



HURON PARK COMFORT STATION

CITY OF MISSISSAUGA

SPEFICATIONS – VOLUME 1

ISSUED FOR TENDER

October 9, 2025

PROCUREMENT NO. **PRC005197**

PROJECT# 24-053

Cellucci+Pace
ARCHITECTURE | PLANNING | PROJECT MANAGEMENT

PROJECT MANUAL

PROJECT:

**HURON PARK
COMFORT STATION
830 PAISLEY BOULEVARD WEST
MISSISSAUGA, ONTARIO L5C 3P5**

OWNER:

**THE CORPORATION OF
THE CITY OF MISSISSAUGA**

CONSULTANT:

**CELLUCCI+PACE
510 ROWNTREE DAIRY RD. UNIT 3C
WOODBIDGE, ONTARIO L4L 8H2**

TEL: 416-855-2260

CONSULTANT'S PROJECT NO:

24-053

DATE:

JANUARY 15, 2025

SECTION 00 01 03 - PROJECT DIRECTORY

1.1 OWNER

The Corporation of the City of Mississauga

1.2 CONSULTANT

Cellucci + Pace Inc.
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Woodbridge, ON L4L 8H2
Tel: 416-855-2260

1.3 STRUCTURAL

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Toronto, ON M2J 5A9
Tel: 416-635-9970

1.4 MECHANICAL

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707 Kipling Ave.
Etobicoke, ON M8Z 5G4
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1.5 ELECTRICAL

JLK Engineering
26 Cobblestone Court
Brampton, ON L6R 2S1
Tel: 416-455-5254

1.6 CIVIL

BaseTech Consulting Inc.
309 Roywood Crescent
Newmarket, ON L3Y 1A6
Tel: 905-251-7720

1.7 LANDSCAPING

Henry Kortekaas & Associates Inc.
230 Westney Road Suite 308
Ajax, ON L1S 7P9
Tel: 905-839-5599

1.8 ENVIRONMENTAL

Pinchin Environmental
2470 Milltower Court
Mississauga, ON L5N 7W2
Tel: 905-363-0678

1.9 SOILS

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Toronto, ON M9W 6X9
Tel: 416-798-3500

PROJECT NO. 24-053

30/01/2025

WESPEC

**COMFORT STATION AT
HURON PARK, MISSISSAUGA, ONTARIO
00 01 03-1**

SECTION 00 01 03 - PROJECT DIRECTORY

1.10 DOOR HARDWARE

ABDP Consulting Ltd.
1910 Port Davidson Road
Smithville, ON L0R 2A0
Tel: 1-905-327-1374

END

CATEGORY	SEAL & SIGNATURE
ARCHITECTURAL This seal governs all Documents and Sections of these Specifications except for Section 00 31 00 – Existing Conditions,, and all Sections/Divisions listed below.	
STRUCTURAL This seal governs: Section 03 30 00 – Structural Cast-in-Place Concrete Section 05 12 23 – Structural Steel Framing Section 05 31 23 – Structural Roof Decking	
LANDSCAPING This seal governs: Section 03 33 11 – Concrete for Landscaping Section 32 14 23 – Asphalt and Paving Section 32 90 00 – Planting Section 32 92 23 – Sodding and Topsoil	
CIVIL This seal governs: Section 31 10 00 – Site Clearing and Removals Section 31 23 00 – Excavation, Filling, Grading Section 32 13 13 – Concrete Curbs and Paving Section 33 90 00 – Site Services	

END

SECTION 00 01 10 SPECIFICATIONS TABLE OF CONTENTS

VOLUME 1

00 00 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

Section 00 01 03	Project Directory
00 01 07	Seals
00 01 10	Specifications Table of Contents
00 31 00	Existing Conditions

01 00 00 GENERAL REQUIREMENTS

Section 01 19 00	General Requirements
01 21 00	Allowances
01 31 00	Project Coordination
01 32 00	Project Progress Documentation
01 33 00	Submittals
01 35 00	Special Project Requirements
01 41 00	Regulatory Requirements
01 42 00	Abbreviations
01 45 00	Quality Control
01 50 00	Temporary Facilities
01 60 00	Product Requirements
01 70 00	Execution Requirements
01 74 00	Cleaning
01 77 00	Project Closeout

03 00 00 CONCRETE

Section 03 30 00	Structural Cast-in-place Concrete
03 33 11	Concrete for Landscaping

04 00 00 MASONRY

Section 04 05 13	Mortar
04 20 00	Masonry

05 00 00 METALS

Section 05 12 23	Structural Steel Framing
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06 00 00 WOOD, PLASTICS AND COMPOSITES

Section 06 10 00	Rough Carpentry
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07 00 00 THERMAL AND MOISTURE PROTECTION

Section 07 11 13	Bituminous Dampproofing
07 19 00	Water Repellent Sealer
07 21 13	Rigid Board Insulation
07 21 16	Blanket Insulation
07 21 19	Sprayed Foam Insulation
07 26 16	Underslab Vapour Retarder
07 27 00	Air Barrier
07 42 26	Aluminum Composite Panel Cladding
07 46 19	Steel Cladding
07 61 13	Metal Roofing System
07 92 00	Sealants

08 00 00 OPENINGS

Section 08 11 13	Steel Doors and Frames
08 71 00	Door Hardware

PROJECT NO. 24-053

06/10/2025

WESPEC

**COMFORT STATION AT
HURON PARK, MISSISSAUGA, ONTARIO
00 01 10-1**

SECTION 00 01 10 SPECIFICATIONS TABLE OF CONTENTS

	Hardware Group No. 01
	Hardware Group No. 02
	Hardware Group No. 03
08 80 00	Glass and Glazing
08 91 00	Metal Louvres

09 00 00 FINISHES

Section 09 67 29	Epoxy Flooring
09 91 00	Painting
09 96 56	Epoxy Wall Coating

10 00 00 SPECIALTIES

Section 10 21 19	Solid Phenolic Partitions
10 28 00	Washroom Accessories

20 00 00 MECHANICAL COMMON WORK RESULTS (Information on Drawings)

23 00 00 HEATING, VENTILATING AND AIR CONDITIONING (HVAC) (Information on Drawings)

26 00 00 ELECTRICAL (Information on Drawings)

31 00 00 EARTHWORK

Section 31 10 00	Site Clearing and Removals
31 23 00	Excavation, Filling, Grading

32 00 00 EXTERIOR IMPROVEMENTS

Section 32 13 13	Concrete Curbs and Paving
32 14 23	Asphalt Paving
32 90 00	Planting
32 92 23	Sodding and Topsoil

33 00 00 UTILITIES

Section 33 90 00	Site Services
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REPORTS

Geotechnical Report
Soil Chemical Test Report

END

1.1 GEOTECHNICAL CONDITIONS

- .1 A soil investigation has been carried out by Forward Engineering and Associates Inc. who have issued the following reports included with these specifications:
 - .1 "Report Geotechnical Investigation Proposed Comfort Station Building Replacement at Huron Park, 830 Paisley Boulevard West, Mississauga, Ontario", Ref. No. G7408A, dated September 18, 2025.
 - .2 "Soil Chemical Testing Report Comfort Station, Huron Park, Mississauga, Ontario", dated September 15, 2025, Ref. No. 7408A.
- .2 Report is hereby offered in good faith for general information and guidance. Owner and Consultant assume no responsibility for accuracy and completeness of reports.
- .3 Contractor shall not be entitled to extra payment and/or performance time for work which is required and which is reasonably inferable in reports as being necessary.
- .4 In case of discrepancies between recommendations contained in reports and requirements of Contract Documents, the latter shall govern. Advise Consultant in writing of any discrepancies discovered.
- .5 During excavation of soil at the Project Areas should any visual or olfactory observations be made that may suggest that the soil being excavated may be impacted the following should be completed:
 - Soil excavation in the Project Area must cease upon the observation being made until the City/project leader directs that soil excavation may resume;
 - The City/project leader must be notified immediately by the contractor that impacted soil may have been encountered during construction activities;
 - The City/project leader should ensure that potentially impacted soil is segregated from other excavated soil in the project area, the limits of the project area that may be impacted is determined and any excess soil from the portion of the project area that is potentially impacted is disposed of in accordance with O.Reg. 406/19.
 - The City/project leader will retain a Qualified Person under O.Reg. 153/04 to assist with ensuring impacted soil is segregated from other excavated soil in the project area, the limits of the project area that may be impacted is determined and any excess soil from the portion of the project area that is potentially impacted is disposed of in accordance with O.Reg. 406/19.

END

FORWARD ENGINEERING
& ASSOCIATES INC.

Geotechnical, Environmental, Inspection & Material Testing Services
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9, Tel: (416)798-3500, Fax:(416)798-8481

REPORT
GEOTECHNICAL INVESTIGATION

PROPOSED
NEW COMFORT STATION BUILDING
HURON PARK

830 PAISLEY BOULEVARD WEST
MISSISSAUGA, ONTARIO

PREPARED FOR:
CITY OF MISSISSAUGA

c/o

CELLUCCI+PACE
3C-510 Rowntree Dairy Road
Woodbridge, Ontario
L4L 8H2

September 18, 2025
Ref. No. G7408A

Distribution: 1 PDF Copy– CELLUCCI+PACE
1 PDF Copy–FORWARD ENGINEERING & ASSOCIATES INC.

List of Contents

INTRODUCTION	1
PURPOSE AND SCOPE	1
PROPOSED DEVELOPMENT	2
FIELD AND LABORATORY TESTING	2
Field Works:	2
Laboratory Testing:	3
SITE CONDITIONS	3
Surface Conditions	3
Subsurface Conditions	4
GEOTECHNICAL DISCUSSION AND RECOMMENDATIONS	7
Foundations	7
Foundation Notes:	8
Earthquake Considerations	8
Underground Walls	8
Excavation and Backfill	9
Slab Construction and Permanent Drainage	9
Underground Utilities and Manholes/Catch Basins	10
Pavement Design	11
General Comments	12

LIST OF ENCLOSURES:

BOREHOLE LOCATION PLAN – DRAWING NO. 1

PERMENANT PERIMETER DRAINAGE – DRAWING NO. 2

LOG OF BOREHOLE SHEET (BH-101 to BH-108) – APPENDIX A

INTRODUCTION

This report presents the results of the geotechnical investigation carried out by Forward Engineering & Associates Inc. for the proposed new Comfort Station Building at Huron Park, which is located at 830 Paisley Boulevard West, Mississauga, Ontario.

The location of the proposed new comfort station in relation to the existing recreation centre building and the common Site features including adjacent walkway and soccer fields as shown on Drawing No. 1. The approximate location of the boreholes conducted during this investigation is also presented on Drawing No. 1.

This investigation was authorized by CELLUCCI+PACE, on behalf of the City of Mississauga.

PURPOSE AND SCOPE

The objectives (purpose) of this investigation were to determine the following:

- The extent, depth and properties of the predominant fill/soil strata as they affect the design and construction of the proposed new comfort station.
- The short-term groundwater levels, if encountered.
- The appropriate geotechnical design criteria for the new comfort station building foundations, excavations, backfill, slab construction, permanent drainage, underground services and pavement.

To achieve the above noted objectives, the field program of this investigation consisted of eight [8] boreholes drilled to a depth ranging from about 1.73 to 3.33 m below the **Existing Ground Surface Level (EGSL)**.

On completion of the field and laboratory work, an engineering analysis was carried out and this summary report was prepared.

PROPOSED DEVELOPMENT

We understand that the proposed development will be consisting of the construction of a new Comfort Station building, with no basement, to be located north and east of the existing building facility recreational centre .

It is also proposed to construct the required underground sanitary sewer services for the proposed new comfort station building, and to connect these new lines to the recreational centre facility existing lines,

FIELD AND LABORATORY TESTING

Field Works:

The field work for the investigation consisted of eight [8] boreholes (BH-101 to BH-108) drilled on August 28, 2025, under the supervision of a member of our staff.

Boreholes BH-101 to BH-103, drilled in the area of proposed new comfort station, were located north and east of the existing building facility somewhat in the middle of the overall park. This area is located between the existing natural grass soccer field and artificial turf soccer field.

The remainder of the boreholes were located around the existing recreational centre facility building, along the proposed new underground sanitary/sewer lines, as shown on Drawing No. 1.

The boreholes extended to a depth ranging from about 1.73 to 3.33 m below the EGSL. Some of the boreholes were relocated in the field from originally intended location due to existing underground utility services.

Soils in the boreholes were sampled following the Standard Penetration Test (SPT) method using a CME-55 track mounted Auger Drill Rig using Rotary Drilling, with Split Spoon Samplers.

The samples were logged in the field and appropriately stored in plastic bags and re-examined in more detail in the laboratory. The samples will be stored for a period of three months and then discarded, unless we are instructed differently.

Groundwater observations were made in the open boreholes, during and upon completion of drilling. The results are recorded on the Log of Borehole sheet.

Elevations referred to in this report are metric and geodetic. The ground level elevations at the borehole locations were interpolated from the *Site Servicing Drawing & Phasing Plan*, by Base Tech Consulting Inc, dated October 2024, and provided to us by the Client.

Laboratory Testing:

Laboratory testing consisted of determination of the in-situ moisture content of the retrieved and representative soil samples.

SITE CONDITIONS

Surface Conditions

Huron Park is located at 830 Paisley Boulevard West, Mississauga, Ontario.

For this description it will be assumed that the north bearing is parallel to the nearest arterial, which is Mavis Road.

The *subject site* (the area of the proposed new comfort station), where BH-101 to BH-103 were drilled, is located somewhat in the middle of the overall park in between existing grass soccer field and artificial turf soccer field.

The *subject site* is dissected by a tall chain-link metal fence and consists of grass surface.

A north-south direction ditch/swale is located just to the west of the *subject site*. The topography of this area gently slopes down from east to west, towards the existing ditch.

The remainder of the site, where boreholes BH-104 to BH-108 were drilled, encompasses a larger area of the park of flat and hilly landscaping and asphalt surface (walkways and parking spaces) located around the existing facility building.

At the time of our investigation, evidence of recent alterations to the general landscape were observed including recently paved walkways, parking lot and light poles.

Subsurface Conditions

The subsurface condition encountered at the borehole location is shown on the Log of Borehole sheet, presented in Appendix A, and can be summarized as follows:

Topsoil/Organic Soil	<p>Topsoil/organic soil layer was encountered at the surface of all the boreholes, except BH-106 and BH-108, with thicknesses ranging from about 150 and 200 mm.</p> <p><i>It shall be noted that the measurements of this layer are not considered accurate to be used for estimate purposes.</i></p>
Pavement	<p>Pavement consisting of about 100 mm of asphalt and about 390 mm of crushed granular base was encountered at the surface of BH-108.</p>
Fill/Disturbed Soil	<p>A layer of fill/disturbed soil was encountered at the surface or below the topsoil and pavement layers in all the boreholes, except BH-107 and BH-108, and extended to a depth ranging from about 0.46 m to 2.29 m below the EGSL.</p> <p>This layer consisted of dark brown and grey clayey silt with traces of organics in the upper zone. This layer was observed in moist condition and in loose to compact state of packing.</p> <p><i>For more accurate description of this layer, and for a more accurate depth, test pits are required.</i></p>
Clayey Silt Till	<p>Native stratum of Brown and olive grey Clayey Silt Till was encountered below the topsoil and fill/disturbed soil layers in all the boreholes, except for boreholes BH-106 and BH-108, and extended to a depth ranging from about 0.76 to 3.05 m below EGSL.</p> <p>This till was found in moist state and in stiff to hard consistency.</p>

Shale Till	<p>Olive grey Shale Till was encountered below the pavement, fill/disturbed soil, and clayey silt till layers in boreholes BH-103 to BH-108 and extended to a depth ranging from about 1.52 to 3.05 m below EGSL.</p> <p>This till was found in moist state and in stiff to hard consistency.</p>
Highly Weathered Shale	<p>Highly weathered shale was encountered below the clayey silt till and shale till strata in all the boreholes and extended to the maximum explored depth of this investigation.</p> <p>This hard shale was observed in mainly moist state but occasionally was observed to be wet. Some of the boreholes encountered limestone interbedded within the weathered shale.</p>
Groundwater	<p>Groundwater level observations were made during and upon the completion of the drilling investigation. The results are summarized in the following <i>Table 2</i>, as shown:</p>

Table 1: Groundwater & Cave-in Observations Upon Completion of Drilling

Borehole No.	Borehole Depth (m)	Cave-in Depth Below EGSL (m)	Groundwater Depth Below EGSL (m)
BH-101	3.07	Open	Dry
BH-102	2.33	Open	Dry
BH-103	2.34	Open	Dry
BH-104	3.33	Open	Dry

BH-105	2.72	Open	Dry
BH-106	2.72	Open	2.1
BH-107	2.56	Open	Dry
BH-108	1.73	Open	Dry

It shall be noted, however, that the groundwater levels are subject to seasonal fluctuations. Consequently, definitive information on the long-term groundwater levels could not be obtained at the present time.

GEOTECHNICAL DISCUSSION AND RECOMMENDATIONS

Foundations

We understand that the proposed development will be consisting of the construction of a new Comfort Station building, with no basement, to be located north and east of the existing building facility recreational centre.

The Finished Floor Elevation (FFE) is expected to be 116.80 m. The design loads are not known at this stage.

Based on the information obtained at the borehole locations, the proposed new comfort station building structure can be supported on the conventional strip/spread footings, established below the fill/disturbed soil layer, within the native undisturbed, competent founding soils, i.e., at or below the depths and elevations outlined in Table 3, shown below.

The size of the strip/spread footings can be proportioned to the following bearing resistances.

Factored Bearing Resistance at Ultimate Limit State (ULS) = 300 kPa

Bearing Resistance at Serviceability Limit State (SLS) = 200 kPa

Table 3 - Foundation Depth and Elevation (at or below) for Strip/Spread Footing

Borehole No.	BH Ground Surface Elevation (m)	Founding Depth Below EGSL (m) (at/or Below)	Founding Elevation (m) (at/or Below)
BH-101	116.50	2.30	114.20
BH-102	116.25	1.50	114.75
BH-103	115.75	0.75	115.00

Foundation Notes:

Adjacent footings, founded at different elevations, shall be stepped at 10 horizontal to 7 vertical.

For frost protection requirements, all exterior footings must have a minimum soil cover of 1.2 m.

Under no circumstances shall the footings be constructed over loose, soft or frozen subgrade soil or within ponded water. During winter construction, the footings must be adequately protected against the effects of frost.

Concrete shall be placed without delay after excavation to avoid softening of the subgrade surface. Hand cleaning of footing bases shall be carried out as directed by the field inspector.

Total settlements of the proposed footings designed and constructed in accordance with the above recommended resistances at SLS shall be less than the tolerable limits of 25 mm. The differential settlements are expected to be less than 19 mm.

More specific information, with respect to founding conditions between the boreholes will become available when the proposed construction is underway. Therefore, the encountered founding conditions must be verified in the field, and all caissons must be inspected by this office before placement of concrete.

Earthquake Considerations

For structural design seismic consideration, the seismic provisions of the Ontario Building Code (*OBC 2024*) outline the classification of sites for Seismic Site Response in Table 4.1.8.4.-B of the National Building Code of Canada (NBC) 2020.

According to Table 4.1.8.4.-B of the NBC code, and this investigation findings, the subject site Class is selected as "C".

Underground Walls

Underground walls shall be designed to resist a pressure "p", at any depth, "h" below the surface, as given by the expression:

$$p = 0.45[\gamma h + q]$$

Where:

0.45 is the earth pressure coefficient considered applicable

$\gamma = 21.0 \text{ kN/m}^3$ is the unit weight of backfill

q = an allowance for surcharge

The above equation assumes that perimeter drains will be provided and that the backfill against the subsurface walls would be a free draining granular material.

Excavation and Backfill

No major problems shall be encountered for the anticipated depth of excavation. The excavation shall be back-sloped at 45 degrees or flatter in accordance with the current Ontario Occupational Health and Safety Act.

The anticipated water seepage, if any, into the excavations from the more permeable seams/lenses or surface run-off can be handled by conventional pumping methods.

The material to be used for backfilling under floor slab shall be suitable for compaction, i.e. free of organics and with natural moisture content, which is within 2 percent of the optimum moisture content and no pieces larger than 150 mm in size. The backfill material shall be compacted to at least 98 percent of the Standard Proctor Maximum Dry Density (SPMDD).

Selected on site excavated fill and native soils can be used as backfill under the floor slab or in-service trenches, provided the excavated materials are not allowed to become wet. However, the excavated materials will be very sensitive to moisture content, and the use of Granular B/C is preferred.

The backfill against the subsurface walls, and confined spaces, shall be free draining granular fill, preferably conforming to the Ontario Provincial Standard Specification for granular base course, Granular B.

Slab Construction and Permanent Drainage

Option 1: Removal of Fill/Disturbed Soils

The floor slabs for the new comfort station can be constructed following the standard slab-on-grade technique, provided that fill/disturbed soil are removed, and the base is thoroughly proof-rolled.

Any soft spots revealed during proof-rolling shall be sub-excavated, backfilled with suitable materials, and adequately compacted to at least 98 % of its Standard Proctor Maximum Dry Density (SPMDD). The final subgrade surface must be inspected and approved prior to placement of the granular base.

Option 2: Structural Slab

The slab can be constructed as a structural slab. In this case, the fill may remain under the structural slab, with consideration of void/air space, or a ventilation system, to deal with possible methane gas that could generate due the presence of organics in the existing fill/disturbed soils.

The floor slabs shall rest on a well compacted layer of “19 mm clear stone” at least 200 mm thick when compacted. The stone bed would act as a barrier and prevent capillary rise of moisture from the subgrade to the pit slab.

No perimeter drainage will be required, if the floor slab is at least 150 mm above the exterior grade, which slopes away from the building at an inclination of 1 to 2 percent, to prevent surface ponding of water close to exterior walls. If this condition cannot be complied with, then perimeter drainage as shown on Drawing No. 2 shall be provided.

Underground Utilities and Manholes/Catch Basins

The problem areas of pavement settlement largely occur adjacent to manholes, catch basins and service crossings. The on-site materials would generally be difficult to compact in these areas, and it is therefore recommended that a sand backfill be used in confined areas.

The upper 1.0 m of the trench backfill shall be compacted to 98 % SPMDD. Below this zone, a 95 % SPMDD compaction is considered acceptable.

The cover and bedding material for any buried utilities should consist of OPSS 1010 Granular Class ‘A’ or ‘B’ Type II, conforming to and in accordance with the relevant Ontario Provincial Standard Drawings series OPSD 802.033 for rigid pipe bedding and/or OPSD 802.010 for flexible pipe embedment. The minimum thickness of granular material bedding below the pipe invert should be 150 mm, and this bedding thickness may, however, have to be increased depending on the sewer diameter, wet or weak subgrade conditions are encountered.

If wet or saturated conditions exist within any utility excavation, consideration should be given to using 19 mm diameter crushed clear stone wrapped in a geotextile filter fabric as pipe bedding,

Fill/disturbed soils encountered below the pipes and/or manholes/catch basins are to be removed and replaced with granular material compacted to at least 98 % SPMDD.

Pavement Design

In the proposed pavement areas any vegetation, topsoil/organic soil and/or fill with noticeable amount of organics shall be removed, and the base shall be thoroughly proof-rolled.

Any soft spots revealed during proof-rolling shall be sub-excavated and backfilled with suitable materials, compacted to at least 98 % SPMDD.

The subgrade soil is frost susceptible. The design of pavement is therefore mainly influenced by the need to minimize the effects of freezing and thawing. Consequently, the ground must not be unnecessarily disturbed.

The subgrade shall be sloped to facilitate drainage towards catch basins and the final subgrade shall be compacted before pavement is constructed.

It shall be noted that the subgrade shall be dry and firm, not spongy, during compaction and during the construction of the [sub] base. Soft or spongy subgrade areas shall also be sub-excavated and properly replaced with suitable approved backfill compacted to 98 % SPMDD.

The subgrade will suffer strength regression if water is allowed to infiltrate into the mantle. Therefore, sub-drains shall be installed along the edge of all pavement areas to prevent surface water from infiltrating into the subgrade.

Within the parking lots, sub-drains radiating from the catch basins shall also be installed. These sub-drains shall be at least 3 m long in each direction and have inverts at least 0.75 m below the pavement surface.

All granular materials used in the construction of pavement shall be compacted to 98 % of Standard Proctor maximum dry density.

Based on the engineering properties of the subgrade soil, climatic conditions and the anticipated use of the pavement, typical flexible asphaltic pavement designs for this development are as shown in the following Table:

Table 4 - Typical Flexible Asphaltic Pavement Design

Pavement Components	Heavy Duty	Medium Duty	Light Duty
Asphaltic Concrete	40 mm HL3	40 mm HL3	50 mm HL3
	60 mm HL8	40 mm HL8	
19 mm Crushed Limestone	200 mm	150 mm	150 mm
Granular B Sub-base or 50 mm Crushed Limestone	300 mm	200 mm	200 mm

If the proposed pavements are to be constructed during wet seasons, the moisture content in the subgrade will probably be above the optimum, and this will render its shear strength inadequate to support paving equipment traffic. In this case, the granular sub/base shall consist of 50 mm Crusher-Run Limestone.

General Comments

This geotechnical report is provided on the basis of the terms of reference provided above, and on the assumption that the design will be in accordance with the applicable codes and standards.

If there is any change in the design features relevant to the geotechnical analyses, or if any questions arise regarding the geotechnical aspects of the codes and standards, this office shall be contacted to review the design.

The comments given in this report are intended only for the guidance of design engineers.

Contractors bidding on or undertaking the works shall, in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results.

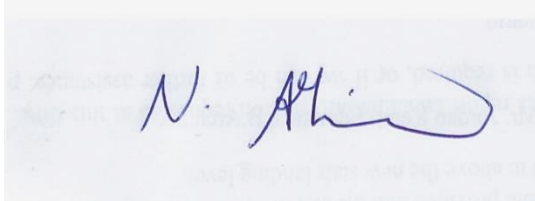
This concern specifically applies to the classification of the fill/organic/topsoil cover and the potential reuse of these soils on/off site.

The prospective contractors must draw their own conclusions as to how the near surface and subsurface conditions may affect them.

We trust this report contains information requested at this time. However, if any clarification is required, or if we can be of further assistance, please contact this office.

Yours truly,

Forward Engineering & Associates Inc.



Nasser Abdelghani, M.Sc., P.Eng.
Project Geotechnical Engineer



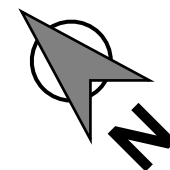
G. S. Semaan, M.Eng., P.Eng.
Principal

NOTES:

BH



= BOREHOLE LOCATION



DRAWING No. 1
BOREHOLE LOCATION PLAN

04	
03	
02	
01	
Rev.	DATE REVISION / ISSUE

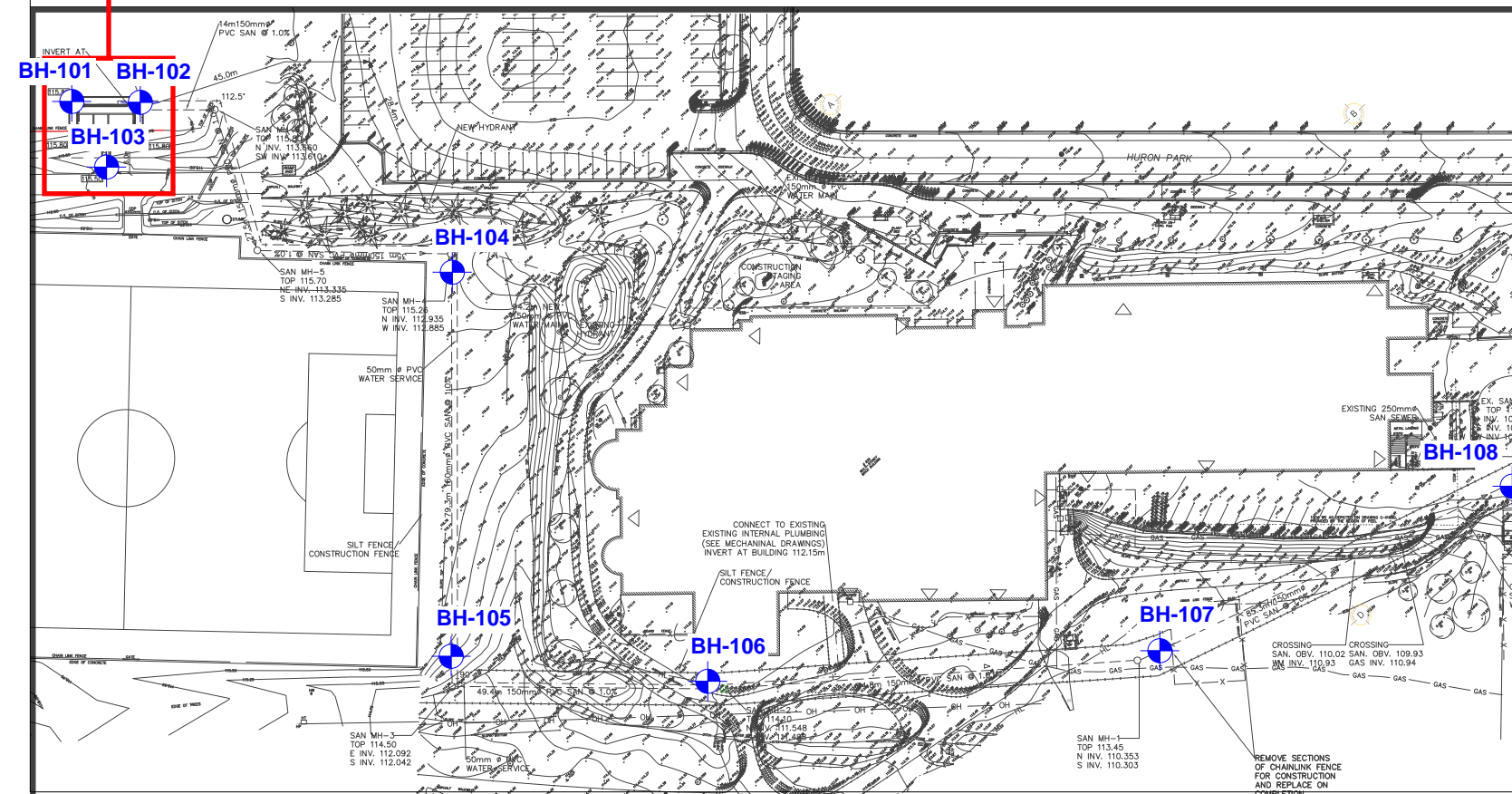
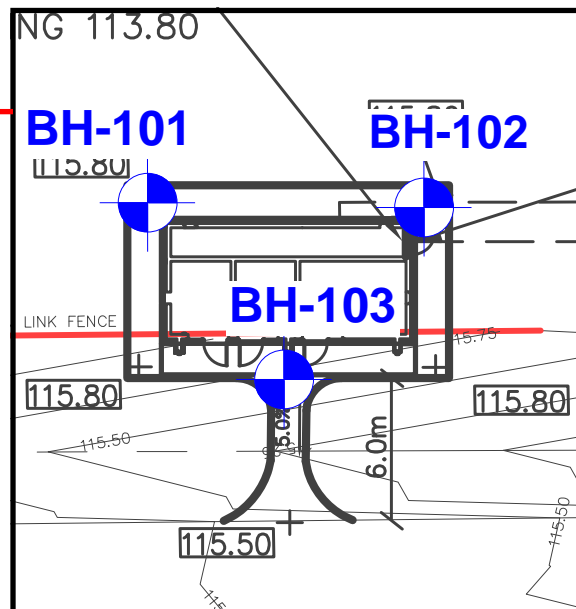
Project Name: PROPOSED NEW
COMFORT STATION BUILDING
Address: 830 PAISLEY BOULEVARD W.
MISSISSAUGA, ON.

PROJECT No.	:7408-A
DESIGN BY	:P.R.
DRAWING DATE	:SEPT. 4, 2025
DRAWN BY:	P.R.
CHECKED BY:	G.S.



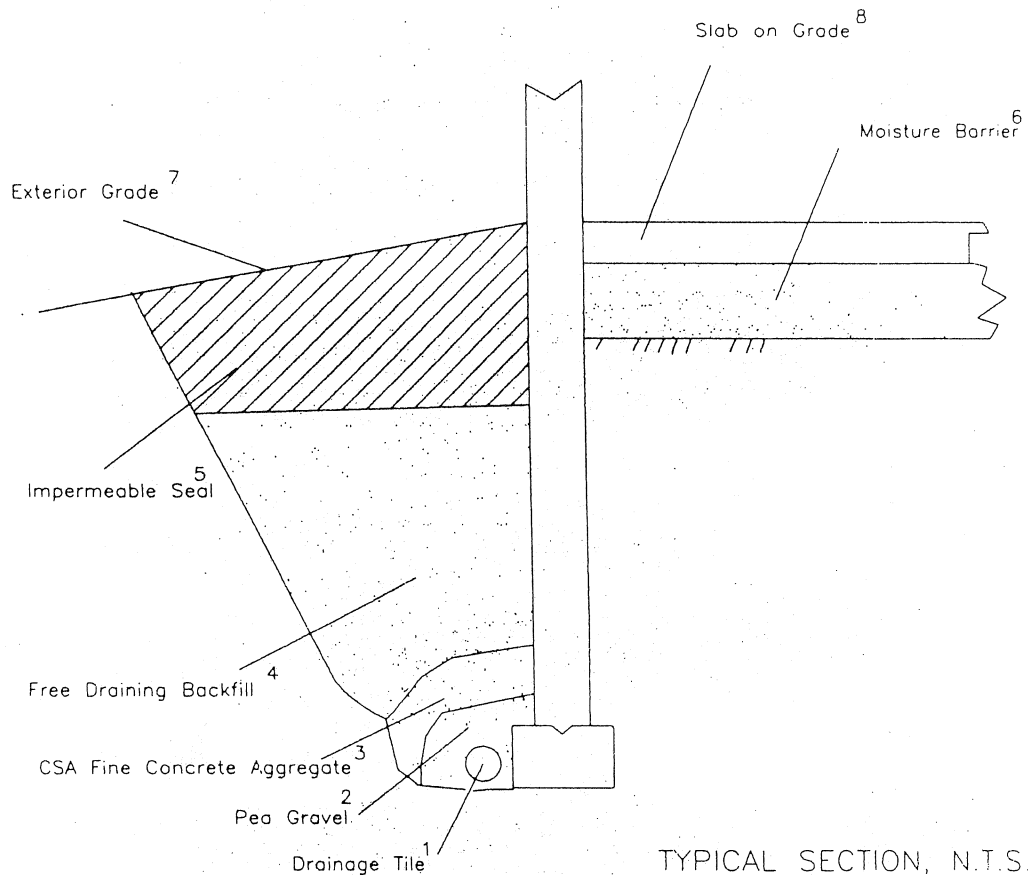
Forward Engineering & Associates Inc.
244 Brockport Drive, Unit 15
Toronto, Ontario M9W 6X9
Tel: 416-798-3500 Fax: 416-798-8481

www.forwardengineering.ca



DRAINAGE AND BACKFILL RECOMMENDATIONS

(Not to Scale)



NOTES:

1. Drainage tile to consist of 100 (4") diam. Weeping tile or equivalent perforated pipe leading to a positive sump or outlet. Invert to be minimum 150mm (6") below underside of floor slab.
2. Pea gravel 150mm (6") top and sides of drain. If drain is not on footing, 100 mm (4") of pea gravel below drain. Clear 20mm (3/4") crushed stone may be used provided it is covered by an approved porous membrane (TerraFix 270R or equivalent).
3. C.S.A. Fine aggregate to act as filter material. Minimum 300 mm (12") top and sides of tile drain. This may be replaced by an approved porous plastic membrane as indicated in 2.
4. Free draining backfill - Class B pit-run gravel or equivalent compacted to 93 - 95 % Standard Proctor Maximum Dry Density (SPMDD).
5. Impermeable backfill seal compacted clay, day silt or equivalent. If original soil is free draining seal may be omitted.
6. Moisture barrier to consist of 20mm (3/4") compacted crushed stone. Layer to be 200mm (8") thick.
7. Exterior grade to slope away from wall.
8. Slab on grade should not be structurally connected to wall footing.
9. If the 20mm (3/4") stone requires surface blinding, use 6mm (1/4") stone chips.

