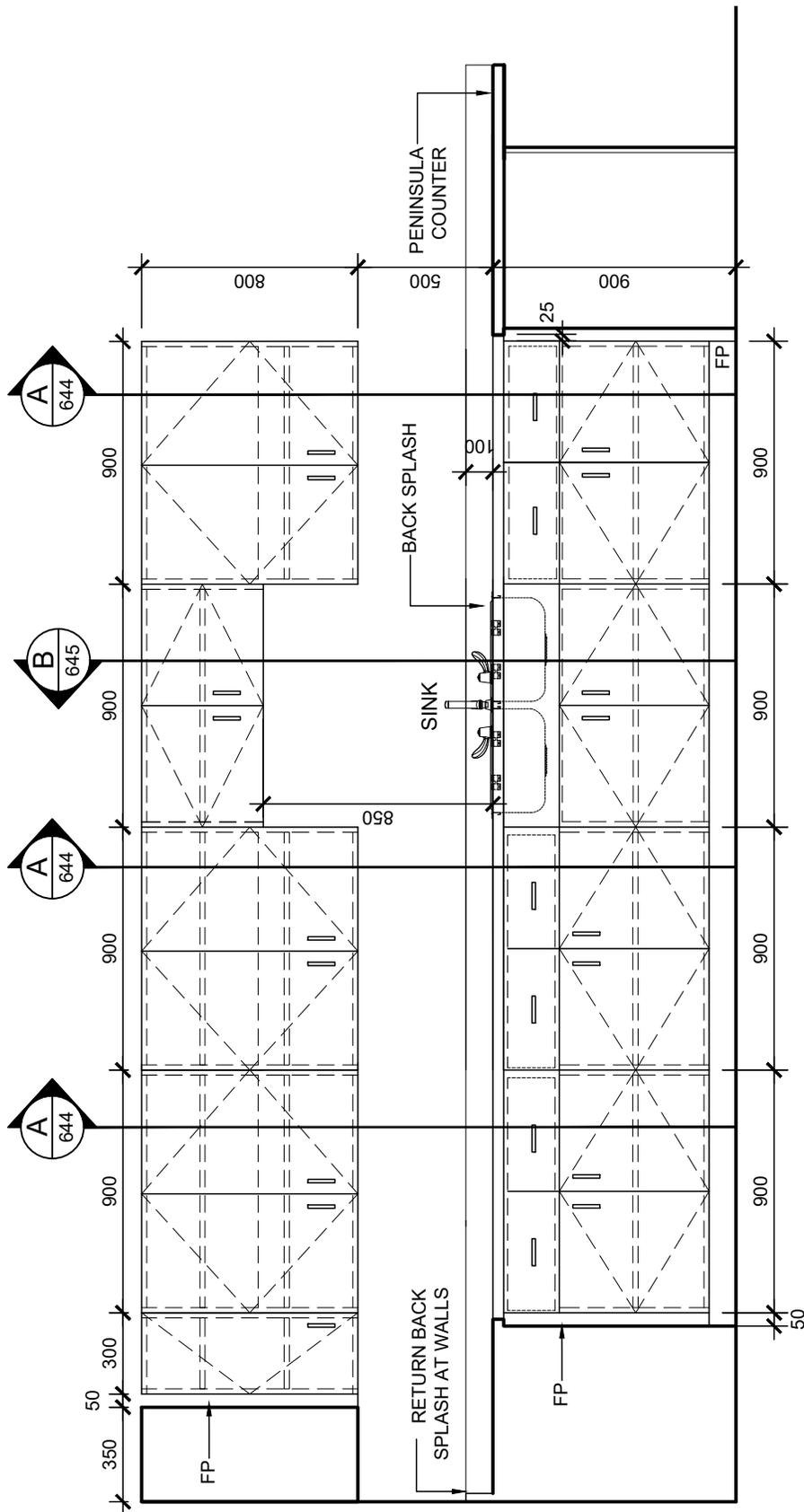
DRAWN: R.P.

DATE: 2026-02-02

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**AD
425**



ELEVATION - A
SCALE 1:25

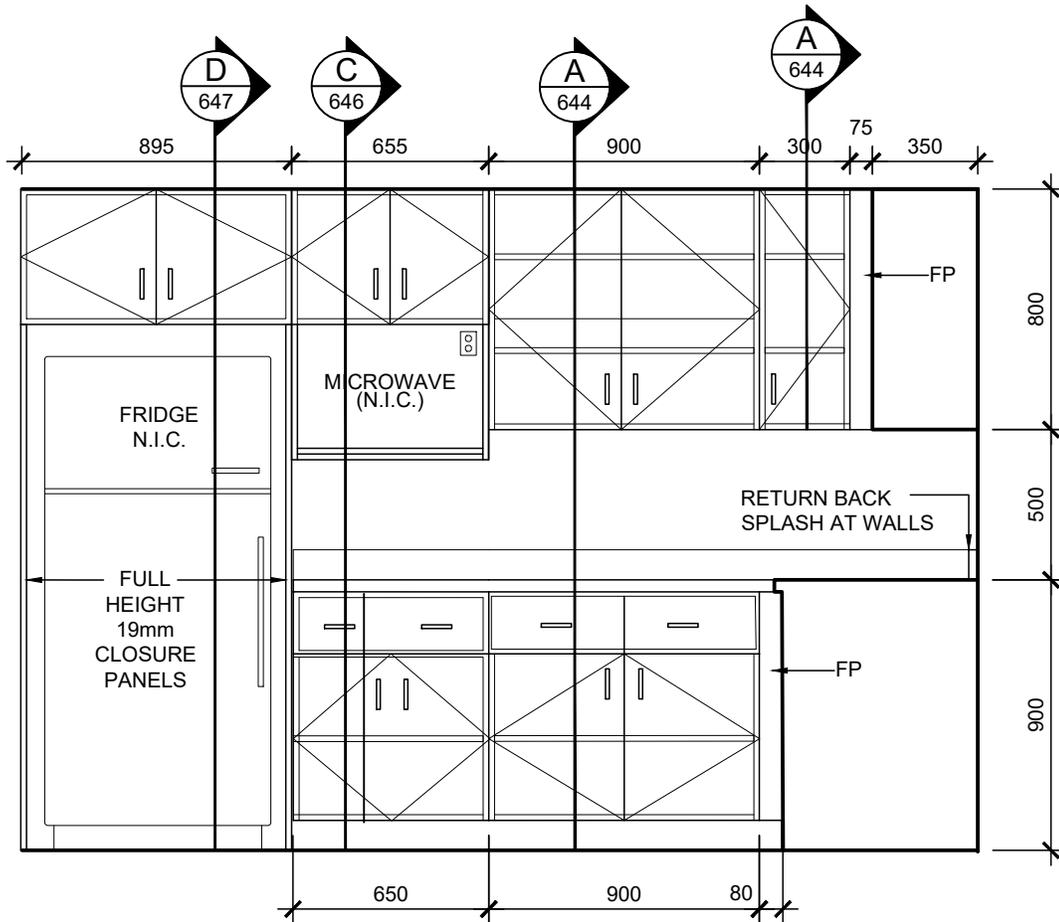
NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM1
(REFERENCE: A2.10)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

PROJ: 2021-39
SCALE: AS NOTED
DRAWN: R.P.
DATE: 2026-02-02

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**AD
604**



ELEVATION - B

SCALE 1:25

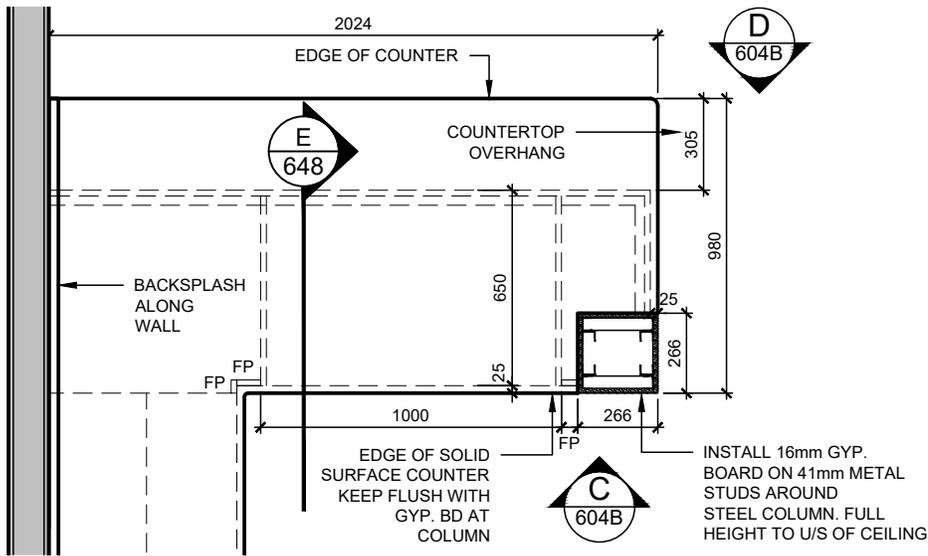
NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
 615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM1
 (REFERENCE: A2.10)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
 REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

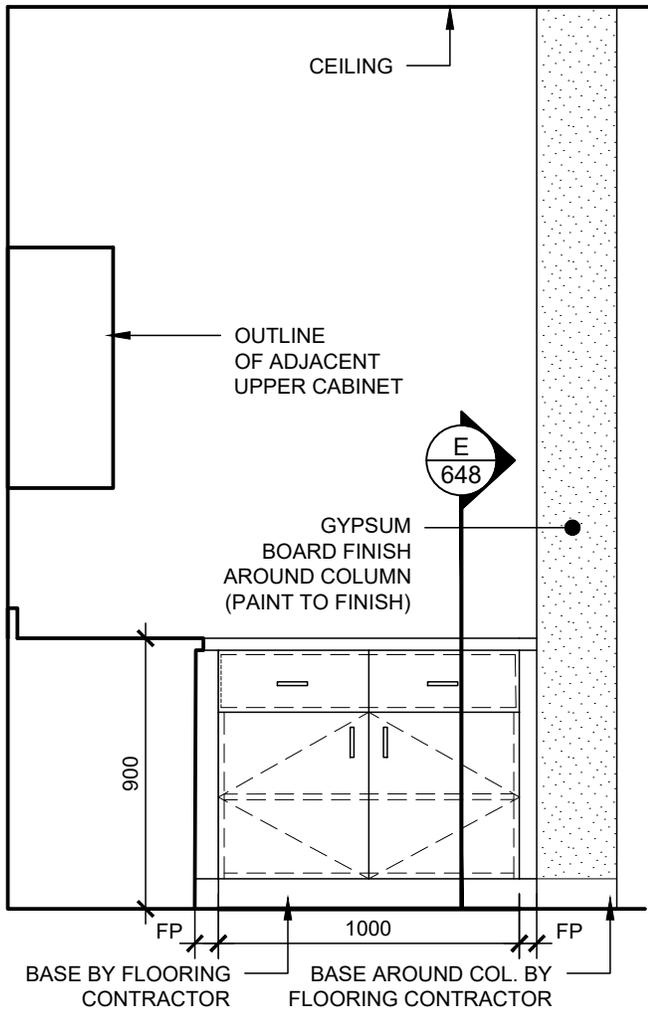
PROJ: 2021-39
 SCALE: AS NOTED
 DRAWN: R.P.
 DATE: 2026-02-02

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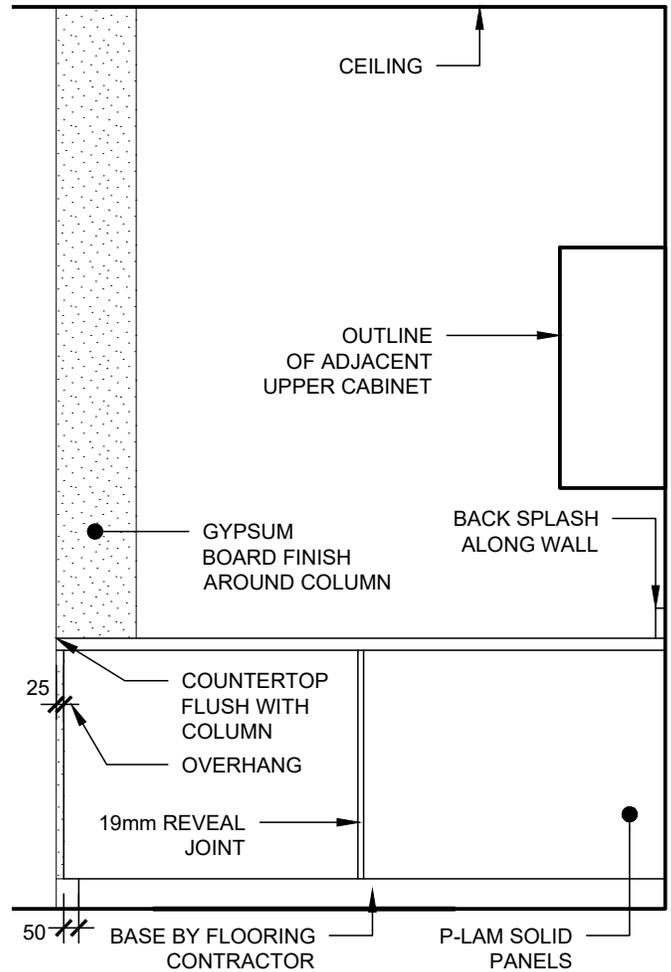
**AD
 604A**