APPENDIX A

**BOREHOLE LOG SHEETS
(101 – 108)**

Project No: 7408-A

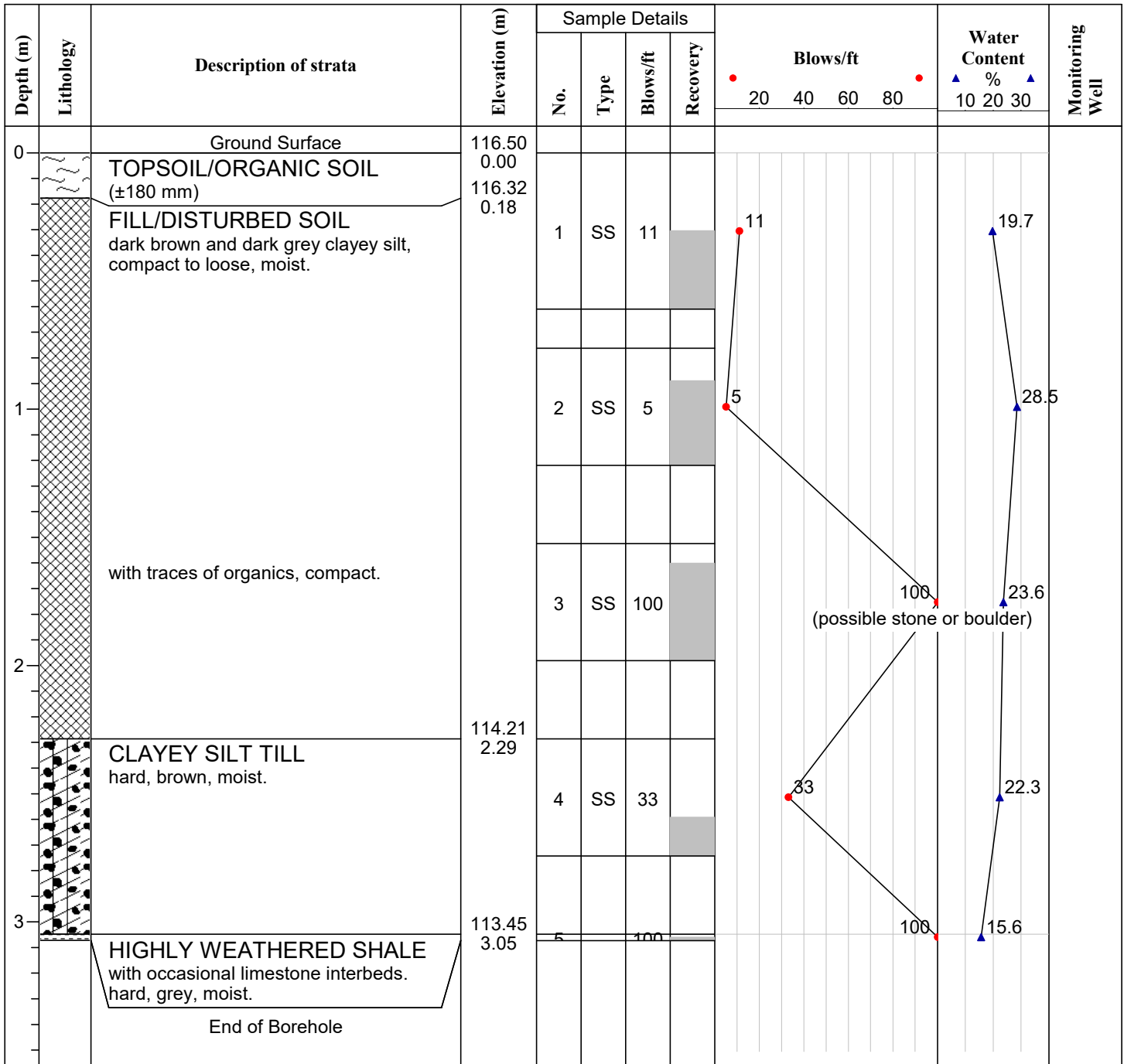
Log of Borehole BH-101

Project: PROPOSED NEW COMFORT STATION BUILDING

Client: CELLUCCI+PACE

Enclosure: 2

Location: HURON PARK, 830 PAISLEY BOULEVARD WEST, MISSISSAUGA

**Remarks:** Upon completion of drilling, the borehole was open and dry.

Drill Method: CME-55

Drill Date: 28 AUGUST 2025

Datum: GEODETIC

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7408-A

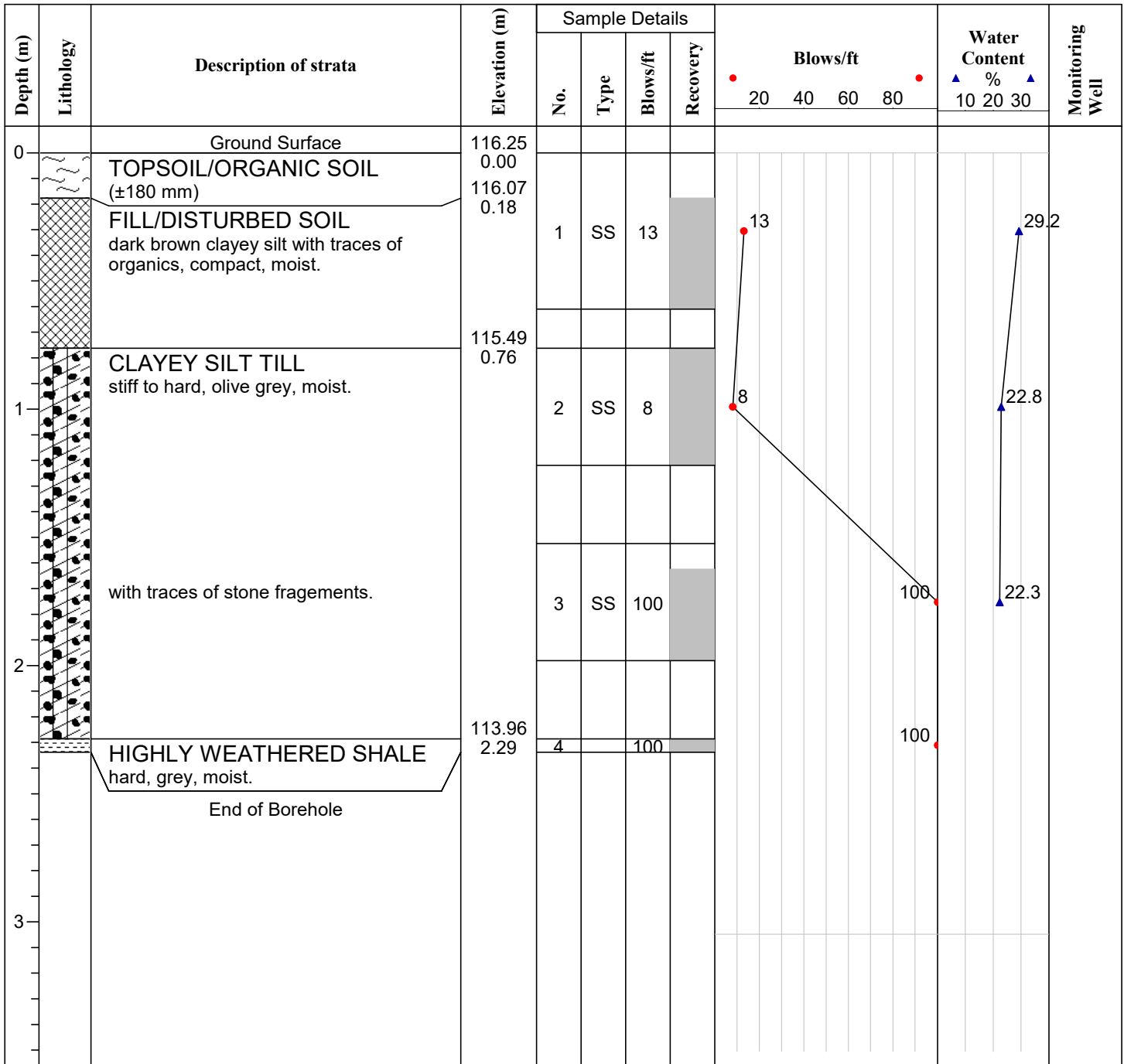
Log of Borehole BH-102

Project: PROPOSED NEW COMFORT STATION BUILDING

Client: CELLUCCI+PACE

Enclosure: 3

Location: HURON PARK, 830 PAISLEY BOULEVARD WEST, MISSISSAUGA

**Remarks:** Upon completion of drilling, the borehole was open and dry.

Drill Method: CME-55

Drill Date: 28 AUGUST 2025

Datum: GEODETIC

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7408-A

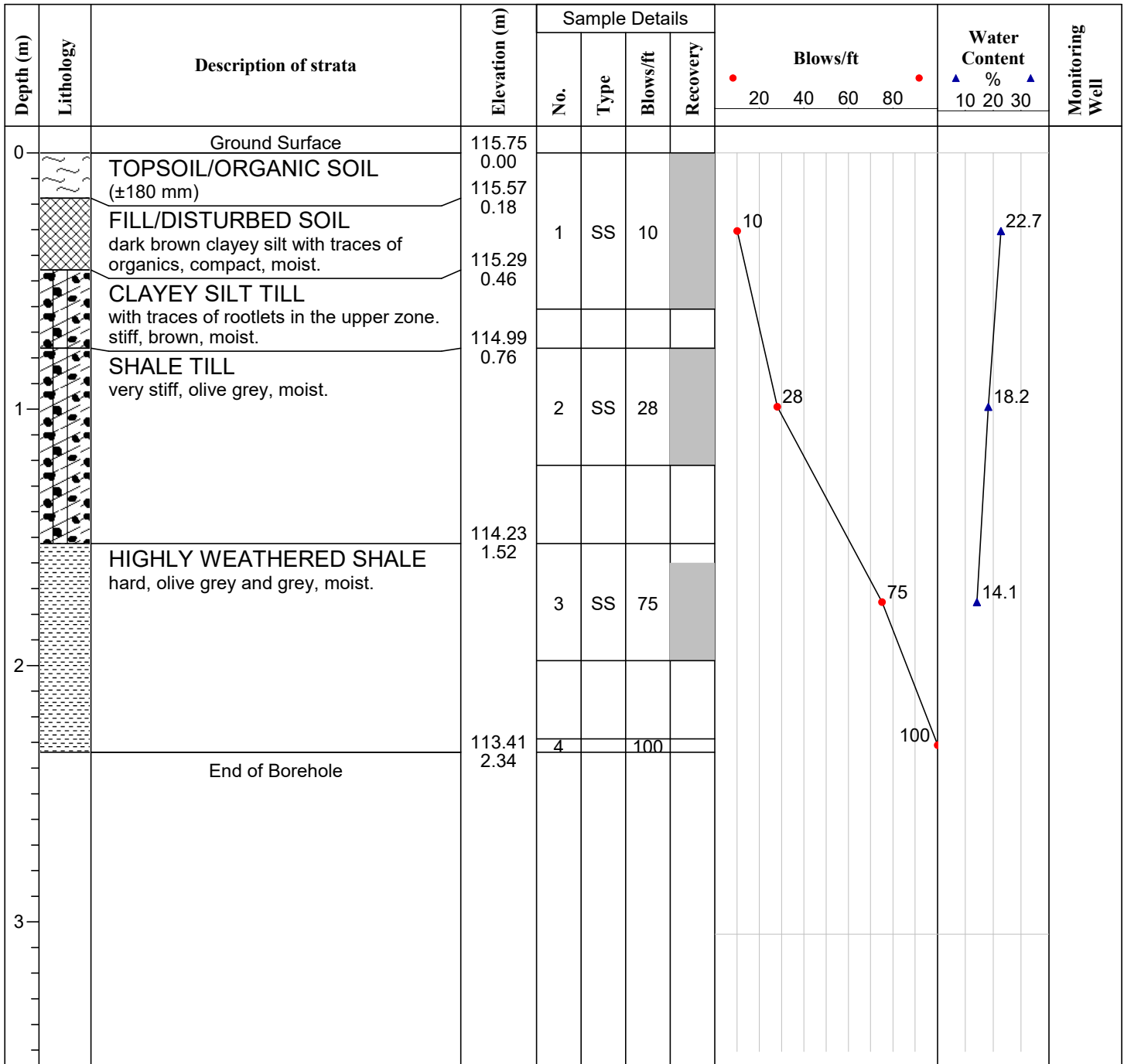
Log of Borehole BH-103

Project: PROPOSED NEW COMFORT STATION BUILDING

Client: CELLUCCI+PACE

Enclosure: 4

Location: HURON PARK, 830 PAISLEY BOULEVARD WEST, MISSISSAUGA

**Remarks:** Upon completion of drilling, the borehole was open and dry.

Drill Method: CME-55

Drill Date: 28 AUGUST 2025

Datum: GEODETIC

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7408-A

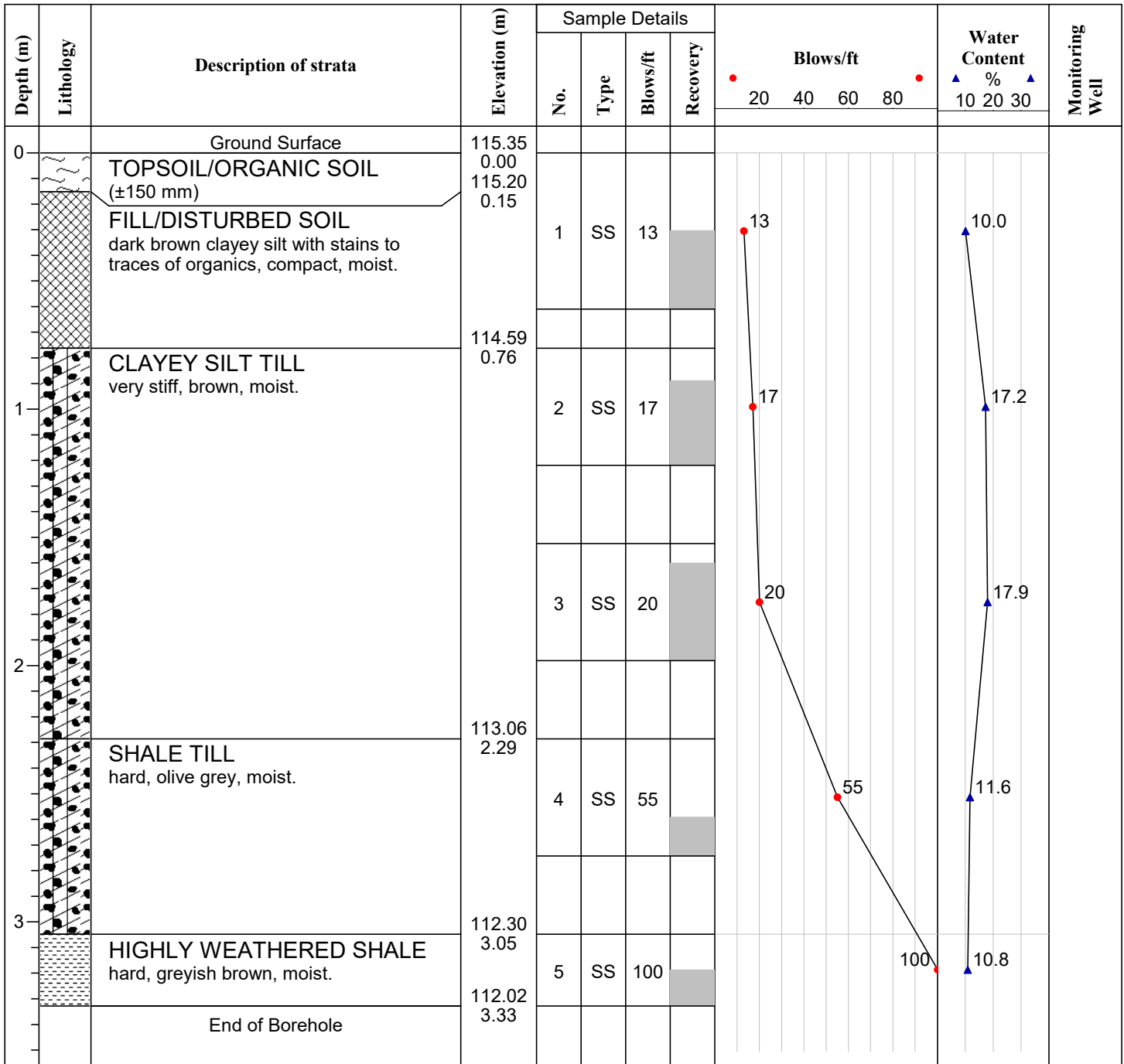
Log of Borehole BH-104

Project: PROPOSED NEW COMFORT STATION BUILDING

Client: CELLUCCI+PACE

Enclosure: 5

Location: HURON PARK, 830 PAISLEY BOULEVARD WEST, MISSISSAUGA

**Remarks:** Upon completion of drilling, the borehole was open and dry.

Drill Method: CME-55

Drill Date: 28 AUGUST 2025

Datum: GEODETIC

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7408-A

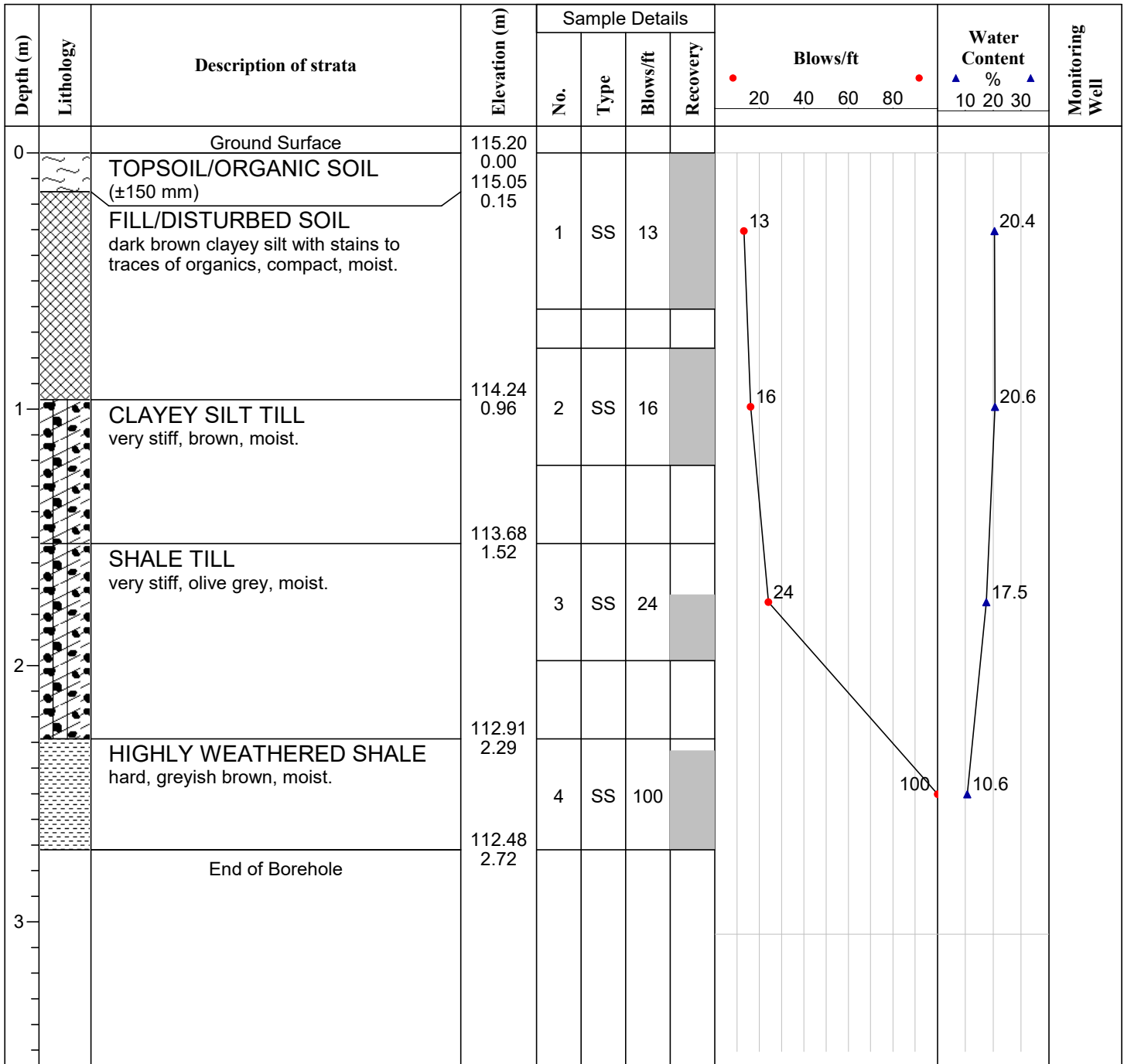
Log of Borehole BH-105

Project: PROPOSED NEW COMFORT STATION BUILDING

Client: CELLUCCI+PACE

Enclosure: 6

Location: HURON PARK, 830 PAISLEY BOULEVARD WEST, MISSISSAUGA

**Remarks:** Upon completion of drilling, the borehole was open and dry.

Drill Method: CME-55

Drill Date: 28 AUGUST 2025

Datum: GEODETIC

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7408-A

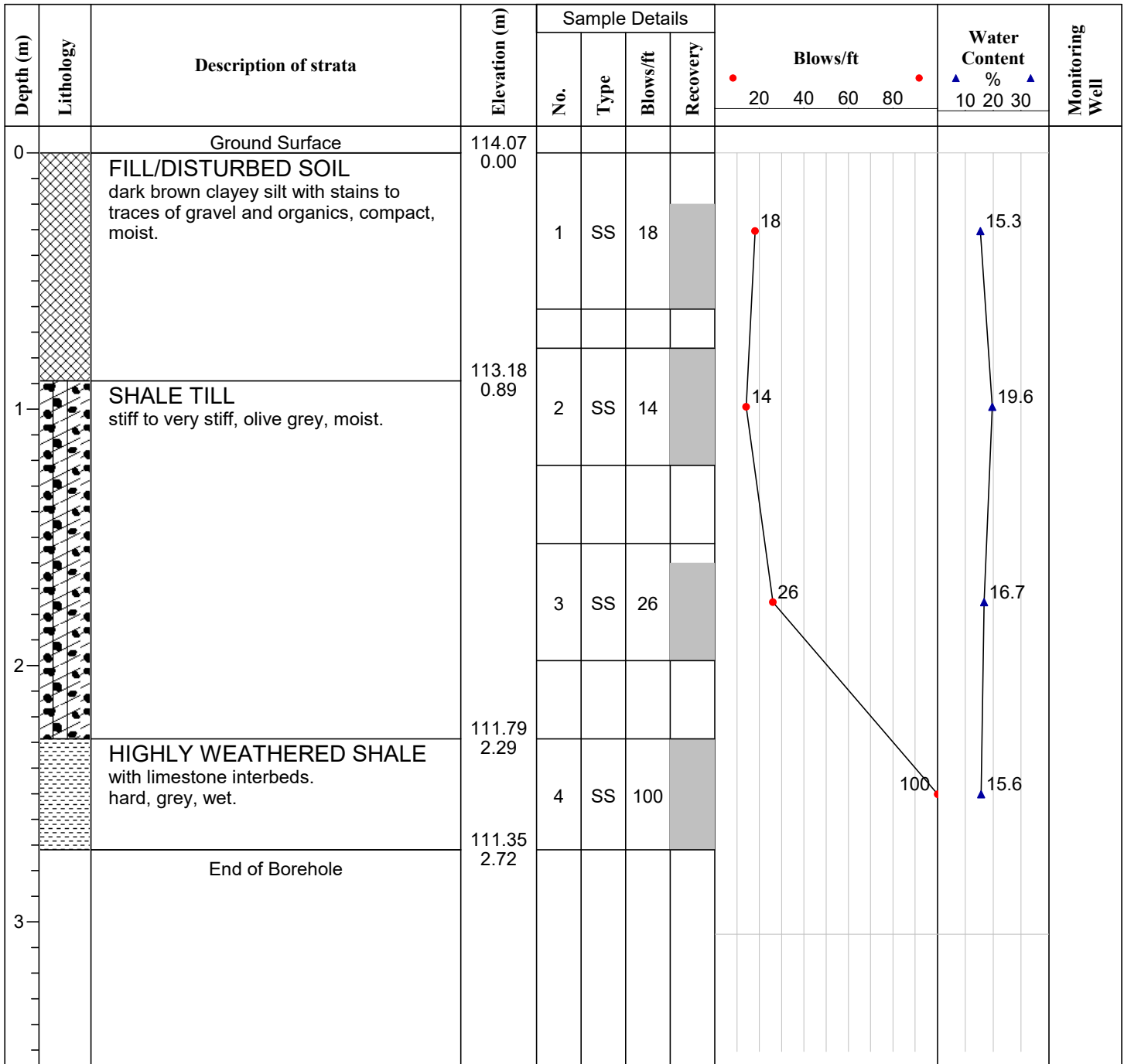
Log of Borehole BH-106

Project: PROPOSED NEW COMFORT STATION BUILDING

Client: CELLUCCI+PACE

Enclosure: 7

Location: HURON PARK, 830 PAISLEY BOULEVARD WEST, MISSISSAUGA

**Remarks:** Upon completion of drilling, the borehole was open and water level was measured at 2.1 m below EGSL.

Drill Method: CME-55

Drill Date: 28 AUGUST 2025

Datum: GEODETIC

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7408-A

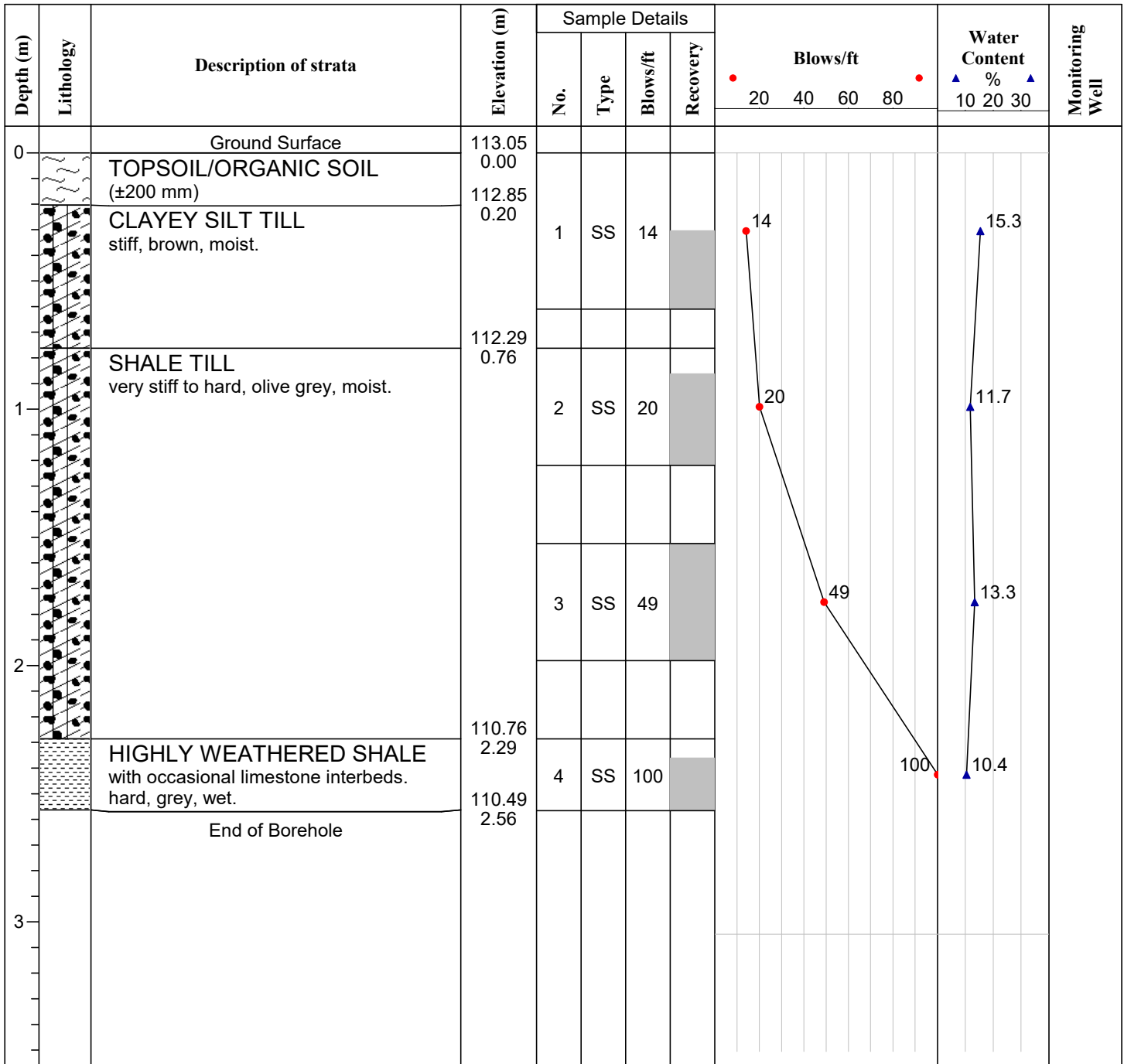
Log of Borehole BH-107

Project: PROPOSED NEW COMFORT STATION BUILDING

Client: CELLUCCI+PACE

Enclosure: 8

Location: HURON PARK, 830 PAISLEY BOULEVARD WEST, MISSISSAUGA

**Remarks:** Upon completion of drilling, the borehole was open and dry.

Drill Method: CME-55

Drill Date: 28 AUGUST 2025

Datum: GEODETIC

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7408-A

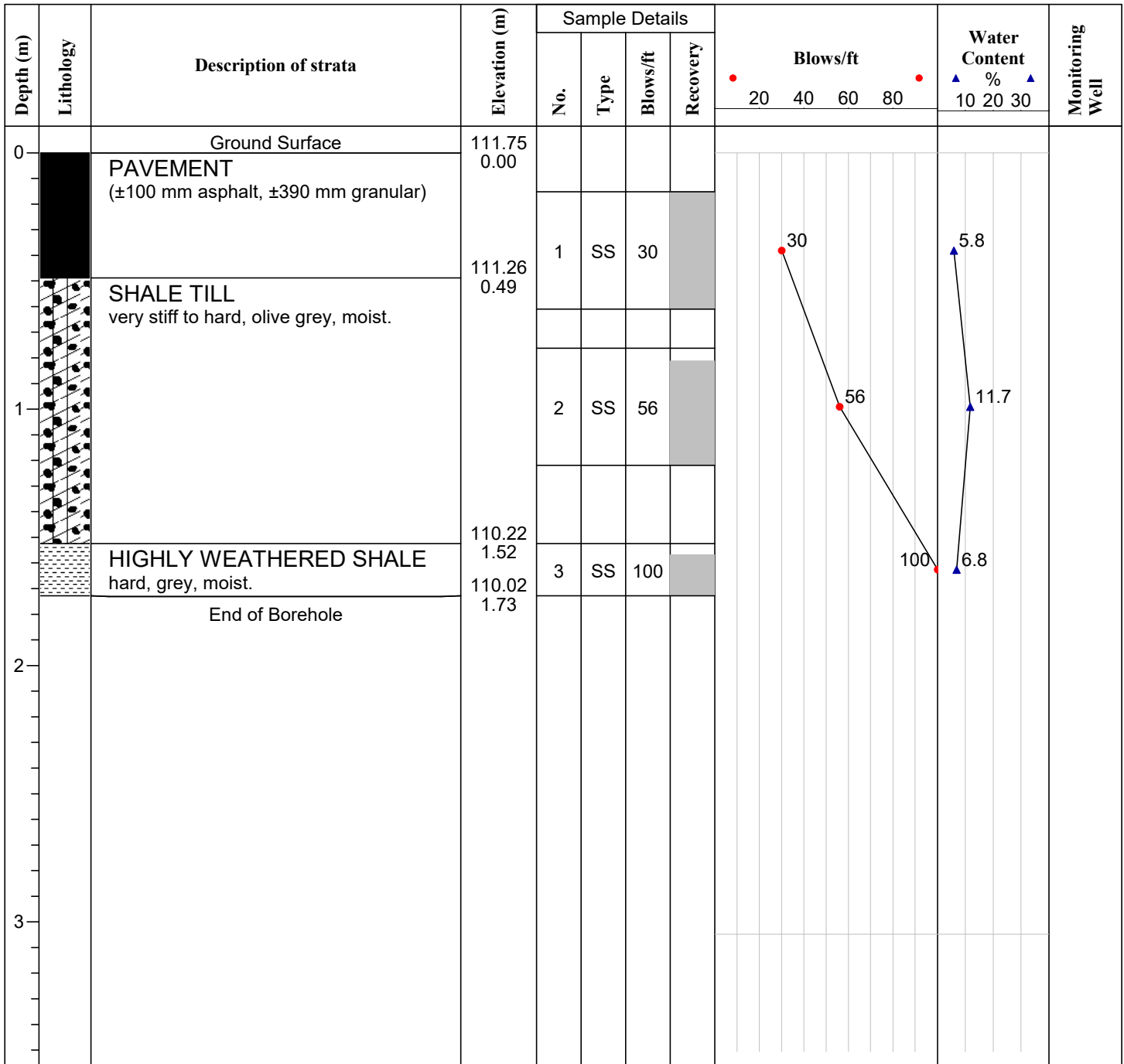
Log of Borehole BH-108

Project: PROPOSED NEW COMFORT STATION BUILDING

Client: CELLUCCI+PACE

Enclosure: 9

Location: HURON PARK, 830 PAISLEY BOULEVARD WEST, MISSISSAUGA

**Remarks:** Upon completion of drilling, the borehole was open and dry.

Drill Method: CME-55

Drill Date: 28 AUGUST 2025

Datum: GEODETIC

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1



7408A

September 15, 2025

Cellucci+Pace
3C-510 Rowntree Dairy Road
Woodbridge, Ontario
L4L 8H2

Attention: Mr. Claudio Cellucci B. Arch, MRAIC
Principal

Dear Sir:

**Re: Soil Chemical Testing Report
Comfort Station, Huron Park
Mississauga, Ontario**

1.0 INTRODUCTION

As requested, Forward Engineering & Associates Inc. (**Forward**) conducted a chemical testing program for the above project site.

The report of the chemical testing program is to be used for Characterization of the materials for disposal purposes only.

2.0 BACKGROUND

The purpose of this program is to test the materials to be excavated during the construction of the proposed comfort station.

3.0 FIELD WORKS

3.1 Sampling

The field sampling was carried out from the boreholes drilled in August 2025.

Examination of the soil samples did not indicate visual and/or olfactory evidence of contamination.

Three [3] representative samples, obtained from the boreholes, were prepared for laboratory chemical testing.



4.0 ANALYTICAL TESTING PROGRAM

4.1 Soil Testing

The samples were prepared, and chemically tested, as presented in the following table:

Laboratory Sample ID	Field Sample ID	Tested Parameters
2536296-01	BH101, SS1+SS2	Metals and Inorganics, PHCs F1-F4 + BTEX
2536296-02	BH104, SS1	Metals and Inorganics, PHCs F1-F4 + BTEX
2536296-03	BH107, SS2	Metals and Inorganics, PHCs F1-F4 + BTEX

- SS1 stands for sample taken from Split Spoon No. 1.

The soil samples were submitted to PARACEL Laboratories, Mississauga, Ontario, which are independent laboratories and are certified by the Canadian Association of Environmental Analytical Laboratories (CAEAL).

5.0 FINDINGS AND DISCUSSIONS

5.1 Soils Type and Condition

The tested materials consisted of fine texture materials (Clayey Silt).

5.2 Analytical Testing Results

5.2.1 Results Compared to Table 1 Residential/Parkland/ Industrial/Commercial Criteria

The results, enclosed in Appendix A, were compared to *Reg 406/19-Table1 Residential/Parkland/Industrial/Commercial/Community* Criteria.

The results met the above Table 1 Criteria except for the following parameter:

- “Cobalt” for sample ID BH107, SS2.



5.2.2 Results Compared to Table 2.1 Industrial/Commercial Criteria

The results, enclosed in Appendix B, were compared to *Reg 406/19-Table 2.1 Industrial/Commercial Criteria*.