PLAN
SCALE 1:25



ELEVATION - C
SCALE 1:25



ELEVATION - D
SCALE 1:25

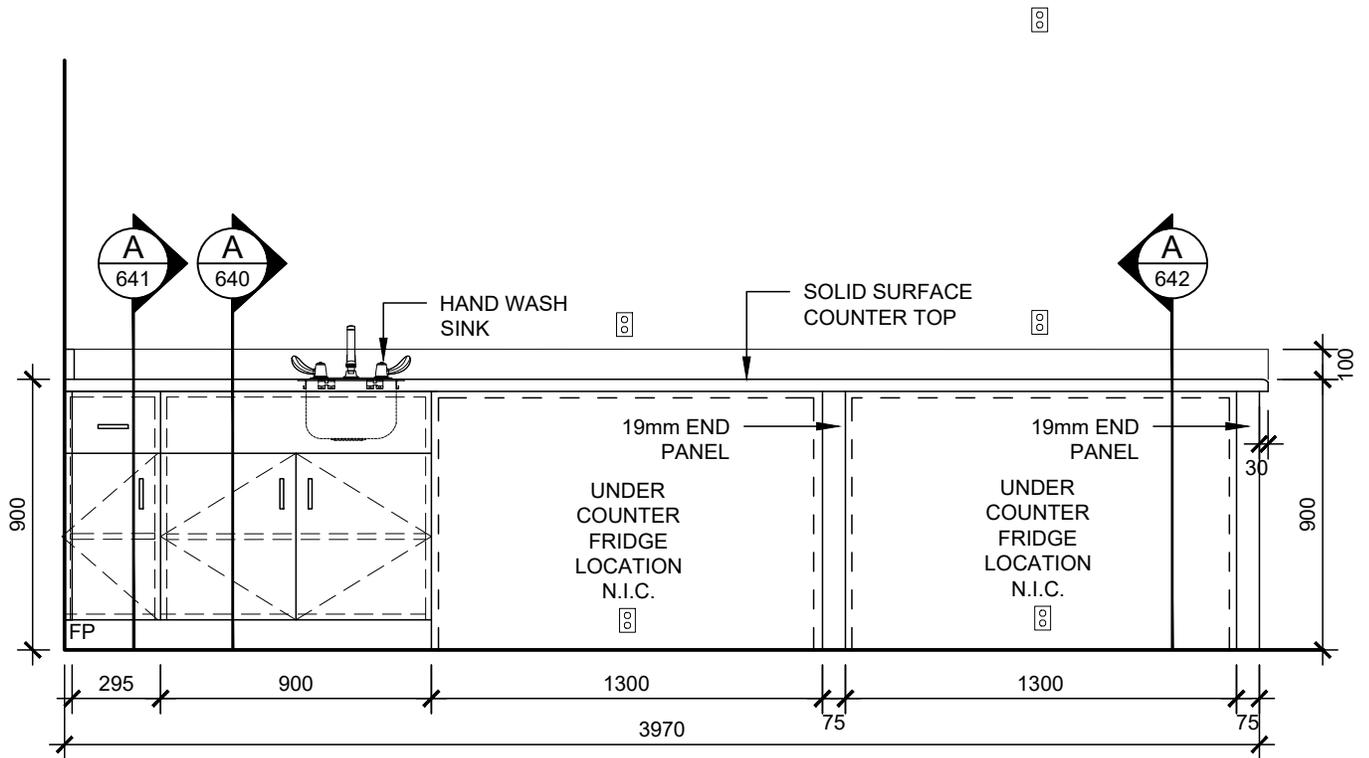
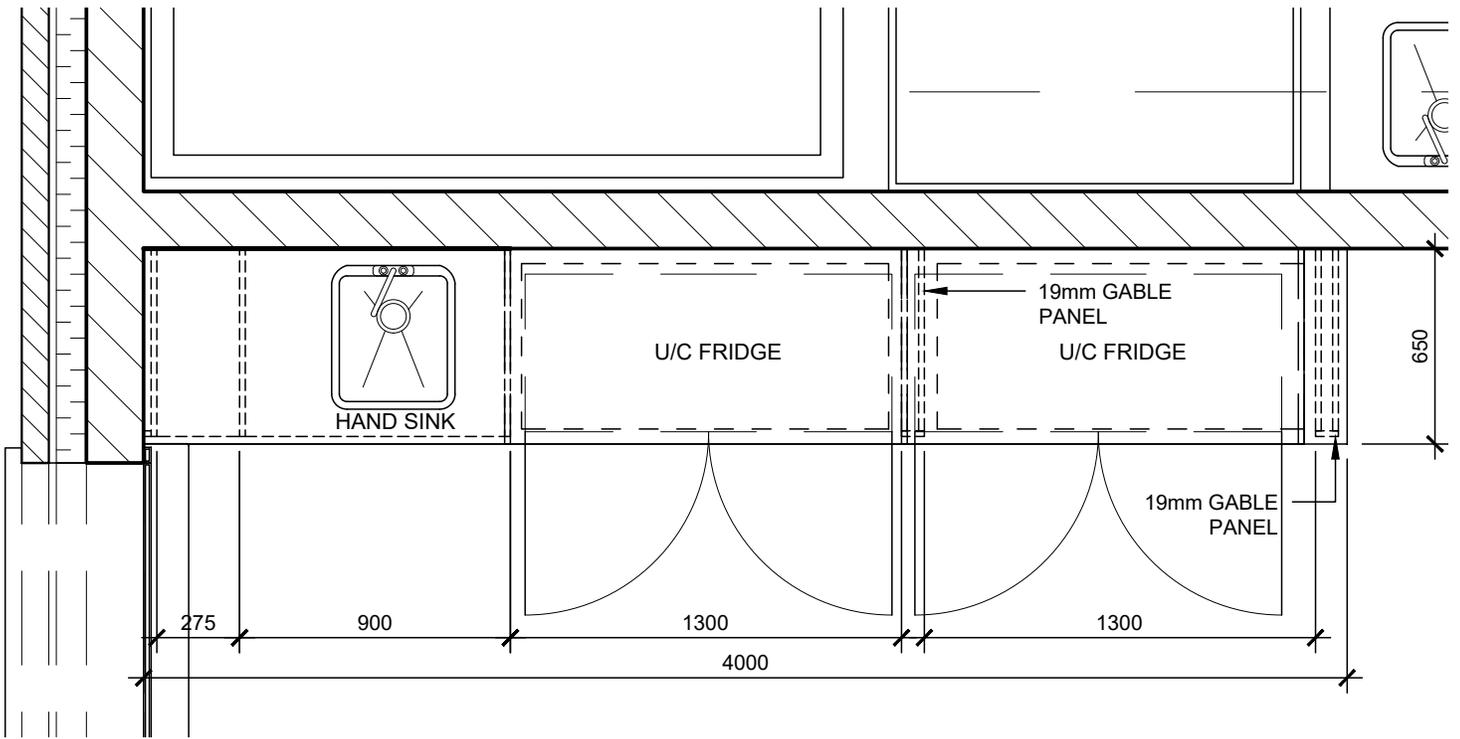
NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM1
(REFERENCE: A2.10)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

PROJ: 2021-39
SCALE: AS NOTED
DRAWN: R.P.
DATE: 2026-02-02

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Web: www.2gai.com

AD 604B



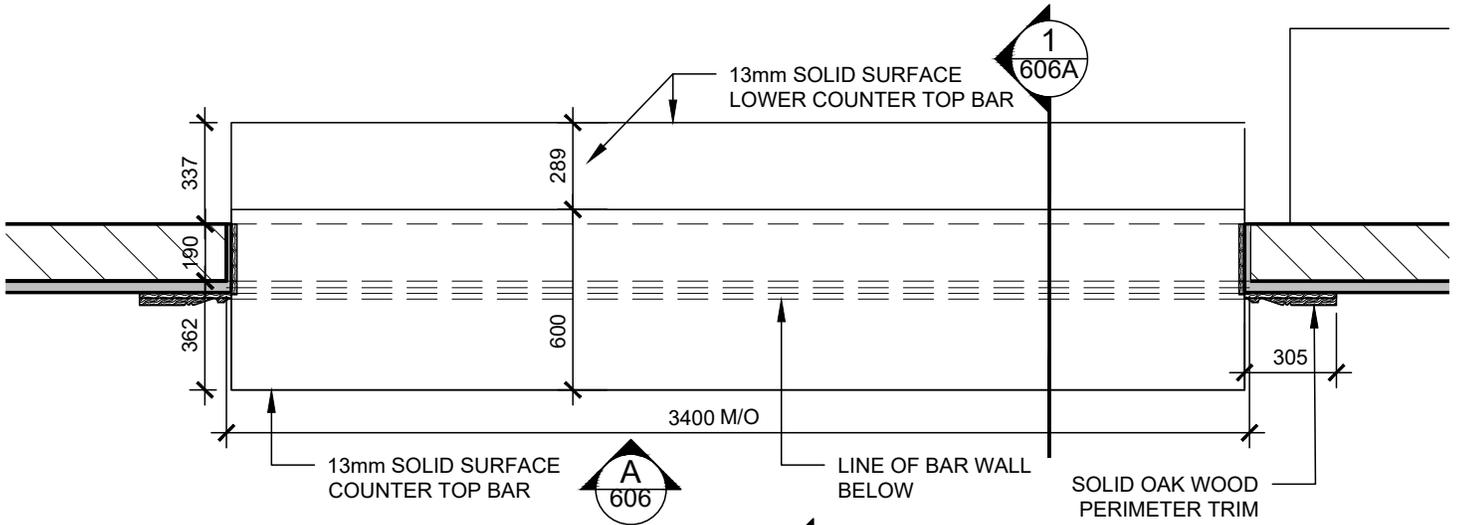
NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM2
(REFERENCE: A2.00 - ROOM 111)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

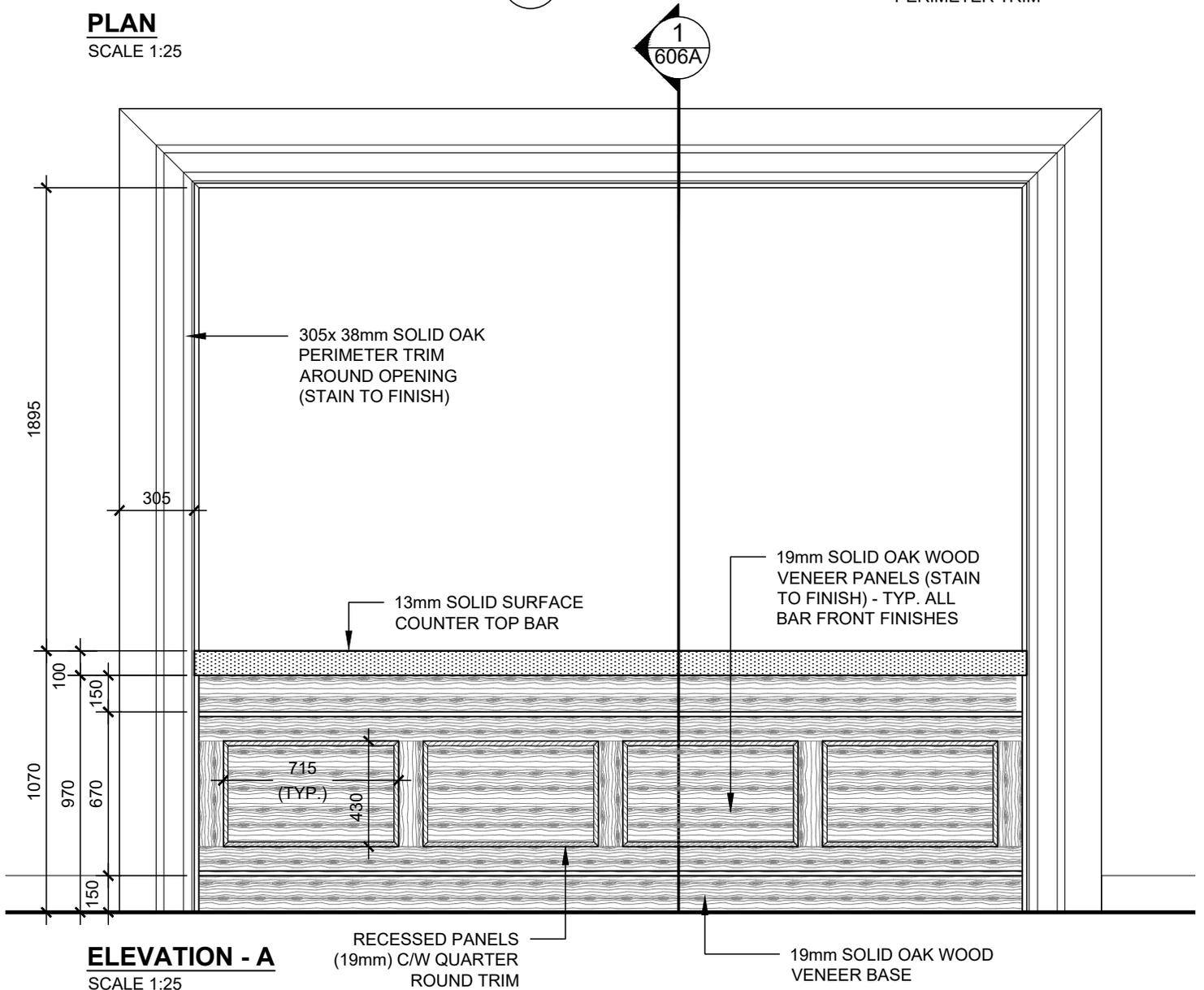
PROJ: 2021-39
SCALE: AS NOTED
DRAWN: R.P.
DATE: 2026-02-02

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**AD
605**



PLAN
SCALE 1:25



ELEVATION - A
SCALE 1:25

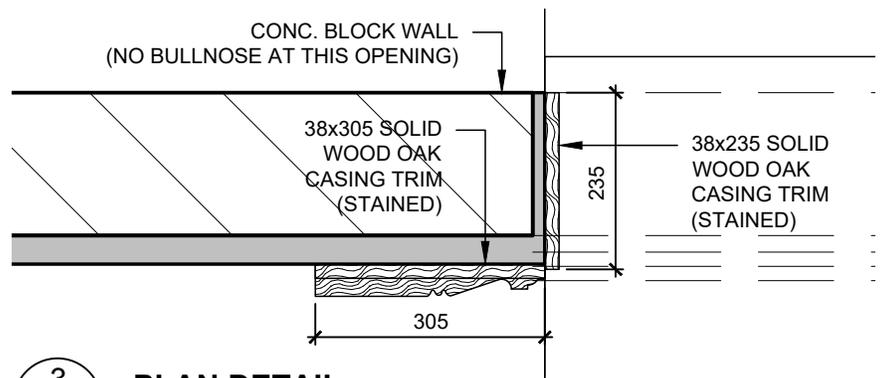
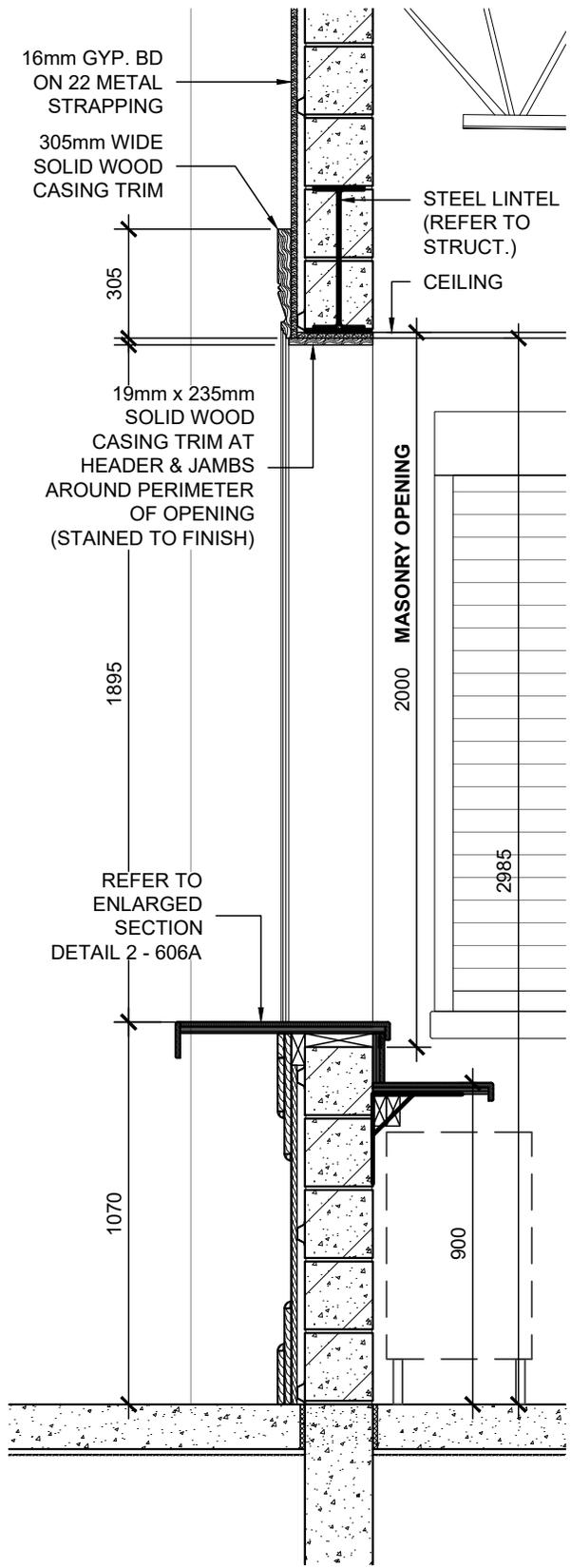
NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM3 - BAR
(REFERENCE: A2.10 - ROOM 111A)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

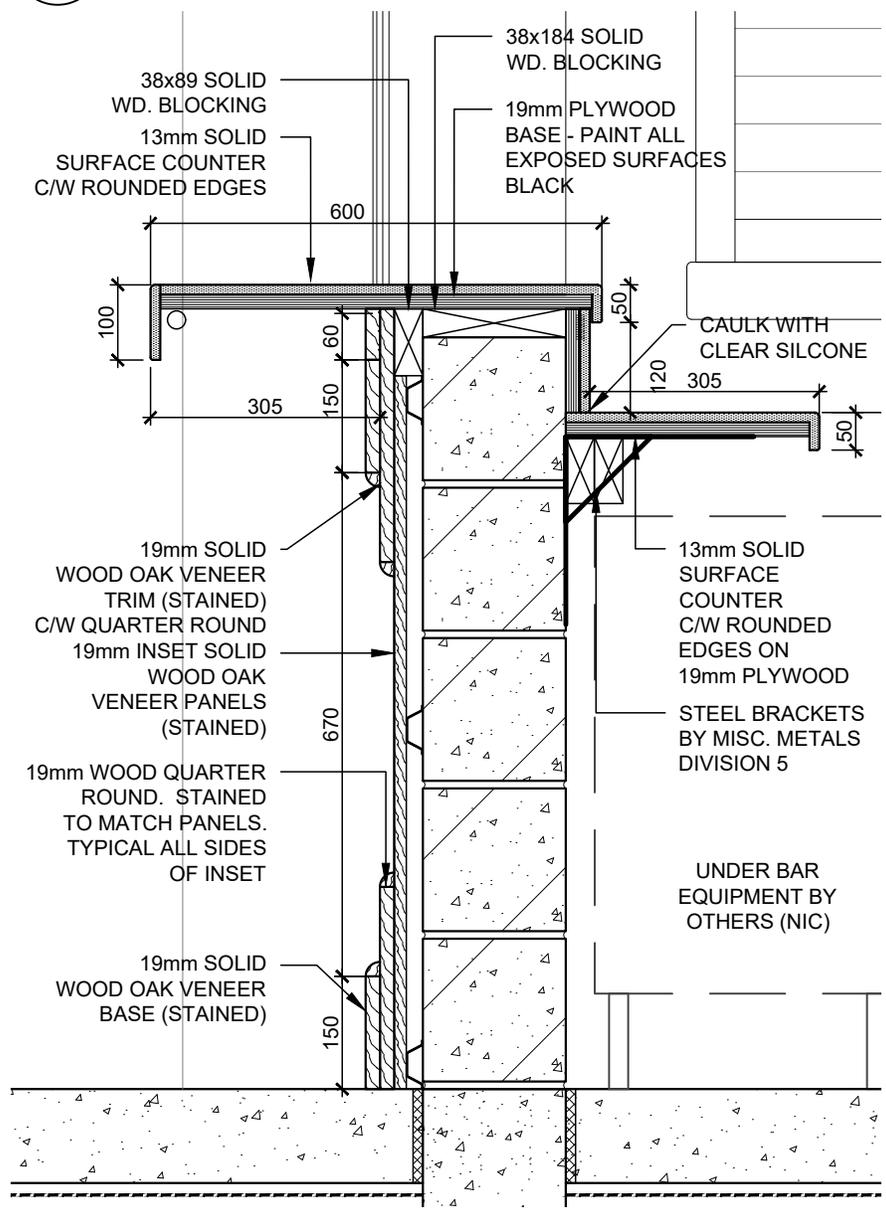
PROJ: 2021-39
SCALE: AS NOTED
DRAWN: R.P.
DATE: 2026-02-02

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Web: www.2gai.com

AD 606



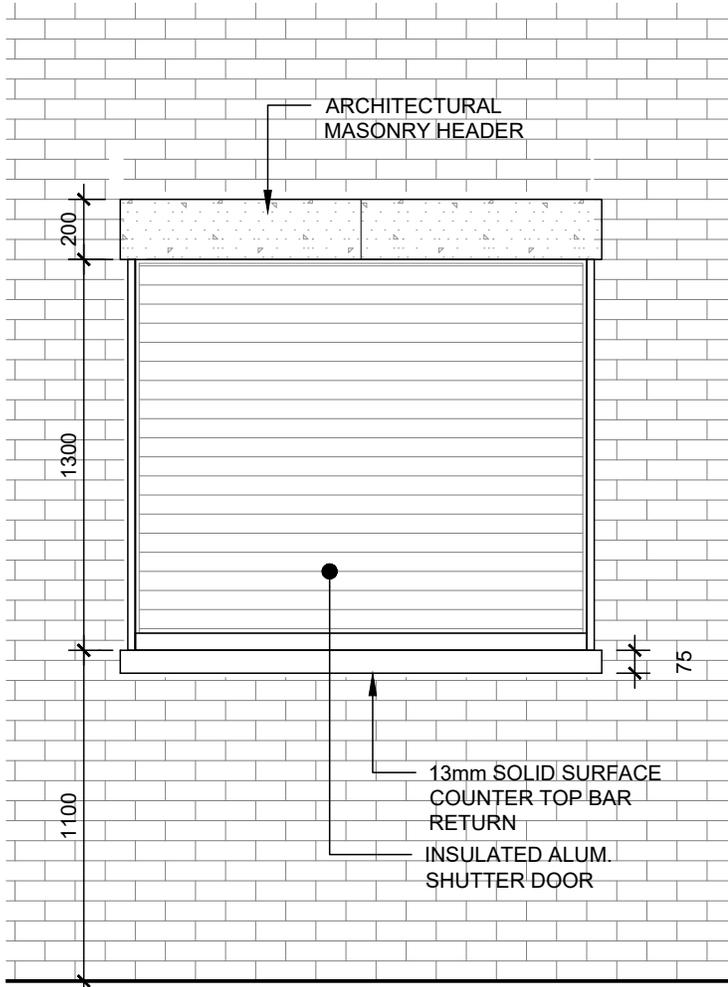
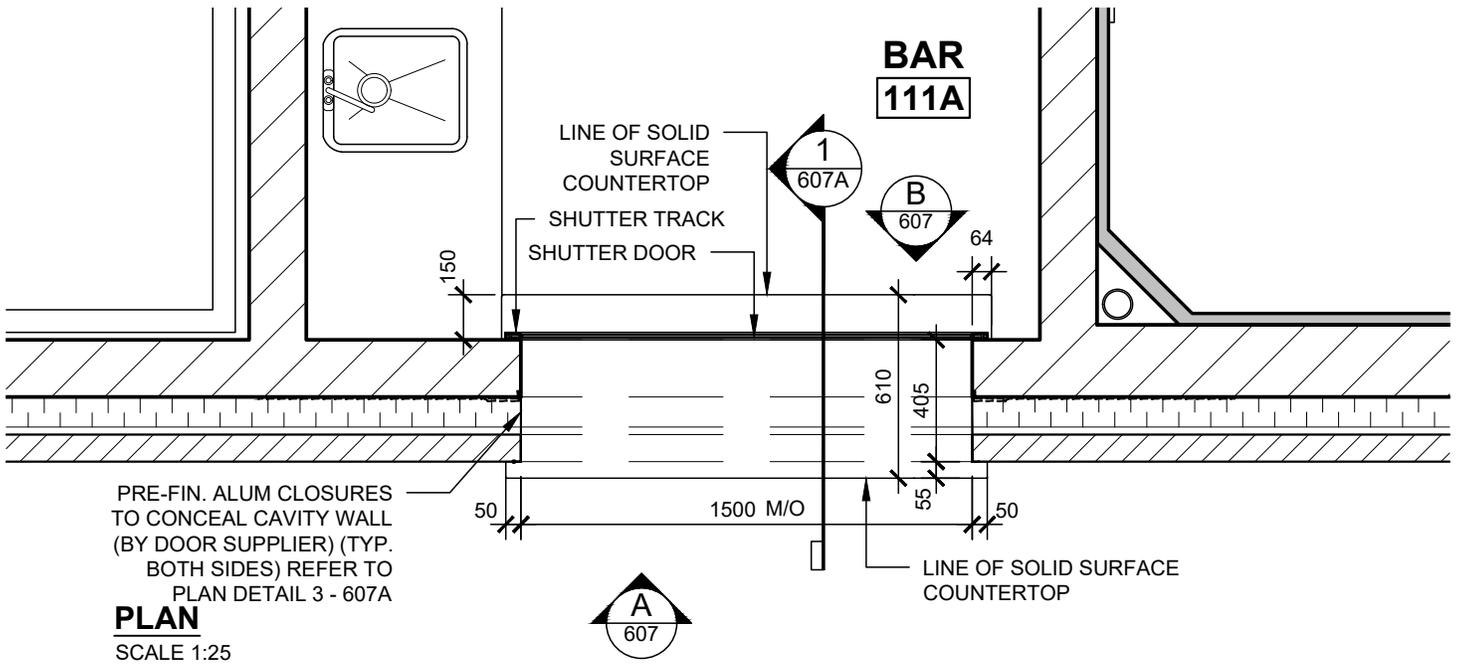
3
606A
PLAN DETAIL
SCALE 1:10



2
606A
SECTION DETAIL
SCALE 1:10

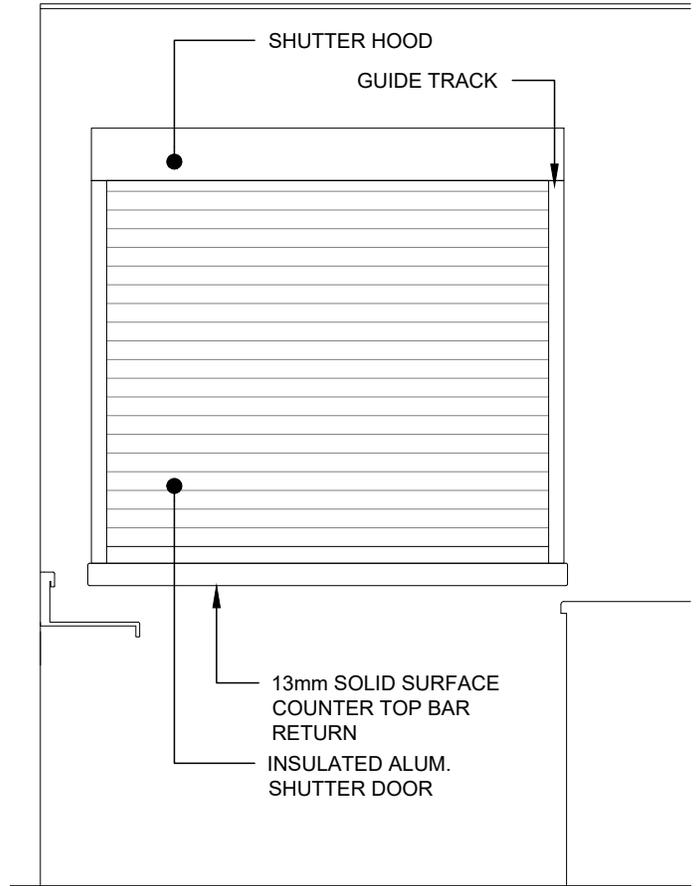
1
606A
SECTION
SCALE 1:20

<p>NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'</p> <p>615 BARTON STREET, STONEY CREEK, ON</p> <p>MILLWORK TYPE MM3 - BAR</p> <p>(REFERENCE: A2.10 - ROOM 111A)</p> <p>TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED. REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES</p>	<p>PROJ: 2021-39</p>	<p>GRGURIC ARCHITECTS INCORPORATED</p> <p>Web: www.2gai.com</p>	<p>AD 606A</p>
	<p>SCALE: AS NOTED</p>		
	<p>DRAWN: R.P.</p>		
	<p>DATE: 2026-02-02</p>		



ELEVATION - A

SCALE 1:25



ELEVATION - B

SCALE 1:25

NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
 615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM4 - ROLLING SHUTTER
 (REFERENCE: A2.10 - ROOM 111A)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED. REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

PROJ: 2021-39

SCALE: AS NOTED

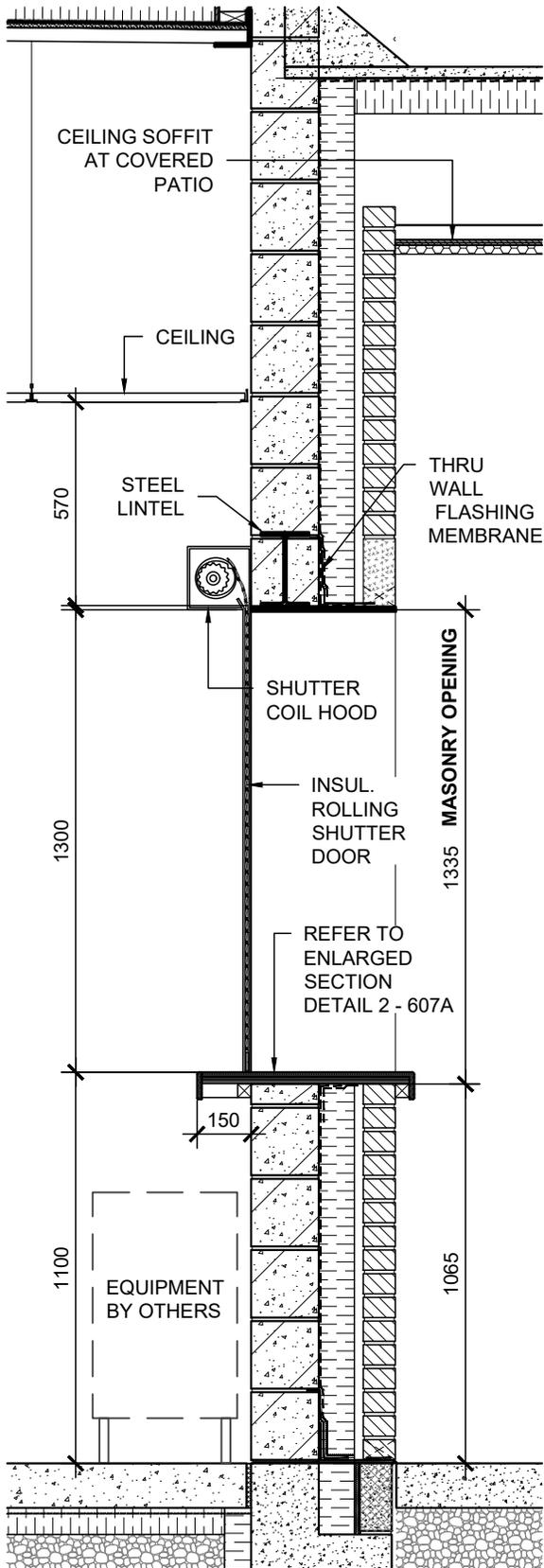
DRAWN: R.P.