The results met the above Table 2.1 Criteria with no exceptions.

For disposal purpose, it should be noted that the acceptance of fill materials depends on the discretion of the receiving site.

We trust this report meets our terms of reference. However, if any clarification is required, or if we can be of further assistance, please contact this office.

Sincerely yours,
FORWARD ENGINEERING & ASSOCIATES INC.

Juan Chahine, P. Eng.
Senior Project Manager



APPENDIX A

Laboratory Chemical Testing Results Compared to Table 1 Residential/Parkland/Industrial/Commercial /Community Criteria

TABLE 1		CLIENT: Forward Engineering & Associates Inc.			
PARACEL LABORATORIES LTD.		ATTENTION: George Semaan			
WORKORDER: 2536296		PROJECT: 7408A			
REPORT DATE: 09/10/2025		REFERENCE: SO Forward Engineering & Associates Inc. - ENV			
Parameter	Units	MDL	Regulation	Sample	
				BH101, SS1+SS2 2536296-01	BH104, SS1 2536296-02
					BH107, SS2 2536296-03
Sample Date (m/d/y)			Reg 406/19 -T1 Res/Park/Ind/Com	09/03/2025	09/03/2025
Physical Characteristics					
% Solids	% by Wt.	0.1		86.5	84.7
General Inorganics					
SAR	N/A	0.01	2.4	0.37	0.42
Conductivity	mS/cm	0.005	0.57	0.330	0.251
Cyanide, free	ug/g dry	0.03	0.051	<0.03	<0.03
pH	pH Units	0.05		7.35	7.29
Metals					
Antimony	ug/g dry	1.0	1.3	<1.0	<1.0
Arsenic	ug/g dry	1.0	18	4.9	5.9
Barium	ug/g dry	1.0	220	58.7	73.1
Beryllium	ug/g dry	0.5	2.5	0.7	0.9
Boron, available	ug/g dry	0.5		1.6	1.1
Boron	ug/g dry	5.0	36	8.2	9.1
Cadmium	ug/g dry	0.5	1.2	<0.5	<0.5
Chromium (VI)	ug/g dry	0.2	0.66	<0.2	0.3
Chromium	ug/g dry	5.0	70	20.0	27.8
Cobalt	ug/g dry	1.0	21	7.7	10.8
Copper	ug/g dry	5.0	92	22.0	29.5
Lead	ug/g dry	1.0	120	14.4	23.5
Mercury	ug/g dry	0.1	0.27	<0.1	<0.1
Molybdenum	ug/g dry	1.0	2	<1.0	<1.0
Nickel	ug/g dry	5.0	82	16.0	22.0
Selenium	ug/g dry	1.0	1.5	<1.0	<1.0
Silver	ug/g dry	0.3	0.5	<0.3	<0.3
Thallium	ug/g dry	1.0	1	<1.0	<1.0
Uranium	ug/g dry	1.0	2.5	<1.0	<1.0
Vanadium	ug/g dry	10.0	86	29.8	38.4
Zinc	ug/g dry	20.0	290	68.6	80.7
Volatiles					
Benzene	ug/g dry	0.02	0.02	<0.02	<0.02
Ethylbenzene	ug/g dry	0.05	0.05	<0.05	<0.05
Toluene	ug/g dry	0.05	0.2	<0.05	<0.05
m/p-Xylene	ug/g dry	0.05		<0.05	<0.05
o-Xylene	ug/g dry	0.05		<0.05	<0.05
Xylenes, total	ug/g dry	0.05	0.05	<0.05	<0.05
Hydrocarbons					
F1 PHCs (C6-C10)	ug/g dry	7	25	<7	<7
F2 PHCs (C10-C16)	ug/g dry	4	10	<4	<4
F3 PHCs (C16-C34)	ug/g dry	8	240	28	41
F4 PHCs (C34-C50)	ug/g dry	6	120	57	44



APPENDIX B

Laboratory Chemical Testing Results Compared to Table 2.1 Industrial/Commercial Criteria

TABLE 1		CLIENT: Forward Engineering & Associates Inc.			
PARACEL LABORATORIES LTD.		ATTENTION: George Semaan			
WORKORDER: 2536296		PROJECT: 7408A			
REPORT DATE: 09/10/2025		REFERENCE: SO Forward Engineering & Associates Inc. - ENV			
Parameter	Units	MDL	Regulation	Sample	
				BH101, SS1+SS2 2536296-01	BH104, SS1 2536296-02 BH107, SS2 2536296-03
Sample Date (m/d/y)			Reg 406/19 -T2.1 Ind/Com	09/03/2025	09/03/2025
Physical Characteristics					
% Solids	% by Wt.	0.1		86.5	84.7
General Inorganics					
SAR	N/A	0.01	12	0.37	1.81
Conductivity	mS/cm	0.005	1.4	0.330	0.469
Cyanide, free	ug/g dry	0.03	0.051	<0.03	<0.03
pH	pH Units	0.05	5	7.35	7.29
Metals					
Antimony	ug/g dry	1.0	40	<1.0	<1.0
Arsenic	ug/g dry	1.0	18	4.9	5.9
Barium	ug/g dry	1.0	670	58.7	73.1
Beryllium	ug/g dry	0.5	8	0.7	0.9
Boron, available	ug/g dry	0.5	2	1.6	1.1
Boron	ug/g dry	5.0	120	8.2	9.1
Cadmium	ug/g dry	0.5	1.9	<0.5	<0.5
Chromium (VI)	ug/g dry	0.2	8	<0.2	0.3
Chromium	ug/g dry	5.0	160	20.0	27.8
Cobalt	ug/g dry	1.0	80	7.7	10.8
Copper	ug/g dry	5.0	230	22.0	29.5
Lead	ug/g dry	1.0	120	14.4	23.5
Mercury	ug/g dry	0.1	0.27	<0.1	<0.1
Molybdenum	ug/g dry	1.0	40	<1.0	<1.0
Nickel	ug/g dry	5.0	270	16.0	22.0
Selenium	ug/g dry	1.0	5.5	<1.0	<1.0
Silver	ug/g dry	0.3	40	<0.3	<0.3
Thallium	ug/g dry	1.0	3.3	<1.0	<1.0
Uranium	ug/g dry	1.0	33	<1.0	<1.0
Vanadium	ug/g dry	10.0	86	29.8	38.4
Zinc	ug/g dry	20.0	340	68.6	80.7
Volatiles					
Benzene	ug/g dry	0.02	0.02	<0.02	<0.02
Ethylbenzene	ug/g dry	0.05	0.05	<0.05	<0.05
Toluene	ug/g dry	0.05	0.2	<0.05	<0.05
m/p-Xylene	ug/g dry	0.05		<0.05	<0.05
o-Xylene	ug/g dry	0.05		<0.05	<0.05
Xylenes, total	ug/g dry	0.05	0.091	<0.05	<0.05
Hydrocarbons					
F1 PHCs (C6-C10)	ug/g dry	7	25	<7	<7
F2 PHCs (C10-C16)	ug/g dry	4	26	<4	<4
F3 PHCs (C16-C34)	ug/g dry	8	240	28	41
F4 PHCs (C34-C50)	ug/g dry	6	3300	57	44

Certificate of Analysis

Forward Engineering & Associates Inc.

244 Brockport Dr., Unit 15

Toronto, ON M9W 6X9

Attn: George Semaan

Client PO:

Project: 7408A

Custody:

Report Date: 10-Sep-2025

Order Date: 4-Sep-2025

Order #: 2536296

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2536296-01	BH101, SS1+SS2
2536296-02	BH104, SS1
2536296-03	BH107, SS2

Approved By:



Alex Enfield, MSc

Lab Manager

Certificate of Analysis

Report Date: 10-Sep-2025

Client: Forward Engineering & Associates Inc.

Order Date: 4-Sep-2025

Client PO:

Project Description: 7408A

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Boron, available	MOE (HWE), EPA 200.8 - ICP-MS	8-Sep-25	8-Sep-25
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	5-Sep-25	8-Sep-25
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	5-Sep-25	8-Sep-25
Conductivity	MOE E3138 - probe @25 °C, water ext	8-Sep-25	8-Sep-25
Cyanide, free	MOE E3015 - Auto Colour, water extraction	8-Sep-25	8-Sep-25
Mercury by CVAA	EPA 7471B - CVAA, digestion	5-Sep-25	8-Sep-25
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	9-Sep-25	9-Sep-25
PHC F1	CWS Tier 1 - P&T GC-FID	5-Sep-25	8-Sep-25
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	5-Sep-25	8-Sep-25
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	8-Sep-25	8-Sep-25
SAR	Calculated	8-Sep-25	8-Sep-25
Solids, %	CWS Tier 1 - Gravimetric	8-Sep-25	9-Sep-25

Certificate of Analysis

Report Date: 10-Sep-2025

Client: Forward Engineering & Associates Inc.

Order Date: 4-Sep-2025

Client PO:

Project Description: 7408A

Client ID:	BH101, SS1+SS2	BH104, SS1	BH107, SS2	-	-
Sample Date:	03-Sep-25 00:00	03-Sep-25 00:00	03-Sep-25 00:00	-	-
Sample ID:	2536296-01	2536296-02	2536296-03	-	-
Matrix:	Soil	Soil	Soil	-	-
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	86.5	84.7	86.6	-	-
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General Inorganics

SAR	0.01 N/A	0.37	0.42	1.81	-	-
Conductivity	0.005 mS/cm	0.330	0.251	0.469	-	-
Cyanide, free	0.03 ug/g	<0.03	<0.03	<0.03	-	-
pH	0.05 pH Units	7.35	7.29	7.57	-	-

Metals

Antimony	1.0 ug/g	<1.0	<1.0	<1.0	-	-
Arsenic	1.0 ug/g	4.9	5.9	14.8	-	-
Barium	1.0 ug/g	58.7	73.1	72.8	-	-
Beryllium	0.5 ug/g	0.7	0.9	1.4	-	-
Boron	5.0 ug/g	8.2	9.1	21.7	-	-
Boron, available	0.5 ug/g	1.6	1.1	0.8	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	-	-
Chromium (VI)	0.2 ug/g	<0.2	0.3	<0.2	-	-
Chromium	5.0 ug/g	20.0	27.8	35.9	-	-
Cobalt	1.0 ug/g	7.7	10.8	22.8	-	-
Copper	5.0 ug/g	22.0	29.5	43.9	-	-
Lead	1.0 ug/g	14.4	23.5	5.4	-	-
Mercury	0.1 ug/g	<0.1	<0.1	<0.1	-	-
Molybdenum	1.0 ug/g	<1.0	<1.0	<1.0	-	-
Nickel	5.0 ug/g	16.0	22.0	41.7	-	-
Selenium	1.0 ug/g	<1.0	<1.0	<1.0	-	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	-	-
Thallium	1.0 ug/g	<1.0	<1.0	<1.0	-	-

Certificate of Analysis

Report Date: 10-Sep-2025

Client: Forward Engineering & Associates Inc.

Order Date: 4-Sep-2025

Client PO:

Project Description: 7408A

Client ID:	BH101, SS1+SS2	BH104, SS1	BH107, SS2	-	-
Sample Date:	03-Sep-25 00:00	03-Sep-25 00:00	03-Sep-25 00:00	-	-
Sample ID:	2536296-01	2536296-02	2536296-03	-	-
Matrix:	Soil	Soil	Soil	-	-
MDL/Units					

Metals

Uranium	1.0 ug/g	<1.0	<1.0	<1.0	-	-
Vanadium	10.0 ug/g	29.8	38.4	49.2	-	-
Zinc	20.0 ug/g	68.6	80.7	80.7	-	-

Volatiles

Benzene	0.02 ug/g	<0.02	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	-	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	<0.05	-	-
Toluene-d8	Surrogate	104%	103%	103%	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	<4	-	-
F3 PHCs (C16-C34)	8 ug/g	28	41	27	-	-
F4 PHCs (C34-C50)	6 ug/g	57	44	44	-	-

Certificate of Analysis

Report Date: 10-Sep-2025

Client: Forward Engineering & Associates Inc.

Order Date: 4-Sep-2025

Client PO:

Project Description: 7408A

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics								
SAR	ND	0.01	N/A					
Conductivity	ND	0.005	mS/cm					
Cyanide, free	ND	0.03	ug/g					
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
Metals								
Antimony	ND	1.0	ug/g					
Arsenic	ND	1.0	ug/g					
Barium	ND	1.0	ug/g					
Beryllium	ND	0.5	ug/g					
Boron, available	ND	0.5	ug/g					
Boron	ND	5.0	ug/g					
Cadmium	ND	0.5	ug/g					
Chromium (VI)	ND	0.2	ug/g					
Chromium	ND	5.0	ug/g					
Cobalt	ND	1.0	ug/g					
Copper	ND	5.0	ug/g					
Lead	ND	1.0	ug/g					
Mercury	ND	0.1	ug/g					
Molybdenum	ND	1.0	ug/g					
Nickel	ND	5.0	ug/g					
Selenium	ND	1.0	ug/g					
Silver	ND	0.3	ug/g					
Thallium	ND	1.0	ug/g					
Uranium	ND	1.0	ug/g					
Vanadium	ND	10.0	ug/g					
Zinc	ND	20.0	ug/g					
Volatiles								
Benzene	ND	0.02	ug/g					

Certificate of Analysis

Report Date: 10-Sep-2025

Client: Forward Engineering & Associates Inc.

Order Date: 4-Sep-2025

Client PO:

Project Description: 7408A

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	8.28		%	103	50-140			

Certificate of Analysis

Report Date: 10-Sep-2025

Client: Forward Engineering & Associates Inc.

Order Date: 4-Sep-2025

Client PO:

Project Description: 7408A

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.13	0.01	N/A	0.13			0.0	30	
Conductivity	0.112	0.005	mS/cm	0.111			1.4	5	
Cyanide, free	ND	0.03	ug/g	ND			NC	35	
pH	7.55	0.05	pH Units	7.55			0.0	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	14	4	ug/g	9			NC	30	
F3 PHCs (C16-C34)	1100	8	ug/g	1080			1.8	30	
F4 PHCs (C34-C50)	3290	6	ug/g	3770			13.3	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	1.8	1.0	ug/g	2.1			16.8	30	
Barium	131	1.0	ug/g	165			23.1	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron, available	ND	0.5	ug/g	ND			NC	35	
Boron	ND	5.0	ug/g	5.1			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	ND	5.0	ug/g	ND			NC	30	
Cobalt	1.2	1.0	ug/g	1.5			23.5	30	
Copper	ND	5.0	ug/g	ND			NC	30	
Lead	3.8	1.0	ug/g	4.5			15.4	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	1.1	1.0	ug/g	ND			NC	30	
Nickel	6.2	5.0	ug/g	8.2			26.7	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	1.2	1.0	ug/g	1.5			18.7	30	
Vanadium	ND	10.0	ug/g	11.8			NC	30	

Certificate of Analysis

Report Date: 10-Sep-2025

Client: Forward Engineering & Associates Inc.

Order Date: 4-Sep-2025

Client PO:

Project Description: 7408A

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Zinc	ND	20.0	ug/g	ND			NC	30	
Physical Characteristics									
% Solids	88.5	0.1	% by Wt.	88.5			0.0	25	
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	9.00		%		104	50-140			

Certificate of Analysis

Report Date: 10-Sep-2025

Client: Forward Engineering & Associates Inc.

Order Date: 4-Sep-2025

Client PO:

Project Description: 7408A

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Cyanide, free	0.364	0.03	ug/g	ND	100	70-130			
Hydrocarbons									
F1 PHCs (C6-C10)	48	7	ug/g	ND	80.9	0-200			
F2 PHCs (C10-C16)	102	4	ug/g	9	87.2	60-140			
F3 PHCs (C16-C34)	1280	8	ug/g	1080	88.4	60-140			
F4 PHCs (C34-C50)	3710	6	ug/g	3770	-33.1	60-140			QM-4X
Metals									
Antimony	38.3	1.0	ug/g	ND	76.5	70-130			
Arsenic	51.1	1.0	ug/g	ND	101	70-130			
Barium	107	1.0	ug/g	65.9	82.9	70-130			
Beryllium	48.5	0.5	ug/g	ND	97.0	70-130			
Boron, available	4.99	0.5	ug/g	ND	99.8	70-122			
Boron	51.8	5.0	ug/g	ND	99.5	70-130			
Cadmium	48.5	0.5	ug/g	ND	97.0	70-130			
Chromium (VI)	4.3	0.2	ug/g	ND	85.5	70-130			
Chromium	53.7	5.0	ug/g	ND	104	70-130			
Cobalt	51.3	1.0	ug/g	ND	101	70-130			
Copper	50.2	5.0	ug/g	ND	97.2	70-130			
Lead	48.6	1.0	ug/g	1.8	93.6	70-130			
Mercury	1.49	0.1	ug/g	ND	99.1	70-130			
Molybdenum	50.7	1.0	ug/g	ND	101	70-130			
Nickel	52.6	5.0	ug/g	ND	98.6	70-130			
Selenium	48.8	1.0	ug/g	ND	97.4	70-130			
Silver	40.3	0.3	ug/g	ND	80.5	70-130			
Thallium	47.4	1.0	ug/g	ND	94.5	70-130			
Uranium	51.5	1.0	ug/g	ND	102	70-130			
Vanadium	58.5	10.0	ug/g	ND	108	70-130			
Zinc	54.8	20.0	ug/g	ND	94.8	70-130			
Volatiles									
Benzene	45.3	0.02	ug/g	ND	113	50-140			

Certificate of Analysis

Report Date: 10-Sep-2025

Client: Forward Engineering & Associates Inc.

Order Date: 4-Sep-2025

Client PO:

Project Description: 7408A

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	38.9	0.05	ug/g	ND	97.3	50-140			
Toluene	39.2	0.05	ug/g	ND	97.7	50-140			
m,p-Xylenes	78.8	0.05	ug/g	ND	98.2	50-140			
o-Xylene	39.1	0.05	ug/g	ND	97.9	50-140			
Surrogate: Toluene-d8	9.74		%		98.3	50-140			

Certificate of Analysis

Client: Forward Engineering & Associates Inc.

Client PO:

Report Date: 10-Sep-2025

Order Date: 4-Sep-2025

Project Description: 7408A

Qualifier Notes:**QC Qualifiers:**

QM-4X The spike recovery was outside of QC acceptance limits due to elevated analyte concentration.

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unless otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Client Name: Forward Engineering & Associates Inc.	Project Ref: 7408A	Page 1 of 1
Contact Name: George Semaan	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular Date Required: _____
Address: 244 Brockport Dr., Unit 15 Toronto ON M9W 6X9	PO #:	
Telephone: (416) 798-3500	E-mail: george@forwardengineering.ca	

<input type="checkbox"/> REG 153/04 <input checked="" type="checkbox"/> REG 406/19 Other Regulation <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> Table _____ For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm Mun: _____ <input type="checkbox"/> Other: _____	Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)	Required Analysis <table border="1"> <tr> <th>PHCs F1-F4+BTEX</th> <th>VOCs</th> <th>PAHs</th> <th>Metals by ICP</th> <th>Hg</th> <th>CvI</th> <th>B (HWS)</th> <th>Metals&Inorganics</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input 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Comments:		Method of Delivery: Walk	
Relinquished By (Sign): [Signature]	Received By (Driver/Depot): [Signature]	Received at Lab: Joo	Verified By: Joo
Relinquished By (Print): JUAN CHAHINE	Date/Time: Sep 4/25 15:15	Date/Time: 9/5/25 11:03	Date/Time: 9/5/25 11:17
Date/Time: SEP. 04, 2025 1:30 PM	Temperature: °C	Temperature: 8.8	pH Verified: <input type="checkbox"/> By:

SECTION 01 19 00 - GENERAL REQUIREMENTS

1.1 GENERAL REQUIREMENTS

- .1 Division 1 requirements apply to all Sections of Work.

1.2 SUMMARY OF WORK

- .1 Provide all items, articles, materials, services and incidentals, whether or not expressly specified or shown on Drawings, to make finished work complete and fully operational, consistent with the intent of the Contract Documents.
- .2 Provide all work indicated in Contract Documents, regardless whether located within or outside Owner's property lines.
- .3 The following work is not included in this Contract:
 - .1 Work identified N.I.C.

1.3 PRODUCTS SUPPLIED BY OWNER

- .1 The following products will be supplied only by the Owner for incorporation into work of this Contract:
 - .1 Selected washroom accessories (Refer to Section 10 28 00 – Washroom Accessories; products supplied only by Owner are labelled OS/CI)
 - .2 Other products indicated accordingly.
- .2 Owner will provide manufacturer's installation instructions for each product if available.
- .3 Contractor's duties:
 - .1 Unload and handle products at site. Promptly inspect delivered products, and give written report to Consultant on condition of all items received. Pay demurrage charges if unloading is delayed.
 - .2 Store and protect products until required for installation.
 - .3 Install, connect and finish products as required.
 - .4 Remove packaging material from site and clean products.

1.4 DIVISION OF WORK

- .1 Work specified in the Specification has been divided into technical Sections for the purpose of ready reference. Division of work among Subcontractors and suppliers is solely the Contractor's responsibility and Consultant assumes no responsibility to act as an arbiter to establish subcontract limits between Sections or Divisions of work.

1.5 METRIC PROJECT

- .1 This project is based on The International System of Units (SI). Measurements are expressed in metric (SI) units and depending on the progress made in the various sectors of the industry are either hard or soft converted units.
- .2 All metric units specified shall be taken to be the minimum acceptable unless otherwise noted.
- .3 It is the Contractor's responsibility to check and verify with manufacturers and suppliers on the availability of materials and products in either metric or imperial sizes.
- .4 Where a material or product cannot be obtained in the metric size specified, provide the next larger imperial size available.
- .5 Where both metric and imperial sizes or dimensions are shown, the metric size or dimension shall

SECTION 01 19 00 - GENERAL REQUIREMENTS

govern.

1.6 SAFETY AND SECURITY

- .1 Be responsible for security of all areas affected by work of this Contract until taken over by Owner. Take steps to prevent entry to the Work by unauthorized persons and guard against theft, fire and damage by any cause.
- .2 Provide suitable surveillance equipment and/or employ guard services, as required to adequately protect the Work.
- .3 Maintain fire protection for work. Store paints and volatile substances in a separate and controlled location and inspect frequently. Inspect temporary wiring, drop cords, extension cables for defective insulation or connections frequently. Remove combustible wastes frequently. Prohibit smoking in areas where volatile and flammable substances are used.
- .4 Do not cut, bore or sleeve through any loadbearing member, new or existing without Consultant's written authorization, unless specifically indicated on Drawings.

1.7 USE OF SITE

- .1 Accept full responsibility for assigned access, work, staging and storage areas from the time of Contract award until Substantial Performance of the Work.
- .2 Check means of access and egress, rights and interests which may be interfered with. Do not block lanes, roadways, entrances or exits. Direct construction traffic and locate access to site as directed by municipality.
- .3 Where encroachment beyond property limits is necessary make arrangement with respective property owners.

END

SECTION 01 21 00 - ALLOWANCES

1.1 GENERAL

- .1 Comply with GC 4.1 CASH ALLOWANCES and GC 4.2 CONTINGENCY ALLOWANCE.
- .2 Cash allowances are designated for additional work and services deemed to be necessary by Owner, from time to time, throughout the execution of the Work. Where a cash allowance refers to an item or category of work already included in Contract Documents, it shall be assumed to cover work or services in addition to that indicated, unless specifically indicated otherwise.
- .3 Contractor may be required from time to time to assist in tendering of certain items of work covered by allowance, as directed by Consultant.

1.2 AUTHORIZATION

- .1 Expenditures from allowances included in the Contract must be authorized in writing by the Consultant.
- .2 Work covered by allowances shall be performed for such amounts and by such persons as directed by the Consultant.

1.3 CASH ALLOWANCES

- .1 Cash allowances include supply and installation unless specifically indicated otherwise.
- .2 Supply only allowances shall include:
 - .1 Net cost of products
 - .2 Delivery to site
 - .3 Applicable taxes and duties (not including HST)
- .3 Supply and install allowances shall include:
 - .1 Net cost of products
 - .2 Delivery to site
 - .3 Unloading, storing, handling of products on site
 - .4 Installation, finishing and commissioning of products
 - .5 Applicable taxes and duties (not including HST)
- .4 Inspection and testing allowances shall include:
 - .1 Net costs of inspection/testing services
 - .2 Applicable taxes (not including HST)
- .5 Other costs related to work covered by allowances including overhead and profit are not covered by the allowance but shall be included separately in Contract.
- .6 Include in the Contract a cash allowance in the amount of \$50,000.00 (fifty thousand dollars) for the following items:
 - .1 Testing and inspections of soil compaction and buried services
 - .2 Testing and inspection of steel construction, testing and inspection of reinforcing, welding and anchorages

SECTION 01 21 00 - ALLOWANCES

- .3 Testing of asphalt and concrete paving
- .4 Inspections of masonry
- .5 Roofing inspections
- .6 Testing of air barrier
- .7 Building envelop inspection and testing

1.4 CONTINGENCY ALLOWANCE

- .1 Include in this Contract a contingency allowance in the amount of \$70,000.00 (seventy thousand dollars).

END

SECTION 01 31 00 - PROJECT COORDINATION

1.1 PRE-CONSTRUCTION MEETING

- .1 Immediately prior to construction, upon notification attend at location of Owner's choice, pre--construction meeting, along with authoritative representatives of certain key subcontractors as specifically indicated in the conference notice.
- .2 Purpose of meeting is as follows:
 - .1 Review project communications procedures.
 - .2 Review contract administration requirements including submittals, payment and change order procedures.
 - .3 Identify all critical points on construction schedule for positive action.
 - .4 Identify any product availability problems and substitution requests.
 - .5 Establish site arrangements and temporary facilities.
 - .6 Review Consultant's inspection requirements.
 - .7 Review any points which, in Owner's, Consultant's and Contractor's opinion, require clarification.
- .3 The Consultant shall organize and chair the pre-construction meeting. Consultant shall record minutes of pre-construction meeting and distribute a copy to each participant within ten days of meeting.

1.2 SITE MEETINGS

- .1 Prior to the commencement of the Work, the Contractor together with the Consultant shall mutually agree to a sequence for holding bi-weekly site meetings.
- .2 Contractor shall chair site meetings. Ensure that persons, whose presence is required, are present and that relative information is available to allow meetings to be conducted efficiently.
- .3 Once a month or more often if directed by Consultant include review with Consultant and Owner of construction schedule and application for progress payment, during or immediately following site meeting.
- .4 Record minutes of each meeting and promptly distribute copies to be received by all participants not later than seven days after meeting has been held. Distribute minutes of meetings to all major Subconsultants, whether in attendance or not.

1.3 SUPERVISION

- .1 Employ an experienced and qualified supervisor who shall be in complete charge of the work from commencement to final completion of the Work and who shall be present at the site whenever work is being carried out. A working foreperson will not be acceptable. The supervisor shall not be changed after commencement of work without the Consultant's approval.
- .2 Supervise, direct, manage and control the work of all forces carrying out the work, including subcontractors and suppliers. Carry out daily inspections to ensure compliance with the Contract Documents and the maintenance of quality standards. Ensure that the supervisory staff includes personnel competent in supervising all Sections of Work required.
- .3 Arrange for sufficient number of qualified assistants to the supervisor as required for the proper and efficient execution of the Work.

1.4 DOCUMENTS ON SITE

PROJECT NO. 24-053

30/01/2025
WESPEC

**COMFORT STATION AT
HURON PARK, MISSISSAUGA, ONTARIO
01 31 00-1**

SECTION 01 31 00 - PROJECT COORDINATION

- .1 Contractor's field office shall at all times contain a complete set of Contract Documents (Drawings and Specifications) with all addenda, site instructions, change orders, reviewed shop drawings and samples, colour schedule, paint materials schedules, hardware list, progress reports and meeting minutes.
- .2 Keep building permit documents in field office for duration of work.

1.5 INTERFERENCE AND COORDINATION DRAWINGS

- .1 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.
- .2 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are coordinated.
- .3 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance are indicated on drawings.
- .4 Upon Consultant's request submit copies of interference drawings to Consultant.

1.6 SLEEVING AND INSERT SETTING DRAWINGS

- .1 Prepare sleeving drawings for work of Division 21 to 28, showing size and location of all penetrations through load bearing elements. Submit sleeving drawings to Consultant for review not less than 15 days prior to construction of affected elements.
- .2 Prepare insert setting drawings for work to be cast into concrete and/or mortared into masonry elements. Submit insert setting drawings to Consultant for review not less than 15 days prior to construction of affected elements.

END

SECTION 01 32 00 - PROJECT PROGRESS DOCUMENTATION

1.1 CONSTRUCTION SCHEDULE

- .1 Within 21 days of Contract award, submit in format acceptable to Consultant, minimum four copies of Contractor's critical path construction schedule, using suitable computer scheduling software, such as "MS Project" or "Primavera".
- .2 Schedule proposed by the Contractor shall be based on the following assumptions:
 - .1 Critical path base line is considered by Contractor as reasonable and achievable.
 - .2 Schedule is based on resources which have been committed for this project by Contractor and will be readily available when needed.
 - .3 Schedule is based on normal average weather conditions, as documented by official weather records.
 - .4 Float belongs to Project.
- .3 Set up format to permit plotting of actual construction progress against scheduled progress.
- .4 Schedule shall show:
 - .1 Commencement and completion dates of Contract.
 - .2 Commencement and completion dates of construction stages/phases, if any.
 - .3 Commencement and completion dates of each trade. Major trades shall be further broken down as directed by Consultant; generally follow Specification format.
 - .4 Order and delivery dates for major or critical equipment.
 - .5 Critical dates for shop drawing/sample submissions.
 - .6 Any other information relating to orderly progress of Contract, considered by Contractor or Consultant to be pertinent.
- .5 Submit copy of schedule showing actual progress, to Consultant once a month, concurrently with application for payment. Consultant, together with Contractor, shall review construction progress once a month during or immediately following regular site meeting, or more often as directed by Consultant.
- .6 Update construction schedule, whenever changes occur, in manner and at times acceptable to Consultant. Include with each update a written report of activity progress reflected in the revised critical path schedule, and the corrective actions which have been or are to be taken to maintain progress on the schedule in the future, anticipated delay, resource availability, schedule changes, and work to be completed in the next 2 month period.
- .7 Plot actual construction progress on schedule at least once a week.

1.2 CASH FLOW CHART

- .1 Within 21 days after award of Contract, submit, in form approved by Consultant, cash flow chart broken down on a monthly basis in an approved manner. Cash flow chart shall indicate anticipated Contractor's monthly progress billings from commencement of work until completion.
- .2 Update cash flow chart whenever changes occur to scheduling and in manner and at times satisfactory to Consultant.

1.3 PROGRESS RECORD

- .1 Maintain on site, permanent written record of progress of work. Record shall be open to inspection by Consultant at all times and copy shall be furnished to Consultant upon request.

SECTION 01 32 00 - PROJECT PROGRESS DOCUMENTATION

- .2 This record shall show weather conditions, dates of commencement, progress and completion of various trades and items of work. Particulars pertaining to erection and removal of forms, pouring of concrete, installation of roofing and other critical or major components as well as number of employees of various trades and type and quantity of equipment employed daily, shall be noted.
- .3 Display a copy of the construction schedule in the site office from start of construction to completion. Superimpose actual progress of work on schedule at least once each week.

1.4 AS-BUILT DRAWINGS

- .1 Obtain and keep on site at all times a complete and separate set of black line white prints.
- .2 Note clearly, neatly, accurately and promptly as the work progresses location of services, piping, conduits, ductwork embedded in concrete/masonry, concealed in ceilings, walls and furring and underground services below building.
- .3 As-built drawings shall be available for review at each site meeting.
- .4 Refer to Section 01 77 00 for requirements on submission of as-built drawings.

1.5 PROGRESS PHOTOGRAPHS

- .1 Concurrently with monthly application for payment submit coloured progress photographs as follows:
 - .1 Up to four photographs shall be taken from positions determined by Consultant.
 - .2 Photographs shall be properly exposed and in focus; views shall be unobstructed.
 - .3 Identify each photograph on back stating name of project, name of photographer, description of view and date of photograph taken.
 - .4 Submit digital files in jpeg format.

1.6 PRODUCT DELIVERY CONTROL

- .1 It is the responsibility of the Contractor to ensure that the supplier or distributor of materials specified or alternatives accepted, which he intends to use, has materials on the site when required. The Contractor shall obtain confirmed delivery dates from the supplier.
- .2 Provide equipment delivery schedule, coordinated with construction and submittals' schedule, showing delivery dates for major and/or critical equipment.
- .3 The Contractor shall contact the Consultant immediately upon receipt of information indicating that any material, item, will not be available on time, in accordance with the original schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.
- .4 The Consultant reserves the right to receive from the Contractor at any time, upon request, copies of actual purchase or work orders of any material or products to be supplied for the work.
- .5 If materials and products have not been placed on order, the Consultant may instruct such items to be placed on order, if direct communication in writing from the manufacturer or prime suppliers is not available indicating that delivery of said material will be made in sufficient time for the orderly completion of the Work.
- .6 The Consultant's review of purchase orders or other related documentation shall in no way release the Contractor, or his subcontractors and suppliers from their responsibility for ensuring the timely ordering of all materials and items required, including the necessary expediting, to complete the work as scheduled in accordance with the Contract Documents.

END

SECTION 01 33 00 - SUBMITTALS

1.1 GENERAL

- .1 Unless specified or directed otherwise, make all submissions to the Consultant at his office.
- .2 Make all submissions required by the Contract Documents with reasonable promptness and in orderly sequence so as to cause no delay in the work.
- .3 Arrange and pay for delivery to and return from Consultant of all submittals.
- .4 Submit the following prior to start of work:
 - .1 Insurance certificates
 - .2 Bonds
 - .3 Workplace Safety and Insurance Board Certificate

1.2 RELATED REQUIREMENTS

- .1 Make the following submissions in accordance with requirements specified elsewhere:
 - .1 Applications for payment: GC 5.2
 - .2 Workplace safety and insurance board certificates of clearance: GC 10.4
 - .3 Insurance certificates: GC 11.1
 - .4 Bonds: GC 11.2
 - .5 Interference drawings, sleeving and insert drawings: Section 01 31 00
 - .5 Construction schedule: Section 01 31 00
 - .6 Cash flow chart: Section 01 31 00
 - .7 Progress photographs: Section 01 31 00
 - .8 Equipment delivery schedule: Section 01 32 00
 - .10 Purchase order documentation: Section 01 32 00
 - .11 Certified site plan: Section 01 32 00
 - .12 Waste audit and reduction plans: Section 01 41 00
 - .13 Maintenance and operations data: Section 01 77 00
 - .14 As-built drawings: Section 01 77 00
 - .15 Maintenance materials: Section 01 77 00

1.3 SCHEDULE OF VALUES

- .1 Submit schedule of values in accordance with requirements of GC 5.2 APPLICATIONS FOR PROGRESS PAYMENT, not less than 15 days prior to first application for payment.
- .2 Follow specifications table of contents as basis for degree of breakdown required. Show breakdown for different construction phases/stages if required by Consultant.
- .3 Break down cost for large items of work directed by Consultant.
- .4 Provide additional cost breakdown information if requested by Consultant.

1.4 SCHEDULE OF SUBMITTALS

- .1 Within 21 days of submission of construction schedule submit a schedule of submittals for shop drawings, samples, lists of materials and other documentation requiring Consultant's review.
- .2 For each item requiring submission and review show anticipated date of submission and critical date for return of reviewed submission.
- .3 Design sequence of submissions to reflect requirements of construction schedule.

SECTION 01 33 00 - SUBMITTALS

- .4 Allow up to 15 days for Consultant's review for each submission. Stagger submissions as much as possible to permit adequate review time for each item submitted. If several submissions are made at the same time or within a short time of each other, indicate order of priority in which submissions should be reviewed.
- .5 Include sufficient time to permit corrections and resubmission, if necessary, without affecting construction schedule.

1.5 PRODUCT DATA

- .1 Submit product data sheets, required by Contract Documents, and others as may be reasonably required by Consultant.
- .2 Submit product data sheets in digital or printed hardcopy form and in accordance with the following requirements:
 - .1 Show detailed comprehensive information on products to be used.
 - .2 Clearly identify product/model number on data sheets containing multiple products.
 - .3 Supplement manufacturers/distributor's standard schematics, diagrams, brochures data sheets, catalogue sheets, charts and other descriptive data as required to give a clear understanding of the properties of the product and how product is to be incorporated into project.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings required by Contract Documents, in accordance with requirements of GC 3.11 SHOP DRAWINGS.
- .2 Prepare shop drawings in metric measurements only. Shop drawings containing imperial measurements will be rejected.
- .3 Provide shop drawings bearing seal and signature of professional engineer licensed to practise in Ontario where required. Shop drawings submitted without required seal and signature will be rejected and returned to Contractor without review.
- .4 Unless otherwise directed by the Consultant, submit a digital file or the following number of prints for each shop drawing required:
 - .1 Architectural shop drawings: 3 prints
 - .2 Structural, mechanical, electrical shop drawings: 4 prints
- .5 After review Consultant will return a marked up digital file or print to the Contractor. Contractor shall obtain and distribute the necessary number of copies for each shop drawing.
- .6 Shop drawings which require the approval of a legally constituted authority having jurisdiction shall be submitted by Contractor to such authority for approval. Such shop drawings shall receive final approval of authority having jurisdiction before Consultant's final review.
- .7 No work requiring a shop drawing submission shall be commenced until the submission has received Consultant's final review. Do not use any shop drawing, erection drawing or setting drawing which does not bear the stamp and signature of the Consultant.
- .8 The Consultant's review is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and this review shall not relieve the Contractor of his responsibility for meeting the requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site for information that pertains solely to fabrication processes or to techniques of construction and

SECTION 01 33 00 - SUBMITTALS

installation and for coordination of the work of all subtrades.

1.7 SAMPLES

- .1 Submit samples required by Contract Documents and as directed by the Consultant.
- .2 Unless indicated otherwise submit samples in duplicate.
- .3 Where colour selection is required submit manufacturer's full colour range for specified product line.
- .4 Submit samples with identifying labels bearing material or component description, manufacturer's name and brand name, Contractor's name, project name, location in which material or component is to be used, and date.
- .5 Prepay any shipping charges involved for delivering samples to destination point and returning to point of origin if required.
- .6 No work requiring a sample submission shall be commenced until the submission has received Consultant's final review.

1.8 REQUESTS FOR INFORMATION (RFI'S)

- .1 Submit RFI's only after a thorough review has determined that the required information is not included in the Contract Documents.
- .2 Submit RFI's in a timely manner so as not to cause any delay and leaving sufficient review time for the Consultant.
- .3 The Consultant will identify each RFI with the time and date received and assign an anticipated review time of one to five working days depending on the complexity of the matter under review, applied consecutively.
- .4 The Consultant will review RFI's in the order received, unless, upon Contractor's request, the Consultant agrees to prioritize the review of a particular RFI, adjusting the review time accordingly.
- .5 The Consultant will advise the Contractor within the assigned review time with one of the following responses:
 - .1 Information requested is included in the Contract Documents.
 - .2 A site instruction will be issued.
 - .3 A change notice will be issued.
 - .4 A change directive will be issued.

END

SECTION 01 35 00 - SPECIAL PROJECT REQUIREMENTS

1.1 OPERATIONAL LIMITATIONS

- .1 Contractor's use of site and access to it is limited to areas indicated.
- .2 Working hours on site are 7:00 a.m. to 5:00 p.m., Monday to Friday.
- .3 At all times restrict access, parking, material deliveries, execution of work, operations and procedures to agreed locations and times and do not deviate from agreed procedures without prior approval by Consultant.
- .4 Periodically review proposed construction operations with the Owner and Consultant and co-operate as required to ensure that the Owner's interests and requirements are not unduly compromised.
- .5 Do not execute work adjacent and/or above occupied areas except where it can be demonstrated that adequate protective devices are in place.
- .6 Enclose assigned work, staging and storage with a chain link or wire mesh fence, minimum 18 m high.
- .7 Do not use fuel powered machines and tools inside building.
- .8 Prevent spread of dust and noxious fumes, odours to occupied areas and beyond.

1.2 EXISTING SERVICES

- .1 Locate and protect existing services required for new buildings.
- .2 Should existing services be accidentally disrupted, make complete restoration immediately and ensure adequate protection to avoid future disruption.

1.3 PROTECTION

- .1 Keep area of work safe and secure at all times, denying access to unauthorized personnel.
- .2 Protect existing work from damage. Make good any damage caused.
- .3 Ensure that no part of the existing structure is overloaded due to work executed under this Contract.
- .4 Provide adequate guards, barricades and other temporary protection to prevent injury to persons.
- .5 Protect existing building interiors from damage by weather, when executing work which affects integrity of exterior walls and roof. Schedule activities during dry periods and/or provide temporary weatherproof closures to protect openings made in exterior walls and roof. At no cost to the Owner, replace interior finishes damaged by weather as a result of the Work of this Contract.
- .6 Prevent spread of dust and noxious fumes, odours to unassigned areas. Comply with Consultant's directions concerning noise and dust control.

1.4 TEMPORARY USE OF EXISTING FACILITIES

- .1 Existing facilities such as water and electrical power may be utilized by Contractor for temporary use; make arrangements with the Owner and follow Owner's directions with regard to such use.
- .2 Provide power cords, hoses and other devices as required to convey power/water from points where it is required to location where it is available.

SECTION 01 35 00 - SPECIAL PROJECT REQUIREMENTS

1.5 CARBON & WASTE REDUCTION OPPORTUNITY - HIGH MATERIAL RECOVERY POTENTIAL

- .1 This project has a high potential to demonstrate measurable reductions in carbon emissions and construction waste.
- .2 This project involves deconstruction, renovation, or retrofitting. Diversion rates and subsequent material reuse or recovery (internal to project or external reuse) should be achieved.
- .2 The contractor is to provide a list of materials that can and will be recycled during the demolition process. Submit the list of recyclable materials to the design team architect for review.
- .3 At the end of the project, the contractor is to submit a certified letter from the receiving site/s, with a list and quantities of all materials that were received by the receiving site, along with the detailed list of recycled materials.

END

SECTION 01 41 00 - REGULATORY REQUIREMENTS

1.1 PERMITS, LICENCES, FEES

- .1 Comply with requirements of GC 10.2.
- .2 Where permits, licences and inspection fees are required by authorities having jurisdiction for specific trade functions, they shall be obtained by particular subtrade responsible for that work.
- .3 Review building permit set with Consultant immediately following receipt of building permit and jointly determine whether or not changes to Contract are required.
- .4 Be responsible for ensuring that no work is undertaken which is conditional on permits, approvals, reviews, licences, fees, until all applicable conditions are met. No time extension will be allowed for delay in obtaining necessary permits.
- .5 Report to the Consultant in writing any condition which would prohibit granting of any permit or approval before work affecting such items is commenced.
- .6 Give notice of completion of project prior to occupancy, as required by applicable legislation.

1.2 BUILDING CODE, BY-LAWS, REGULATIONS

- .1 Carry out work in accordance with requirements of the Ontario Building Code, latest issue, including all amendments and revisions.
- .2 Comply with requirements, regulations and ordinances of other jurisdictional authorities.
- .3 Where it is necessary to carry out work outside property lines, such as sidewalks, paving or concrete curbs, comply with applicable municipal and/or regional requirements.
- .4 Promptly submit written notice to Consultant, of observed variance of Contract Documents from requirements of Building Code and authorities having jurisdiction. Assume responsibility for work known to be contrary to such requirements and performed without notifying Consultant.

1.3 CONSTRUCTION SAFETY

- .1 Comply with requirements of GC 3.6.
- .2 Be governed by pertinent safety requirements of Federal or Provincial Governments and of municipal bodies having authority, particularly the Ontario Construction Safety Act, and regulations of Ontario Ministry of Labour, and work in conjunction with proper safety associations operating under the authority of Workplace Safety and Insurance Act.
- .3 Do not, in the performance of the work, in any manner endanger the safety or unlawfully interfere with the convenience of the public.
- .4 Notify the Ontario Ministry of Labour of intended work of this Contract as required by the Occupational Health and Safety Act. One copy of the "Notice of Project" shall be handed to Consultant.

1.4 FIRE PROTECTION

- .1 Refer to technical sections of Specifications and Drawings for fire protection requirements.
- .2 Test methods used to determine fire hazard classification and fire endurance rating shall be as required by Ontario Building Code.
- .3 Fire rated door assemblies shall include doors, frame, anchors and hardware and shall bear label of fire rating authority showing opening classification and rating.
- .4 Materials having a fire hazard classification shall be applied or installed in accordance with fire rating authority's printed instructions.

SECTION 01 41 00 - REGULATORY REQUIREMENTS

- .5 Fire rated assemblies shall be constructed in accordance with applicable fire test report information issued by fire rating authority. Deviation from fire test report will not be allowed.
- .6 Construct fire separations as continuous, uninterrupted elements except for permitted openings. Extend fire rated walls and partitions from floor to underside of structural deck above.
- .7 Fill and patch voids and gaps around openings and penetrations in and at perimeter of assemblies so as to maintain continuity and to produce a fire resistant smoke tight seal, acceptable to jurisdictional authorities and Consultant.

1.5 HAZARDOUS MATERIALS

- .1 Comply with provisions of the Occupational Health and Safety Act as amended to include WHMIS (Workplace Hazardous Materials Information System).
- .2 Ensure that Safety Data Sheets (SDS) are available on site prior to first delivery to site of any controlled material or substance.
- .3 Maintain on site for duration of Contract a hazardous materials log containing all required SDS.
- .4 Log shall be open for inspection for Owner, Consultant and all personnel on site.
- .5 Ensure that workers are instructed in the purpose and content of SDS.

1.6 WASTE MANAGEMENT

- .1 Comply with applicable regulations of the authorities having jurisdiction governing waste management.
- .2 Prepare and submit waste audit and waste reduction plan in accordance with applicable requirements of regulatory agencies.
- .3 Prepare and submit source separation plan in accordance with applicable requirements of regulatory agencies.

END

SECTION 01 42 00 - ABBREVIATIONS

1.1 ABBREVIATIONS

- .1 The abbreviations, acronyms and initialisms listed below, when used in the Contract Documents, shall have the meanings shown.
- .2 See Drawing and Room Finish Schedule Abbreviations for additional abbreviations.

ABBREVIATION MEANING

AA	ALUMINUM ASSOCIATION
AAMA	ARCHITECTURAL ALUMINUM MANUFACTURERS' ASSOCIATION
AASHO	AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS
ACI	AMERICAN CONCRETE INSTITUTE
AGA	AMERICAN GAS ASSOCIATION
AIA	AMERICAN INSTITUTE OF ARCHITECTS
AIMA	ACOUSTICAL & INSULATING MATERIALS ASSOCIATION
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AISI	AMERICAN IRON AND STEEL INSTITUTE
AMCA	AIR MOVING AND CONDITIONING ASSOCIATION INC.
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIRCONDITIONING ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWI	ARCHITECTURAL WOODWORK INSTITUTE (USA)
AWMAC	ARCHITECTURAL WOODWORK MANUFACTURERS ASSOCIATION OF CANADA
AWS	AMERICAN WELDING SOCIETY
CCA	CANADIAN CONSTRUCTION ASSOCIATION
CCRC	CANADIAN CODE FOR RESIDENTIAL CONSTRUCTION
CEC	CANADIAN ELECTRICAL CODE
CFUA	CANADIAN FIRE UNDERWRITERS ASSOCIATION
CGA	CANADIAN GAS ASSOCIATION
CGSB	CANADIAN GENERAL STANDARDS BOARD
CIQS	CANADIAN INSTITUTE OF QUANTITY SURVEYORS
CISC	CANADIAN INSTITUTE OF STEEL CONSTRUCTION
CITC	CANADIAN INSTITUTE OF TIMBER CONSTRUCTION
CLA	CANADIAN LUMBERMEN'S ASSOCIATION
CMHC	CANADA MORTGAGE & HOUSING CORPORATION
COFI	COUNCIL OF FOREST INDUSTRIES OF BRITISH COLUMBIA
CPCI	CANADIAN PRESTRESSED CONCRETE INSTITUTE
CRCA	CANADIAN ROOFING CONTRACTORS ASSOCIATION
CSA	CANADIAN STANDARDS ASSOCIATION
CSC	CONSTRUCTION SPECIFICATIONS CANADA
CSI	CONSTRUCTION SPECIFICATIONS INSTITUTE (USA)
CSPI	CORRUGATED STEEL PIPE INSTITUTE
CSSBI	CANADIAN SHEET STEEL BUILDING INSTITUTE
CUA	CANADIAN UNDERWRITERS' ASSOCIATION
CWB	CANADIAN WELDING BUREAU
CWC	CANADIAN WOOD COUNCIL
DND	DEPARTMENT OF NATIONAL DEFENCE, CANADA
FM	FACTORY MUTUAL ENGINEERING CORPORATION
FS	FEDERAL SPECIFICATION (USA)
IES	ILLUMINATING ENGINEERING SOCIETY
IGMAC	INSULATED GLASS MANUFACTURERS ASSOCIATION OF CANADA
LTIC	LAMINATED TIMBER INSTITUTE OF CANADA
MIA	MARBLE INSTITUTE OF AMERICA
MPI	MASTER PAINTERS INSTITUTE
MPMDD	MODIFIED PROCTOR MAXIMUM DRY DENSITY
NAAMM	NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (USA)
NBFU	NATIONAL BOARD OF FIRE UNDERWRITERS
NBC	NATIONAL BUILDING CODE OF CANADA
NBS	NATIONAL BUREAU OF STANDARDS (USDC)
NEMA	NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION

SECTION 01 42 00 - ABBREVIATIONS

NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NHLA	NATIONAL HARDWOOD LUMBER ASSOCIATION (USA)
NLGA	NATIONAL LUMBER GRADES AUTHORITY
NRC	NATIONAL RESEARCH COUNCIL
OBC	ONTARIO BUILDING CODE
OHSA	OCCUPATIONAL HEALTH AND SAFETY ACT
OPSS	ONTARIO PROVINCIAL STANDARD SPECIFICATIONS
OS/CI	OWNER SUPPLIED/CONTRACTOR INSTALLED
PCA	PORTLAND CEMENT ASSOCIATION
PCI	PRESTRESSED CONCRETE INSTITUTE
RAIC	ROYAL ARCHITECTURAL INSTITUTE OF CANADA
SDI	STEEL DECK INSTITUTE
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
SPMDD	STANDARD PROCTOR MAXIMUM DRY DENSITY
SSPC	STEEL STRUCTURES PAINTING COUNCIL
TTMAC	TERRAZZO, TILE & MARBLE ASSOCIATION OF CANADA
ULC	UNDERWRITERS' LABORATORIES OF CANADA
ULI	UNDERWRITERS' LABORATORIES, INC. (USA)
USAS	UNITED STATES OF AMERICA STANDARDS INSTITUTE
WSIB	WORKPLACE SAFETY AND INSURANCE BOARD

END

SECTION 01 45 00 - QUALITY CONTROL

1.1 INDEPENDENT INSPECTION AND TESTING

- .1 Requirements specified herein apply to independent inspection and testing specified under technical Specification Sections, Divisions 2 to 33. Owner will pay separately for independent inspection and testing services.
- .2 Requirements specified herein do not apply to the following:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations and orders of public authorities.
 - .2 Testing, adjustment and balancing of mechanical and electrical systems and equipment.
 - .3 Inspection and testing performed exclusively for Contractor's convenience.
 - .4 Tests specified in Division 2 to 33 inclusive, to be included in Contract such as mill tests, certificates of compliance and testing to be carried out by Contractor under direction of Consultant.
- .3 Failure by independent inspection and testing agency to detect defective work or materials shall not in any way prevent later rejection, when such defect is discovered, nor shall it obligate Consultant for final acceptance.
- .4 Independent inspection and testing agency (hereinafter referred to as testing agency) is expected to do the following:
 - .1 Act on a professional and unprejudiced basis and carry out inspection and testing functions to establish compliance with requirements of Contract Documents.
 - .2 Check work as it progresses and prepare reports stating results of tests and conditions of work and state in each report whether specimens tested conform to requirements of Contract Documents, specifically noting deviations.
 - .3 Distribute reports as follows:
 - .1 Owner: 2 copies
 - .2 Consultant: 2 copies
 - .3 Subconsultants affected: 1 copy
 - .4 Contractor: 2 copies
 - .5 Building Department: 1 copy
- .5 Testing agency is not authorized to amend or release any requirements of Contract Documents, nor to approve or accept any portion of work.
- .6 Contractor shall do the following:
 - .1 Notify testing agency minimum 48 hours in advance of operations to allow for assignment of personnel and scheduling of tests without causing delay in work.
 - .2 Provide testing agency with access to work at all times.
 - .3 Supply material samples for testing.
 - .4 Supply casual labour and other incidental services required by testing agency.
 - .5 Provide facilities for site storage of samples.
 - .6 Make good work disturbed by testing agency.
- .7 When initial inspection and testing indicates non-compliance with Contract Documents, any

SECTION 01 45 00 - QUALITY CONTROL

subsequent reinspection and retesting occasioned by non-compliance shall be performed by same testing agency and cost thereof borne by Contractor.

1.2 MOCK UPS

- .1 Where required by Contract Documents construct mock-ups of work on site, in size and at location directed by Consultant.
- .2 Construct mock-ups prior to start of affected work. Allow sufficient time for Consultant's review. Work affected by mock-ups may not commence prior to acceptance of mock-up.
- .3 Construct mock ups to include all related specified materials and workmanship. Make revisions as directed by Consultant, in accordance with intent of Contract Documents, until mock-ups are acceptable.
- .4 Mock ups, reviewed and accepted by Consultant, shall become the standard of quality against which installed work will be measured.
- .5 Mock ups, by prior arrangement, may be incorporated into finished work if approved by Consultant.

1.3 TOLERANCES

- .1 Unless specific tolerances are required by a Section of the Specifications or a referenced standard, meet the following non-cumulative tolerances for installed work:
 - .1 "plumb" shall mean plumb within ± 3 mm in 3 m of true plumb.
 - .2 "level" shall mean level within ± 3 mm in 3 m of true level
 - .3 "square" shall mean within ± 30 seconds of true 90° .
 - .4 "straight" shall mean within ± 3 mm in 3 m under a 3 m straightedge.

1.4 BUILDING ENVELOPE

- .1 Requirements specified herein apply to all elements of the exterior building envelope.
- .2 Provide control joints in exterior building components of design and spacing which will permit expansion and contraction of components without causing distortion, failure of joint seals, undue stress, cracking, bowing or other defects detrimental to appearance and performance. Review design and location of control joints with Consultant prior to start of work and follow directions given by Consultant.
- .3 Anchor exterior cladding components to structure in manner suitable to accommodate structural deflection and creep. Design anchorage to withstand expected wind loads, positive and negative, in accordance with applicable regulations.
- .4 Ensure that air spaces on the outside of vertical air barrier/vapour retarder (walls) are constructed with adequate drainage provisions to the exterior.

1.5 DRAINAGE

- .1 Lay out and construct work to ensure that positive drainage is provided to roof drains, floor drains, site drains and catch basins, as set in their final position, preventing undrained areas and ponding.
- .2 Ensure that allowable construction tolerances and structural deflection do not cause ponding of water.
- .3 Report to Consultant in writing prior to executing work affected, in case adequate drainage cannot be provided.

END

SECTION 01 50 00 - TEMPORARY FACILITIES

1.1 GENERAL

- .1 Provide all temporary facilities and controls required for the proper execution of the work.
- .2 Provide and maintain temporary systems in accordance with applicable regulations and requirements. Arrange for, obtain and pay for any permits required.
- .3 Upon completion of the Work or when no longer required remove temporary facilities from site.

1.2 TEMPORARY ELECTRICITY AND LIGHTING

- .1 Provide temporary electrical lighting and power system for use by all Sections.
- .2 Arrange, obtain and pay for service, including meter, of sufficient size to allow use of required tools and equipment and to ensure adequate lighting levels for the proper execution of work.
- .3 Install and maintain temporary electrical systems in accordance with the Ontario Electrical Code and other authorities having jurisdiction.

1.3 TEMPORARY HEATING

- .1 Furnish equipment, labour and fuel to provide temporary heat as required for proper execution of work.
- .2 Heat enclosed building to minimum 15°C at all times until taken over by Owner. Provide intermittent heating up to 21°C as required for proper execution of work.
- .3 Use propane or natural gas heaters of a type where the flame is not exposed. Open flame heaters are not permitted.
- .4 Uniformly distribute heat to avoid hot and cold areas and to prevent excessive drying.

1.4 TEMPORARY VENTILATION

- .1 Provide minimum 1 air change per hour for enclosed areas receiving architectural finishes.
- .2 Prior to commencement of work where hazardous or volatile adhesives, coatings or substances are used, install adequate mechanical ventilation.
- .3 Do not allow excessive build-up of moisture inside building.

1.5 TEMPORARY COMMUNICATIONS

- .1 Make provisions on site to send and receive e-mails until Substantial Performance.

1.6 TEMPORARY WATER

- .1 Provide temporary water supply, for use by all Sections.
- .2 Water shall be clean and non-staining.

1.7 TEMPORARY SANITARY FACILITIES

- .1 Provide temporary male and female toilet facilities, including handwash facilities, for all construction personnel.
- .2 Keep facilities clean and sanitary and provided with required supplies at all times.
- .3 Except where temporary sanitary facilities are connected to municipal sewer system, periodically remove wastes from site.

1.8 TEMPORARY FIRST-AID FACILITIES

- .1 Provide site equipment and medical facilities necessary to supply first-aid service to injured personnel

SECTION 01 50 00 - TEMPORARY FACILITIES

in accordance with regulations of the Workplace Safety and Insurance Act. Maintain facilities for duration of Contract.

1.9 TEMPORARY FIRE PROTECTION

- .1 Provide and maintain in proper working order at least two fire extinguishers on each floor, prominently placed, until completion of work.
- .2 Fire extinguishers shall be minimum 9 kg 4A 60BC type.
- .3 Remove fire extinguishers from site, upon completion of work or when directed by Consultant.
- .4 Where gas welding or cutting is to be done within 3 m or above combustible material, or above space that may be occupied by persons, interpose shields of non-combustible material. Tanks supplying gases for welding or cutting shall be placed at no greater distance from the work than is necessary and shall be securely fastened in an upright position. Such tanks shall be free from exposure to the sun or high temperature.

1.10 TEMPORARY USE OF NEW PERMANENT SERVICE AND EQUIPMENT

- .1 Do not use any new permanent service or equipment without Owner's written approval.
- .2 Where permission is granted to use permanent services and equipment provide competent persons to operate services and equipment; inspect frequently and maintain facilities in proper operating condition at all times.
- .3 Permanent services and equipment shall be turned over to Owner in "as new" and perfect operating condition.
- .4 Use of permanent systems and equipment as temporary facilities shall not affect the warranty conditions and warranty period for such systems and equipment. Make due allowance to ensure that Owner will receive full benefits of equipment manufacturers warranty after project takeover.

1.11 CONSTRUCTION AIDS

- .1 Provide temporary steps, ladders, ramps required for movement and placing of materials, equipment and personnel.
- .2 Provide mechanical hoisting equipment and fully qualified operators as required during construction.
- .3 Erect required scaffolding independent of walls, arranged to avoid interference with work of other Sections as much as possible.
- .4 Provide and maintain required shoring and bracing in accordance with Construction Safety Act and other applicable regulations.
- .5 Shoring and all false work over one tier in height shall be designed and shall bear the stamp of a registered professional engineer, having experience in this field.
- .6 The use of explosive power tools must be approved in writing by jurisdictional authorities. The use of explosive power tools will not be permitted under any circumstances unless equipped with a device which positively prevents free flight of the stud.

1.12 BARRIERS

- .1 Protect public and workers from injury.
- .2 Provide and maintain required hoardings, barricades, guardrails, and lights in accordance with applicable regulations.
- .3 Provide and maintain around assigned work and storage areas 1.8 m high fencing, as follows:
 - .1 Steel pipe or tee posts driven into ground minimum 1 m at maximum 2400 mm o.c.

SECTION 01 50 00 - TEMPORARY FACILITIES

- .2 50 mm hot dip galvanized chain link mesh wire tied to posts.
- .3 Where required, for construction access, hinged, lockable chain link gates.
- .4 Welded wire mesh fence panels, such as Instafence may be used in lieu of chain link fence.

1.13 TEMPORARY CONTROLS

- .1 Provide protective coverings to protect work against damage caused by weather, including but not necessarily limited to rain, snow, ice, wind, frost and excessive heat.
- .2 Provide wind breaks and sun shades to allow proper setting and curing of cementitious materials.
- .3 Protect built components from freezing until fully cured.
- .4 Prevent sprayed materials from contaminating air beyond application area, by providing temporary enclosures.
- .5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .6 Prevent tracking of mud and dirt from site onto paved surfaces. Maintain stabilized vehicle egress point (mud mat), constructed of coarse granular material. Place additional granular material as required to maintain access/egress points in proper working order. Clean mud and dirt from paved roads at end of each day by shovelling or sweeping and subsequent washing. Dispose of mud and dirt in a controlled disposal area.

1.14 PEST CONTROL

- .1 Provide rodent control and other pest control programs during construction, in accordance with requirements of jurisdictional authorities.

1.15 TEMPORARY DRAINAGE

- .1 Provide and maintain adequate temporary pumping and drainage systems to keep excavations and structures free of water. Prevent flow of surface water into excavations. Locate sumps away from foundations. Prevent pumped water from carrying soil in suspension in sufficient quantity to cause settlement of adjacent earth. Provide sufficient standby equipment to ensure continuity of pumping systems.
- .2 Control drainage on site to prevent flooding, erosion and run-off onto adjacent properties as a result of construction operations.
- .3 Dispose of water containing silt in suspension in accordance with requirements of jurisdictional authorities.
- .4 Conform to sedimentation and erosion control requirements of the conservation authority having jurisdiction. Provide and maintain until completion of work or until directed by Consultant to be removed, sediment control devices at catch basins, drainage courses and at other locations on site as directed.

1.16 SIGNS

- .1 Except as specified here do not erect any signs unless approved by the Consultant.
- .2 Erect signs relating to safety on the work, or mandatory regulation notices.
- .3 Prior to commencement of work wherein hazardous or volatile cements, coatings, or substances are used, barricade entire area and post adequate number of "NO SMOKING" signs.
- .4 Mount Owner's and Consultants' signs outside construction hoarding at location directed by

SECTION 01 50 00 - TEMPORARY FACILITIES

Consultant.

1.17 FIELD OFFICE AND SHEDS

- .1 Maintain, until completion of Contract, for Contractor's use, a temporary office as required for work, large enough to accommodate site administrative activities and site meetings, complete with light, heating and cooling equipment to maintain 21°C, ventilation, telephone, fax machine (on separate line), copier (not combination fax/copier), table and chairs. Do not store materials, tools, equipment in meeting area; keep clean and tidy.
- .2 Provide temporary covers, sheds and platforms of weatherproof construction as may be required for protection and preservation of materials, small tools, equipment which may be susceptible to damage.

END

SECTION 01 60 00 - PRODUCT REQUIREMENTS

1.1 PRODUCT QUALITY

- .1 Products supplied for work shall be new and as far as possible and unless otherwise specified, of Canadian manufacture.
- .2 Materials used for temporary facilities are not required to be new, provided they are structurally sound and in suitable and safe operating condition.

1.2 STANDARDS AND TERMINOLOGY

- .1 Where a standard has been adopted by these Specifications, incorporate minimum requirements of such standard into the work. Where requirements of Specifications are more stringent than those of the standard, follow more stringent requirements.
- .2 Reference to standards, specifications, handbooks and manufacturer's catalogues refer to latest edition thereof and all amendments or revisions applicable at bid closing date, unless date suffix is included with document number.
- .3 Wherever words "acceptable", "approved", "satisfactory", "selected", "directed", "designated", "permitted", "inspected", "instructed", "required", "submit", or similar words or phrases are used in standards or elsewhere in Contract Documents, it shall be understood, that "by (to) the Consultant" follow, unless context provides otherwise.
- .4 Where the word "provide" is used in these Contract Documents, it shall be taken to mean "supply and install" unless specifically noted otherwise.

1.3 CERTIFICATION

- .1 Building materials, components and elements specified without the use of trade or proprietary names shall meet requirements specified.
- .2 If requested by Consultant, submit evidence of meeting requirements specified. Evidence shall consist of certification based on tests carried out by an independent testing agency.
- .3 Certification based on previous tests for same materials, components or elements is acceptable. Certification shall be in form of written test reports prepared by testing agency.

1.4 AVAILABILITY AND SUBSTITUTIONS

- .1 Contractor may make substitution requests for specified products during bid period not later than 5 working days prior to the bid submission date.
 - .1 Submit technical and performance data, including available finishes, for both the specified product and the proposed substitution.
 - .2 Clearly show any differences between the specified products and the proposed substitution. State the reason for any substitution.
 - .3 Poorly documented substitutions will not be reviewed.
- .2 Products which are specified by their proprietary names or by part or catalogue number form the basis for Contract. No substitutes for these may be used without Consultant's approval in writing.
- .3 Where it is found that specified materials have become unavailable for incorporating into work, notify Consultant immediately of proposed substitution.
- .4 Proposed substitution shall be any top quality product considered by Consultant to be of equal quality and value to that specified, and suitable for purpose intended.
- .5 Products proposed as substitutions, and which are considered by Consultant to be suitable for purpose intended, but which are in his opinion of lesser value and quality than those specified shall

SECTION 01 60 00 - PRODUCT REQUIREMENTS

only be accepted as substitution if reasonable credits are allowed for their use.

- .6 In order to substantiate equivalency of proposed materials, products or processes, submit samples, printed product descriptions, test data, installation instructions, standards, certification, sample, - guarantee/warranty forms, list of successful projects incorporating such proposals, and similar information requested by Consultant.
- .7 Whenever a substitute is proposed, any change to contract price as a result of acceptance of proposed product shall include any adjustments to adjacent structure or space in order to accept minor differences in size or weight between proposed items and corresponding specified items.
- .8 Prevent any substitution or request for substitution from delaying construction progress in any way.
- .9 Requests for substitution resulting from failure to place orders in time will not be entertained. Be responsible for ordering products in time to ensure their required delivery; bear all costs for failure to comply with these requirements.

1.5 PRODUCT HANDLING AND STORAGE

- .1 Suitably pack, crate and protect products during transportation to site to preserve their quality and fitness for the purpose intended.
- .2 Store products in original, undamaged condition with manufacturer's labels and seals intact until they are being incorporated into completed work.
- .3 Handle and store materials in accordance with manufacturer's and supplier's recommendations and so as to ensure preservation of their quality, appearance and fitness for work.
- .4 Arrange materials so as to facilitate prompt inspection, and remove faulty, damaged or rejected materials immediately from site.

END

SECTION 01 70 00 - EXECUTION REQUIREMENTS

1.1 EXAMINATION

- .1 Examine the site, existing premises and surrounding areas and be fully informed as to the conditions and limitations under which the work has to be executed. Claims for additional costs will not be entertained with respect to conditions which could reasonably have been ascertained by an inspection prior to bid closing.
- .2 Prior to commencement of work, make careful examination of previously executed work, existing conditions, levels, dimensions and clearances. Promptly advise Consultant of unsatisfactory preparatory work and substrate conditions; commencement of work implies acceptance of conditions.

1.2 PROTECTION

1. Ensure that no damage is caused to existing structures, buildings, foundations, pavement, fences, curbs, grounds, plants, property, utilities, services, finishes during the progress of Work. Repair and make good any damage caused at no extra cost to Owner to the complete satisfaction of the respective property owners and authorities having jurisdiction. Do not proceed with repairs or remedial work without written permission of the Consultant. Only trades specifically capable of performing the work will be allowed to make remedial or repair work.
- .2 Keep surfaces to receive finished flooring dry and free from oil and grease. Stockpiling of damp or wet building materials and use of mixing boxes or water buckets without protecting floors from moisture gain by approved means, is prohibited.
- .3 Keep municipal roads clean of mud and debris resulting from construction traffic.
- .4 Prevent soiling of pavement due to spillage, mixing of material or any other cause. Make good any damage caused.
- .5 Protect new work from damage with suitable protective coverings.
- .6 Protect work during periods of suspension, regardless of reason for suspension.

1.3 SERVICES AND UTILITY SYSTEMS

- .1 Consult with utility companies and other authorities having jurisdiction to ascertain the locations of existing services on or adjacent to site.
- .2 Information as to the location of existing services, if shown on the Drawings, does not relieve the Contractor of his responsibility to determine the exact number and location of existing services.
- .3 Give proper notices for new services as may be required. Make arrangements with authorities and utilities for service connections required.
- .4 Pay any charges levied by utilities or authorities for work carried out by them in connection with this Contract, unless specified otherwise.
- .5 Operate and maintain all utility systems affected by work of this Contract, until the building or specific portions thereof have been accepted by the Owner.
- .6 Report existing unknown services encountered during excavation to Consultant for instructions; cut back and cap or plug unused services. Be responsible for the protection of all active services encountered and for repair of such services if damaged.

1.4 SLEEVES, SUPPORTS, AND FASTENERS

- .1 Unless specified in other Sections, furnish, set and secure inserts, hangers, sleeves, fasteners, adhesives, anchors and other supports and fittings required for proper installation of work.
- .2 Use exposed metal fastenings and accessories of same texture, colour and finish as base metal on which they occur.

SECTION 01 70 00 - EXECUTION REQUIREMENTS

- .3 Select appropriate type of anchoring and fastening devices and in sufficient quantity and in such manner as to provide positive permanent anchorage of unit to be anchored in position. Keep exposed fasteners to a minimum, evenly spaced and neatly laid out.
- .4 Fasteners shall be of permanent type. Do not use wood plugs.
- .5 Fasteners which cause spalling or cracking of material to which anchorage is being made shall not be used.
- .6 Fasteners in contact with preservative pressure treated wood shall be stainless steel unless otherwise approved by Consultant.

1.5 CONCEALMENT

- .1 Conceal piping, conduit and wiring located in finished areas, in ceiling spaces and furred construction unless specifically noted to be exposed.
- .2 If any doubt arises as to means of concealment, or intent of Contract Documents in this connection, request clarification from Consultant before proceeding with portion of work in question.

1.6 CUTTING AND PATCHING

- .1 Regardless of which Section of work is responsible for any portion of cutting and patching, in each case tradesmen qualified in work being cut and patched shall be employed to ensure that it is correctly done.
- .2 Any cost caused by omission or ill-timed work shall be borne by party responsible therefore.
- .3 Do not endanger any work by cutting, digging or otherwise altering, and do not cut nor alter any loadbearing element without written authorization by Consultant. Provide bracing, shoring and temporary supports as required to keep construction safely supported at all times.
- .4 Cut holes carefully and not larger than required after they are located by Sections requiring them, using suitable equipment and tools.
- .5 Patching and making good work shall be undetectable in finished work.

1.7 WORKMANSHIP

- .1 All work shall be carried out in accordance with the best trade practice, by mechanics skilled in the type of work concerned.
- .2 Products, materials, systems and equipment shall be applied, installed, connected, erected, used cleaned and conditioned in accordance with the applicable manufacturer's printed directions.
- .3 Where specified requirements are in conflict with manufacturer's written directions, follow manufacturer's directions, but inform Consultant in writing prior to proceeding with affected work. Where specified requirements are more stringent than manufacturer's directions, comply with specified requirements.

1.8 LINES AND LEVELS

- .1 Verify all elevations, lines, levels and dimensions as indicated and report errors, any conflicts, or inconsistencies to the Consultant before commencing work or as soon as discovered.
- .2 Arrange to have building base lines laid out by an Ontario Land Surveyor.
- .3 Accurately lay out work and establish lines and levels in accord with requirements of Contract Documents.

SECTION 01 70 00 - EXECUTION REQUIREMENTS

- .4 Set up, maintain and protect permanent reference points and provide general dimensions and elevations for all Sections of Work.

1.9 DIMENSIONS

- .1 Check and verify dimensions wherever referring to work. Dimensions, when pertaining to work of another Section, shall be verified with Section concerned. Details and measurements of work which is to fit or conform with work installed shall be taken at site.
- .2 Do not scale Drawings. If there is ambiguity, lack of information or inconsistency, immediately consult Consultant for directions. Be responsible for extra costs involved through the disregarding of this notice.
- .3 Walls, partitions and screens shall be considered as extending from floor to underside of structural deck unless specifically indicated otherwise on Drawings.