DATE: 2026-02-02

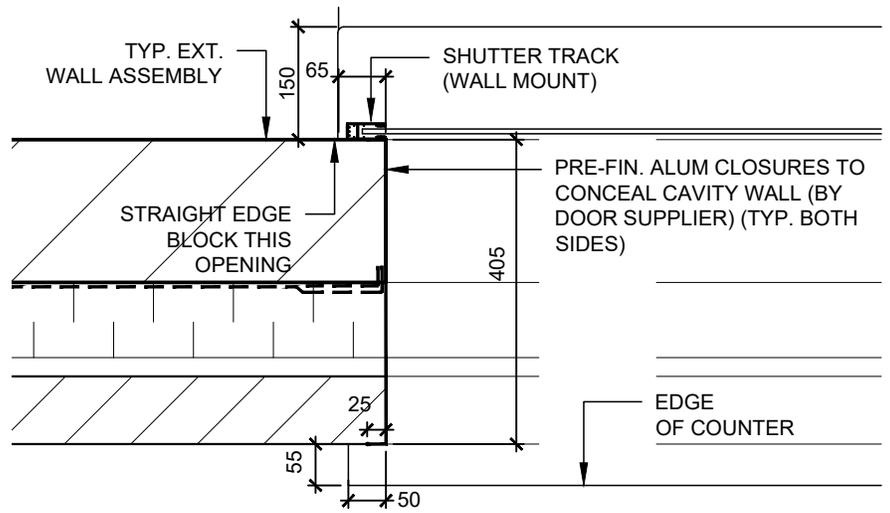
GRGURIC ARCHITECTS INCORPORATED

Web: www.2gai.com

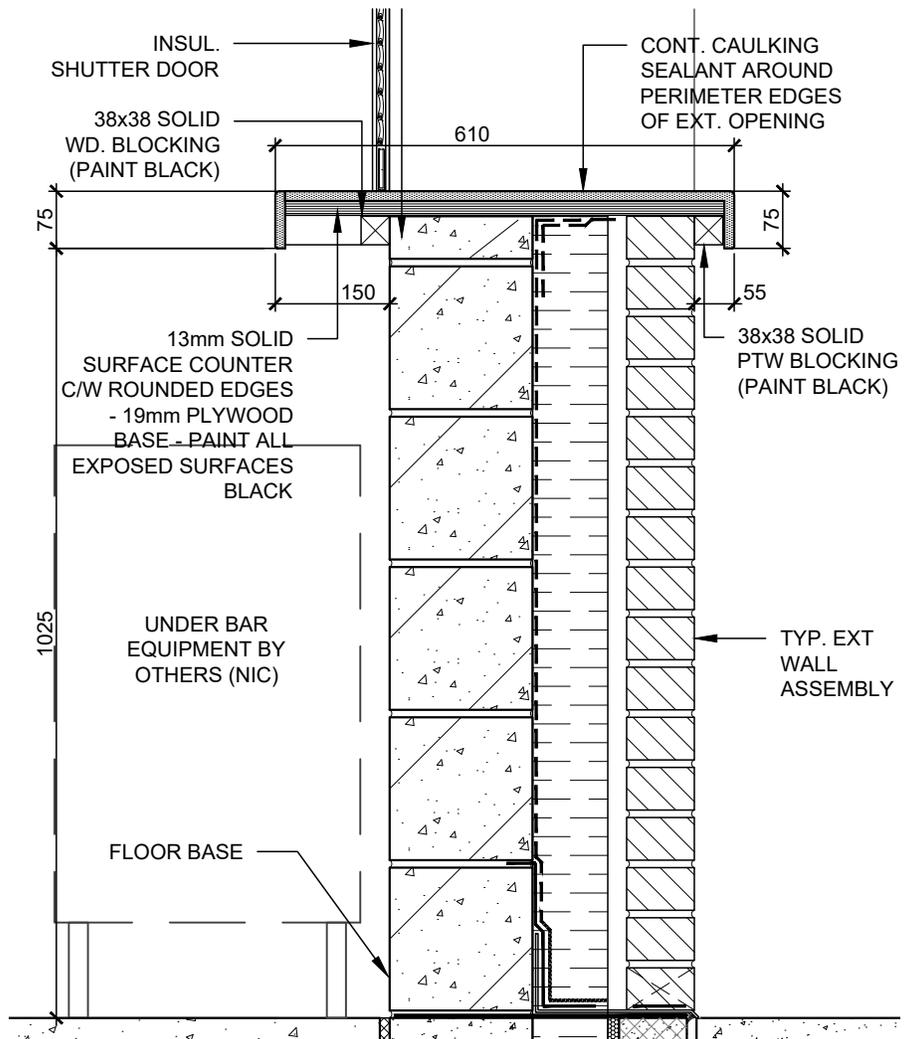
AD 607



1 SECTION
607A SCALE 1:20



3 PLAN DETAIL
607A SCALE 1:10



2 SECTION DETAIL
607A SCALE 1:10

NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM4 - ROLLING SHUTTER
(REFERENCE: A2.10 - ROOM 111A)

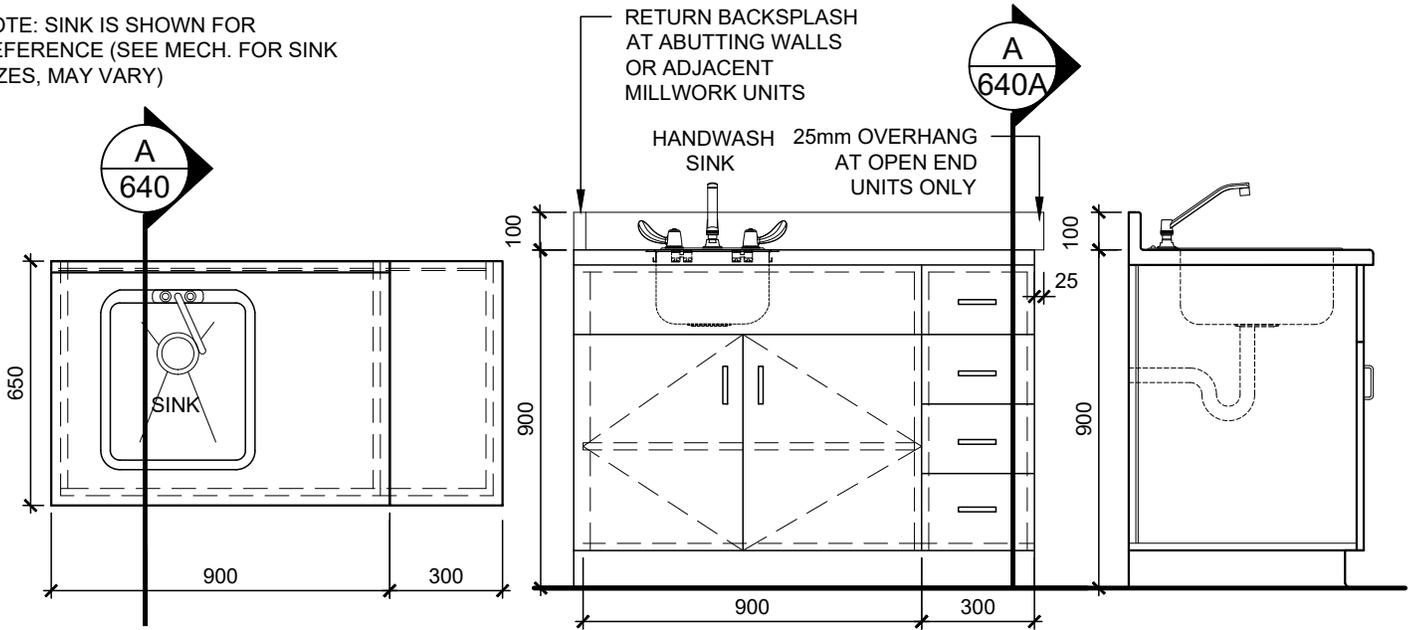
TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

PROJ: 2021-39
SCALE: AS NOTED
DRAWN: R.P.
DATE: 2026-02-02

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Web: www.2gai.com

AD 607A

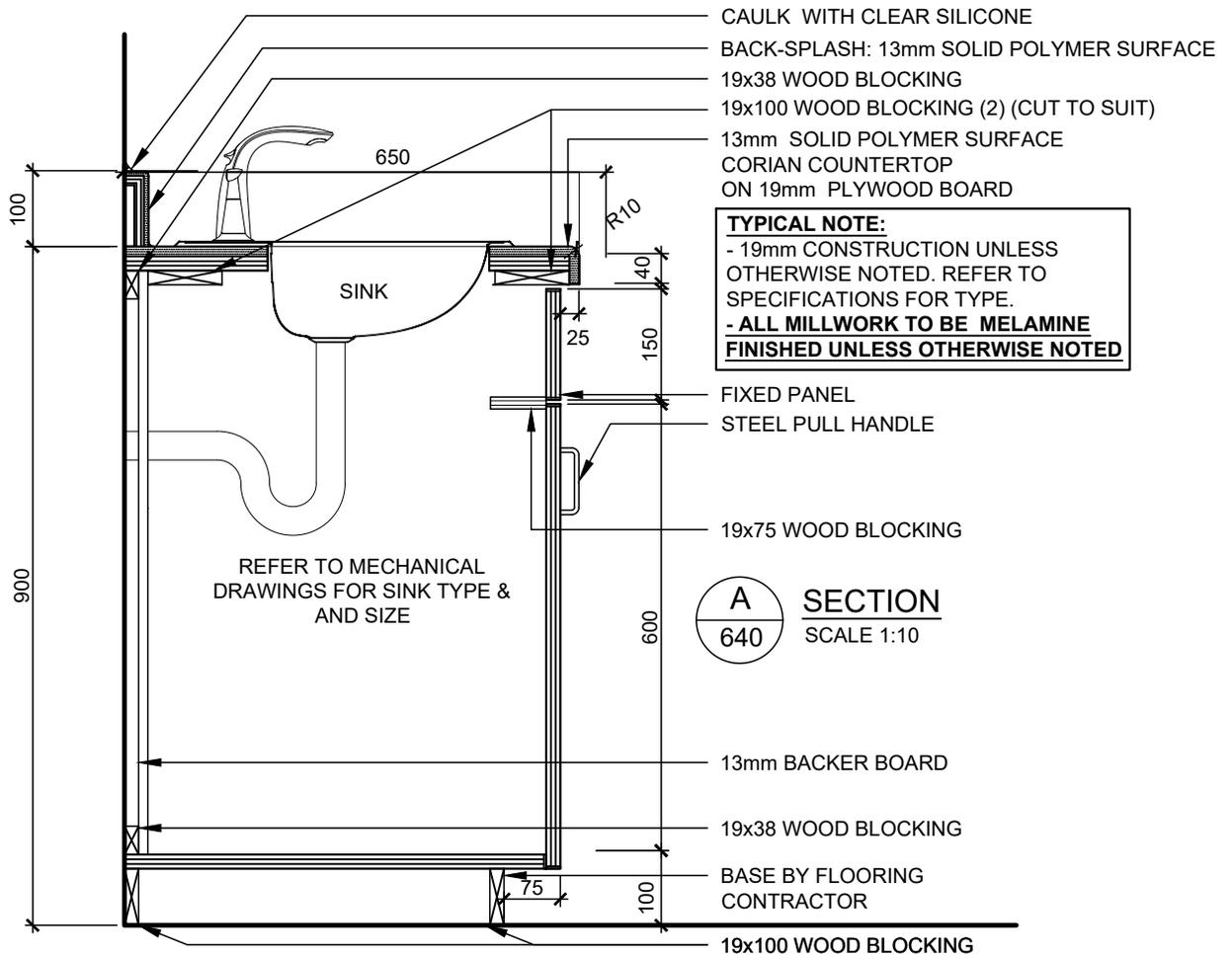
NOTE: SINK IS SHOWN FOR REFERENCE (SEE MECH. FOR SINK SIZES, MAY VARY)



PLAN
SCALE 1:20

ELEVATION
SCALE 1:20

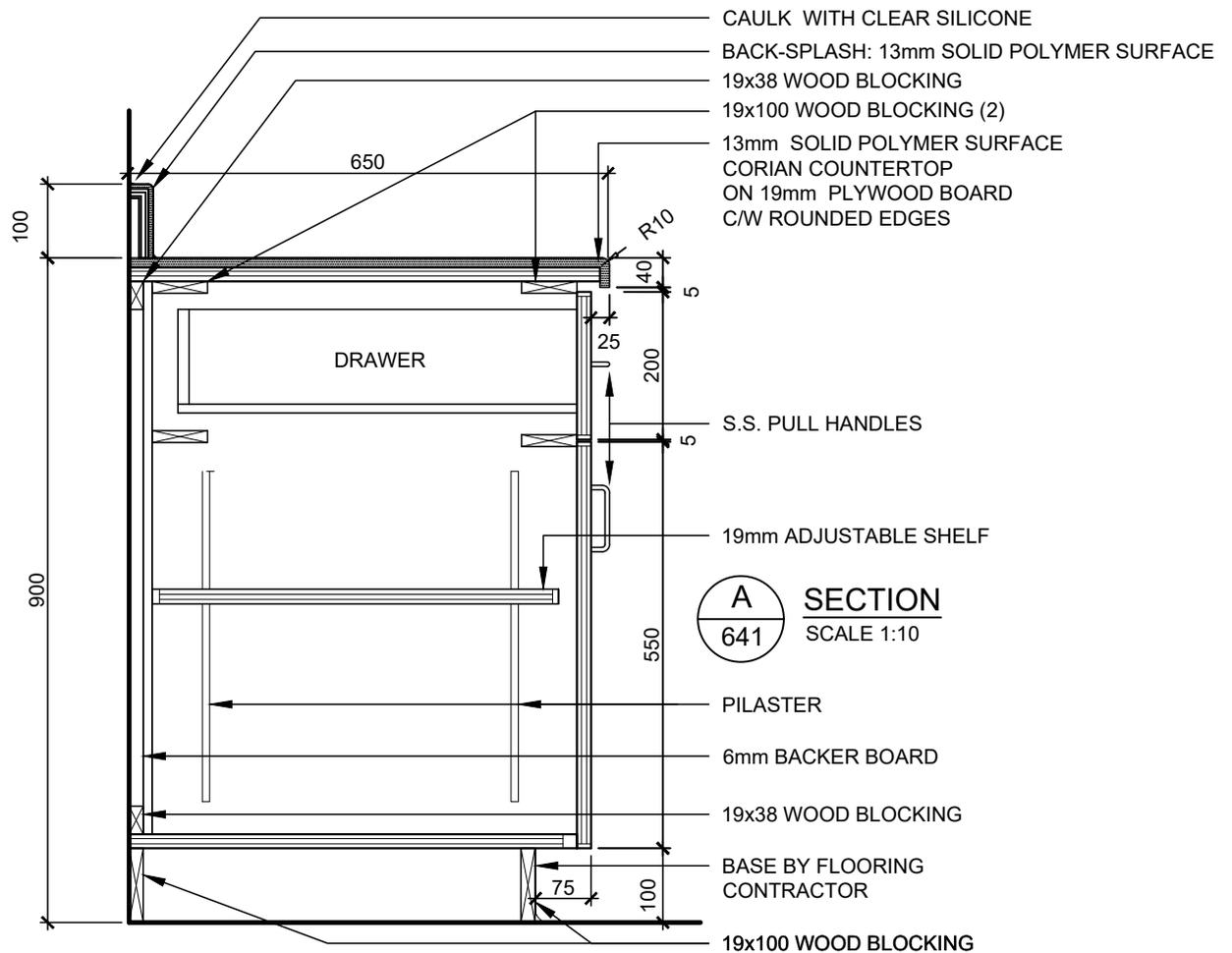
SIDE ELEVATION
SCALE 1:20



TYPICAL NOTE:
- 19mm CONSTRUCTION UNLESS OTHERWISE NOTED. REFER TO SPECIFICATIONS FOR TYPE.
- ALL MILLWORK TO BE MELAMINE FINISHED UNLESS OTHERWISE NOTED

A
640 SECTION
SCALE 1:10

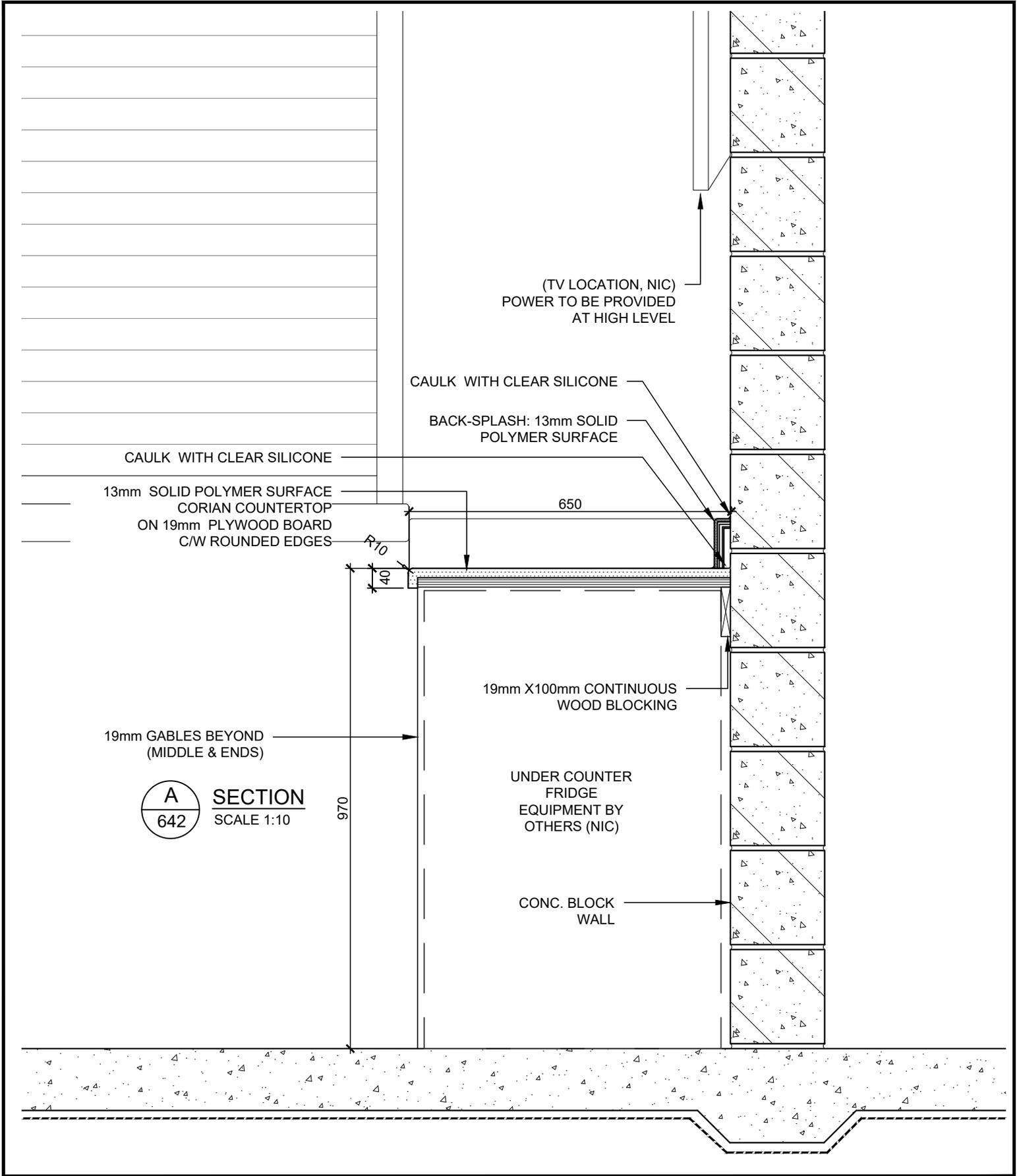
<p>NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME' 615 BARTON STREET, STONEY CREEK, ON MILLWORK TYPE S1 - BASE SINK (REFERENCE: A2.10 - ROOM 111A)</p>	<p>PROJ: 2021-39</p>	<p>GRGURIC ARCHITECTS INCORPORATED Web: www.2gai.com</p>	<p>AD 640</p>
	<p>SCALE: AS NOTED</p>		
	<p>DRAWN: R.P.</p>		
	<p>DATE: 2026-02-02</p>		
<p>TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED. REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES</p>			



- CAULK WITH CLEAR SILICONE
- BACK-SPLASH: 13mm SOLID POLYMER SURFACE
- 19x38 WOOD BLOCKING
- 19x100 WOOD BLOCKING (2)
- 13mm SOLID POLYMER SURFACE
- CORIAN COUNTERTOP
- ON 19mm PLYWOOD BOARD
- C/W ROUNDED EDGES
- R10
- 40
- 5
- 25
- 5
- S.S. PULL HANDLES
- 19mm ADJUSTABLE SHELF
- 550
- PILASTER
- 6mm BACKER BOARD
- 19x38 WOOD BLOCKING
- BASE BY FLOORING CONTRACTOR
- 75
- 100
- 19x100 WOOD BLOCKING

A SECTION
641 SCALE 1:10

<p>NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'</p> <p>615 BARTON STREET, STONEY CREEK, ON</p> <p>MILLWORK TYPICAL BASE CABINET</p> <p>(REFERENCE: A2.10 - ROOM 111A)</p> <p><small>TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED. REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES</small></p>	<p>PROJ: 2021-39</p> <p>SCALE: AS NOTED</p> <p>DRAWN: R.P.</p> <p>DATE: 2026-02-02</p>	<p>GRGURIC ARCHITECTS INCORPORATED</p> <p>Web: www.2gai.com</p>	<p>AD 641</p>
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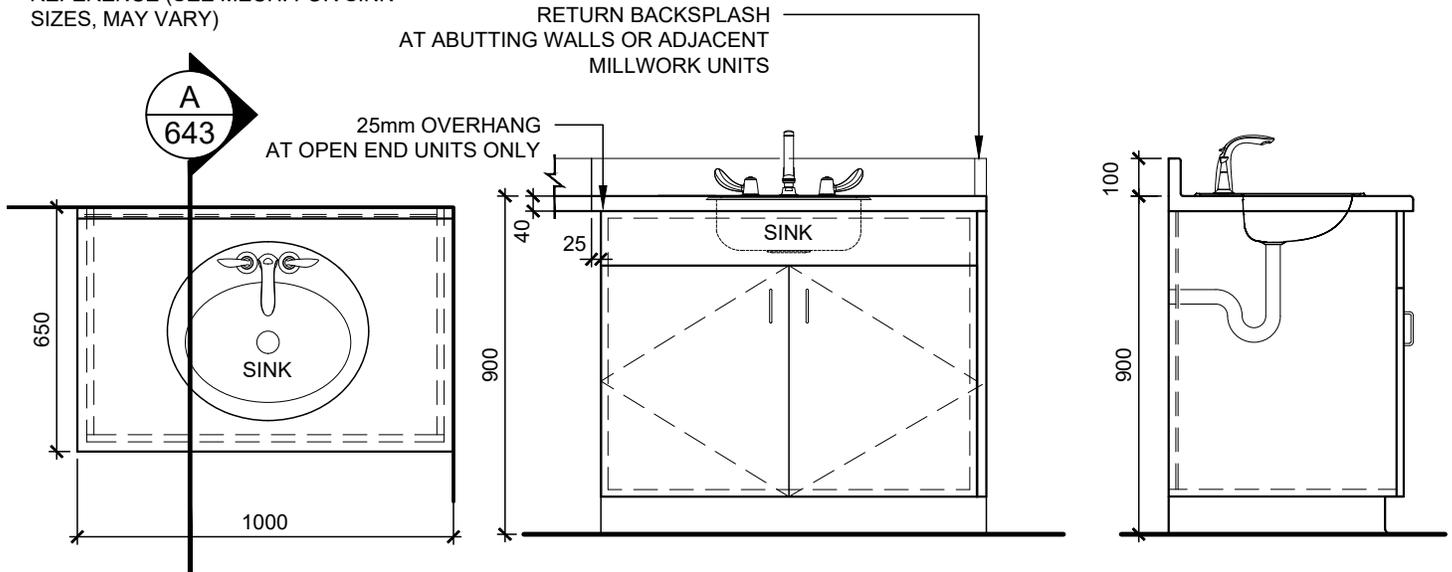


A
642

SECTION
SCALE 1:10

<p>NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'</p> <p>615 BARTON STREET, STONEY CREEK, ON</p> <p>MILLWORK TYPE MM2 - SECTION</p> <p>(REFERENCE: A2.10 - ROOM 111A)</p> <p>TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED. REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES</p>	<p>PROJ: 2021-39</p>	<p>GRGURIC ARCHITECTS INCORPORATED</p> <p>Web: www.2gai.com</p>	<p>AD 642</p>
	<p>SCALE: AS NOTED</p>		
	<p>DRAWN: R.P.</p>		
	<p>DATE: 2026-02-02</p>		

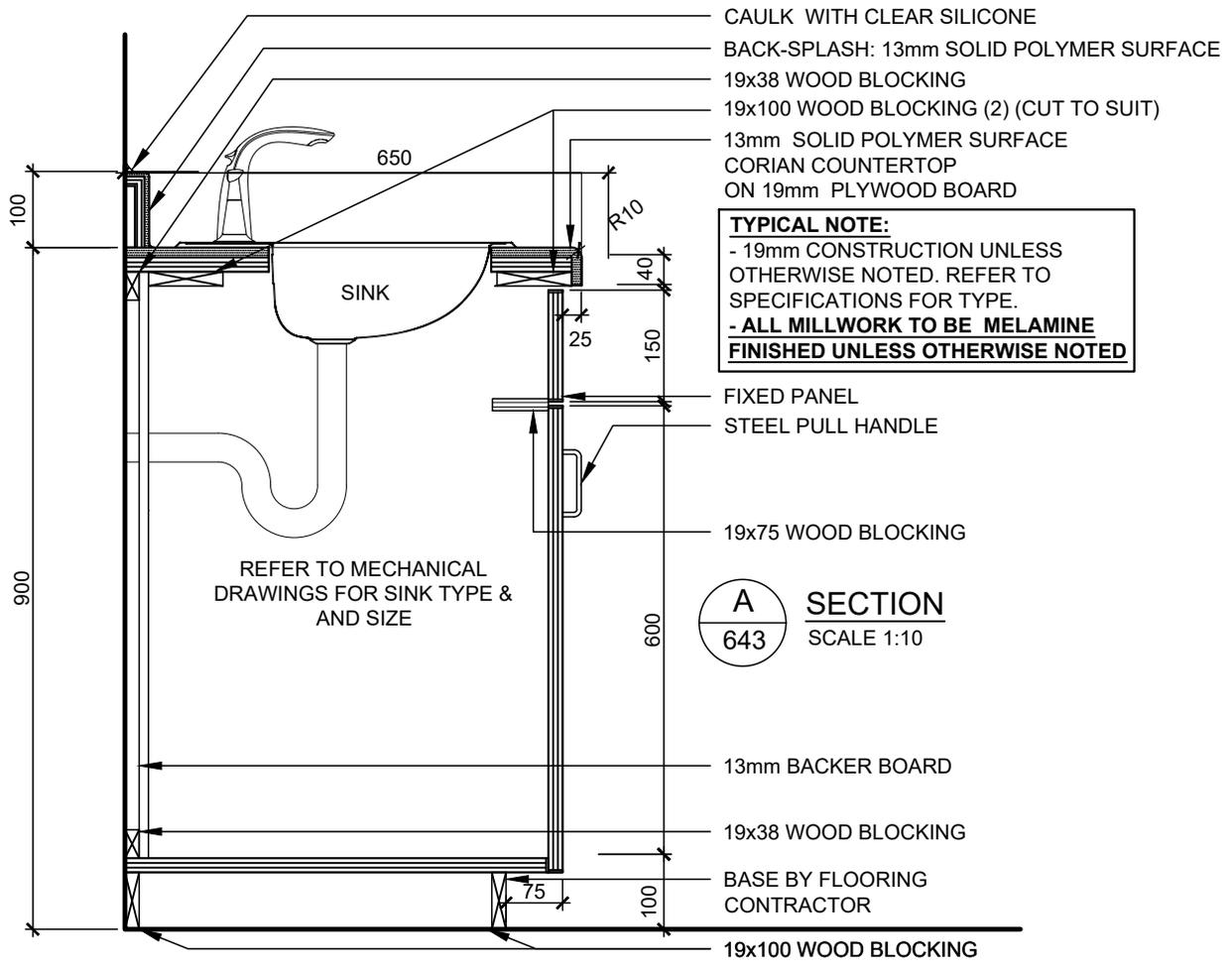
NOTE: SINK IS SHOWN FOR REFERENCE (SEE MECH. FOR SINK SIZES, MAY VARY)