1.10 LOCATION OF FIXTURES

- .1 Location of fixtures, apparatus, equipment, fittings, outlets, conduits, pipes and ducts shown or specified, but not dimensioned, shall be considered approximate.
- .2 Request direction from Consultant to establish exact location. Any relocation caused by Contractor's failure to request direction from Consultant shall be done by Contractor at no extra cost. Where job conditions require reasonable changes in indicated locations and arrangements, make changes at no additional cost.
- .3 Conserve space and coordinate with work of other Sections to ensure that ducts, pipes, conduits and other items will fit into allocated wall and ceiling spaces, while ensuring adequate space for access and maintenance.
- .4 Where ducts, piping and conduits are permitted to be exposed they shall be neatly and uniformly laid out parallel to adjacent building lines and parallel to each other where they run in the same direction. Review exposed installations with Consultant prior to start of work. At no cost to Owner make changes to exposed work as directed by the Consultant where such work is not installed in accordance with Consultant's prior review.
- .5 Except where locations are specifically noted on Drawings, install exposed mechanical and electrical fixtures including outlets, switches, thermostats, panels and other items, located on walls, in orderly and neatly laid out manner, lining up with each other and grouped together where possible. Review installation with Consultant prior to start of rough-in work. Relocate at no cost to Owner any work which does not meet this requirement.

END

SECTION 01 74 00 - CLEANING

1.1 GENERAL

- .1 Be responsible for cleanliness of assigned work areas to satisfaction of Consultant. Maintain work areas in neat and orderly condition at all times.
- .2 Periodically, or when directed by the Consultant, remove from work areas rubbish and waste materials.
- .3 Burning or burying of rubbish and waste materials on site is not permitted.
- .4 Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- .5 Use cleaning material only on surfaces recommended by cleaning material manufacturer.

1.2 CLEANING DURING CONSTRUCTION

- .1 Remove debris, packaging and waste materials frequently.
- .2 Keep dust and dirt to an acceptable level, as directed.
- .3 Remove oily rags, waste and other hazardous substances from premises at close of each day, or more often if required.
- .4 Clear sidewalks of snow and ice, adjacent to construction site.

1.3 FINAL CLEANING

- .1 Upon completion of work, or, where work is phased, upon completion of each phase, thoroughly clean all surfaces and components. Provide professional cleaning by a recognized, established cleaning company, to allow Owner to occupy without further cleaning except where specifically indicated otherwise.
- .2 Remove stains, dirt and smudges from finished surfaces.
- .3 Clean exposed finished surfaces in accordance with respective material manufacturer's recommendations.
- .4 Clean mechanical and electrical fixtures and other fittings of labels, wrappings, paper and other foreign material.
- .5 Replace heating, ventilation and air conditioning filters if units were operated during construction. Clean inside of ducts, blowers and coils.
- .6 Remove from work areas all waste and surplus materials from all areas, including roofs and ceiling spaces.
- .7 Steam clean existing masonry which becomes an interior exposed wall surface.
- .8 Remove snow and ice from driveways, parking areas and walks.
- .9 Power wash paved surfaces.

1.4 WASTE COLLECTION AND DISPOSAL

- .1 All waste materials and debris resulting from the work of this Contract shall belong to the Contractor and shall be removed from the site and legally disposed.
- .2 Periodically, or when directed by the Consultant remove waste material and debris.
- .3 Separate and salvage materials suitable for recycling from general waste stream and transport to recognized recycling facility.

SECTION 01 74 00 - CLEANING

- .4 Burying, burning, selling waste materials on site is prohibited.
- .5 Disposal of liquid wastes into waterways, sewers is prohibited.

END

SECTION 01 77 00 - PROJECT CLOSEOUT

1.1 REFERENCE STANDARD

- .1 Comply with provisions of OAA / OGCA Document No. 100, 2018 "Takeover Procedures", except as modified in these Specifications.

1.2 OPERATING AND MAINTENANCE MANUALS

- .1 Provide operation and maintenance manuals. Data shall be contained in D-ring binders with soft vinyl covers. Binders shall have clear plastic pocket at back of spine identification containing label "Operation and Maintenance Manual" and project name and volume number, if applicable. Each manual shall contain a title sheet listing project name, date and volume number and names and addresses of Contractors and Subcontractors, Consultant and Subconsultants. Also provide a digital copy of the entire manual on a CD or Pen Drive.
- .2 Provide operating and maintenance data, prepared on 8 1/2" X 11" sheets in printed or typewritten form.
- .3 Data shall be assembled in systematic order, generally following the specification format. Provide labelled, celluloid covered tabs fastened to hard paper dividers to identify different Sections.
- .4 Provide the following material as applicable to work of this Contract:
 - .1 List of contents. If more than one volume is required, provide a cross-reference contents page at front of each volume.
 - .2 Complete list of subcontractors and suppliers, showing name, address, telephone/fax numbers, name of contact person and description of work done.
 - .3 Complete list of products used in the work showing product name, part number or code and manufacturer for each listing; follow specification format.
 - .4 Copy of finish hardware list, complete with all amendments and revisions.
 - .5 Schedule of paints and coatings. Include sufficient explanation to fully identify each surface with the applicable paint or coating used. Enclose copy of colour schedule.
 - .6 Maintenance instructions for all finished surfaces.
 - .7 Brochures, cuts of all equipment and fixtures.
 - .8 Operating and maintenance instructions for all equipment.
 - .9 Valve manual.
 - .10 Controls schematics.
 - .11 Extended warranties.
 - .12 Maintenance contracts.
 - .13 Other data required elsewhere in Contract Documents or deemed necessary by Consultant.

1.3 EXTENDED WARRANTIES

- .1 Submit extended warranties as part of "Operating and Maintenance Manuals".
- .2 Arrange extended warranties in systematic order matching Specification format. Include a table of contents listing warranties in same order.
- .3 Each warranty must show:

SECTION 01 77 00 - PROJECT CLOSEOUT

- .1 Name and address of Project
- .2 Name of Owner
- .3 Section Number and Title
- .4 All extended warranties must be presented under Contractor's letterhead, seal and signature and must bear similar wording to that specified in Contract Documents.
- .5 Submit manufacturers' Product warranties in accordance with GC 12.3.6.

1.4 AS-BUILT DRAWINGS

- .1 Prior to final payment submit as-built drawings specified in Section 01 32 00.
- .2 Clearly and prominently mark each drawing "AS-BUILT DRAWING prepared by _____
(name of Contractor).

1.5 MAINTENANCE MATERIALS

- .1 Deliver maintenance materials as required elsewhere in these Specifications. Obtain receipt for delivered materials and submit copy of receipt to Consultant.
- .2 Package materials so that they are protected from damage and loss of essential properties.
- .3 Label packaged materials for proper identification of contents and project name.

1.6 OPERATING AND MAINTENANCE INSTRUCTIONS

- .1 Prior to requesting Substantial Performance, at a time acceptable to Owner and Consultant, but not before operating and maintenance data has been reviewed and accepted by Consultant, instruct designated Owner's representatives in the operation and maintenance of all systems and equipment.
- .2 Arrange training sessions for each type of operating system and equipment. Sessions shall be conducted by qualified instructors and shall be of sufficient duration and depth to adequately instruct participants.
- .3 Throughout the training sessions make reference to reviewed operation and maintenance manuals to familiarize participants with the data provided.
- .4 Prepare an attendance record for each training session, to be signed by each participant upon conclusion of session. Show date and time of session, subject of session and name, title and organization of each participant. Submit a copy of each record to Consultant.
- .5 Subcontractor whose work is subject of training session and Contractor shall be represented during training session by qualified personnel.

1.7 INSPECTION AND ACCEPTANCE OF WORK

- .1 Prior to requesting Substantial Performance submit the following:
 - .1 4 copies of operating and maintenance manuals (one complete set of manuals must be submitted for Consultant's review minimum 6 weeks prior to requesting Substantial Performance).
 - .2 Inspection and acceptance certificates required from regulatory agencies.
 - .3 Written statement from each subcontractor / supplier verifying that all work provided by them is asbestos-free.
- .2 Advise the Consultant in writing, when work has been substantially completed. If Consultant agrees that this stage has been reached, prepare a complete list of deficiencies and submit this list to Consultant.

SECTION 01 77 00 - PROJECT CLOSEOUT

- .3 On receipt of the above deficiency list in a satisfactory form, the Consultant, accompanied by Subconsultants, the Contractor and the Owner, if deemed desirable, will carry out an inspection of the Project.
- .4 Add to the deficiency list, in accordance with Consultant's directions, any additional deficiencies which are identified during inspection and reissue updated deficiency list.
- .5 Upon completion, inspection and acceptance of work, Owner will take over and occupy completed work. Refer to Supplementary Conditions for procedures relating to certification of Substantial Performance and release of holdback.

1.8 FINAL SUBMISSION

- .1 Prior to claiming Final Payment do the following:
 - .1 Submit set of as-built drawings.
 - .2 Submit complete set of reviewed shop drawings, folded to 8 1/2" X 11" size, contained in heavy duty manila envelopes, numbered and labelled. Follow specification format with no more than one Section per envelope.
 - .3 Submit maintenance materials.
 - .4 Submit a final accounting of all approved changes to the Contract Price, including adjustments to cash allowances.

1.9 WARRANTY INSPECTION

- .1 The Contractor shall organize a warranty inspection to take place two weeks prior to the expiration of the standard one-year warranty. The Consultant, subconsultants, the Contractor, sub-contractors and the Owner's representatives shall attend.

END

PART I – GENERAL

1.1. Description

- .1 The work covered by this section includes the furnishing of all labour, materials, equipment and incidentals for the inspection and construction of concrete paving as shown on the Construction Drawings and as described by the Contract Specifications.
- .2 Comply with the requirements of the Tender Document and General Conditions.

1.3. Quality Assurance

- .1 The contractor must have a minimum of 5 years experience in concrete work.
- .2 All materials must conform to CSA A23.1-94. A copy must be kept on site at all times during construction.
- .3 Furnish the Landscape Architect with a certificate prepared by the Ready-Mix concrete suppliers stating that all requirements regarding strength, slump, air entrainment, mix, materials and ratio have been met and maintained.
- .4 Prior to pouring concrete, obtain the approval of the Landscape Architect of all form work, placement of reinforcing steel, consolidation of subgrade and placement and consolidated of granular base.
- .5 When required by the Landscape Architect, have all concrete tested for compressive strength, slump and air content, in accordance with CSA A23.2-94. Submit test reports in duplicate and pay all costs incurred.
- .6 Ensure work complies with the Ontario Building Code and all pertinent local by-laws and regulations. These shall govern in case of conflict with the specification. Obtain and pay for all necessary permits before starting work.

1.4. Product Delivery, Storage and Handling

- .1 Store all materials in accordance with CSA A23.1-94 latest edition.
- .2 Store reinforcing steel on racks or skids. Protect from contamination by dirt or other materials.
- .3 Store forms off the ground and sufficiently supported to prevent warping or distortion. Protect from contaminations by oil, grease, water, earth, etc.
- .4 All concrete is to be ready mixed at plant and transported to the site by truck in accordance with CSA A23.1-94. Hand mixed concrete is not allowed unless approved in writing by the Landscape Architect prior to the start of work.
- .5 Convey concrete from the mixer to the place of final deposit as rapidly as possible, with as little rehandling as is practical. Avoid segregation and/or loss of material.
- .6 Place concrete in final position and at such a rate that it remains plastic at all times and flows readily between reinforcement, into all corners and crevices and around all embedded fixtures. Pour in a continuous operation between expansion joints.

SECTION 03 33 11 – CONCRETE

- .7 Thoroughly clean all equipment, used for mixing or transporting of concrete, of all hardened concrete and foreign material prior to placing concrete.
- .8 Do not allow concrete to be contaminated by foreign materials. Do not use retempered concrete unless approved in writing, by the Landscape Architect.
- .9 Obtain the approval of the Landscape Architect of the type, number and method of use of mechanical vibrators. Do not operate a vibrator for longer than 10 seconds in any one location.
- .10 Maintain constant control to ensure that finished concrete is dense, uniform, free of air holes or honeycombs and that no segregation of aggregates and cement paste occurs.

1.5. Job Conditions

- .1 Protect all concrete surfaces from damage or harmful effects of weather, water, mechanical shock or trespassers until concrete is properly cured.
- .2 If temperature is expected to drop below 5°C, place and protect concrete in accordance with AC1.605.

1.5. Inspection

- .1 Obtain the approval of the Landscape Architect of the layout, compacted sub-grade, compacted granular base, formwork and reinforcing before proceeding with subsequent work.

PART II – PRODUCTS

2.1. Materials

- .1 Granular A and Granular B: granular material conforming in all respects to OPSS 1010, latest edition.
- .2 Portland cement: standard grey portland cement, conforming to CAN/CSA-A5/A8/A362-93 type 10 normal.
- .3 Aggregates: nominal size as specified and conforming to CSA A23.1-94.
- .4 Water: clear and free of deleterious substances or efflorescing salts.
- .5 Air entraining admixtures: conforming to ASTM C 260-94 and of approved manufacturer.
- .6 Reinforcing steel: conforming to CSA G-30.12-M77 for bars, CSA G30.5-M83 for welded steel wire mesh and OPSS 1440.
- .7 Expansion joint filler: premoulded bituminous impregnated fibre board conforming to ASTM D1751-73 of thickness and depth specified.
- .8 Curing Compounds: clear liquid chlorinated rubber to ASTM C309 and OPSS 1315.
- .9 Formwork: conforming to CSA A23.1-94 and AC1- 347 and of sound wood, in good condition and equal or better than No. 2 grade construction spruce and/or 19mm Douglas

SECTION 03 33 11 – CONCRETE

Fir plywood, with the surface treated to produce a smooth concrete finish. Plywood to be CSA 0/2/.

2.2. Mixes

- .1 Mix concrete materials in accordance with CSA CAN3-A23.1M-77, in the proper proportions and ratios to provide a finished product as specified. Concrete mix shall meet the following requirements: Compressive strength 32 MPa at 28 days; 100mm slump at point of deposit; air entrainment 6% (+ or - 1%). Unless noted otherwise on the drawings or details, all concrete is to be 32 MPa strength.
- .2 With the exception of air entraining agents, other mixtures may only be used with the written approval of the Landscape Architect. The use of agents to lower the freezing point of the mix will not be permitted.

PART III – EXECUTION

3.1. Preparation

- .1 Excavate to the minimum specified depths, after compaction, as shown on the drawings. Maintain sub-grade parallel to finished grade in all cases.
- .2 Fine grade subgrade eliminating uneven areas and filling low spots. Remove all debris. Excavate all soft and unstable areas in subgrade and backfill with Granular “B”.
- .3 Compact subgrade uniformly to ninety-eight percent (98%) Standard Proctor Maximum Dry Density. Arrange for testing of fill materials and compaction. When required and as directed by the Landscape Architect, the Contractor shall, at his own expense, sprinkle water to assist in compaction.
- .4 The Granular “B” base shall be applied in maximum 50mm layers, graded, rolled and compacted to ninety-eight percent (98%) Standard Proctor Maximum Dry Density.
- .5 In the event of delay between completion of subgrade and commencement of application of stone base, the Contractor shall re-grade and re-compact subgrade at his own expense if so ordered.
- .6 Keep materials clean and free of deleterious materials at all times.
- .7 Maintain final grade of granular base course parallel to finished grade.
- .8 Submit written test reports.
- .9 Contractor to ensure that all concrete columns are vibrated to eliminated all voids.

3.2. Granular Base

- .1 Spread the specified granular materials in horizontal layers not exceeding 100mm loose depth and compact to 98% Standard Proctor Maximum Dry Density. In areas where compaction by roller is not possible, compact with approved mechanical or hand tamping devices to the specified density.
- .2 Build up thickness of each material to the minimum compacted thickness as specified on the drawings.
- .3 Ensure that granular does not become contaminated by deleterious material.
- .4 Correct all irregularities or depressions resulting from rolling and compact until the granular surface is smooth, uniform and true to line and grade.
- .5 When required by the Landscape Architect, have the compaction of the granular materials tested by an approved, independent testing firm. Submit 2 copies of the test results to the Landscape Architect and obtain his approval prior to pouring concrete. Pay testing costs incurred.

3.3. Form Work

- .1 Erect forms in such a manner as to facilitate dismantling and removal without damaging concrete.
- .2 Erect forms true to line and level in accordance with the drawings, and sufficiently braced to maintain their form and alignment when concrete is placed.
- .3 Prior to each pouring operation, coat affected form surfaces with an approved form separating material.
- .4 Provide for all openings, sleeves, hangers, anchors and ties to be cast into the concrete.
- .5 Do not use treated plywood for exposed surfaces more than 5 times. Do not use plywood if surface is damaged.
- .6 Obtain the approval of the Landscape Architect of all form work before proceeding

3.4. Reinforcement

- .1 Before placing reinforcement, clean all loose scale, dirt and any other coating that would destroy or reduce bonding to concrete.
- .2 Place all reinforcement accurately in accordance with the drawings and/or approved shop drawings. Use approved chairs, spacers, hangers or ties to secure the reinforcing in position.
- .3 Unless directed otherwise, provide the following minimum concrete cover over reinforcing:
 - a) 75mm where concrete is deposited against soil.
 - b) 50mm for bars larger than 10m and 40mm for bars smaller than 10m where concrete is exposed to weather.

- .4 Obtain the approval of the Landscape Architect of all reinforcing before proceeding.

3.5. Joints

- .1 Locate expansion joints as shown on the drawings or at max. intervals of 6.0m, between new concrete and all new or existing rigid structures, and either side of all driveway sections. Joints must be cast in place.
- .2 Execute construction joints in accordance with AC1-301 and as detailed on the drawings. Thoroughly clean the joint surface of all laitance and wet thoroughly and slush with a coat of cement grout immediately before placing new concrete.
- .3 Except for expansion joints, continue reinforcing uninterrupted through joints, unless shown otherwise on the drawings or directed by the Landscape Architect.
- .4 Stop reinforcing on each side of expansion joints. Where dowels are indicated, cast one half into one side of the joints. The exposed half shall be machined smooth and heavily greased before placing adjoining sections.
- .5 Locate control joints as shown on the drawings or at a max. spacing of 2.0m. Ensure joints are to a minimum depth of 1/4 the thickness of the concrete. Make joints by one of the following methods:
 - a) Sawed joints
 - b) Hand formed and hand tooled
 - c) Inset joints placed in plastic concrete
- .6 No offsets will be allowed between adjacent sections of joint fillers and no plugs of concrete will be permitted anywhere within an expansion joint.
- .7 Apply joint sealant in accordance with the manufacturer's directions. Ensure joints are clean and free of any foreign substances before sealing. Clean any sealant spilled on concrete surface immediately.

3.6. Placing of Concrete

- .1 Place concrete by approved means and using approved equipment.
- .2 Do not place concrete until formwork and grades have been inspected by the Owner or Landscape Architect.
- .3 Transport concrete from mixer to point of deposit, and place in final position as quickly as possible to prevent separation and loss of materials.
- .4 While placing concrete, compact thoroughly and uniformly by approved means to ensure a dense homogeneous structure free of air pockets, and honeycombs and closely bonded with reinforcement.

3.7. Finishing

- .1 Treat and finish all surfaces as directed or specified and in accordance with CSA CAN3-A23-1-M77.

SECTION 03 33 11 – CONCRETE

- .2 Strike off and float all exposed paving surfaces as soon as possible after consolidation and in accordance with recommendations of the Portland Cement Association. Execute final finishing as specified on the drawings or as directed by the Landscape Architect.
- .3 Ensure finished surface is true to line and level as shown on the drawings. Walks are to be sloped as per grading plans.
- .4 All irregularities greater than 6mm under a 3000mm straight edge, operated parallel to the centre line, must be repaired.
- .5 Obtain the approval of the Landscape Architect of finished surfaces before starting curing operations.
- .6 Immediately after stripping formwork, obtain the approval of the Landscape Architect before commencing patching, finishing or curing operations.
- .7 The extent, method and type of mix for patching shall have the approval of the Landscape Architect before commencing work. Ensure patching mix contains an approved bonding and waterproofing agent and that it is installed in accordance with the manufacturer's specifications.

3.8. Curing

- .1 Keep concrete moist for at least 3 days after placement, in accordance with CSA CAN-A231-M77.
- .2 Method of curing shall be as specified or by one of the following approved methods if not specified:
 - a) Moist curing
 - b) Waterproofing paper or white polyethylene sheeting
 - c) White liquid membrane compound
 - d) Combination of above methods
- .3 Moist curing: use burlap or approved equal. Ensure it is thoroughly wet when applied and kept continuously wet and in full contact with the surface during the curing period.
- .4 Waterproof paper or white polyethylene sheeting: ensure sheet is large enough to cover entire concrete surface. Secure to prevent displacement during curing period. Immediately repair any tears or holes.
- .5 White liquid membrane compound: apply at the rate of 1 litre per 5 square meters after final finishing and all free water has disappeared. Keep membrane compound agitated to prevent settling of compound. Apply membrane compound to edges immediately after formwork is removed. Ensure a continuous and unbroken membrane cover is applied.

3.9. Clean-up

- .1 Clean and remove all concrete spills from the site and make good any disturbance.

End of Section

SECTION 04 05 13 - MORTAR

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Concrete fill for block lintels and reinforced masonry: Section 03 30 00
- .2 Masonry, including mortar joint workmanship: Section 04 20 00

1.3 QUALITY ASSURANCE

- .1 Quality Standards: meet requirements of CSA A179-14.
- .2 Source of Material: for mortar to remain exposed in finished project, brands of cementitious materials and source of supply of sand, shall remain the same for duration of work.
- .3 Owner may arrange and pay out of allowance carried in Section 01 21 00 for testing of mortar and grout by an independent testing agency.

1.4 SUBMITTALS

- .1 Submit detailed product data for each product required.

1.5 PRODUCT HANDLING

- .1 Store cementitious materials so as to prevent moisture absorption from any source. Do not use material affected by moisture.
- .2 Store mortar aggregate materials to prevent contamination. Do not use contaminated materials.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Water: potable and non-staining.
- .2 Sand: ASTM C144-17.
- .3 Portland cement: CSA-A3001-18, Type GU.
- .4 Masonry cement: CSA-A3002-18.
- .5 Lime: ASTM C207, Type S.
- .6 Colour pigment to ASTM C979, pure concentrated mineral pigments from "Premium Group" by Davis Colour or equivalent product by Solomon or as recommended by mortar producer. Colours selected by Consultant.

PART 3 - EXECUTION

3.1 PROPORTIONING AND MIXING

- .1 Mix mortar in accordance with CSA A179-14 except as specified herein.
- .2 Place an experienced and competent person in direct charge of proportioning and mixing operations.
- .3 Accurately premeasure ingredients for each batch prior to being deposited into mixer. Use measuring boxes or other method acceptable to Consultant. Depositing materials directly into mixer from

SECTION 04 05 13 - MORTAR

stockpiles without premeasuring is not permitted.

- .4 Except where specified otherwise do not add admixtures of any kind to mixes.
- .5 Mix coloured mortar in colours selected by Consultant. Make adjustments in colour as directed by Consultant. Use white cement where required to obtain required colour.
- .6 All mortar shall be mixed for a period of not less than 3 minutes and not more than 10 minutes.

3.2 TIME LIMITS AND RETEMPERING

- .1 Use and place mortar in final position within following time limits after mixing:
 - .1 Air Temp. above 25°C - 2 hours.
 - .2 Air Temp. below 25°C - 2.5 hours.
- .2 Standard mortar that has stiffened within above time limits because of evaporation of water may be retempered by adding water as frequently as needed to restore required consistency. Discard mortar not used within above time limits.
- .3 Do not retemper coloured mortar. Discard coloured mortar not used within time limits specified.

3.3 MORTAR SCHEDULE

- .1 Exterior masonry veneer 1-1-6 cement/lime mortar.
- .2 Non-bearing walls: Type N mortar.
- .3 Below grade walls: Type M mortar.
- .4 Provide coloured mortar at exterior locations with architectural block and clay brick. Provide up to 3 different coloured mortar.

END

SECTION 04 20 00 - MASONRY

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Supply of reinforcing steel and concrete for block lintels and reinforced masonry: Division 3
- .2 Mortar: Section 04 05 13
- .3 Supply of loose steel lintels: Section 05 50 00
- .4 Air barriers: Section 07 27 00
- .5 Caulking of control joints: Section 07 92 00
- .6 Supply of steel door frames: Section 08 11 13

1.3 WORK INSTALLED BUT SUPPLIED BY OTHERS

- .1 Build into masonry elements inserts, anchors, bolts, sleeves and other items supplied by other Sections and which are required for installation and performance of work of other Sections.
- .2 Install loose steel lintels required for support of masonry elements.
- .3 Install steel door frames and access doors occurring in masonry elements.
- .4 Install reinforcing steel and concrete fill into block lintels and reinforcing steel grouted into masonry walls as shown on the structural drawings.
- .5 Build architectural precast components into masonry where required.

1.4 QUALITY ASSURANCE

- .1 Meet requirements of CSA A370-14 (2018), CSA A371-14 (2016) and CSA S304.1-14 (2019).
- .2 Ensure that work is executed under the continuous supervision and direction of a competent foreperson.
- .3 Provide standard tests carried out by an approved testing company on the actual production run of clay brick showing compression, absorption and saturation coefficient. Provide 50-cycle freeze-thaw resistance test.

1.5 SUBMITTALS

- .1 Prior to start of work submit product data and duplicate samples of all masonry accessories including horizontal reinforcement, masonry anchors, membrane flashings, control joint filler, weep holes, mortar dropping control device.
- .2 Prior to start of work submit drawings showing proposed locations of exterior and interior masonry control joints.

1.6 MOCK-UPS

- .1 Construct sample panel, minimum 600 x 600 mm, of each type of masonry requiring coloured mortar to determine acceptability of each mortar colour. Make adjustments as directed by Consultant and repeat procedure until each mortar colour is approved.

SECTION 04 20 00 - MASONRY

- .2 Construct sample panel of an exterior wall incorporating masonry veneer and including reinforcement, flashings and weep holes, minimum 1.2 x 1.2 m in size. Build panel in stepped fashion to expose each material used.
- .3 Locate panels where directed by Consultant. Exterior wall mock-up may not be incorporated into finished work and shall be removed upon completion of masonry work, when directed by Consultant.
- .5 Construct panels to meet project requirements. Select masonry units to represent maximum texture and colour variations.
- .6 Do not begin masonry work until panels are approved by Consultant. Approved panel shall represent minimum standard of quality for project masonry.

1.7 PRODUCT HANDLING AND STORAGE

- .1 Deliver and handle masonry units so as to prevent soiling and chipping.
- .2 Store masonry units above and off ground on level platforms which permit air circulation under stacks.
- .3 During storage, protect masonry units against moisture absorption, damage and staining.

1.8 PROTECTION

- .1 When work is not in progress, cover tops of completed masonry elements exposed to weather with non-staining weatherproof covers. Covers shall be at least 600 mm wider than masonry elements and shall be well secured against displacement.
- .2 Protect finished work at corners, sills, projections and other areas likely to be damaged, with suitable coverings until completion of building.
- .3 Adequately brace masonry walls and partitions to resist effects of wind and other lateral forces.

1.9 HOT AND COLD WEATHER WORK

- .1 Comply with requirements of CSA A371-14 (2016).
- .2 When outside temperature is below or likely to go below 5°C provide heat to maintain temperature of materials and surrounding air at 5°C or better during laying and for 72 hours thereafter. Submit for approval the proposed method of protecting masonry against low temperatures. Salamanders will not be permitted.
- .3 Keep units completely free from ice and frost. Preheat mortar materials and mortar boards. Temperature of mortar to be between 21°C and 48°C. Protect mortar from frost. Do not use admixtures or antifreezes in mortar.
- .4 Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.
- .5 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Concrete block: to CSA A165 Series-14 (R2019). Cure concrete block using carbon capturing technology/carbon reducing technologies, converting gaseous CO₂ to calcium carbonate nano crystals (CaCO₃). Acceptable products: Carboclave Concrete Block by Bampton Brick or "Carbon Capturing" block by Richvale York or Day & Campbell Limited or "CarbonCure" distributed by Bampton Brick and Permacon.
 - .1 Normal weight block: H/15/A/M and S/15/A/M unless otherwise indicated.

SECTION 04 20 00 - MASONRY

- .2 Size: unless indicated 190 x 390 mm x thickness shown.
- .3 Exposed concrete block units shall be uniform in size, free of perceptible warp or twist, without chipped, ragged or broken edges; have a uniform surface texture, free of cracks, blemishes or defects detrimental to appearance or performance.
- .2 Precast Concrete Sills: 424 Tapestry Tex Stone by Shouldice.
 - .1 Size: 90 mm thick x 190 mm high.
- .3 Clay Masonry Units: ASTM C216, Grade SW.
 - .1 Size: 90 mm D x 57 mm H x 290 mm L.
 - .2 Product: Sundance Smooth, Ironspot by Meridian.
- .4 Metal Reinforcement:
 - .1 Material: high tensile strength steel wire meeting ASTM A82, by Blok-Lok or Dur-O-Wall.
 - .2 Finish: hot dip galvanized after fabrication to ASTM A153, Class B.
 - .3 Horizontal reinforcement, exterior walls: Ladder type with 4.8 mm diameter hot dip galvanized steel side and cross rods; side rods centred on concrete block face shells; prefabricated corner and intersection assemblies: BLOK-TRUS BL11 ladder reinforcement by Blok-Lok or equivalent product by Dur-O-Wal.
 - .4 Horizontal reinforcement for interior walls and partitions: truss type with minimum 3.66 mm thick side and cross rods unless otherwise indicated; width 50 mm less than wall thickness; mill galvanized: BLOK-TRUS BL10 ladder reinforcement.
- .5 Connectors, anchors and ties:
 - .1 Materials:
 - .1 Steel: hot dip galvanized to ASTM A123.
 - .2 Wire materials: high tensile strength steel wire meeting ASTM A82, hot galvanized
- .6 Cavity wall connectors at walls with concrete block back-up: one of the following types:
 - .1 Fero Thermal Block Shear Connector, Holed, consisting of 1.6 mm thick steel connector plate of length to suit insulation and concrete block thickness, steel wire V-tie 4.8 mm diameter by Form & building Supply (Toronto) Inc.
 - .2 BLOK-LOK Shear Anchor, holed, with wire ties: BL507S.
- .7 Provide lateral support angles at top of non-loadbearing masonry partition/walls. Anchor angles to structural deck or beam at 10 x partition/wall thickness each side of partition and maximum 0.6 mm from end of partition//wall.
- .8 Membrane Flashing/Dampproof Course: TWF by Bakor.
- .9 Membrane flashing back-up: minimum 0.9 mm thick hot dip galvanized sheet steel; Z275 zinc coating designation.
- .10 Premoulded Joint Filler: Mineral fibre board by Rockwool or Fibrex.
- .11 Control Joint Filler: Emseal 25V Expanding Foam Sealant.
- .12 Weep and vent hole inserts: Cell Vent by Dur-O-Wall.

- .13 Mortar dropping control device (cavity drainage mat): high density polyethylene or nylon mesh in trapezoidal configuration designed to facilitate effective drainage of moisture to weep holes; thickness to suit air space: "The Mortar Net" by Mortar Net Solutions.

PART 3 - EXECUTION**3.1 ERECTION - GENERAL**

- .1 Lay masonry work in uniform manner. No one portion of any section of work shall rise more than 750 mm above general level. Do not lay more than 1500 mm in height of any wall in any working day.
- .2 Unless otherwise noted, all walls and partitions shall extend to the underside of the structural deck.
- .3 Cut exposed masonry units with power driven table model masonry saw only. Ragged or chipped edges will not be permitted.
- .4 Consult with other Sections to avoid cutting and patching. Co-operate in setting and aligning built-in items. Build in conduit and piping so that they are not exposed. Do not break masonry bond to accommodate concealed built-in items.
- .5 Grout solid with mortar all spaces around built-in items.
- .6 Build in metal nailing plugs, grounds, inserts, anchor bolts, bearing plates, loose and miscellaneous items of steel and iron, isolated beams, lintels and shelf angles, sleeves, blocking and items furnished by other Sections.
- .7 Do not shift or tap masonry units after mortar has taken its initial set.
- .8 At masonry openings less than 450 mm wide, unless otherwise detailed, use mild steel plates, minimum 6 mm thick, of width 25 mm less than supported masonry thickness and with minimum 100 mm end bearing each side.
- .9 Construct structurally reinforced masonry elements in accordance with requirements indicated on structural drawings.

3.2 CHASES, SLEEVES, OPENINGS AND HOLES

- .1 Chases, sleeves and openings shall be built in during erection of masonry work, and purpose-made chased units shall be built into proper position.
- .2 Openings in masonry work exceeding 450 mm shall be provided with lintels in accord with lintel schedule.
- .3 Chasing of completed walls or formation of holes shall only be carried out with Consultant's prior approval, and then only with a tool designed to cleanly cut masonry units.
- .4 Chases shall be plumb and shall be minimum of one unit length from jambs of openings.
- .5 Horizontal or diagonal chases are not permitted.

3.3 MASONRY BEARING

- .1 Masonry bearing shall extend full thickness of wall.
- .2 Unless otherwise indicated, provide at least 200 mm of bearing for lintels and beams.
- .3 Bearings of block masonry walls: use minimum 2 courses of solid or grouted block units except where concrete bearing pads are required.
- .4 Bearings in brick masonry walls: use solid face brick where exposed to view.

- .5 Build masonry neatly around beam, and lintel bearings.

3.4 CONSTRUCTION JOINTS

- .1 Where fresh masonry joins partially or totally set masonry, clean exposed surfaces of set masonry and remove loose mortar and foreign material prior to laying fresh masonry.
- .2 If necessary to stop off a horizontal run of masonry, rack back one-half masonry unit length in each course. Tothing will not be permitted unless approved by the Consultant.

3.5 BLOCKWORK

- .1 Blockwork shall be laid up in running bond except where shown otherwise. Provide stack bond where shown. Unless otherwise indicated, blocks shall be of thickness required to produce total wythe thickness.
- .2 Do not wet blocks before laying.
- .3 Units shall be laid with webs aligning one over the other in full bed of mortar over entire laying surface including webs.
- .4 Exposed faces shall be full units laid out to minimize cutting with not less than 100 mm any at vertical edge or corner.
- .5 Top course of block walls shall be laid with semi-solid blocks at door and window sills, at wall changes to brick and where shown. Top course of freestanding block walls shall be bullnosed all sides.
- .6 Provide solid block roof parapets or fill hollow block with grout.
- .7 Use solid block for at least two courses under all point bearing loads.
- .8 Form exposed external block foundation corners with end units.
- .9 Provide bullnose block at all exposed vertical and horizontal block corners. Where directed by Consultant provide square corner block at first course above floor; grind corner above base to match bullnose above.
- .10 Provide minimum 400 mm solid or grouted block for jambs of openings and at ends of walls. Provide return corner block where shown.
- .11 Cut with power saw exposed units to accommodate flush mounted electrical outlets, grilles and other components. Leave maximum 5 mm clearance. Cover plates and flanges must cover cut edges.
- .12 Blockwork scheduled to be left exposed or painted shall be laid and pointed with utmost care. Distribute units of varying colour and texture evenly to achieve homogeneous blend. Replace at no extra cost to Contract, block units which in the opinion of the Consultant are too contrasting in appearance for satisfactory blending.
- .13 Take special care to prevent mortar or other substances from staining exposed block faces. Replace stained blocks as directed by the Consultant at no extra cost to Contract.

3.6 BLOCK LINTELS

- .1 Build block lintels; install reinforcement and concrete fill. Unless otherwise detailed make lintels 200 mm high.
- .2 Lintels shall have minimum 200 mm bearing, with care taken in layout of wall to ensure that lintel jointing coincides with regular bond of wall.
- .3 Provide building paper in joint at bearings and at vehicle joint at ends of block lintels to break bond.