PLAN
SCALE 1:20

ELEVATION
SCALE 1:20

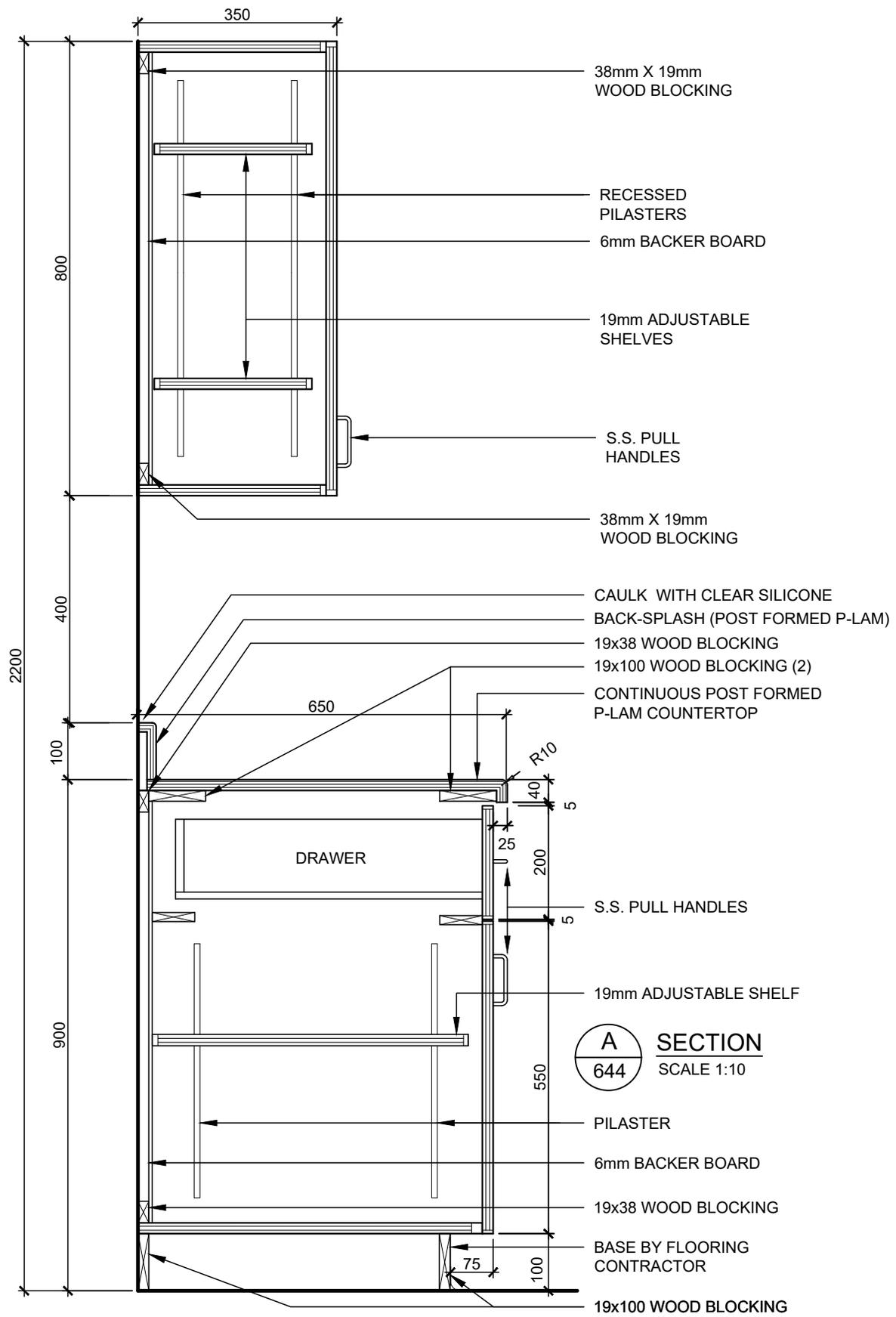
SIDE ELEVATION
SCALE 1:20



TYPICAL NOTE:
- 19mm CONSTRUCTION UNLESS OTHERWISE NOTED. REFER TO SPECIFICATIONS FOR TYPE.
- ALL MILLWORK TO BE MELAMINE FINISHED UNLESS OTHERWISE NOTED

A
643 **SECTION**
SCALE 1:10

<p>NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'</p> <p>615 BARTON STREET, STONEY CREEK, ON</p> <p>MILLWORK TYPE S2 - BASE SINK</p> <p>(REFERENCE: A2.10 - ROOM 111A)</p> <p>TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED. REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES</p>	<p>PROJ: 2021-39</p>	<p>GRGURIC ARCHITECTS INCORPORATED</p> <p>Web: www.2gai.com</p>	<p>AD 643</p>
	<p>SCALE: AS NOTED</p>		
	<p>DRAWN: R.P.</p>		
	<p>DATE: 2026-02-02</p>		



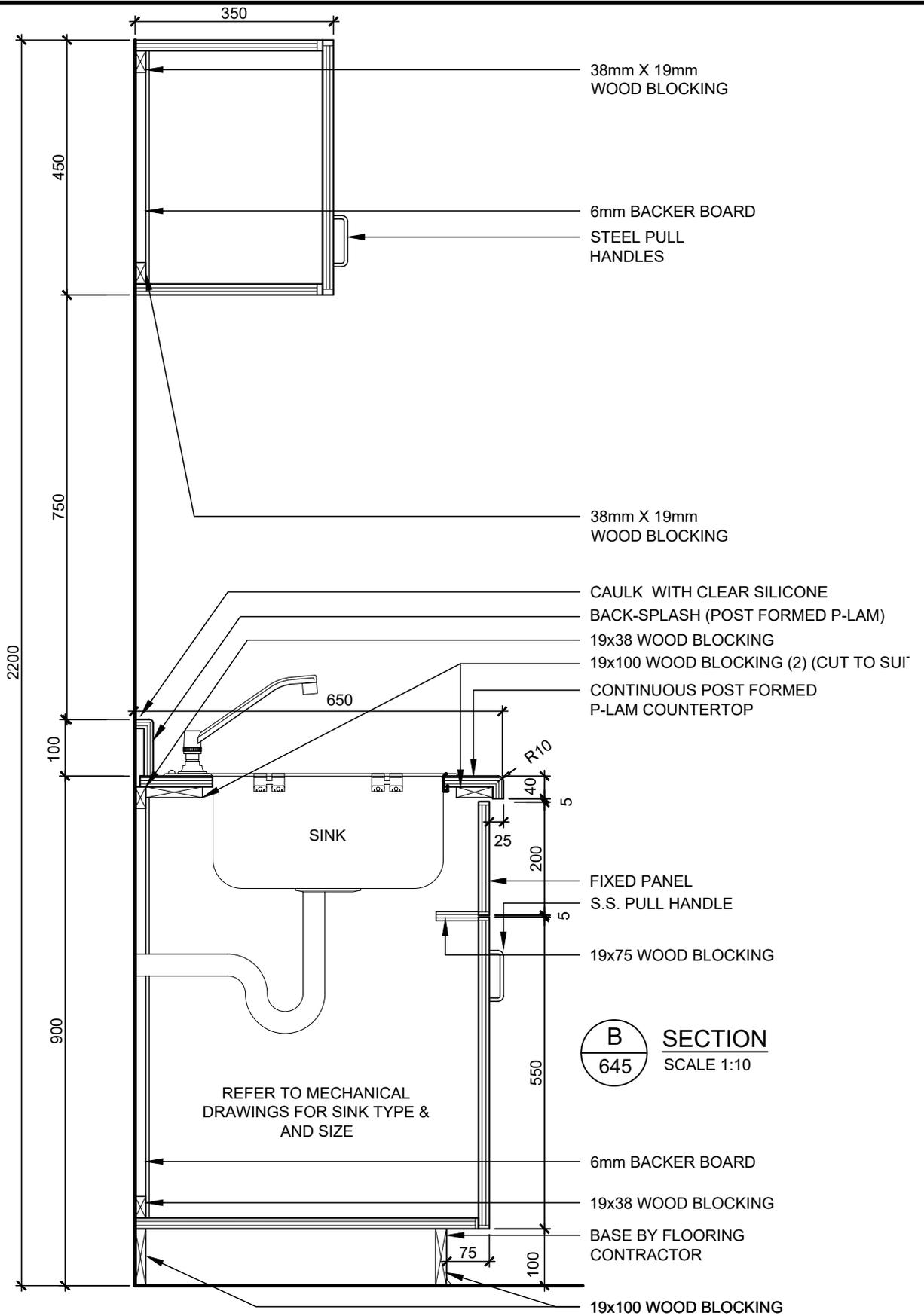
A SECTION
644 SCALE 1:10

NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM1 - TYPICAL SECTION
(REFERENCE: A2.10)
TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

PROJ: 2021-39
SCALE: AS NOTED
DRAWN: R.P.
DATE: 2026-02-02

GRGURIC ARCHITECTS INCORPORATED
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AD 644



NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM1 - TYPICAL SECTION
(REFERENCE: A2.10)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

PROJ: 2021-39

SCALE: AS NOTED

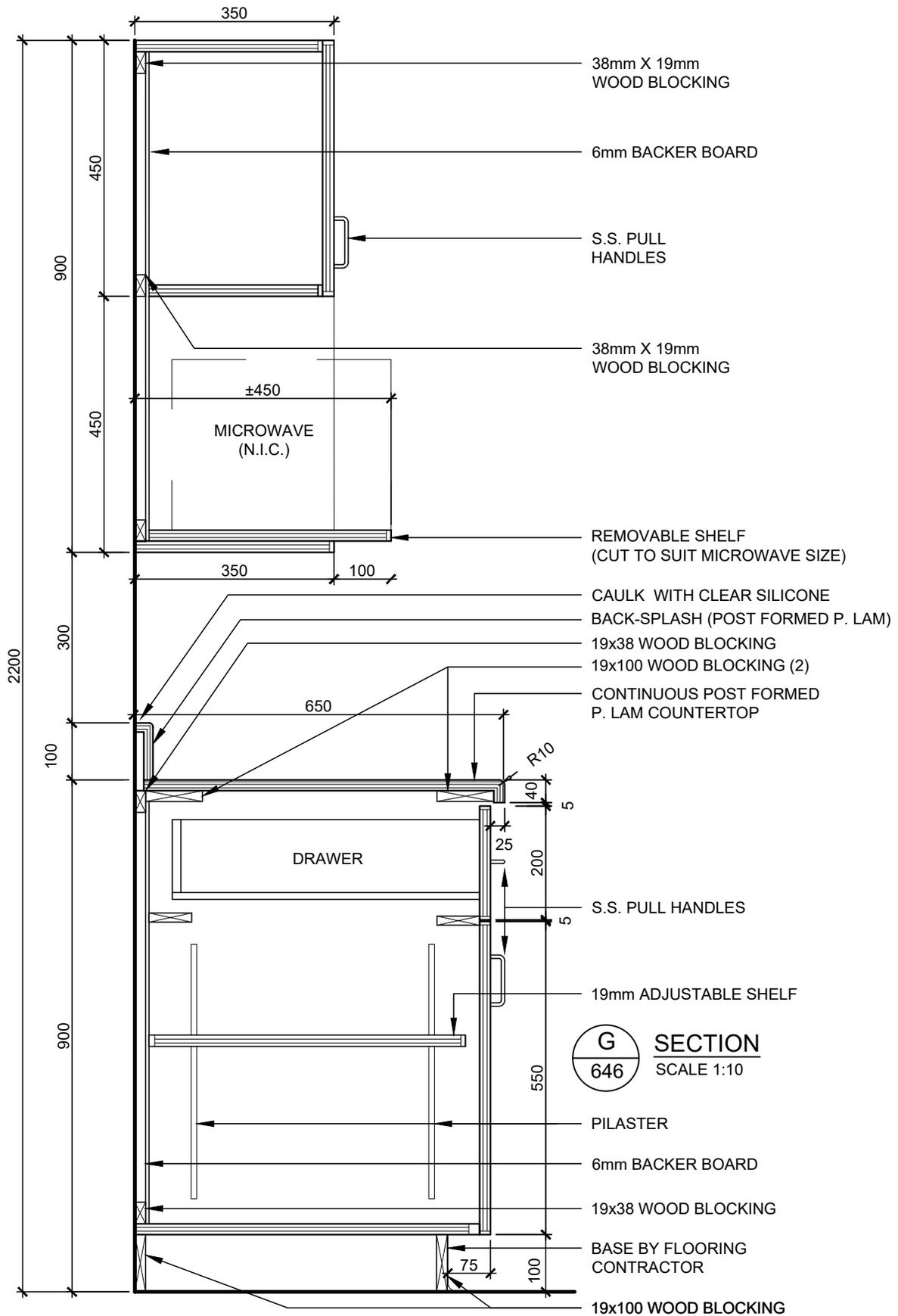
DRAWN: R.P.

DATE: 2026-02-02

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AD
645



NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM1 - TYPICAL SECTION
(REFERENCE: A2.10)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

PROJ: 2021-39

SCALE: AS NOTED

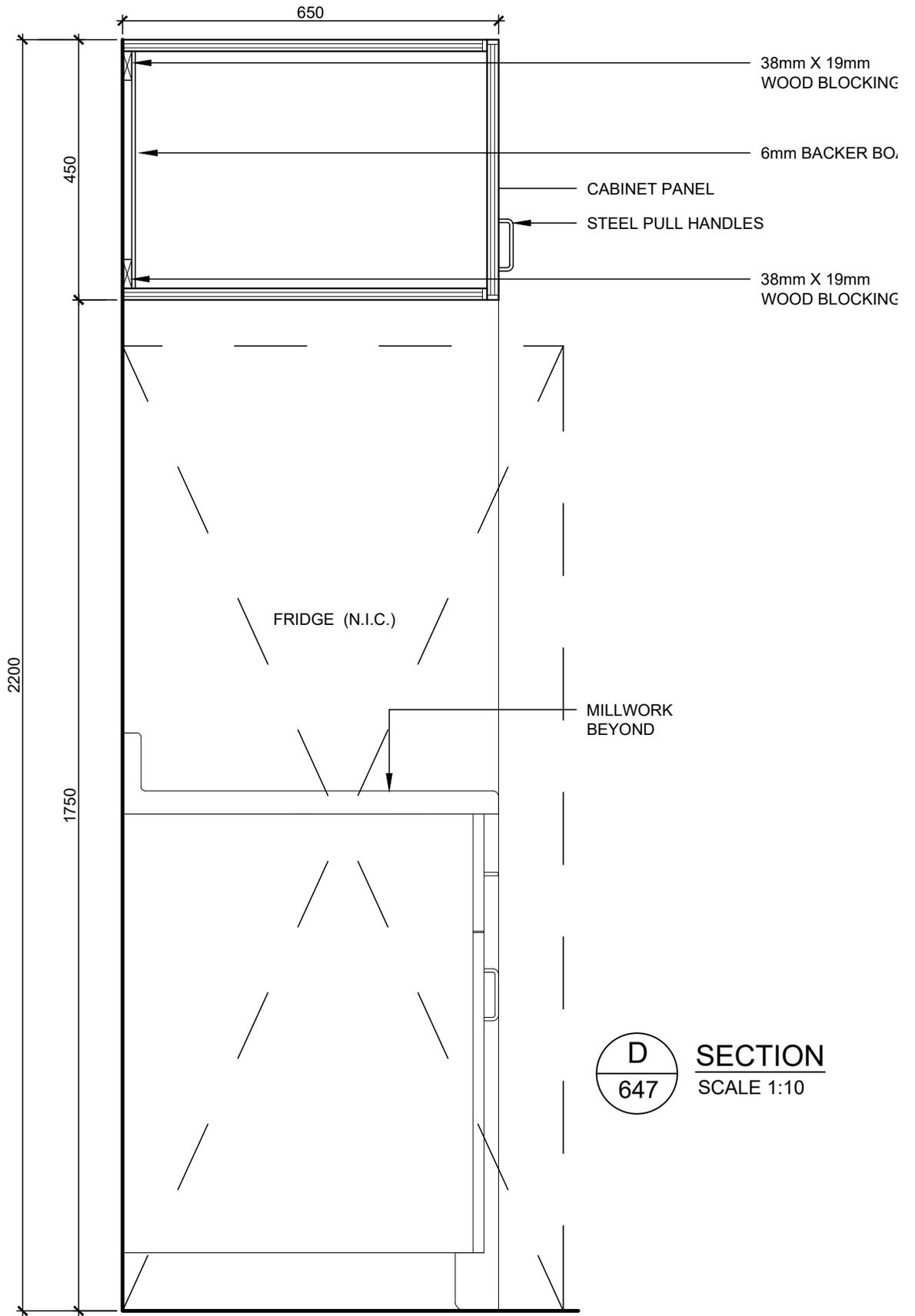
DRAWN: R.P.

DATE: 2026-02-02

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**AD
646**



NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
 615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM1 - TYPICAL SECTION
 (REFERENCE: A2.10)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
 REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

PROJ: 2021-39

SCALE: AS NOTED

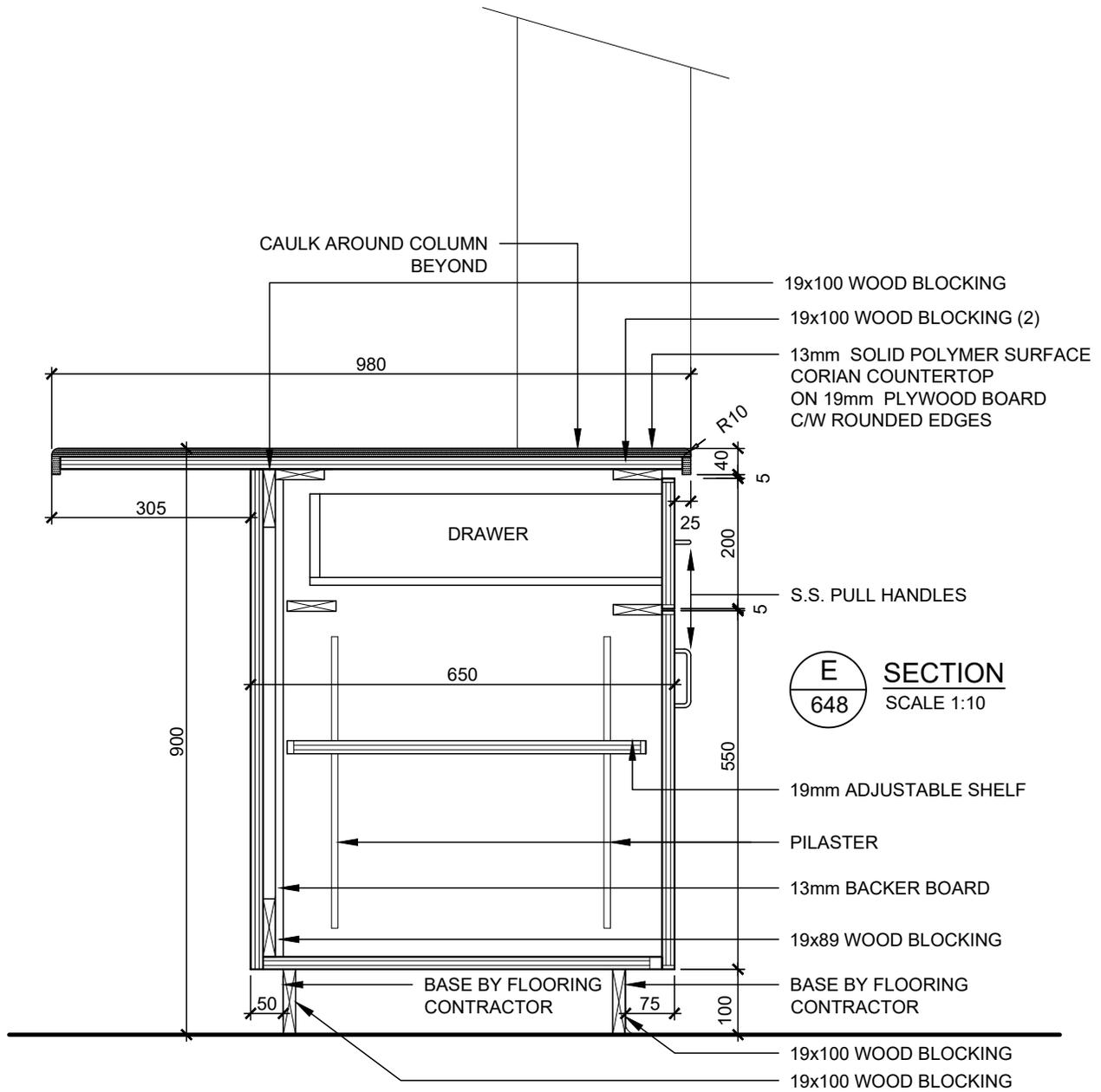
DRAWN: R.P.

DATE: 2026-02-02

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 647**



NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE MM1 - TYPICAL SECTION
(REFERENCE: A2.10)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

PROJ: 2021-39

SCALE: AS NOTED

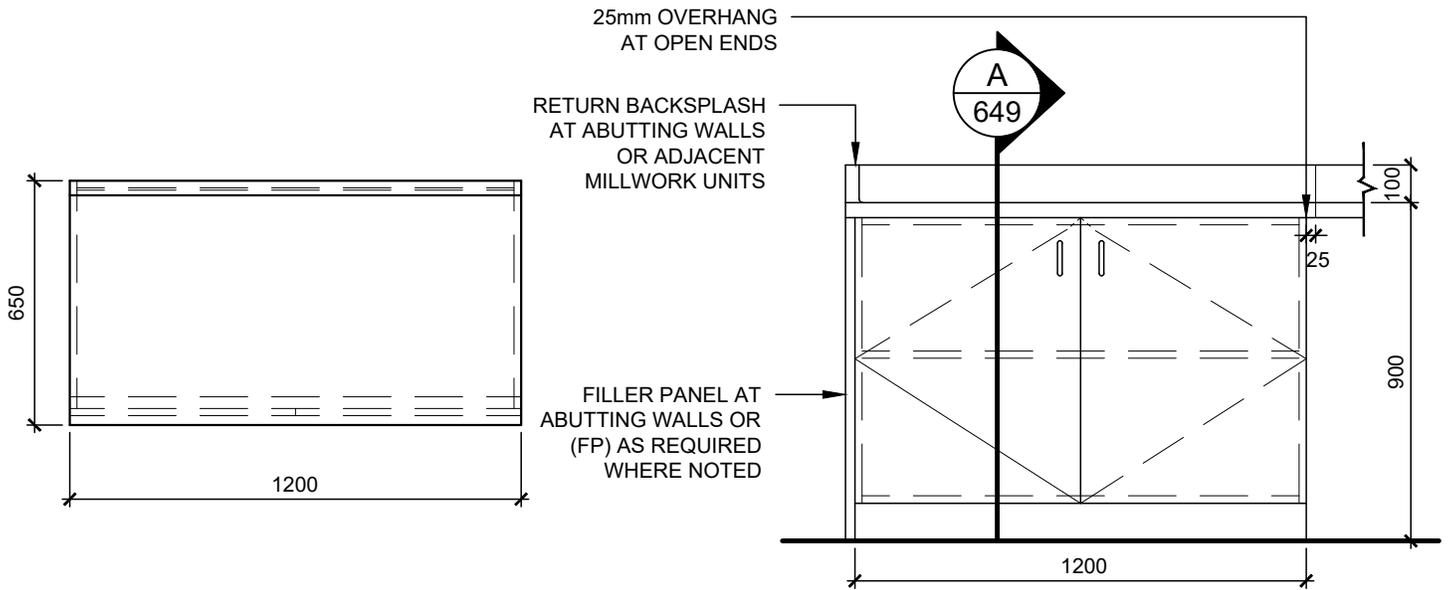
DRAWN: R.P.

DATE: 2026-02-02

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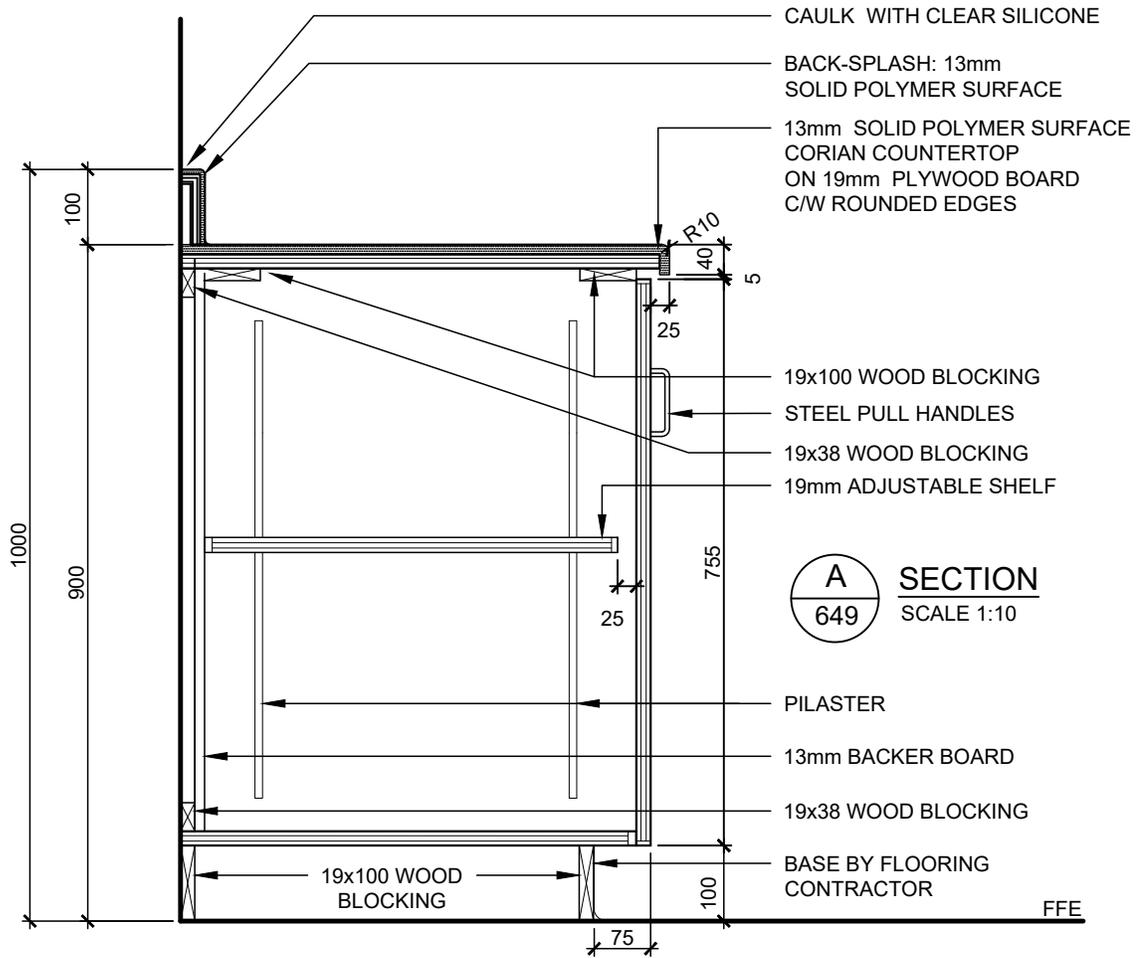
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PLAN VIEW
SCALE 1:20

ELEVATION
SCALE 1:20



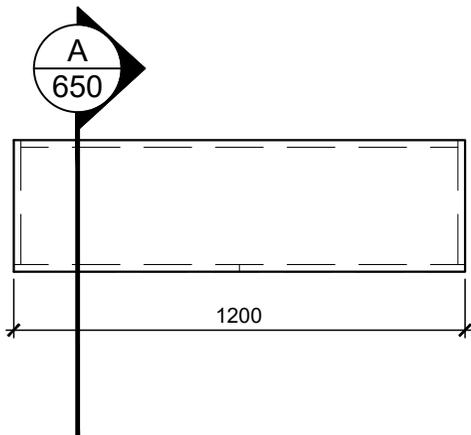
A SECTION
649 SCALE 1:10

NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE B1 - BASE CABINET
(REFERENCE: A2.10)
TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