3.7 JOINT WORK

- .1 Make joints uniform and 10 mm thick unless otherwise shown.
- .2 Joints in exposed and painted surfaces, and in masonry behind wall mounted and built-in fixtures, lockers and cabinetwork shall be tooled when thumbprint hard with a 25 mm o.d. plastic tool to produce a concave joint.
- .3 Joints in unparged masonry below grade shall be pointed tight with a trowel.
- .4 Joints directly behind resilient base, rigid insulation, ceramic tile and gypsum board shall be struck flush.

3.8 VENEER WALLS

- .1 Coordinate with Section 07 27 00 to install air barrier at exterior face of interior wythe of masonry.
- .2 After review and acceptance of air barrier by Consultant, construction exterior wythe of masonry.
- .3 Maintain 25 mm deep air space between interior and exterior wythes of masonry.
- .4 Install membrane flashings and weep holes to maintain proper drainage conditions.

3.9 ANCHORING AND REINFORCEMENT

- .1 Unless otherwise indicated reinforce all walls and partitions with continuous horizontal metal reinforcement, installed at 400 mm o.c. vertically.
- .2 At wall openings place continuous reinforcement in first and second mortar joints above and below openings. Additional reinforcement at openings shall extend 610 mm beyond both sides of openings.
- .3 Install prefabricated corner assemblies at corners.
- .4 Lap continuous reinforcement 150 mm at splices. Cut reinforcement at control joints.

3.10 CONTROL JOINTS

- .1 Provide control joints at masonry walls supported by foundation walls at approximately 7.5 m o.c. and at masonry walls supported on framed slabs at approximately 4 m o.c., and where shown. Confirm actual locations of control joints with Consultant before starting work.
- .2 Control joints must be constructed during erection of masonry, and may not be sawcut later.

3.11 MEMBRANE FLASHINGS / DAMPPROOF COURSE

- .1 Install dampproof course on top of foundation walls above grade.
- .2 Install membrane flashing where shown, and at the following locations:
 - .1 Door heads
 - .2 Window heads
 - .3 Immediately above horizontal interruptions within exterior walls.
- .3 Lap membrane flashing 100 mm at joints; seal lap with adhesive.

3.12 WEEP AND VENT HOLES

SECTION 04 20 00 - MASONRY

- .1 Form weep holes by inserting weep/vent hole inserts into exterior wythe mortar joint immediately above all membrane flashings, and at other locations where shown. Space weep holes at 610 mm o.c. horizontally.
- .2 Form vent holes by inserting weep/vent hole insert into exterior wythe mortar joint near top of each cavity compartment and at other locations, where indicated. Space vent holes at 610 mm o.c. horizontally.
- .3 Keep face of weep/vent hole inserts back from face of brick minimum 6 mm. keep weep holes free of mortar.

3.13 STEEL DOOR FRAMES

- .1 Install steel frames in masonry walls. Build in frames rigid, true and plumb. Fill voids between frames and masonry with grout. Fill fixed centre mullions at double doors with grout.
- .2 Brace frames solidly in position while being built in. Provide temporary horizontal wood spreader at mid-height of frames to ensure maintenance of required frame width until masonry work is completed. For frames over 1200 mm width provide temporary vertical support at centre of head.
- .3 Comply with installation requirements specified under Section 08110.

3.14 PATCHING AND CLEANING

- .1 At completion of work, holes and other defects in masonry joints shall be repaired, and masonry surfaces shall be thoroughly cleaned.
- .2 Holes in masonry joints shall be filled with mortar and suitably tooled. Cut out and repoint defective joints. Use coloured mortar to match existing.
- .3 Dry brush masonry surfaces at end of each day's work and after all final pointing.
- .4 Remove mortar smears and droppings from concrete block masonry surfaces after such smears and droppings have dried. When mortar joints are dry and hard, clean block masonry surfaces by rubbing down with abrasive blocks and stiff fibre brushes.
- .5 Remove efflorescence from masonry surfaces by wet cleaning in accordance with manufacturer's recommendations.

END

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Concrete formwork: Section 03 30 00

1.3 QUALITY ASSURANCE

- .1 Lumber shall bear the grading stamp of an agency certified by The Canadian Lumber Standards Administration Board.
- .2 All lumber shall be sound, straight, dressed all sides and kiln dried, and moisture content at any time during shipment and storage shall not exceed 19%.

1.4 PRODUCT HANDLING

- .1 Store materials on site to prevent deterioration, loss or impairment of their structural and other essential properties. Prevent excessive moisture gain of materials.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Lumber:
 - .1 Meet requirements of CAN/CSA-086-19 Strength Group D (spruce-pine-fir) and CAN/CSA 0141-05 and National Lumber Grading Authority (NLGA) Standard Grading Rules.
 - .2 Blocking, Copings, Nailers, Curbs: NLGA 122c "Standard" S-P-F.
- .2 Plywood:
 - .1 All locations except backboards: Douglas Fir plywood to CSA 0121-17 Unsanded Sheathing Grade.
 - .2 Backboards: Canadian Softwood plywood to CSA 0151-17, Sanded grade, solid two sides, fire retardant pressure treated.
- .3 Fasteners and Connecting Hardware:
 - .1 Nails: to CSA B111-1974 (R2003), hot dip galvanized steel for exterior work including components located in exterior walls and roofs; bright finish steel in all other locations. Unless otherwise indicated use common spiral flathead nails.
 - .2 Bolts, nuts, washers: ASTM A307, hot dip galvanized steel.
 - .3 Connectors, anchors, brackets, spikes: hot dip galvanized structural quality steel.
 - .4 Screws: zinc, cadmium or chrome plated.
 - .5 Fasteners in contact with preservative pressure treated wood shall be stainless steel, unless otherwise approved by Consultant.

2.2 WOOD TREATMENT

- .1 Preservative pressure treated components: to CSA-080 Series 15, arsenic free using copper and azole.

SECTION 06 10 00 - ROUGH CARPENTRY

- .2 Fire retardant pressure treated components: to CSA 080- Series 15 for maximum flame spread of 25 and labelled by ULC.
- .3 Surface cut, bore and trim components to sizes required as much as possible prior to pressure treatment.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Erect work plumb, level, square and to required lines. Ensure that materials are rigidly and securely attached to each other and to adjacent building elements and will not be loosened by work of other Sections.
- .2 Where other materials and components are to be applied directly over wood members recess heads of fastening devices below wood surfaces.
- .3 Where work remains exposed to view, fasteners shall be uniformly and evenly spaced and neatly installed.

3.2 NAILERS, BLOCKING, GROUNDS, BUCKS

- .1 Provide wood nailers, blocking, strapping, bucks, grounds and other rough carpentry components to sizes and in locations required for satisfactory support of fabricated items and other work.
- .2 Unless otherwise indicated, provide minimum 38 mm thick materials. Grounds may be 21 mm thick material unless otherwise indicated.

3.3 ANCHORS AND FASTENERS

- .1 Provide rough hardware including nails, screws, bolts, washers, brackets, hangers, and fastening devices of all types.
- .2 Unless otherwise indicated, attach wood members at maximum 600 mm o.c. as follows:
 - .1 To concrete and solid masonry with expansion or friction type anchor bolts.
 - .2 To hollow masonry with toggle bolts.
 - .3 To heavy gauge metal with bolts.
 - .4 To light gauge metal with screws or bolts.

3.4 PRESSURE TREATED COMPONENTS

- .1 Use preservative pressure treated lumber and plywood within exterior wall and roof systems and at other locations indicated.
- .2 Where it is necessary to cut, bore or otherwise alter pressure treated components in the field, treat cut surfaces with heavy coat of wood preservative.

END

SECTION 07 11 13 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Concrete foundation walls: Division 3
- .2 Underslab vapour retarder: Section 07 26 16
- .3 Water repellent sealer: Section 07 19 00

1.3 QUALITY ASSURANCE

- .1 Meet applicable requirements of CAN/CGSB-37.3-M89 and CGSB 37-GP-36M.

1.4 SUBMITTALS

- .1 Submit detailed product data for each product required.

1.5 PRODUCT HANDLING AND STORAGE

- .1 Deliver materials to site in unopened and undamaged sealed original containers.
- .2 Store solvent based liquids away from excessive heat and open flame. Store asphalt emulsions in temperature not lower than 5°C, nor higher than 30°C.

1.6 JOB CONDITIONS

- .1 Do not apply materials during periods of precipitation or when precipitation is imminent.
- .2 Protect materials against freezing and against contact with water from any source until applied and completely cured.
- .3 Protect surrounding surfaces from damage and overspray.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Dampproofing material for use above 5°C: emulsified asphalt to CAN/CGSB-37.2-M88; one of the following products:
 - .1 700-01 by Henry Company.
 - .2 520 Sealmastic by W.R. Meadows.
 - .3 Master Seal 610 by Master Builders Solutions Canada Inc.
- .2 Dampproofing material for use below 5°C: solvent based cutback asphalt to CAN/CGSB-37.16-M89; one of the following products:
 - .1 710-11 by Henry Company.
 - .2 501 Sealmastic by W.R. Meadows.
 - .3 Master Guard 700 by ChemMasters.
- .3 Protection board: 3.2 mm thick asphaltic core with asphalt impregnated fibreglass mat at each face:

SECTION 07 11 13 - BITUMINOUS DAMPPROOFING

Vibraflex PC No. 70 by W.R. Meadows.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Examine surfaces to receive bituminous dampproofing and ensure that they are reasonably smooth, free of cracks, holes and projections which might cause puncture of membrane, free of dirt, oil, grease and other foreign matter and cured to the point, where moisture continued therein will not adversely affect membrane.
- .2 Do not apply dampproofing to a frozen or partly frozen substrate.
- .3 Remove dirt and dust from substrates and spray apply primer at rate recommended by manufacturer. Protect primed surfaces from rain and frost until it is cured.

3.2 MEMBRANE APPLICATION

- .1 Provide bituminous dampproofing at exterior face of foundation walls, at retaining walls in contact with soil and at other locations indicated.
- .2 Start dampproofing at outside edge of footing or at bottom of grade beam or wall and extend to 100 mm below finish grade.
- .3 Brush or spray apply bitumen t rate recommended by manufacturer and so as to ensure that dampproofing extends over entire application area, fully covering substrate.

3.3 PROTECTION BOARD

- .1 Except where thermal insulation or panel drains are required, protect bituminous dampproofing with protection board.
- .2 Prior to placing backfilling, adhere protection board to dampproofing with adhesive recommended by protection board manufacturer.

END

SECTION 07 19 00 - WATER REPELLENT SEALER

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Concrete foundation walls: Division 3
- .2 Concrete block foundation walls: Section 04 20 00

1.3 QUALITY ASSURANCE

- .1 Applicator shall be fully trained and approved by material manufacturer.

1.4 SUBMITTALS

- .1 Submit complete and detailed product data including MSDS's prior to start of work.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store materials in original, undamaged containers with manufacturer's labels intact.
- .2 Store materials in dry, protected area, with containers closed and away from heat, sparks and open flames.

1.6 JOB CONDITIONS

- .1 Apply materials in strict accordance with manufacturer's directions and within environmental conditions stated by manufacturer including but not limited to:
 - .1 Substrate temperature: minimum -5°C, maximum 35°C.
 - .2 Surface condition: dry.
 - .3 Weather: without precipitation and/or high winds.
- .2 Use protective equipment when applying materials in accordance with manufacturer's recommendations.
- .3 Take steps to intercept, collect and legally dispose of excess sealer during application.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Water repellent sealer: Silane based, clear penetrating, breathable liquid compound; one of the following products:
 - .1 Chem-Trete PB by Dre Industries Inc.
 - .2 Rain-Shield Clear SX WB by W.R. Meadows.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Examine substrates scheduled to receive water repellent sealer to ensure that conditions are acceptable. Start of work shall imply acceptance of conditions.
- .2 Clean substrates to remove dirt, dust, grease, oil and any other substance which would inhibit proper application and performance of sealer.

SECTION 07 19 00 - WATER REPELLENT SEALER

- .3 Mask adjacent surfaces, not scheduled to receive sealer, from overspray, overcoating.

3.2 APPLICATION

- .1 Apply sealer to exposed concrete surfaces and at below building foundations.
- .2 Apply sealer in accordance with manufacturer's directions by spray, roller or brush.
- .3 Apply sealer in a flooding application from bottom up and so as to achieve coverage rates recommended by manufacturer.

END

SECTION 07 21 13 - RIGID BOARD INSULATION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Metal roofing: Section 07 61 00
- .2 Roof insulation: Section 07 61 00

1.3 SUBMITTALS

- .1 Submit detailed and complete product data for each product required.

1.4 PRODUCT STORAGE AND HANDLING

- .1 Deliver insulation to site in sealed wrappings bearing manufacturer's name, product name and RSI or KSI value.
- .2 Store materials in a dry area protected from the elements.

1.5 PROTECTION

- .1 Temporarily protect installed insulation from damage and action of the elements until it is permanently concealed or protected.
- .2 Protect polystyrene insulation from sunlight.

PART 2 - PRODUCTS

2.1 INSULATION

- .1 Rigid board insulation: extruded, polystyrene with shiplapped edges: CAN/ULC-S701-11: Styrofoam SM by Dupont de Nemours Inc., or Foamular C-300 XPS by Owens Corning.
- .2 Adhesive: compatible with insulation, as recommended by insulation manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Substrates to receive rigid board insulation, shall be sound, dry and free of dirt, oil, grease and other foreign substances.
- .2 Clean substrates as required. Remove concrete surface ridges and deposits.

3.2 INSULATION INSTALLATION - GENERAL

- .1 Provide continuous uniform thermal insulation over insulated areas.
- .2 Where insulation is interrupted by construction elements, neatly fit insulation around such elements and pack spaces around elements with same insulation.
- .3 Moderately butt insulation boards against each other so that there are no gaps.
- .4 Stagger joints at multiple layer installations.

3.3 FOUNDATION INSTALLATION

SECTION 07 21 13 - RIGID BOARD INSULATION

- .1 Provide rigid board insulation at building foundation.
- .2 Provide perimeter insulation below grade, within foundation walls, as indicated, to minimum 1200 mm below finished grade or lower where shown. Unless otherwise indicated provide 75 mm thick insulation bonded to substrate with spot adhesive or bead application.
- .3 Provide rigid board insulation below slabs on grade where indicated. Place insulation board on prepared, level subgrade with joints tightly butted. Unless noted, use 75 mm thick insulation.

3.4 ROOF INSULATION

- .1 Provide rigid board insulation at metal roof.

END

SECTION 07 21 16 - BLANKET INSULATION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Sprayed foam insulation: Section 07 21 19
- .2 Acoustical insulation inside gypsum board elements: Section 09 21 16
- .3 Duct and pipe insulation: Division 22 and 23

1.3 SUBMITTALS

- .1 Submit detailed and complete product data for each product required.
- .2 Submit duplicate, minimum 300 x 300 mm samples of each type and thickness of insulation required. Submit duplicate sample of impale clip.
- .3 Submit test report from a recognized testing agency showing compliance with specified requirements.

1.4 PRODUCT STORAGE AND HANDLING

- .1 Deliver insulation to site in sealed wrappings bearing manufacturer's name, product name and RSI or KSI value.
- .2 Store materials in a dry area protected from the elements in manufacturer's original packaging until required for installation.

1.5 PROTECTION

- .1 Do not install insulation during inclement weather.
- .2 Temporarily protect installed insulation from damage and action of the elements until it is permanently concealed or protected.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Blanket insulation for exterior stud walls and soffits: non-combustible, semi-rigid mineral wool insulation to CAN/ULC-S702, Type 1: Rockwool Comfortbatt, meeting the following requirements:
 - .1 Blanket thickness: match stud depth unless shown otherwise.
 - .2 Density: 32 kg/m³
 - .3 Flame spread: 0.
 - .4 Smoke developed: 0.
 - .5 RSI-value (per 25.4 mm) at 24°: 0.72 m² K/W.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Examine existing conditions to ensure that they are satisfactory to receive the work of this Section.

SECTION 07 21 16 - BLANKET INSULATION

- .2 Start of installation shall imply acceptance of conditions.

3.2 INSULATION

- .1 Provide continuous uniform thermal insulation over insulated areas.
- .2 Where insulation is interrupted by construction elements, neatly fit insulation around such elements and pack spaces around elements with same insulation.
- .3 Moderately butt insulation boards against each other so that there are no gaps.
- .4 Stagger joints at multiple layer installations.
- .5 Do not cover any dampproofing, waterproofing and air barrier/vapour retarder before Consultant's review and acceptance with such coatings.
- .6 Completely fill stud spaces with insulation, leaving no gaps or voids. Do not compress insulation to fit into stud spaces.
- .7 Fit insulation closely around electrical boxes, pipes, ducts and other components entering or passing through insulation space.

END

SECTION 07 26 16 - UNDERSLAB VAPOUR RETARDER

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Granular base below slabs on grade: Section 31 23 36
- .2 Concrete slabs on grade: Section 03 30 00
- .3 Bituminous dampproofing: Section 07 11 13

1.3 REFERENCES

- .1 ASTM E1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
- .2 ASTM E1643 Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

1.4 SUBMITTALS

- .1 Submit full set of test results from a recognized independent testing agency as per paragraph 8.3 of ASTM E1745.
- .2 Submit manufacturer's samples, product literature and installation instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Vapour retarder: Stego Wrap Vapour Barrier 15 Mil, Class A by Stego Industries or Perminator 15 by W.R. Meadows; meeting the following requirements:
 - .1 Permeance: max 0.01 perms {0.6 ng (Pa.s.m²)}, when tested after conditioning (ASTM E1745).
 - .2 Strength: Class A (ASTM E1745).
 - .3 Thickness: 0.38 mm (15 mils) minimum.
- .2 Termination tape: Stegotrack Tape by Stego Industries or equivalent product by W.R. Meadows or Henry.
- .3 Seam and repair tape: Stego Crete Claw Tape 3" and 6" or equivalent product by W.R. Meadows or Henry.
- .4 Mastic: as recommended by vapour retarder manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Examine existing conditions to ensure they are acceptable to receive the work of this Section.
- .2 Start of work shall imply acceptance of conditions.

3.2 INSTALLATION

SECTION 07 26 16 - UNDERSLAB VAPOUR RETARDER

- .1 Provide underslab vapour retarder below concrete slabs on grade unless shown otherwise. Follow product manufacturer's installation instructions.
- .2 Install vapour retarder in accordance with manufacturer's instructions and ASTM E1643. Secure vapour retarder at grade beams with a termination tape, as recommended by tape manufacturer.
- .3 Unroll vapour retarder with the longest dimension parallel with the direction of the pour.
- .4 Extend vapour retarder minimum 100 mm up the grade beams and seal to grade beams. Secure edge of vapour retarder with a termination tape.
- .5 Overlap joints 150 mm and seal with manufacturer's seam tape.
- .6 Seal all penetrations with mastic in accordance with manufacturer's instructions
- .7 No penetration of the vapour retarder is allowed except for permanent pipes and utilities.
- .8 Request Consultant's inspection and acceptance of the underslab vapour retarder prior to casting slab on grade concrete.
- .9 Repair damaged areas by cutting patches of vapour retarder, overlapping damaged area 150 mm and taping all four sides with seam tape. Cover installed vapour retarder as soon as possible with slab on grade.
- .10 Do not use any area covered with an underslab vapour retarder as a working platform.

END

SECTION 07 21 19 - SPRAYED FOAM INSULATION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Through-wall flashing membrane at masonry walls: Section 04 20 00
- .2 Blanket insulation: Section 07 21 16

1.3 REFERENCE STANDARDS

- .1 BASF Canada Quality and Training Program-Raising Performance to New Heights, June 2005.
- .2 BASF Canada Installer Training Manual, June 2005.
- .3 CAN/ULC S705.1-15 Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
- .4 CAN/ULC S705.2-05 Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density, Installation.
- .5 DEMILEC Air Barrier System Training Program – August 2017.
- .6 DEMILEC Air Barrier System Training Manual – August 2017.
- .7 CAN/ULC S718: 2018 Standard for Site Quality Assurance Program for Spray Applied Polyurethane Foam.
- .8 CAN/ULC S770-15 Standard Test Method for Determination of Long-Term Thermal Resistance of Closed Cell Thermal Insulating Foams.

1.4 SUBMITTALS

- .1 Submit detailed and complete product data for each product required.
- .2 Complete reports from on-site inspector during installation as per CAN/ULC-S705.2-05.

1.5 QUALITY ASSURANCE

- .1 Applicator's Qualifications:
 - .1 Certified and approved by material manufacturer/distributor as a Qualified Applicator.
 - .2 Certified applicators shall carry their certification cards, available for presentation upon request. The certification card shall bear a polyurethane foam applicator number and a certified air barrier system applicator number.
- .2 Maintain one copy of installation manual on site.
- .3 Installers of insulation system shall perform daily on-site testing as recommended by material manufacturer.
- .4 Material manufacturer/distributor shall provide on-site quality assurance program. Submit one copy of quality assurance program within first week of application.

SECTION 07 21 19 - SPRAYED FOAM INSULATION

1.6 MOCK-UP

- .1 Provide mock-up of insulation materials in accordance with Section 01 45 00.
- .2 Construct a mock-up minimum 5 m² including inside and outside corners, control joint and transition membrane.
- .3 Locate mock-up where directed by Consultant.
- .4 Mock-up may remain as part of the work if approved by Consultant.
- .5 Conduct the following tests on mock-up panel and enter results in CCMC report form:
 - .1 Insulation core density
 - .2 Adhesion between transition membrane and substrate
 - .3 Cohesion / adhesion between insulation and substrate.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store materials in their original containers and packaging leaving manufacturer's and products name, quantity, CCMC numbers and expiry date.
- .2 Store materials in manner recommended by material manufacturer.

1.8 JOB CONDITIONS

- .1 Maintain temperature and humidity recommended by the materials manufacturer before, during, and after installation.
- .2 Take steps to positively prevent overspray and drifting of foam particles caused by wind. Provide wind screens if required. Do not spray when wind speed exceeds 40 km/hr.

1.9 WARRANTY

- .1 At no cost to Owner remedy any defects in the work of this Section due to faults in materials and/or workmanship, appearing within 2 years from Substantial Performance.
- .2 All work provided under this Section shall be covered by the third party warranty program as set forth by the manufacturer's quality assurance program.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Sprayed foam insulation: closed cell, medium density spray applied polyurethane foam insulation and air barrier, listed under CAN/ULC-S705.1, one of the following products:
 - .1 BASF Walltile v.5 by BASF Canada (CCMC Evaluation Listings: CCMC 14100-L for insulation).
 - .2 Demilec Heatlok Soya by Demilec Inc. (CCMC Evaluation Listings: 14078-L for insulation).
- .2 Primer: as recommended by insulation manufacturer.
- .3 Transition membrane: one of the following products, or other products recommended by insulation

SECTION 07 21 19 - SPRAYED FOAM INSULATION

manufacturer:

- .1 Blueskin SA by Henry
 - .2 Sopraseal Stick 1100 by Soprema
 - .3 Modiflex MP-180-FS-BASE by IKO.
 - .4 ExoAir 110 or 110 LT by Tremco.
- .4 Cavity compartment seals/fire stops: minimum 0.9 mm thick sheet steel formed to profile required, hot dip galvanized ASTM A653, zinc coating designation Z275.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept the work of this Section. Start of work shall be deemed acceptance of existing work and existing conditions. Report in writing defects in substrates which may adversely affect the performance of the foam insulation.

3.2 PREPARATION

- .1 Surfaces to receive foam insulation shall be free of frost, loose or foreign matter which might impair adhesion of materials.
- .2 Prepare surface by brushing, scrubbing, scraping, or grinding to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion and integrity of the foam insulation system. Wipe down metal surfaces to remove release agents or other non-compatible coatings, using clean sponges or rags soaked in a solvent compatible with the foam insulation. Ensure surfaces are dry before proceeding.
- .3 Provide transition membrane at control joints, at all wall penetrations and openings, and at junctions with other building elements such as steel framing members and roof system and at open joints in substrates. Ensure that membrane is fully secured to substrate. Do not allow applied membrane to deteriorate by leaving it exposed to weather. Cover with foam insulation before any deterioration can occur. Seal at any ripples or "birds mouths" in the membrane, prior to applying foam.
- .4 Install cavity wall compartment seals near wall corners, at masonry exterior wythe control joints and at locations shown. Securely fasten compartment seals to interior wythe. Where width of cavity air space exceeds 25 mm provide fire stops in accordance with OBC requirements.

3.3 APPLICATION

- .1 Apply foam insulation in strict accordance with manufacturer's written instructions.
- .2 Apply foam insulation only when surfaces and ambient temperatures are within limits prescribed by the material manufacturer. Apply insulation to a minimum thickness of 75 mm, unless otherwise shown.
- .3 Apply foam insulation to within a tolerance of +6 mm/-6 mm of thicknesses required.
- .4 Finished sprayed foam insulation shall have uniform texture and thickness and shall be free of voids and imbedded foreign materials.
- .5 Do not allow foam insulation to cover or mark adjacent surfaces. Use masking materials if necessary.
- .6 Remove masking materials immediately after foam has cured to hard surface film.

SECTION 07 21 19 - SPRAYED FOAM INSULATION

- .7 Clean and make good surfaces soiled or damaged by work of this Section. Consult with Section of work soiled before cleaning to ensure methods used will not damage their work.

3.4 FIELD QUALITY CONTROL

- .1 Comply with requirements of CAN/LC-S718: 2018 and CAN/ULC-S770-15, unless shown otherwise.
- .2 Authorized material manufacturer's representative shall visit the site periodically, inspect the work and issue reports, verifying that work meets material manufacturer's quality requirements. Costs for all such inspections shall be included in the Contract.
- .3 Throughout application of sprayed insulation system, on a daily basis, conduct field tests in accordance with procedures established by manufacturer and enter results in manufacturer's daily report forms. Testing shall include but not necessarily be limited to:
 - .1 Thickness
 - .2 Core density
 - .3 Cohesion
 - .4 Adhesion to substrate (including transition membranes)
- .4 Conduct testing in accordance with manufacturer's technical guidelines for installation of air barrier system. Costs for testing shall be included in the Contract.
- .5 Conduct testing in accordance with CAN/ULC-S705.2-05 to ensure insulation installed can be considered as an air barrier. Failure to do so will result in removal of installed insulation and reinstallation as per CAN/ULC-S705.2-05 at no additional cost to the Owner.

END

SECTION 07 27 00 - AIR BARRIER

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Board insulation: Section 07 21 13
- .2 Metal roof system: Section 07 61 13

1.3 QUALITY CONTROL

- .1 Owner may appoint and pay separately for inspection and testing of work provided under this Section, by independent inspection agency, as directed by Consultant. Comply with requirements of Section 01 45 00.

1.4 SUBMITTALS

- .1 Submit detailed and complete product data for each product to be used.

1.5 PRODUCT HANDLING

- .1 Handle and store membrane materials to prevent tearing, puncturing and other damage.
- .2 Store roll goods in upright position and protected from the weather.

1.6 JOB CONDITIONS

- .1 Apply membrane during dry weather and to dry substrates only.
- .2 Apply materials only within acceptable application temperature range determined by manufacturer. Select a membrane system which is best suited for expected application conditions. Use the same system throughout entire project.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Vapour permeable, self adhesive, modified bitumen membrane, one of the following products:
 - .1 Blueskin VP160 by Henry.
 - .2 Perm-A-Barrier VPS by W.R.Grace.
 - .3 Sopraseal Stick VP by Soprema.
- .2 Low permeance, vapour retardant, self adhesive, modified bitumen membrane; one of the following products:
 - .1 Blueskin SA by Henry.
 - .2 Perm-A-Barrier by W.R. Grace.
 - .3 Sopraseal Stick 1100 by Soprema.
- .3 Primer: as recommended by membrane manufacturer.
- .4 Adhesives, mastics, joint backing: as recommended by membrane manufacturer.
- .5 Metal backing: cold rolled sheet steel, hot dip galvanized to ASTM A653, zinc coating designation Z275; unless otherwise shown, 0.9 mm thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Examine substrates to ensure conditions are satisfactory to receive work of this Section.
- .2 Start of work shall imply acceptance of conditions.
- .3 Substrates shall be sound, reasonably smooth, dry, clean, free of frost, grease, oil and other substances which would adversely affect membrane adhesion.

3.2 PREPARATION

- .1 Clean substrates as required.
- .2 Remove sharp projections and repair defective areas in substrate.
- .3 Prime substrates if recommended by membrane manufacturer.
- .4 At open joints in substrate, exceeding 3 mm width, and at other locations shown, provide v-shaped metal backing for air barrier membrane, securely fastened each side of joint.

3.3 SHEET MEMBRANE INSTALLATION

- .1 Install membrane system at locations required, in accordance with manufacturer's installation instructions.
- .2 Provide vapour permeable air barrier where thermal insulation or a major portion of it is located on the inside of air barrier. Provide low permeance air barrier where thermal insulation or a major portion of it is located outside of air barriers.
- .3 Apply membrane to exterior face of interior wythe of cavity walls, to exterior wall sheathing at lightweight steel framed exterior walls and, if indicated, in other locations.
- .4 Completely cover substrates. Start at low point and proceed up the wall, overlapping subsequent sheets minimum 50 mm in the direction of water flow. Lap end joints minimum 100 mm.
- .5 Apply primer with roller, brush or spray equipment. Do not apply more primer than that which can be covered, on the same working day, with air barrier membrane. Recoat primed areas which are not covered with membrane the same day.
- .6 Position membrane for alignment, with protective film in place. Roll membrane back, remove film and press membrane in place.
- .7 Roll completed membrane, including seams, with suitable roller, to ensure full contact with substrate.
- .8 At masonry wall ties and at other penetrations through sheet type membrane, accurately cut, fit and seal membrane around penetrating component.
- .9 At wall openings return membrane into rough openings. Provide saddle membrane to ensure that corners of openings are sealed.
- .10 Coordinate with Section 07 61 13 to ensure continuity of air barrier at junction with roof systems.

3.4 FIELD QUALITY CONTROL

- .1 Make arrangements and pay for membrane manufacturer to provide periodic site inspection and technical assistance to ensure work is properly executed.
- .2 Upon completion of membrane installation membrane manufacturer shall issue a report verifying that membrane installation is complete and satisfactory.

SECTION 07 27 00 - AIR BARRIER

- .3 Prior to allowing membrane to be covered with other work, request Consultant's review and acceptance.

END

SECTION 07 42 16 - ALUMINUM COMPOSITE PANEL CLADDING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Steel cladding: Section 07 46 19
- .2 Sealants: Section 07 92 00

1.3 DESCRIPTION

- .1 Panelized exterior wall and soffit system consisting of aluminum and fire resistant resin core composite panels, formed to sizes and profiles shown, with wet joints between panels, and concealed support system designed to meet specified requirements.

1.4 QUALITY ASSURANCE

- .1 Acceptable panel materials:
 - .1 Alpolic FR by Mitsubishi
 - .3 Alucobond Plus by 3A Composites
 - .4 Reynobond FR by Alcoa
 - .5 Alcotex FR by Alcotex
- .2 Erection: by manufacturer or by forces authorized or licensed by manufacturer.

1.5 DESIGN AND PERFORMANCE REQUIREMENTS

- .1 Design, fabricate and erect panel system to meet the following requirements:
 - .1 Appearance: no exposed fasteners, unless approved by Consultant. Exposed surfaces free of distortion, twist, dents, discolouration, scratches, waves and buckles, and consistent in colour, texture and sheen.
 - .2 Moisture penetration: prevent moisture penetration through wall system. Incorporate means of draining to the exterior space between wall panel and existing wall.
 - .3 Wind load: design wall system to resist wind loads, positive and negative, expected in this geographical region (OBC climatic data, 50 year probability) with maximum deflection of 1/180 of span and without causing rattling, vibration, overstressing of fasteners, clips and other detrimental effects on wall system.
 - .4 Structural and thermal movement: accommodate movement of supporting framing and movement caused by thermal expansion and contraction of system component parts without causing bowing, buckling, delamination, oil canning, failure of joint seals, excessive stress on fasteners or any other detrimental effects.
 - .5 Maximum allowable panel tolerances:
 - .1 Panel bow: 0.2% of panel dimension up to maximum 5 mm.
 - .2 Panel width or length: ± 1 mm up to 1.2 m, ± 2 mm, 1.2 to 3.6 m.
 - .3 Squareness: maximum 5 mm difference between diagonal measurements.
 - .4 Camber: maximum 1 mm.
 - .6 Panel removal: system shall be non-progressive, allowing removal of any individual panel without necessitating removal of adjacent work.

SECTION 07 42 16 - ALUMINUM COMPOSITE PANEL CLADDING

1.6 SUBMITTALS

- .1 Submit detailed shop drawings. Consultant will review shop drawings for general conformance with Contract Documents only but will not check dimensions. Co-ordinate, check and verify conditions to ensure that systems components will fit assigned spaces.
- .2 Shop drawings shall bear seal and signature of professional engineer licensed to practice in Ontario.
- .3 Submit duplicate, minimum 200 x 200 mm samples of each colour, gloss and texture finish selected.

1.7 PRODUCT HANDLING AND STORAGE

- .1 Handle and store components and materials to prevent damage.
- .2 Crate, palletize, shrink wrap panels or protect by other suitable means to prevent damage during shipping and storage.
- .3 Store components and materials in dry and protected areas.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Composite panels: minimum 0.5 mm thick sheet aluminum laminated to 3 mm thick fire resistant thermoplastic resin core; total thickness: 4 mm.
- .2 Sheet aluminum: ASTM B209: AA1100-H14 or AA3003-H14 alloy.
- .3 Panel framing: galvanized sheet steel: to ASTM A446, Grade A, zinc coating designation Z275, ASTM A653.
- .4 Fasteners: stainless steel, non-magnetic.
- .5 Isolation coating: bituminous paint CAN/CGSB-1.108 or separation tape recommended by system manufacturer.
- .6 Weather barrier: breathing type, water shedding sheet membrane: Air Outshield by SRP Canada.

2.2 FABRICATION

- .1 Shop fabricate work of this Section with equipment and tools specifically intended for this type of work.
- .2 Fabricate subgirts of minimum 1.2 mm thick galvanized sheet steel.
- .3 Fabricate panels to sizes and profiles indicated, of 4 mm thick composite panel material.
- .4 Accurately cut, form and assemble components to required sizes and profiles, producing flat or uniformly curved surfaces, free of warp and distortion with corners welded and ground smooth, if solid aluminum material is used and V-routed, bent / folded and fused if composite panel material is used.
- .5 Joints shall be neatly fitted and tight. Unless otherwise detailed, allow for 12 mm joints between panels. Provide deep panel returns.
- .6 Unless otherwise approved by Consultant, make all connections, anchorages and fastenings in concealed manner.
- .7 Fabricate closures, covers and trim to size and profile indicated. Locate joints in most inconspicuous location. Design joints to be accurately aligned and tight-fitting.
- .8 Make cutouts for work of other Sections in shop prior to finishing and shipping of panels, where possible.

SECTION 07 42 16 - ALUMINUM COMPOSITE PANEL CLADDING

2.3 FINISHES

- .1 Exposed aluminum surfaces: 70% PVDF; colour: RVW White.
- .2 Concealed aluminum surfaces: mill finish.
- .3 Concealed steel surfaces: hot dip galvanized.
- .4 Isolation coating between dissimilar materials: bituminous paint to CAN/CGSB-1.108-M89.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Examine work of other Sections upon which work of this Section depends for support.
- .2 Examine lines and levels of supporting work and check location of openings to ensure work of this Section can be satisfactorily installed.
- .3 Report to Consultant in writing any unsatisfactory condition prior to proceeding with erection. Do not start installation until unsatisfactory conditions have been corrected.

3.2 ERECTION

- .1 Fasten subgirts / spacers for wall and soffit panels to supporting work. Provide concealed anchorage and, if required, support framing for column covers. Provide additional framing at terminations, openings and penetrations.
- .2 Install subgirts at spacing as shown on reviewed shop drawings by system manufacturer, and anchor securely to supporting work.
- .3 Install panels with concealed anchorage system in accordance with system manufacturer's installation directions.
- .4 Finished work shall be securely anchored, free of perceptible distortion and surface imperfections, uniform in colour, sheen and texture and within the following tolerances:
 - .1 Maximum variation from plane or location shown: 3 mm in 3.5 m (non-cumulative).
 - .2 Maximum offset from true alignment between adjacent panels in same plane: 1.5 mm (non-cumulative).
- .5 Use concealed fastenings only.
- .6 Provide closures, covers and trim as indicated and as required to complete installation.