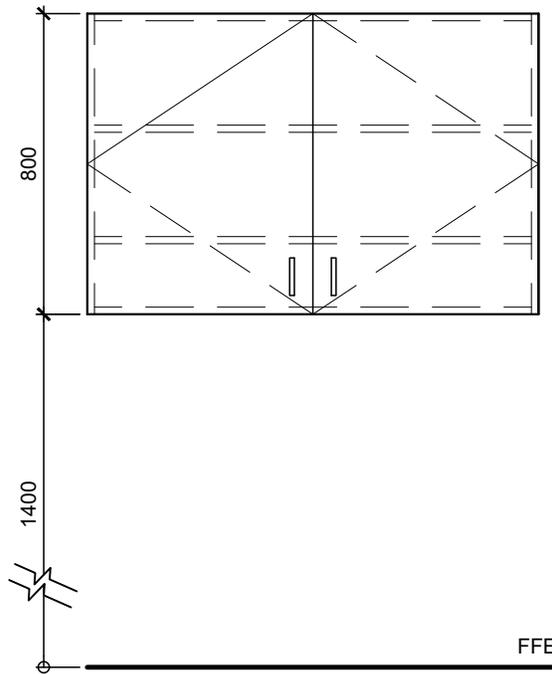
PROJ: 2021-39
SCALE: AS NOTED
DRAWN: R.P.
DATE: 2026-02-02

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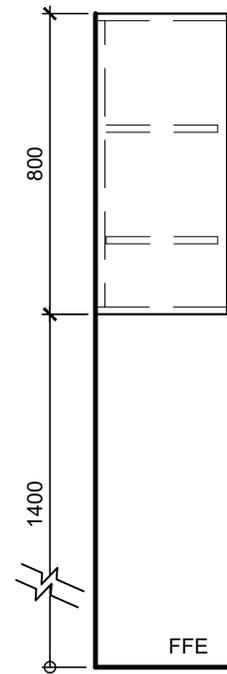
AD 649



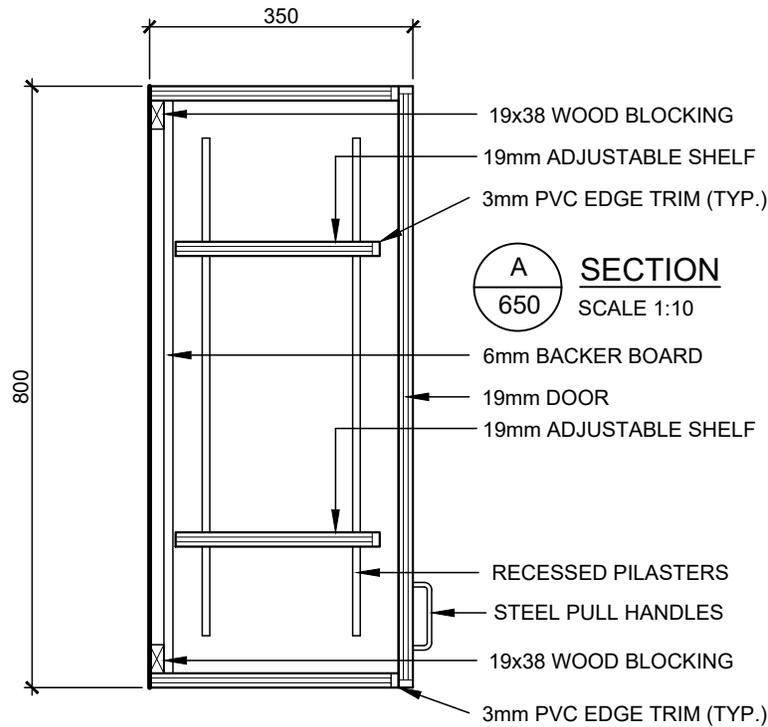
PLAN
SCALE 1:20



ELEVATION
SCALE 1:20



SIDE ELEVATION
SCALE 1:20



A SECTION
SCALE 1:10

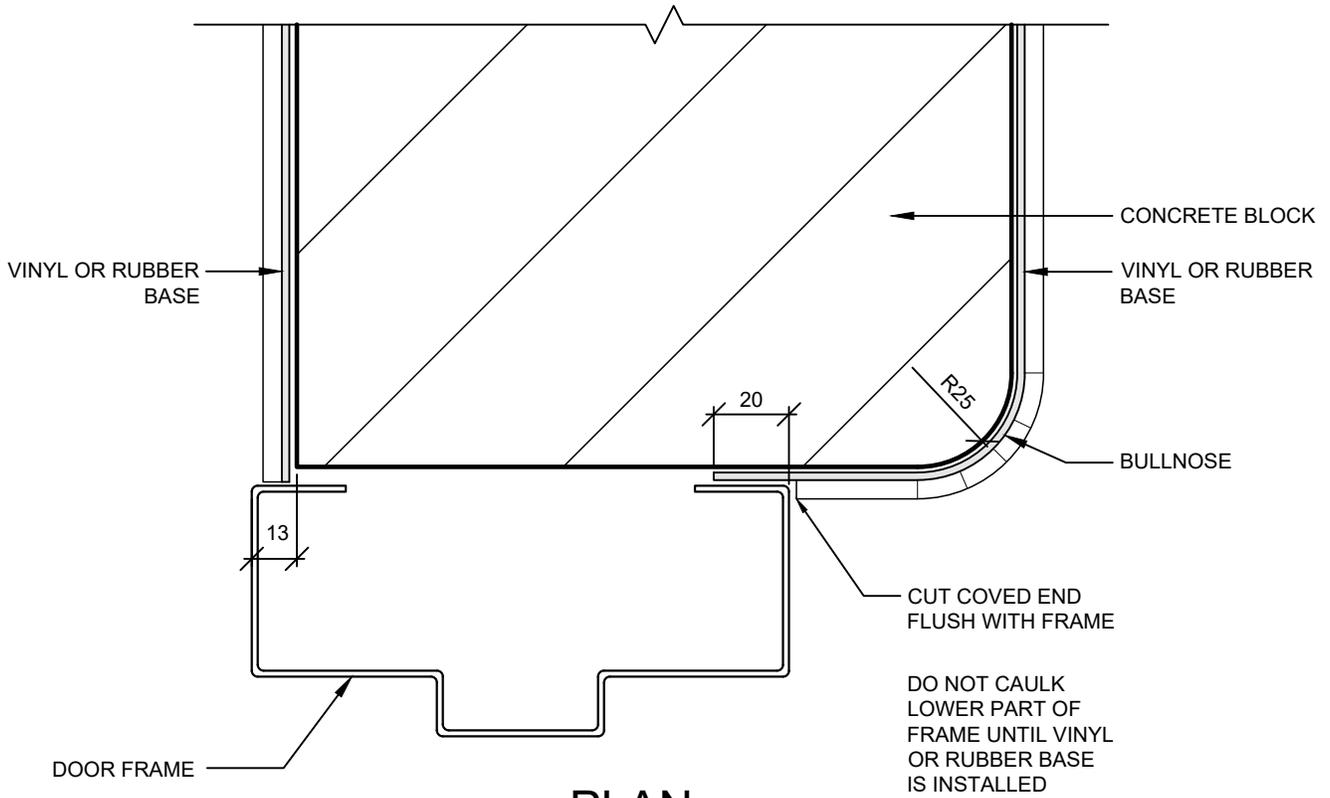
NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON
MILLWORK TYPE U1 - UPPER CABINET
(REFERENCE: A2.10)

TYPICAL NOTE: MILLWORK IS 19mm CONSTRUCTION UNLESS OTHERWISE NOTED.
REFER TO SPECIFICATIONS FOR MATERIAL TYPES & FINISHES

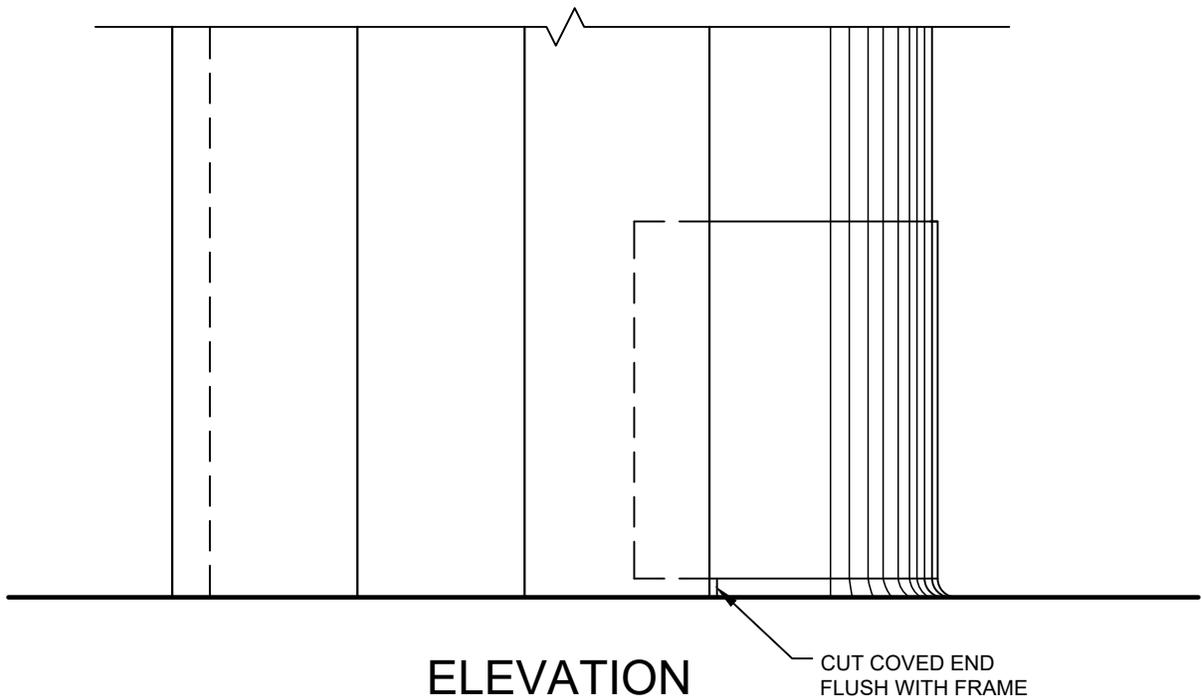
PROJ: 2021-39
SCALE: AS NOTED
DRAWN: R.P.
DATE: 2026-02-02

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AD 650



PLAN



ELEVATION

NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON

**VINYL / RUBBER BASE
DETAIL**

PROJ: 2021-39

SCALE: AS NOTED

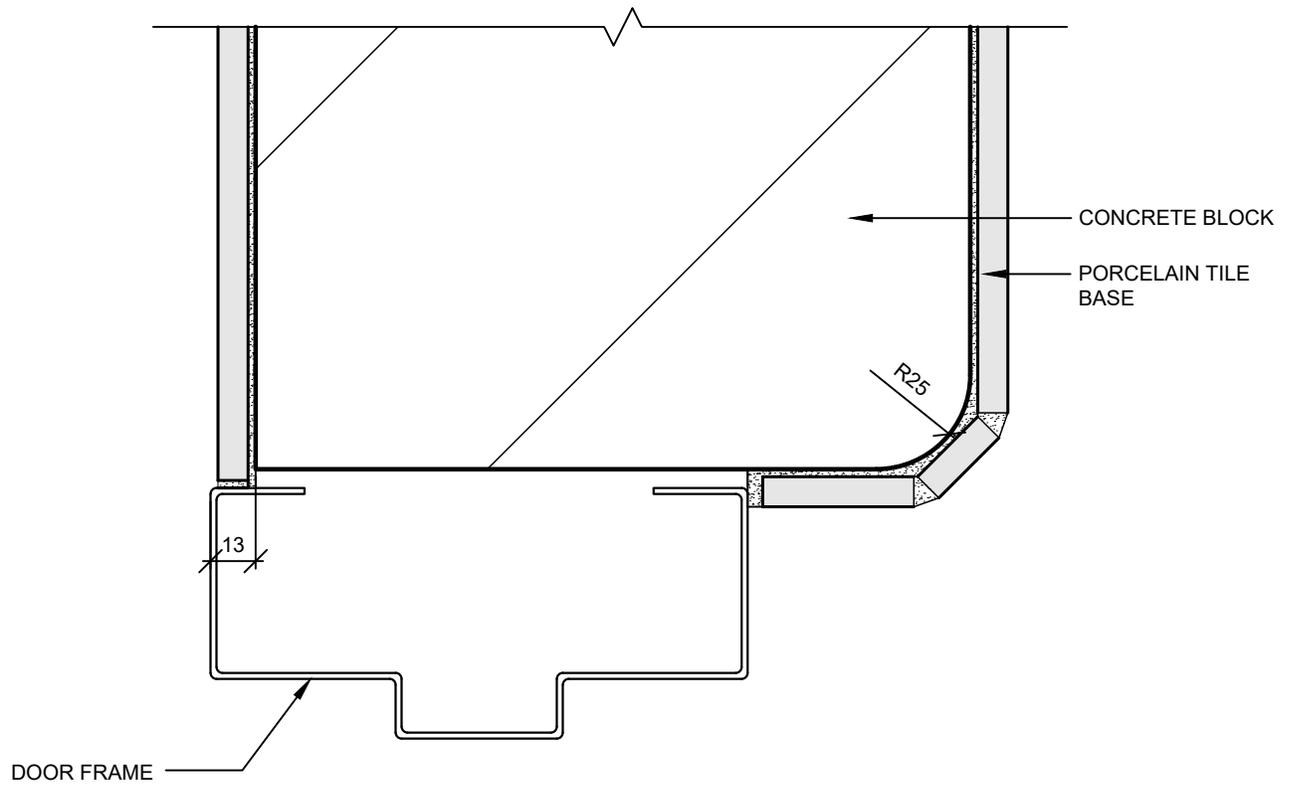
DRAWN: R.P.

DATE: 2026-02-02

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900**



PLAN

TYPICAL DETAIL AT
BULLNOSE BLOCK

NEW CULTURAL CLUB 'CROATIAN NATIONAL HOME'
615 BARTON STREET, STONEY CREEK, ON

**PORCELAIN TILE BASE
DETAIL**

PROJ: 2021-39

SCALE: AS NOTED

DRAWN: R.P.

DATE: 2026-02-02

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