3.3 CLEANING AND TOUCH-UP

- .1 Clean exposed surfaces.
- .2 Replace damaged components and/or components whose colour does not satisfactorily blend with adjacent panels.

END

SECTION 07 46 19 - STEEL CLADDING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Aluminum composite panel cladding: Section 07 42 16
- .2 Metal roofing: Section 07 61 13
- .3 Metal flashings and trim except as specified herein: Section 07 62 00

1.3 QUALITY ASSURANCE

- .1 Reference Standards: comply with applicable requirements of CSSBI S8-2008 and CSSBI 20M-2017, except where specified otherwise herein.
- .2 Erector's qualifications: manufacturer's forces or forces approved by manufacturer.

1.4 DESIGN PERFORMANCE REQUIREMENTS

- .1 Appearance: exposed surfaces free of perceptible distortion, twist, waves, buckles and oil canning; no exposed fasteners.
- .2 Structural loads: resist positive and negative wind pressures expected in this geographical area with a maximum allowable deflection of 1/180 of span. Components shall not vibrate or rattle when subjected to the effects of wind.
- .3 Moisture control: prevent infiltration of water and snow into system. Provide means of draining space behind exterior skin.
- .4 Thermal movement: accommodate expansion and contraction of component parts without causing buckling, failure of joint seals, undue stress on fasteners and other detrimental effects. Thermally isolate transmission through system.
- .5 Structural movement: accommodate movement between wall system and building structure caused by structural movement, without permanent distortion, racking of joints, breakage of seals or water penetration.

1.5 SUBMITTALS

- .1 Submit duplicate minimum 100 x 100 mm size samples of cladding material for confirmation of colour selected by Consultant.
- .2 Submit detailed shop drawings. Indicate dimensions, cladding profiles, attachment methods, wall elevations, trim and closure pieces, and related work.

1.6 PRODUCT DELIVERY, HANDLING AND STORAGE

- .1 Deliver, store and handle materials to prevent damage, distortion and corrosion.
- .2 Store components off the ground and under cover.

PART 2 - PRODUCTS

2.1 SYSTEMS

- .1 Steel cladding: Bellara Mountain Cedar 18-2772 by VicWest.

PROJECT NO. 24-053

30/01/2025
WESPEC

COMFORT STATION AT
HURON PARK, MISSISSAUGA, ONTARIO
07 46 19-1

2.2 MATERIALS

- .1 Prepainted, galvanized sheet steel: approximately 15 mm deep profile, with concealed fasteners; pretreated, primed and finish coated.
- 2 Galvanized sheet steel: ASTM A653, zinc coating designation Z275.
- .3 Subgirts, clips, spacers: minimum 1.2 mm thick formed galvanized steel: ASTM A653, zinc coating designation Z275.
- .4 Fastening devices: stainless, cadmium plated or galvanized steel; colour match exposed fasteners with metal on which they occur.
- .5 Sealants:
 - .1 Concealed locations: tape or compound, nonskinning, non-drying, butyl rubber.
 - .2 Exposed locations: one part silicone to ASTM C920.
 - .3 Primer: as recommended by sealant manufacturer.
- .6 Isolation coating: bituminous paint CAN/CGSB-1.108 or separation tape recommended by system manufacturer.
- .7 Breathing type, water shedding sheet membrane, UV resistant: Air Outshield UV BLACK by SRP Canada.

2.3 FABRICATION

- .1 Wall cladding: 0.45 mm (26 ga) thick, 15 mm deep profile, concealed fasteners, complete with colour matching manufacturer's standard trim at terminations, corners and control joints.
- .2 Flashings, trim, closures: fabricated to profiles indicated and as required to meet design and performance requirements. Use same material as exterior skin where exposed. Use galvanized sheet steel in concealed locations. Double back exposed edges.

2.4 FINISHES

- .1 Exposed surfaces: prepainted sheet steel/ Kynar 70% PVDF polyvinyl fluoride resin; colour selected by Consultant.
- .2 Concealed surfaces: galvanized.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Prior to start of erection, examine existing work and report to Consultant any unsatisfactory conditions.
- .2 Start of work shall imply acceptance of conditions.

3.2 ERECTION

- .1 Install steel cladding system in accordance with manufacturer's directions at exposed surfaces of roof soffits, fascias and perimeter of metal roof.

SECTION 07 46 19 - STEEL CLADDING

- .2 Install cladding support brackets at required location and securely fasten to back-up construction, in accordance with reviewed shop drawings.
- .3 Install subgirts at spacing as shown on reviewed shop drawings by system manufacturer, and anchor securely to cladding support brackets.
- .4 Install water shedding breathable sheet membrane, lapped at joints in direction of water flow; secure membrane at girts.
- .5 Fasten girts to clips at required spacing. Provide additional framing at terminations, openings and penetrations.
- .6 Install exterior wall skin with joints accurately aligned and tight fitting. Provide cladding panels in longest available lengths. Intermediate joints are not permitted unless indicated on shop drawings and approved by Consultant.
- .7 Unless indicated to be responsibility of another Section, provide sill and cap flashings and other flashings required at junction with other building elements.
- .8 Unless otherwise detailed provide metal closures to close off flutes at terminations.
- .9 Provide sealants, flashings, closures, covers and trim as indicated and as required to render work complete and finished in accordance with specified requirements.
- .10 Leave steel cladding system in clean and neat condition; touch up minor surface damage; replace components which cannot be satisfactorily touched up.

END

SECTION 07 61 13 - METAL ROOFING SYSTEM

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 DESCRIPTION

- .1 This section includes an insulated metal roof system, comprising but not limited to the following:
 - .1 Structural liner.
 - .2 Thermal barrier.
 - .3 Air/vapour barrier.
 - .4 Rigid insulation.
 - .5 Roof panel and support system.
 - .6 Water barrier.
 - .7 Accessories including associated flashings, closures, sealants.
 - .8 Gutters and down pipes.

1.3 RELATED WORK

- .1 Steel roof deck: Division 5
- .2 Structural steel framing: Division 5
- .3 Downlights: Division 26

1.4 STANDARDS AND REFERENCES

- .1 Design of cladding system in accordance with the latest edition of:
 - .1 CSA-S136 for the design of cold formed steel structural members.
 - .2 Canadian Sheet Steel Building Institute Standards 10M, 20M, B11.
 - .3 Ontario Building Code.

1.5 QUALITY ASSURANCE

- .1 Fabricator/installer qualifications: minimum 5 years of experience in type of work specified herein.
- .2 Reference standards: comply with applicable requirements of the following, except where specified otherwise herein:
 - .1 CSSB1 S8-2008, Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products.
 - .2 CSSB1 S11-15, Insulated Sheet Steel roof Assemblies.
 - .3 CSSB1 20 M-2016, Standard for Sheet Steel Cladding for Industrial, Commercial and Institutional Building Applications.

1.6 DESIGN REQUIREMENTS

- .1 Design roof system to resist:

SECTION 07 61 13 - METAL ROOFING SYSTEM

- .1 Snow loads and snow build-up and rain load, expected in this geographical region climatic data, 50 year probability.
 - .2 Wind loads, positive and negative, expected in this geographical region climatic data, 50 year probability.
 - .3 Dead load of roof system.
 - .4 If the roof system is to be designed as a shear diaphragm, then the factored shear design loads "Q" and the flexibility factors "F" must be shown on the structural drawings.
- .2 Deflection of the roof system is not to exceed 1/240th of the span for the specified live loading.
- .3 Thermal movements: allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculation on surface temperatures of materials due to both solar heat gain and night time sky heat loss.
- .1 Temperature change range: 20°C ambient; 40°C material surfaces.

1.7 SAMPLES

- .1 Submit duplicate, minimum 150 x 150 mm samples of coloured metal roof sheet for review by the Consultant prior to fabrication.

1.8 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00.
 - .1 Indicate arrangement of pre-finished roof sheet, including joints, types and locations of supports, fasteners, flashing, butters, mitres, and all metal components related to the roof installation. Include for structural liner, thermal barrier, membrane air/vapour barrier, insulation as part of the roof system.
 - .2 Drawings shall be signed and sealed by a Professional Engineer licensed to practice in Ontario, attesting to the ability of the metal panels assembly to withstand the specified loads.

1.9 MAINTENANCE DATA

- .1 Provide maintenance data for cleaning and maintenance of panel finishes for incorporation into manual specified in Section 01 77 00.

1.10 PRODUCT DELIVERY, HANDLING AND STORAGE

- .1 Store components and materials in accordance with panel manufacturer's recommendation and protect from elements.
- .2 Protect prefinished steel during fabrication, transportation, site storage and erection, in accordance with CSSBI Standards.

1.11 WARRANTY

- .1 Furnish panel manufacturer's written warranty covering failure of factory-applied exterior finish within the warranty period. Warranty period for finish: 40 years from date of Substantial Performance. The values below are based on normal environments and exclude any aggressive atmospheric conditions.
- .2 Siliconized polyester will not crack, chip or peel (lose adhesion) for 40 years from date of installation, 40.5 years from application. This does not include minute fracturing that may occur during the normal fabrication process. WeatherXL Siliconized Polyester will not chalk in excess of a number 6 rating, in accordance with ASTM D-4214-98 method D659 at any time for 30 years from date of installation, 30.5 years from application; will not change colour more than 8.0 Hunter Δ E units as determined by ASTM

SECTION 07 61 13 - METAL ROOFING SYSTEM

method D-2244-02.

PART 2 - PRODUCTS

2.1 ACCEPTABLE SYSTEM

- .1 Tradition 100-4: System 3000 by VicWest.

2.2 FABRICATION

- .1 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including fascia and soffit panels and all companion flashing.
- .2 Fabricate all components of the system in the factory, ready for field installation.
- .3 Provide roof sheet and all accessories in longest practicable length to minimize field lapping of joints.

2.3 ROOF SYSTEM COMPONENTS

- .1 Structural liner: Vicwest steel roof deck, fabricated from ASTM A653M structural quality Grade 230 galvanized steel, with zinc coating of ZF75 Galvaneal, Z275 galvanized, as designated by ASTM A653M having a nominal core thickness 1 mm.
- .2 Thermal barrier: exterior grade gypsum sheathing to CSA A82.27, 12 mm thick.
- .3 Air/vapour retarder: Sopraseal Stick 1100T by Soprema Inc. or Ice and Water Shield Bituthene 3000 by W. R. Grace or an equivalent product approved by the Consultant.
- .4 Insulation: rigid mineral fibre by Rockwool or Fibrex, with compressive strength of 60 psf (2.9 kPa).
- .5 Water barrier: barrier shall be Lastobond Shield by Soprema Inc. or an equivalent product approved by Consultant.
- .6 Clip and subgirt system:
 - .1 Thermally responsive clips to be fabricated from a minimum of 0.91 mm (0.036") steel, with minimum Z275 galvanized coating designed to accommodate expansion and contraction of the roof sheet.
 - .2 Continuous hat bar and zee clips made from galvanized steel thickness to suit design parameters, to accommodate depth of insulation.
 - .3 Roof fasteners: provide by manufacturer, to resist wind uplift and sliding snow forces.
- .7 Prefinished roof sheet, exposed to exterior.
 - .1 Profile: Tradition 100-4, with I-style ribs at 400 mm spacing.
 - .2 Panel: Z275 galvanized sheet steel conforming to ASTM A653M structural quality Grade 230 having a nominal core thickness 0.76 mm.
- .8 Snap cap
 - .1 Provide 25 mm high snap caps for full length of roof panel and retained by panel clips, fabricated from Z275 galvanized sheet steel conforming to ASMT A653M structural quality Grade 230 having a nominal core thickness of 0.76 mm. Finish and colour to match roof sheet.

2.4 ACCESSORIES

- .1 Flashings, gutters and trim: formed from same materials as the roof sheet. Custom fabricated to suit architectural details, as required.

SECTION 07 61 13 - METAL ROOFING SYSTEM

- .2 Provide gutters and down pipes made of hot dip galvanized steel, finish coated with 70% Kynar PVDF in colour selected by Consultant.
- .3 Closures: foam and metal closures to suit profiles selected, to manufacturer's recommendations.
- .4 Sealants: in accordance with manufacturer's recommendation and Section 07 92 00.

2.5 FINISHES

- .1 Interior face of roof panels: galvanized finish.
- .2 Exterior face of roof panels: factory painted with WeatherXL siliconized polyester, in colour selected by Consultant.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Examine work of other Sections upon which work of this Section depends.
- .2 Report all discrepancies to Consultant before beginning work on the roof system.

3.2 INSTALLATION

- .1 Thermal and moisture protection:
 - .1 Structural liner: install structural liner in accordance with Section 05 31 00 Steel Deck. Ensure installation is complete before starting roof work.
 - .2 Thermal barrier: install exterior grade gypsum board thermal barrier perpendicular to flutes of structural liner. Fasten using manufacturer's recommended fasteners, with spacing to suit wind loading conditions.
 - .3 Clip support: install 125 mm wide galvanized support plate at clip locations if required. Thickness to suit design parameters.
 - .4 Air/vapour retarder: install membrane air/vapour retarder in accordance with manufacturer's recommendations. Ensure all joints are properly lapped, sealed and tied in to ensure airtight construction.
 - .5 Provide a continuous seal at all openings in the roof system.
 - .6 Clip and subgirts: attach Tradition clips, hat bar, and zee clips using fasteners as recommended by the manufacturer, to suit the substrate.
 - .7 Insulation: install rigid insulation in one layer, as shown on the drawings. Tightly butt against support clips. Insulation should be continuous.
- .2 Roof panel installation:
 - .1 Install exterior prefinished roof panels on panel support clips, using manufacturer's proper construction procedure. Ensure metal roofing sheet side-lap is positively retained by clips, and proper sheet coverage is maintained.
 - .2 Install the snap-cap at all side laps as shown on the approved shop drawings. Mitre snap-cap as required to resist water entry.
 - .3 Where indicated on approved shop drawings, secure the end-lap of metal roofing sheets in accordance with manufacturer specifications and details to provide a weather-tight seal. Exposed fasteners to match colour the roof sheet.

SECTION 07 61 13 - METAL ROOFING SYSTEM

- .4 Provide notched and formed closures, sealed against weather penetration, at changes in pitch, and at ridges and eaves, where required.
- .5 Install all companion flashings, gutters, ventilators and trim as shown on the shop drawings. Use concealed fasteners when possible. Exposed fasteners shall match colour of roof sheet.

3.3 CLEAN-UP

- .1 Clean exposed panel surfaces in accordance with manufacturer's instructions.
- .2 Repair and touch up with colour matching high grade enamel minor surface damage, only where permitted by the Consultant and only where appearance after touch-up is acceptable to Consultant.
- .3 Replace damaged panels and components, which in the opinion of the Consultant cannot be satisfactorily repaired.

END

SECTION 07 92 00 - SEALANTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Caulking relating to metal cladding: Section 07 46 19
- .2 Caulking related to metal flashings: Section 07 62 13
- .3 Caulking related to aluminum windows: Section 08 51 13

1.3 DEFINITION

- .1 Caulking = Sealant.

1.4 QUALITY ASSURANCE

- .1 Sealants must be installed by qualified caulking contractor with minimum five years' experience and proven record of being able to produce good quality work.
- .2 Upon Consultant's request arrange for sealant manufacturer's technical representative to visit the site, investigate conditions and make recommendations in connection with work of this Section.

1.5 PRODUCT HANDLING

- .1 Deliver sealants to site in sealed containers bearing manufacturer's name, brand name of sealant and reference standard to which sealant complies.
- .2 Store materials in a dry area having an ambient temperature within limitations recommended by material manufacturer.

1.6 JOB CONDITIONS

- .1 Unless otherwise specified, apply sealants when air temperature is between 10°C and 25°C. When air temperature is above 25°C or below 10°C follow sealant manufacturer's recommendations regarding application.

1.7 WARRANTY

- .1 At no cost to Owner remedy any defects in work, including work of this and other Sections, due to faults in materials and workmanship provided under this Section appearing within a period of 2 years from date of Substantial Performance.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Sealants:
 - .1 Exterior vertical joints: two-part medium modulus silicone sealant with joint movement capability of $\pm 50\%$; custom colour selected by Consultant: ASTM C920, Type S, Grade NS, Class 25, uses NT, G, A, O; standard of acceptance: Dow Corning 790 Silicone Building Sealant.
 - .2 Interior vertical joints: one part acrylic latex with joint movement capability of $\pm 7 \frac{1}{2}\%$, paintable; ASTM C834 Type OP, Grade -18°C standard of acceptance: Tremflex 834.
 - .3 Exterior and interior horizontal joints: multi-component, self-levelling, chemically curing

SECTION 07 92 00 - SEALANTS

- polyurethane: ASTM C920, Type M, Grade P, Class 25; standard of acceptance Tremco THC-900.
- .4 Interior wet locations: mildew-resistant silicone formulated with fungicide: ASTM C920, Type S, Grade NS, Class 25, uses NT, G, A: standard of acceptance: Dow Corning 786 Mildew Resistant Silicone Sealant.
 - .5 Colours: selected by Consultant, from manufacturer's standard colours.
 - .2 Primers, thinners, cleaners: as recommended by sealant manufacturer, non-staining type.
 - .3 Premoulded backup for sealant: compressible non-gassing foam rope: Sof-Rod by Tremco or Cera Rod by W.R. Meadows.
 - .4 Bond breaker: closed cell polyethylene or vinyl foam tape, self-adhering one side.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Examine joints to be caulked and report in writing to the Consultant any defects in work of other Sections which would impair installation, performance and warranty of sealants.
- .2 Do not commence installation of sealants until conditions are acceptable.
- .3 Start of work implies acceptance of conditions.

3.2 PREPARATION

- .1 Clean and prepare joints to be caulked to produce clean sound surfaces for sealant adhesion.
- .2 Remove dust, oil, grease, water, frost, loose mortar and other foreign matter. Remove loose particles by blowing joint out with compressed air.
- .3 Chemically clean non-porous surfaces such as metal and glass, taking care to wipe solvents dry with a clean cloth. Use solvents recommended by sealant manufacturer.
- .4 Clean porous surfaces such as masonry, concrete and stone by mechanical abrading.
- .5 Surfaces adjacent to joints to be primed and which may be stained by primer shall be masked with tape before primer is applied.
- .6 Prime joints in accordance with sealant manufacturer's recommendations. Apply primer before installing premoulded backup.
- .7 Install premoulded backup in joints 6 mm and more in width. Roll rope type backup into joint, do not stretch or braid. Install bond breaker in joints less than 6 mm in width.
- .8 Protect adjacent surfaces from stains and contamination. Make good any damage caused.

3.3 APPLICATION

- .1 Apply sealants under pressure using suitable equipment. Gun nozzle shall be of proper size to fit, and seal joint.
- .2 Force sealant into joints in full bead, making certain that void free contact is made with sides of joint. Tool joints to produce a slightly concave surface.
- .3 Caulking must appear as a concave recessed joint, free of ridges, wrinkles and embedded foreign matter. Caulking shall not spread or bulge beyond surfaces on each of joint.
- .4 Apply sealants in accordance with following table:

SECTION 07 92 00 - SEALANTS

<u>Joint Width</u>	<u>Sealant Depth</u>
5 mm	5 mm
10 mm	7 mm
15 mm	10 mm
20 mm	12 mm
25 mm	15 mm

- .5 Vent exterior joints in accordance with Consultant's directions.

3.4 CLEANING

- .1 As work progresses, remove sealant smears and stains from adjacent surfaces. Use cleaning method recommended by sealant manufacturer.
- .2 Leave adjacent surfaces in neat and clean condition.

3.5 SCHEDULE

- .1 Apply sealant at the following exterior locations:
- .1 Between dissimilar materials in exposed locations except where specifically indicated otherwise.
 - .2 Control joints in masonry elements.
 - .3 Below door thresholds (double bead).
 - .4 Perimeter of door, screen and louvre frames.
 - .5 Penetrations through exterior building elements.
 - .6 Where indicated.
- .2 Apply sealant at the following interior locations:
- .1 Between dissimilar materials in exposed locations except where specifically indicated otherwise.
 - .2 Perimeter of exterior door, louvre and screen frames.
 - .3 Perimeter of interior door frames.
 - .4 Control joints in masonry elements, and joints between bearing and non-bearing masonry walls.
 - .5 Ceramic tile control joints.
 - .6 Perimeter of firehose cabinets, access panels, and control panels.
 - .7 Between interior door frame and flooring.
 - .8 Where shown.
- .3 At interior locations use acrylic emulsion sealant except:
- .1 At floor control joints use self-levelling polyurethane.
 - .2 Where expected joint movement exceeds movement capability of sealant, use sealant specified for exterior locations as directed by Consultant.

END

SECTION 08 11 13 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Caulking at frame perimeters: Section 07 92 00
- .2 Door hardware: Section 08 71 00
- .3 Glass and glazing: Section 08 80 00
- .4 Metal louvres: Section 08 91 00
- .5 Painting: Section 09 91 00

1.3 QUALITY ASSURANCE

- .1 Acceptable manufacturers for interior doors and frames:
 - .1 Artek Door (1985) Ltd.
 - .2 Daybar Industries Ltd.
 - .3 Fleming (Assa Abloy)
 - .4 Metal Doors Ltd.
- .2 Reference standards: unless otherwise indicated, meet requirements of "Canadian Manufacturing Specification for Steel Doors and Frames" and "Recommended Dimensional Standards for Commercial Steel Doors and Frames" published by the Canadian Steel Door Manufacturers' Association.

1.4 SUBMITTALS

- .1 Prepare and submit detailed shop drawings. Include door and frame schedules, door and frame types, typical details, materials and finishes, hardware preparations and frame anchorage details.

1.5 PRODUCT HANDLING

- .1 Tag doors and frames at shop with identification marks indicating proper location for installation.
- .2 Deliver, store and handle components so as to prevent damage, distortion and corrosion. Store components off the ground and under cover in a dry protected area. Stack doors and frames to prevent twisting. Do not enclose components in plastic covers without venting.
- .3 Upon delivery to site doors and frames shall be removed from packaging. Store doors and frames with spacers/blocking to allow air to circulate. Do not store under tarpaulins, plastic film or other wrapping materials that may retain moisture or create a humidity tent.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Sheet Steel: galvanized cold rolled steel with stretcher level degree of flatness, meeting requirements of ASTM A924 and A653; minimum zinc coating designation ZF120.
- .2 Core Material:
 - .1 Exterior doors: polyisocyanurate to CSA/ULC 704.1-2017.

SECTION 08 11 13 - STEEL DOORS AND FRAMES

- .3 Interior doors: resin impregnated paper honeycomb.
- .3 Finishing Materials:
 - .1 Touch up paint: zinc rich paint CAN/CGSB-1.181-99.
 - .2 Metal filler: two component epoxy type.

2.2 HARDWARE PREPARATION

- .1 Prepare for mortised and cylindrical hardware in accordance with ANSI A115 Series standards, except where specified otherwise. Provide mortise lock preparation to ANSI A115.1, including integral reinforcement channel, mounting tabs, and lock support. Provide cylindrical lock preparation to ANSI A115.2, including integral latch case support.
- .2 Blank, reinforce, drill and tap doors and frames for concealed and mortised hardware. Provide door closer reinforcement at all steel doors and frames whether closer is required by hardware list or not.

2.3 DOORS

- .1 Provide all doors of seamless construction with no visible seams or joints on faces.
- .2 Exterior doors shall be of hollow steel construction with all spaces filled with insulation. Skins shall be minimum 1.34 mm thick. Join door faces at vertical door edges by continuous weld, extending full height of door; grind, fill and dress smooth.
- .3 Interior high traffic doors shall be of steel stiffened construction with 1.7 mm thick door faces, joined at door edges with continuous weld, ground, filled and dressed smooth. Provide high traffic doors at the following locations:
 - .1 Interior vestibule doors
 - .2 Stair doors
 - .3 Cross corridor doors
 - .4 Where shown
- .4 Provide condensation weep holes at bottom edge of exterior doors.
- .5 Provide flush watertight galvanized steel end closures at top edge of exterior doors and where required for attachment of hardware and weatherstripping.
- .6 Hardware reinforcements shall be minimum 3.4 mm thick, not including door skin thickness. Provide reinforcement at all hardware fastening points.
- .7 Surround openings in flush doors with minimum 1 mm thick steel edge channels, welded to both face sheets.
- .8 Provide removable bevelled glazing stops of zinc coated steel channels mitred at corners, accurately fitted into position and fastened with Phillips, oval head screws.
- .9 Glazing stops at outside of exterior doors shall be rendered non-removable.
- .10 Coordinate the work of this section with that of Section 08 80 00 and 08 91 00 respectively.

2.4 FRAMES

- .1 Unless otherwise shown provide welded frames of 1.7 mm thick sheet steel to profiles shown. Door stops and glass stops shall be formed integrally with frame and not added as a separate profile.
- .2 Assemble components with accurately cut joints. Mitre outside corner joints of frames. Continuously

SECTION 08 11 13 - STEEL DOORS AND FRAMES

weld joints on inside of profile; grind welds, flush and sand to smooth uniform surface. Tabbed and spotwelded construction is not acceptable.

- .3 Fit and assemble work in the shop wherever possible, eliminating field joints.
- .4 Glazing stops shall be minimum 0.9 mm thick steel, mitred at corners, drilled and secured with oval head screws. Glazing stops at outside of exterior frames shall be rendered non-removable.
- .5 Side light and transom framing shall be of same thickness metal as adjacent door frame.
- .6 Countersink frames at anchor locations to accommodate 10 mm screw fasteners for frames installed into concrete openings. Provide steel sleeves between frame and wall.
- .7 Drill interior door frames for rubber bumpers. Drill strike jamb of each single door frame for 3 bumpers. Drill head member of double door frames for 2 bumpers.
- .8 Provide angle or channel head reinforcement for door frames wider than 915 mm.
- .9 Tack weld two removable minimum 1.2 mm thick steel spreader channels to inside faces of door frames at base.
- .10 Provide adjustable base clips for anchorage to floor at bottom of each door jamb.
- .11 Protect hardware reinforcements at frames located in masonry elements with 0.9 mm thick guard boxes.
- .12 Hardware reinforcements shall be minimum 3.4 mm thick, not including frame thickness. Provide reinforcement at all hardware fastening points. Provide high frequency (angle type) reinforcement at hinges.
- .13 Where indicated provide removable mullions.
- .14 Provide welded on drip at head of exterior door frames.
- .15 Provide special head members to accommodate automatic door operators coordinate with Division 26 to permit access for wiring and equipment
- .16 Prepare exterior door frames for security system contacts.

2.5 FINISHES

- .1 Fill seams, corner joints and other depressions with filler and sand smooth.
- .2 Clean and remove all traces of oil, grease and other foreign substances to ensure proper bond of touch up after fabrication.
- .3 Touch up damaged zinc coating with zinc rich paint.
- .4 Insulate, where necessary to prevent electrolysis, metal surfaces in contact with dissimilar metals or cementitious materials.

PART 3 - EXECUTION

3.1 FRAME AND SCREEN INSTALLATION

- .1 Allowable limit of distortion shall be 1.5 mm out of plumb at each jamb, measured on face of frame, resulting in maximum twist of frame of 3 mm measured from upper corner to lower diagonal corner.
- .2 Generally, anchorage of frames shall be by means of standard anchors. At masonry walls, use T-strap anchors; wire anchors not acceptable. Where standard anchors cannot be used, provide special anchors to ensure proper installation. Method of anchorage shall not be visible when frames are installed.

SECTION 08 11 13 - STEEL DOORS AND FRAMES

- .3 Provide minimum 3 anchors at each jamb. At frames exceeding 2150 mm in height provide one additional anchor for each additional 610 mm, or part thereof.
- .4 Anchor intermediate vertical frame members to structure above as required to ensure stability. Where required, provide steel frame extensions. Provide flexible connection at structure to allow for deflection.
- .5 Remove steel shipping spreaders; install wood installation spreaders at sill and at third points of frame rabbet height to maintain constant frame width. Remove wood spreaders only after frames are securely anchored in place.
- .6 Intermediate field joints shall be continuously welded or tack welded, filled and ground smooth.

3.2 DOORS

- .1 Install steel doors.
- .2 Install hardware in accordance with hardware supplier's instructions.
- .3 Adjust operable parts to ensure proper operation.

3.3 TOUCH-UP

- .1 Patch damaged finishes. Remove rust, sand damaged and abraded surfaces and touch-up with zinc rich paint.

END

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Mechanical and electrified door hardware
- B. Related Sections:
 - 1. Division 01 Section "Alternates" for alternates affecting this section.
 - 2. Division 06 Section "Rough Carpentry"
 - 3. Division 06 Section "Finish Carpentry"
 - 4. Division 08 sections for doors and frames with hardware specified in this section.
 - 5. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
 - 6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
 - 7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

- A. DHI - Door and Hardware Institute
 - 1. Sequence and Format for the Hardware Schedule
 - 2. Recommended Locations for Builders Hardware
 - 3. Keying Systems and Nomenclature
 - 4. Installation Guide for Doors and Hardware
- B. NFPA – National Fire Protection Association-Current Editions
 - 1. NFPA 80 – Standard for Fire Doors and Other Opening Protectives
- C. ANSI - American National Standards Institute
 - 1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
 - 2. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

- A. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
 - 1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
 - 2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - 3. Door Hardware Schedule: Submit with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI. Indicate complete

designations of each item required for each door or opening, include all notes and operational descriptions from hardware groups.

4. Templates: After final approval of hardware schedule, provide for doors, frames and other work specified to be factory or shop prepared for door hardware installation.
5. Inspection and Testing: Submit written reports of the results of functional testing and inspection for fire door assemblies, in compliance with NFPA 80.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Supplier: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.

B. Certifications:

1. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80, and requirements of authorities having jurisdiction.
2. Accessibility Requirements: This project must comply with all Local and Provincial Codes and Standards.

C. Pre-Installation Meetings

1. Pre-installation Conference: Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays. Coordinate door hardware with other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping. Deliver keys to manufacturer of key control system for subsequent delivery to Owner
- B. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

1.06 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant. Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

- C. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide products from manufacturers listed in hardware groups. Additional alternate products require prior written approval from Owner and are contingent upon those products providing all functions, features, and meeting all requirements of scheduled manufacturer's product.

2.02 MATERIALS

- A. Provide hardware with options specified in the hardware sets, fasteners provided by hardware manufacturer, strikes provided by hardware manufacturer, drop plates, special templates, and other devices necessary for proper hardware installation.
- B. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.
- C. Provide each electrified hardware item and wire harnesses with enough and wire gauge with standardized Molex plug connectors to accommodate electric function of specified hardware.

2.03 HINGES: IVES 5BB SERIES

- A. Provide 5-knuckle plain bearing hinges conforming to ANSI/BHMA A156.1. Provide hinges in the size, quantity, weight, and base metal according to manufacturer's published recommendations. Provide non-removable pins at out-swinging lockable doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.

2.04 MORTISE LOCKS: SCHLAGE L9000 SERIES

- A. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.

2.05 ELECTRIC STRIKES: VON DUPRIN 6000 SERIES

- A. Provide electric strikes designed for use with type of locks shown at each opening, UL Listed as burglary resistant and tested to a minimum endurance test of 1,000,000 cycles. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.06 POWER SUPPLIES: SCHLAGE/VON DUPRIN PS900 SERIES

- A. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with

consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.

2.07 CYLINDERS

- A. Provide Schlage small format construction core cylinders for use during the construction period.
- B. Retain the services of Royal Security Solutions, attention Svetoslav Velikov (905-840-0522, EXT 232) to remove the Schlage SFIC cylinders and replace with keyed Medeco X4 SFIC cylinders prior to substantial completion.

2.08 KEYING:

- A. Owner supplier, Royal Security Solutions will pin Medeco X4 SFIC cylinders to the City of Mississauga keying system.

2.09 SURFACE CLOSERS: LCN 4040XP SERIES

- A. Provide cast iron door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.

2.10 ELECTRO-MECHANICAL AUTOMATIC OPERATORS: LCN 9540 SERIES

- A. Supply and install low energy automatic operator units that are electro-mechanical design complying with ANSI/BHMA A156.19. Locate actuators and other controls as directed by Architect.

2.11 ACTUATORS: LCN

- A. Provide actuators as specified in the hardware groups.

2.12 PROTECTION PLATES: IVES

- A. Provide protection plates with beveled four edges as scheduled. Size plates to suit door width.

2.13 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS: GLYNN-JOHNSON

- A. Provide overhead stop at doors where specified and where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.14 THRESHOLDS, WEATHERSTRIPPING, AND GASKETING: ZERO INTERNATIONAL

- A. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items. Where smoke- and draft-control door

assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

2.15 DOOR POSITION SWITCHES, RELAYS, TIMER: SCHLAGE, ALTRONIX

- A. Provide door position switches as specified. Coordinate door and frame preparations with door and frame suppliers.
- B. Provide relays and seven-day timer to control openings with auto door operators.

2.16 FINISHES

- A. Provide hardware with finishes as indicated in hardware sets.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.
- B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

3.02 PREPARATION

- A. Where on-site modification of doors and frames is required, prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
 - 1. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.

3.03 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.

- C. Install hardware in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period. Royal Security Solutions will replace construction cores with keyed Medeco permanent cores.
- E. Coordinate Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for wiring and connections of related components.
- F. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors.

3.04 FIELD QUALITY CONTROL

- A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
- B. Clean adjacent surfaces soiled by door hardware installation. Clean operating items per manufacturer's instructions to restore proper function and finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

END OF SECTION

Comfort Station Huron Park

Legend:
























-  Link to catalog cut sheet
-  Electrified Opening

Hardware Group No. 01

For use on Door #(s):

101 102

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 127X114MM NRP		630	IVE
1	EA	STOREROOM LOCK	L9080HD LLL 17B LLL L283-150		630	SCH
1	EA	PERMANENT CORE CYLINDER	MEDECO X4 SFIC SUPPLIED AND INSTALLED BY OWNER		626	MED
4	EA	CUT CONST. KEY	48-310			SCH
2	EA	CUT CONTROL KEY	48-311			SCH
1	EA	ELECTRIC STRIKE	6211 FSE CON		 630	VON
1	EA	DOOR PULL	CBH 6039-1 24" LONG, 16" CTC #6 MTG		630	CBH
1	EA	OH STOP	100S ADJ		630	GLY
1	EA	SURF. AUTO OPERATOR	9542 MS AS REQ (120/240 VAC)		 ANCL R	LCN
1	EA	WEATHER RING 6" DIA	8310-802		 PLA	LCN
2	EA	ACTUATOR, TOUCH	8310-852T		630	LCN
2	EA	ESCUTCHEON	8310-876		630	LCN
1	EA	MOUNTING PLATE	9540-18 X LENGTH		689	LCN
1	EA	KICK PLATE	8400 325MM X 40MM LDW B-CS		630	IVE
1	SET	GASKETING	8303AA-S (1X HD/2 X JB)		AA	ZER
1	EA	DOOR SWEEP	8192AA X DOOR WIDTH		AA	ZER
1	EA	THRESHOLD	625A X FR WIDTH		A	ZER
1	EA	WIRE HARNESS	CON-6W			SCH
1	EA	DOOR CONTACT	679-05HM		 BLK	SCE
1	EA	7 DAY TIMER	DPT724A			ALT
1	EA	DPDT RELAY	RB1224			ALT
1	EA	POWER SUPPLY	PS902 BBK 120/240 VAC		 LGR	SCE

NOTE: AUTO DOOR OPERATOR AND ELECTRIC STRIKE CONTROLLED BY A TIMER LOCATED IN THE SERVICE AREA OF THE BUILDING.

















Comfort Station Huron Park

Hardware Group No. 02

For use on Door #(s):

103

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 127X114MM NRP		630	IVE
1	EA	STOREROOM LOCK	L9080HD LLL 17B LLL L283-150		630	SCH
1	EA	CONST MORTISE CYL	30-001 118 KA-1		626	SCH
1	EA	PERMANENT CORE CYLINDER	MEDECO X4 SFIC SUPPLIED AND INSTALLED BY OWNER		626	MED
1	EA	ELECTRIC STRIKE	6211 FSE CON	 ⚡	630	VON
1	EA	DOOR PULL	CBH 6039-1 24" LONG, 16" CTC #6 MTG		630	CBH
1	EA	OH STOP	100S ADJ		630	GLY
1	EA	SURF. AUTO OPERATOR	9542 MS AS REQ (120/240 VAC)	 ⚡	ANCL R	LCN
1	EA	MOUNTING PLATE	9540-18 X LENGTH		689	LCN
2	EA	ILLUMINATED ACTUATOR	CM-46/4/GRF/SFE1			CAM
1	EA	AURA PUSH TO LOCK	CM-46/8/GRF/SFE1			CAM
1	EA	KICK PLATE	8400 325MM X 40MM LDW B-CS		630	IVE
1	SET	GASKETING	8303AA-S (1X HD/2 X JB)		AA	ZER
1	EA	DOOR SWEEP	8192AA X DOOR WIDTH		AA	ZER
1	EA	THRESHOLD	625A X FR WIDTH		A	ZER
1	EA	ADVANCED LOGIC RELAY	CX-33			CAM
1	EA	WIRE HARNESS	CON-6W		⚡	SCH
1	EA	DOOR CONTACT	679-05HM	 ⚡	BLK	SCE
1	EA	MOMENTARY RESET SWITCH	CM-8010/13	 ⚡		CAM
1	EA	EMERG CALL KIT UNIV RESTRMS	CX-WEC12 - C/W PUSH BUTTON RESET		⚡	CAM
1	EA	7 DAY TIMER	DPT724A		⚡	ALT
1	EA	DPDT RELAY	RB1224		⚡	ALT
1	EA	POWER SUPPLY	PS902 BBK 900-8F 120/240 VAC	 ⚡	LGR	SCE

NOTE: AUTO DOOR OPERATOR AND ELECTRIC STRIKE CONTROLLED BY A TIMER LOCATED IN THE SERVICE AREA OF THE BUILDING BY OTHERS.











Comfort Station Huron Park

Hardware Group No. 03

For use on Door #(s):

100

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 127X114MM NRP		630	IVE
1	EA	STOREROOM W/DEADBOLT	L9480HD LLL 17B LLL L583-363 L283-150		630	SCH
1	EA	CONST MORTISE CYL	30-001 118 KA-1		626	SCH
1	EA	PERMANENT CORE CYLINDER	MEDECO X4 SFIC SUPPLIED AND INSTALLED BY OWNER		626	MED
1	EA	PUSH/PULL PLATE	CBH 380 127 X 508 CFC		630	CBH
1	EA	SURFACE CLOSER	4040XP SHCUSH ST-3068		689	LCN
1	EA	KICK PLATE	8400 325MM X 40MM LDW B-CS		630	IVE
1	SET	GASKETING	8303AA-S (1X HD/2 X JB)		AA	ZER
1	EA	DOOR SWEEP	8192AA X DOOR WIDTH		AA	ZER
1	EA	THRESHOLD	625A X FR WIDTH		A	ZER
1	EA	DOOR CONTACT	679-05HM	 ⚡	BLK	SCE

SECTION 08 80 00 - GLASS AND GLAZING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Steel doors and frames: Section 08 11 13
- .2 Metal louvres: Section 08 91 00

1.3 SUBMITTALS

- .1 Submit detailed product data for each product to be used.
- .2 Submit detailed shop drawings for the work of this Section, showing sizes, configurations, materials, finishes, anchorages. Coordinate with Section 08 91 00 – Louvres.
- .3 Submit duplicate, minimum 100 x 100 mm samples of shop applied finish for window frames.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Framing components:
 - .1 Aluminum extrusions: ASTM B221, AA 6063-T5 alloy/temper.
 - .2 Aluminum plate and sheet: ASTM B209 AA 1100 alloy.
 - .3 Screws, bolts, nuts, washers, rivets and other fasteners, incorporated into aluminum sections: aluminum or ANSI Series 300 stainless steel or hot dip galvanized steel.
 - .4 Anchoring devices: aluminum, non-magnetic stainless steel or hot dip galvanized steel.
- .2 Glass and glazing materials:
 - .1 Setting blocks: neoprene, Shore 'A' durometer hardness of 70 to 90 points; spacer shims, 40 to 50 points, as recommended by glass manufacturer.
 - .2 Glazing compound: non-hardening modified oil type meeting requirements of CAN/CGSB-19.2-M87.
 - .3 Glazing sealant: one part polysulphide or one part silicone to ASTM C920.
 - .4 Glazing tape: polyisobutylene tape; acceptable product: Tremco 440 tape.
 - .5 Glazing gasket: Tremco Vision Strip; colour selected by Consultant.
 - .6 Glass: laminated, Lexan polycarbonate, minimum 19 mm total thickness with high impact resistance and with a translucent PVB interlayer, selected by Consultant.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Examine existing condition to ensure that they are satisfactory to receive the work of this section. Start of work on site shall imply acceptance of conditions.

3.2 GLASS INSTALLATION GENERAL

SECTION 08 80 00 - GLASS AND GLAZING

- .1 Do not glaze when ambient or surface temperature is less than 5°C. Ensure that glazing rabbets, stops and glass are dry, free of frost, grease, oil, dust, rust or other substances detrimental to adhesion of compounds and sealants.
- .2 Provide clearance at perimeter edge of glass on all four sides, minimum equal to glass thickness. Accurately cut glass to fit openings, allowing for expansion in accordance with glass manufacturer's recommendations.
- .3 Provide sealer space between face of glass and glazing stops of minimum 3 mm.
- .4 Clean sealing surfaces at perimeter of glass and sealing surfaces of rabbets and stop beads before applying glazing tapes, gaskets and compounds. Use solvents and cleaning agents recommended by manufacturer of sealing materials.
- .5 Install glazing tapes uniformly with accurately formed corners and bevels. Ensure that proper contact is made with glass and rabbet interfaces.
- .6 Set glass on setting blocks, spaced as recommended by glass manufacturer. Provide at least one setting block at quarter points from each corner.
- .7 Centre glass in glazing rabbet to maintain specified clearances at perimeter on all four sides. Maintain centered position of glass in rabbet and provide the required sealer thickness on both sides of glass.
- .8 Use spacers and shims in accordance with glass manufacturer's recommendations.
- .9 Carefully remove glazing stops and reinstall after glazing.

3.3 CLEANING

- .1 Remove dirt, scum, plaster, paint spatter, and other harmful and deleterious matter from glass promptly and completely, before they establish tight adhesion.
- .2 Avoid using abrasives, steel wool, razor blades, solvents, alkaline or other harsh cleaning agents.
- .3 Remove glazing compound droppings promptly from all surfaces as the work progresses.
- .4 Replace scratched or otherwise damaged glass.

END

SECTION 08 91 00 - METAL LOUVRES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Caulking: Section 07 92 00
- .2 Grilles and registers except as specified herein: Division 23

1.3 PERFORMANCE REQUIREMENTS

- .1 Deflection: louvre members shall deflect not more than 1/180 of span between supports when subjected to positive and negative wind loads based on OBC 50 year probability.
- .2 Vibration: louvre members shall not vibrate or rattle.

1.4 SUBMITTALS

- .1 Submit detailed shop drawings, showing profiles, sizes, materials, finishes, anchorage and installation details.
- .2 Submit two minimum 100 x 200 mm samples of louvre finish in colour selected.

PART 2 - PRODUCTS

2.1 ACCEPTABLE PRODUCT

- .1 CS 4" (101.6 mm) deep storm resistant fixed horizontal louvre, Model RS-4700 by Construction Specialties or equivalent product by McGill or TenPlus.

2.2 MATERIALS AND FABRICATION

- .1 Aluminum:
 - .1 Extrusions: ASTM B211, allow 6063-T5 or T6.
 - .2 Sheet: ASTM B211, alloy 1100, 3003 or 5050.
- .2 Fastenings: aluminum or stainless steel for aluminum louvres; hot dip galvanized steel for steel louvres.
- .3 Bird screen: 16 mm mesh, 1.27 mm expanded and flattened aluminum wire; extruded aluminum frame, corners mitred.
- .4 Sill extensions: extruded aluminum, depth to suit wall condition, concealed clip anchors, drip deflectors at sill ends.
- .5 Insulated blank off panels: 50 mm thick rigid core, faced both sides with 0.8 mm thick aluminum sheet. Perimeter of panel framed with extruded aluminum sections. Closed cell perimeter gaskets.
- .6 Finish: all exposed exterior surfaces, including blank off panels, unless otherwise shown: three coat fluoropolymer system; colour selected by Consultant.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Provide louvres in sizes and locations indicated in Contract Documents.

SECTION 08 91 00 - METAL LOUVRES

- .2 Install louvres plumb and level and securely fasten to adjacent building elements.
- .3 Allow for expansion and contraction of components without detrimental effects.
- .4 Dissimilar metals and metals in contact with cementitious elements shall have contact surfaces coated with bituminous paint or other means approved by Consultant.
- .5 Install bird screens at all exterior aluminum louvres.
- .6 Install sill extensions. Where shown, install trim matching louvre material and finish.
- .7 Install insulated blank off panels at unused portions of louvres, except where louvres are required to be left open.

END

SECTION 09 67 29 - EPOXY FLOORING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Waterproof flooring: Section 09 67 33
- .2 Epoxy wall coating: Section 09 96 56

1.3 QUALITY ASSURANCE

- .1 Applicator's qualifications: licensed or certified by system manufacturer, regularly engaged in application of polymer floor systems for the past 5 years and having successfully executed at least 5 projects of similar size and complexity.
- .2 Work of this section shall be carried out in strict accordance with system manufacturer's directions. Keep manufacturer's current installation instruction on site throughout installation.
- .3 Obtain all materials used from or through the same manufacturer.
- .4 Manufacturer's representative shall periodically inspect work in progress and upon completion of work, issue a written statement certifying that floor system as installed meets specified requirements.

1.4 SUBMITTALS

- .1 Submit full range of standard colours and textures for selection by Consultant.
- .2 Submit duplicate samples, minimum 300 x 300 mm representative of finished work.
- .3 Product data: submit manufacturer's technical information, including basic materials analysis and installation instructions for each material specified. List each material and cross-reference to the specific coating and finish system and application. Identify by manufacturer's catalogue number and general classification.
- .4 Submit maintenance instructions for inclusion into operations and maintenance manual specified in Section 01 77 00.

1.5 MOCK-UP

- .1 Provide an epoxy flooring mock-up, minimum 10 m² including a coved integral wall base, in colour and texture and at location directed by Consultant.
- .2 Provide coved base condition in conjunction with mock-up for epoxy wall coating. Coordinate with Section 09 96 56.
- .3 Mock-up, once approved by Consultant, may be incorporated into finished work.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in original packaging and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
- .2 Store materials to prevent deterioration caused by moisture, heat, cold, direct sunlight and other detrimental effects.
- .3 Materials to be used shall be factory pre-weighted and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighting or volumetric measurements allowed.

1.7 JOB CONDITIONS

SECTION 09 67 29 - EPOXY FLOORING

- .1 Maintain substrates and ambient air temperature within limits recommended by system manufacturer, prior, during and after installation of flooring.
- .2 Provide adequate ventilation during installation and curing.
- .3 Lighting: provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- .4 Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.
- .5 Install flooring prior to installation of floor mounted fixtures and equipment and prior to painting and caulking work in areas affected.
- .6 Protect adjacent surfaces from damage. If necessary, mask or cover surfaces.

1.8 WARRANTY

- .1 At no cost to Owner repair or replace any work of this Section, including areas showing cracks, blisters, delamination from substrate, excessive wear and other defects due to materials and workmanship, for a period of 3 years from date of Substantial Performance.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Epoxy flooring system and integral base: 3 mm thick system consisting of penetrating moisture tolerant two-component epoxy primer and a multi-component epoxy trowelled mortar and a two-component 100% solids epoxy coating; up to 5 colours selected by Consultant; 3 of the colours to be custom matching provided RAL colours selected by Consultant: one of the following systems:
 - .1 Mapefloor EP19/Mapefloor I 302 SL by Mapei.
 - .2 Stonclad GS/Stonkote GS4 by Stonhard.
 - .3 Sikafloor Morritex/Sikafloor 261 by Sika.
- .2 Fillers, underlayment, primer, sealer and other materials: as recommended by system manufacturer.
- .3 Patching compound: Stoneset PM5 by Stonhard or equivalent product by Sika or Mapei.
- .4 Concrete crack treatment: CTG5 by Stonhard or equivalent product by Sika or Mapei.
- .5 Joint filler: Stonflex MP7 by Stonhard or equivalent product by Sika or Mapei.
- .6 Slip resistant aggregate: as recommended by flooring manufacturer.
- .7 Waterproofing membrane: Stoneproof ME7 by Stonhard or equivalent product by Sika or Mapei.

2.2 MIXING

- .1 Mix materials in accordance with system manufacturer's directions.
- .2 Use factory pre-weighed and packaged materials only.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Examine substrate prior to start of work. Start of work implies acceptance of conditions.
- .2 Ensure substrates are sound, dry, free of dust, dirt, grease, oil, paint and other foreign substances. Repair damaged/deteriorated substrates as recommended by flooring manufacturer. Prepare all

SECTION 09 67 29 - EPOXY FLOORING

substrates by mechanical means with a shotblast machine. Use dust accumulator or other containment measures to prevent dust from spreading to other areas.

- .3 Substrate variations shall not exceed 3 mm in 3 m when measured in any direction with a 3 m straight-edge. Excessive deviations and defective concrete shall be corrected prior to start of work.
- .4 Substrate moisture and alkalinity content must be within limitations specified by manufacturer. New concrete shall be cured at least 30 days. Test substrate for moisture and alkalinity prior to application of coating system.

3.2 INSTALLATION

- .1 Apply primer to suitably prepared substrates as recommended by system manufacturer.
- .2 Apply epoxy flooring in accordance with system manufacturer's directions in colour and textures selected by Consultant.
- .3 Apply single mortar coat with metal trowel. Hand or power trowel and grout to fill voids. When cured, sand to remove trowel marks and roughness.
- .4 Where indicated, provide 150 mm high integral cove base at junction with walls.
- .5 Apply topcoat over cured mortar coat, in colour selected by Consultant. Provide contrasting colour selected by Consultant at cove base. Broadcast slip resistant aggregate into topcoat to achieve light slip resistant texture as directed by Consultant.
- .6 Where required, chase edges to lock flooring into concrete at terminations and so as to achieve flush transition to abutting flooring.
- .7 At substrate control joints provide joint in epoxy flooring and apply joint filler in accordance with flooring manufacturer's direction.
- .8 Curbs shall be integral with floor and shall be coved with a 20 mm radius. Tops of curbs shall be bullnosed.
- .9 Provide slip resistant finish by broadcasting slip resistant aggregate into top coat as directed by Consultant.
- .10 Cure and protect floor to manufacturer's directions prior allowing traffic on floor. Provide temporary covering until directed to be removed by Consultant.
- .11 Immediately prior to takeover by Owner remove temporary covering and thoroughly clean floor as recommended by system manufacturer.
- .12 Finished flooring shall be uniform in thickness, colour, texture, pattern and sheen, free of defects detrimental to performance and appearance.

3.3 FIELD QUALITY CONTROL

- .1 Owner may engage service of an independent testing laboratory to sample materials being used on the jobsite. Samples of material will be taken, identified and sealed, and certified in presence of Contractor.
- .2 Testing laboratory will perform tests for any of characteristics specified, using applicable testing procedures referenced herein, or if none referenced, in manufacturer's product data.
- .3 If test results show materials being used do not comply with specified requirements, Contractor may be directed by Consultant to stop work; remove non-complying materials; pay for testing; reapply flooring materials to properly prepared surfaces which had previously been coated with unacceptable materials.

END

SECTION 09 67 29 - EPOXY FLOORING

PROJECT NO. 24-053

30/01/2025

WESPEC

**COMFORT STATION AT
HURON PARK, MISSISSAUGA, ONTARIO
09 67 29-4**

SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Epoxy wall covering: Section 09 96 56

1.3 ACCEPTABLE MANUFACTURERS

- .1 Unless otherwise specified, materials shall be manufactured and supplied by one of the following:
 - .1 Benjamin-Moore
 - .2 Dulux (ICI)
 - .3 Sico
 - .4 Sherwin-Williams

1.4 LIST OF MATERIALS, SAMPLES

- .1 List of Materials:
 - .1 Before ordering materials, submit written request in form acceptable to Consultant, for approval of paint materials. List each of the materials proposed and surfaces to be covered. State manufacturer's name and brand name of materials.
 - .2 List of materials shall be endorsed by manufacturer as being the best material for the applicable condition.
 - .3 Do not order material or commence work until list of materials is approved by Consultant.
- .2 Samples:
 - .1 Submit two 200 mm x 250 mm colour chips of each paint colour coated with manufacturer's paint system to confirm colour match with colour chips supplied by Consultant.
 - .2 Submit sample of natural and stained finishes on each species and grade of wood to receive such finishes.
 - .3 Prepare full size samples showing each type of door finish.
 - .4 Prepare sample panels of each wall and ceiling paint system specified, as directed by Consultant.
- .3 Maintenance Materials:
 - .1 Upon completion of work provide one sealed and properly identified 1 L can of each type and colour paint used on this project.
 - .2 Only top coating paints used in building interior are required.

1.5 PRODUCT HANDLING

- .1 Deliver paint materials to site in sealed original labelled containers bearing manufacturer's name, brand name, type of paint and colour designation.
- .2 Store materials in accordance with manufacturer's recommendations.
- .3 Store paints, stains, varnishes, equipment in designated area inside building. Maintain separate

SECTION 09 91 00 - PAINTING

workshop/storage area for duration of work by this Section.

1.6 JOB CONDITIONS

- .1 Environmental Conditions:
 - .1 Maintain temperature in interior areas to receive coatings between 15°C and 25°C for at least 24 hours before, during application and until coatings have cured after application. Apply exterior coatings only when temperature is above 10°C.
 - .2 Do not apply exterior coatings during periods of precipitation nor when precipitation is imminent.
 - .3 Do not apply coatings under direct sunlight during hot weather.
 - .4 Adequately ventilate areas where coatings are being applied. Maintain a reasonably dust-free atmosphere for duration of work.
- .2 Protection:
 - .1 Protect adjacent surfaces not scheduled to receive coatings from damage.
 - .2 Remove electrical plates, surface hardware, fittings and fastenings prior to painting operations. These items shall be carefully stored, cleaned and replaced on completion of work in each area. No solvent shall be used to clean hardware that will remove permanent lacquer finish on these items.
 - .3 Mask labels and specification plates occurring on equipment to be painted.
 - .4 Post "wet coating" signs while work is in progress and while coatings are curing.
 - .5 Keep oily rags, wastes and other combustible materials in closed metal containers and remove at end of each work day. Take every precaution to avoid spontaneous combustion.
- .3 Work Schedule:
 - .1 Unless otherwise permitted, apply coatings only after all other Sections have completed their work.
 - .2 Co-ordinate work of this Section with that of Section 07900 and review order of installation with Consultant where sealants are installed adjacent to painted surfaces.
 - .3 If it becomes necessary for the Owner to occupy areas of the building prior to their completion, schedule work of this Section to hours when occupants have vacated building.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Materials shall be "top line quality" products and shall be supplied by a single manufacturer except for specialty products not available from paint manufacturer.
- .2 Materials wherever possible shall be low odour products, free or low in VOC content.
- .3 Paints shall be factory mixed unless otherwise specified.
- .4 Primers shall be as specified by manufacturer and fully compatible with finish coats.
- .5 Stains shall be of the rapid dry, alkyd base type or pigment oil type.
- .6 Varnishes shall be synthetic type.

SECTION 09 91 00 - PAINTING

- .7 Shellac shall be pure white gum in pure grain alcohol.
- .8 Thinners, cleaners: as recommended by paint manufacturer.

2.2 FINISHES

- .1 Paint colours and other finishes will be selected by Consultant. Do not start work until after receiving colour schedule.
- .2 Colours selected by the Consultant will not necessarily be from manufacturer's standard colours.
- .3 A variety of colours may be used. Some colours may be deep tones.
- .4 Confirm gloss levels for all surfaces with Consultant before starting work. Unless otherwise indicated, allow for semi-gloss.

PART 3 - EXECUTION

3.1 CONDITIONS OF SUBSTRATES

- .1 Sound, non-dusting, and free of grease, oil, dirt, and other matter detrimental to adhesion and appearance of coatings.
- .2 Temperature: minimum 13°C.
- .3 Moisture content: maximum 12%. Test for moisture content using moisture meter.
- .4 Alkalinity: test cementitious substrates for alkalinity. Use method recommended by coating manufacturer.

3.2 PREPARATION OF SUBSTRATES

- .1 All substrates: clean as required to produce an acceptable surface. If wood, metal or any other surface to be finished cannot be put in proper condition for finishing by cleaning, sanding and filling as specified, notify Consultant in writing or assume responsibility for an rectify any unsatisfactory finish resulting.
- .2 Bare ferrous metal: remove rust and scale; wash with solvent; chemically clean; apply coat of metal primer.
- .3 Zinc coated metal: wash and etch to dull paint receptive surface using an approved crystalline zinc phosphate or vinyl pretreatment.
- .4 Unit masonry & concrete: fill minor cracks, holes and fissures with Polyfilla and smooth to a flush surface. Texture filled areas to match surrounding surface.
- .5 Alkaline surfaces: wash and neutralize using proper type of solution compatible with paint to be used.

3.3 APPLICATION OF COATINGS

- .1 Apply paint by brush or roller, except on metal surfaces where paint shall be applied by brush only.
- .2 Applied and cured coatings shall be uniform in thickness, sheen, colour and texture and free of brush or roller marks, sags, crawls and other defects detrimental to appearance and performance.
- .3 Regardless of the number of coats specified for any surface, apply sufficient paint to completely cover and hide substrate and to produce a solid uniform appearance.
- .4 Thoroughly mix materials before application. Use same brand of paint for primer, intermediate and finish coats.
- .5 Touch up suction spots after application of first coat. Sand lightly between coats with fine sandpaper.

SECTION 09 91 00 - PAINTING

- .6 Each coat of finish shall be dry and hard before succeeding coats are applied with a minimum of 24 hours between coats, unless manufacturer's instructions state otherwise. Do not proceed with any coat until the last preceding coat is approved by the Consultant.

3.4 SCHEDULE OF FINISHES

- .1 General Requirements:
- .1 Paint exposed surfaces of building materials, services and equipment, except those which are prefinished in factory and except those which are located in areas designed as not requiring painting.
 - .2 Comply with the following requirements except in areas designated as not requiring painting.
 - .1 Paint behind surface mounted fixtures on walls and ceilings with full coats of paint.
 - .2 Finish tops of doors, trim, projections and other work as specified for surrounding work whether above site lines or not.
 - .3 Finish edges of doors to match face of door. Refinish edges of doors after fitting.
 - .4 Paint interior of ducts at grilles and diffusers with two coats of flat black paint, so that duct interior is not visible when grilles and diffusers are installed.
 - .5 Paint piping, ducts and conduits in colours matching background wall or ceiling colours, unless otherwise directed by the Consultant.
 - .3 Where finishing formula for surfaces requiring painting is not included hereunder, follow recommendations of MPI Architectural Painting Specification Manual, latest issue.
- .2 Interior Finishing:
- .1 Concrete and concrete block:
1 coat block filler and primer, latex or PVA based
2 coats acrylic latex semi-gloss
 - .2 Metal, prime painted:
spot prime with alkyd metal primer
2 coats acrylic latex semi-gloss
 - .3 Metal, zinc coated:
1 coat galvanized primer
2 coats acrylic latex semi-gloss
 - .4 Exposed piping and conduit, unwrapped:
1 coat alkyd metal primer
2 coats acrylic latex semi-gloss
- .3 Exterior Finishing:
- .1 Metal, zinc coated (hot dip galvanized):
1 coat epoxy primer
2 coats aliphatic polyurethane
 - .2 Metal, zinc coated (inorganic zinc rich primer):
1 coat epoxy primer
2 coats aliphatic polyurethane

END

SECTION 09 96 56 - EPOXY WALL COATING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Epoxy flooring: Section 09 67 29
- .2 Painting: Section 09 91 00

1.3 DEFINITION

- .1 Epoxy coating = Epoxy paint = High build glazed coating.

1.4 QUALITY ASSURANCE

- .1 Applicator qualifications: licensed by coating manufacturer.
- .2 Upon Consultant's request verify film thickness of completed coating in presence of Consultant with s coating inspection gauge.

1.5 SUBMITTALS

- .1 Submit detailed product data for each product to be used.
- .2 Submit duplicate 200 x 250 mm draw-downs of each colour coating selected by Consultant.

1.6 MOCK-UP

- .1 Provide mock-up of epoxy coating minimum 5 m² applied to wall at location directed by Consultant.
- .2 Mock-up, once approved by Consultant, may be incorporated into finished work.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store materials undamaged, in original containers, with manufacturer's labels and seals intact.
- .2 Store materials in a single designated area having ambient temperature of minimum 10°C.

1.8 JOB CONDITIONS

- .1 Maintain temperature in areas to receive coatings at minimum 10°C for at least 24 hours before, during application and until coatings have cured.
- .2 Adequately ventilate areas where coatings are being applied. Maintain a reasonably dust-free atmosphere for duration of work.
- .3 Protect adjacent surfaces not scheduled to receive coatings from damage and overspray.
- .4 Post "wet coating" signs while work is in progress and while coatings are curing.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Coating system: cross-linked, water based, low odour, high gloss epoxy coating: one of the following:
 - .1 Carboline Sanitile 555 by Stonhard.
 - .2 Sikagard Duroplast 150 by Sika.

SECTION 09 96 56 - EPOXY WALL COATING

- .2 Fill coats, primers, thinners and cleaning agents: as recommended by coating manufacturer.
- .3 Colours: selected by Consultant, not necessarily from manufacturer's standard range.

PART 3 – EXECUTION

3.1 PREPARATION

- .1 Substrate shall be sound, non-dusting, and free of grease, oil, dirt and other matter detrimental to adhesion and appearance of coating. Minimum temperature 10°C; with moisture content: 30 to 85% and as follows:
 - .1 Concrete block: mortar joints cured for minimum 15 days at 24°C and 50% RH.
 - .2 Concrete: cured for minimum 28 days at 24°C and 50% RH, free of laitance, form oils curing agents, sealers removed.
 - .3 Steel: shop primed with primer as recommended by coating manufacturer.
- .2 Clean and prepare substrates to produce acceptable surface. Do the following:
 - .1 General: remove any oil, grease, grime, dirt and any other substance which would inhibit proper bond of coating system.
 - .2 Concrete: apply medium build fill coat entire surface to produce smooth void-free surface.
 - .3 Concrete block masonry: apply high build fill coat over entire surface to produce smooth void-free surface.
 - .4 Steel: remove rust and touch up primer.

3.2 APPLICATION OF WALL COATINGS

- .1 Over prepared and filled substrates apply glazed coating with roller or back rolled spray in accordance with manufacturer's printed directions.
- .2 Apply epoxy coating in 2 coats, each 0.075 to 0.1 mm thick (3 mils to 4 mils).
- .3 Applied and cured coatings shall be high-gloss, uniform in thickness, sheen, colour and texture and be free of defects detrimental to appearance and performance.
- .4 Do not apply coating over caulked joints, unless compatibility between coating and sealant is confirmed.

END

SECTION 10 21 19 - SOLID PHENOLIC PARTITIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Washroom accessories: Section 10 28 13

1.3 SUBMITTALS

- .1 Submit detailed shop drawings. Clearly indicate fabrication details, plans, elevations, hardware, and installation details.
- .2 Upon Consultant's request, submit duplicate 300 x 300 mm samples of panel showing finish on both sides, two finished edges and core construction.
- .3 Submit duplicate representative samples of each hardware item, including brackets, fastenings and trim.
- .4 Submit duplicate minimum 50 x 100 mm plastic laminate samples of full range of available products.

1.4 PROTECTION

- .1 Protect finished surfaces during shipment and installation by approved means. Do not remove until immediately prior to final inspections.

1.5 WARRANTY

- .1 At no cost to Owner, remedy any defects in work of this Section due to delamination and warping of components for a period of 2 years from date of Substantial Performance.

PART 2 - PRODUCTS

2.1 SYSTEM

- .1 Partition System: Floor mounted, overhead braced, solid phenolic.
- .2 Acceptable Products:
 - .1 1082 Series by Bobrick
 - .2 Equivalent product by Ampco, Bradley, Decolam, Global.

2.2 MATERIALS

- .1 Melamine surface sheets: to ANSI/NEMA LD3-2005 high pressure type with solid colour, satin finish; colour: selected by Consultant.
- .2 Core material: solid phenolic core, 19 mm thick.
- .3 Wall and connection brackets: stainless steel.
- .4 Stainless steel sheet metal: to ASTM A666, type 302 or 304 with polished finish.
- .5 Fasteners: stainless steel tamperproof type screws and bolts.
- .6 Pilaster shoes: stainless steel.
- .7 Shower dressing compartment seats: melamine faced solid phenolic core.

SECTION 10 21 19 - SOLID PHENOLIC PARTITIONS

- .8 Hardware for toilet partitions:
 - .1 Hinges: heavy duty stainless steel, self-closing type, adjustable to hold door open at any angle up to 90°.
 - .2 Slide bolt and keeper: stainless steel, equipped for emergency access.
 - .3 Door stop: stainless steel with rubber insert.
 - .4 Wall and connecting brackets: stainless steel.
 - .5 Door pull: stainless steel, type suited for outswinging doors.
- .9 Overhead brace: extruded aluminum channel with colour anodized finish; anti grip profile; complete with stainless steel curtain hooks at shower compartments.

2.3 FABRICATION

- .1 Fabricate shower and drying compartments to layouts shown.
- .2 Fabricate panels of door and pilasters of solid phenolic core 19 mm thick with melamine surface sheets fixed to core under high temperature and pressure.
- .3 Fabricate panels and doors 1500 mm high, fabricate pilasters extending from finish floor to headrail.
- .4 Panel and pilaster edges shall be black.
- .5 Provide jack levelling bolt at floor. Fabricate pilaster shoe of formed stainless steel sheet 75 mm high, with concealed fastening.

PART 3 - EXECUTION

3.1 PARTITION ERECTION

- .1 Install partitions secure, plumb and square.
- .2 Attach pilasters to floor with pilaster supports, and level installation with levelling device. Secure pilaster shoes in position.
- .3 Provide maximum 3 mm space between doors and pilasters. Leave max 6 mm space between wall and panel or end pilaster.
- .4 Attach fixing brackets securely to solid masonry and concrete walls using friction or expansion type screw anchors and to hollow walls using bolts and toggle type anchors.
- .5 Attach panel and pilaster to brackets with through type sleeve bolt and nut.
- .6 Set doors in closed partition level with panels.
- .7 Equip each door with hinges, latch set, and door stop. Adjust and align hardware for easy, proper function. Set door open position at 30° to front.
- .8 Equip outswinging doors with door pulls inside and outside. Provide door stop outside.

END

SECTION 10 28 00 - WASHROOM ACCESSORIES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Toilet partitions: Section 10 21 14
- .2 Hand dryers: Division 26

1.3 SUBMITTALS

- .1 Submit manufacturer's catalogue cut of each component required.
- .2 Submit a washroom accessories schedule indicating all accessories required, on a room by room basis, showing model number, finish and mounting height.

1.4 WARRANTY

- .1 At no cost to Owner, replace mirrors should defects in silvering occur within a period of 5 years from date of Substantial Performance.

PART 2 - PRODUCTS

2.1 FABRICATION - GENERAL

- .1 Fabricate work true to dimensions, square and plumb.
- .2 Thickness of metal shall be adequate for the various conditions, and intended uses.
- .3 Finished work shall be free from warping, open seams, weld marks, rattles and other defects. Drilling shall be reamed and exposed edges finished smooth.
- .4 Fastenings shall be concealed or theftproof type where possible. Exposed fastenings shall be neatly executed and shall be of the same material and finish as the base metal on which they occur.
- .5 Accessories required, in each case, are specified by a reference to a particular product by one manufacturer. The products listed shall serve to establish a standard of acceptance. Accessories of the same materials, construction and finishes, similar in function, design appearance and conforming to the standard of those specified, manufactured by the following are acceptable:
 - .1 Bobrick
 - .2 Bradley
 - .3 Frost
 - .4 ASI

2.2 WASHROOM ACCESSORIES

- .1 Toilet tissue dispenser (TTD): double roll, surface mounted: 09655 Noir Mini-Max JBT: supplied only by Owner; installed by Contractor (OS/CI).
- .2 Sanitary napkin disposal (SND): surface mounted: Frost 620; supplied only by Owner, installed by Contractor (OS/CI).
- .3 Soap dispenser (SD): Stoko WRM ILDS supplied only by Owner; installed by Contractor (OS/CI).
- .4 Waste receptacle (WR): recessed welded stainless steel, equipped with interior hooks for optional vinyl liner, capacity of 45.4L: Bobrick B-3644.

SECTION 10 28 00 - WASHROOM ACCESSORIES

- .5 Frameless mirror (FM): welded stainless steel construction with bright polished finish; with a 6 mm thick tempered Masonite backing; size 445 x 750 mm; Bobrick B-1556.
- .6 Tilted mirror (TM): 6 mm thick, tilted fixed mirror; of welded stainless steel construction and with galvanized steel back; size: 455 x 760 mm: Bradley 7405.
- .7 Grab bars (GB): 38 mm diameter stainless steel pipe with a peened surface: Frost Code 1001NP30 and 1003NP 30 x 30.
- .8 Swing-up grab bar (SGB): satin finish welded stainless steel construction: Bobrick B4998.
- .9 Stainless steel shelf (SS): 205 mm deep x 455 mm long; stainless steel construction; with 2 mounting brackets.
- .10 Coat hook (CH): 2 mm thick stainless steel mounting plate; vandal resistant design; hook shall release at a load of 40 lbs and greater: Bobrick B983.
- .11 Toilet backrest (TB): 32 mm diameter stainless steel tube and 16 mm solid white plastic laminate backrest: Frost Code 1028.
- .12 Baby change station (BCS): injection moulded polypropylene with a stainless steel finish front surface; concealed pneumatic cylinder to control speed at opening and closing. Dual cavity liner dispenser, holding up to 50 bed liners: KB 300 – SS Baby Station, colour: Graphite Gray.
- .13 Adult change station (ACS): fixed height, safety rail; provide mounting kit: Pressalit SCT 3000 Shower/Change Table.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install components at locations shown. Where location is not given install as directed by Consultant.
- .2 Fastenings shall be non-corrosive type.
- .3 Provide mounting and anchorage devices to be built into walls and other construction elements as required to securely anchor components in place.
- .4 Securely anchor components in place. Method of fastenings shall ensure that components will be capable of withstanding expected loads without movement.
- .5 Install mirrors with concealed wall hangers and lock in place with theftproof screws.
- .6 Insulate accessory surfaces to prevent electrolysis due to contact with dissimilar metal surfaces. Use bituminous paint or other approved means.

3.2 CLEANING AND ADJUSTMENT

- .1 Upon completion of 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

SECTION 31 10 00 - SITE CLEARING AND REMOVALS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Excavation, Filling, Grading Section 31 23 00

1.3 PROTECTION

- .1 Prevent damage to adjacent property and to areas scheduled to remain unchanged. Make good any damage caused by site clearing operations.

PART 2 - PRODUCTS

- .1 Approved topsoil to be imported to site.

PART 3 - EXECUTION

3.1 EXAMINATION PREPARATION

- .1 Visit the site and examine existing conditions and so as to understand the extent of work required. No increase in cost will be considered out of failure to know existing conditions.
- .2 Erect protective tree hoarding prior to commencing removal operations. No heavy machinery, storage or vehicular access is allowed within this area during construction.

3.2 CLEARING AND REMOVALS OPERATIONS

- .1 Notwithstanding requirements specified herein, retain existing items specifically indicated on Drawings to be retained.
- .2 Remove existing elements regardless whether shown on the Drawings to be removed or not, but request Consultant's review prior to removal.
- .3 Take care to protect and preserve the root systems of plants designated to remain.
- .4 Keep all heavy equipment away from trees, shrubs and store only in designated area(s)..
- .5 Remove all plants including roots, that affect installation of work.
- .6 Topsoil is to be stripped and stored for reuse.
- .7 Contractor shall inspect the site conditions and satisfy himself of the required removals to complete the work. No extra compensation will be made for removals work.
- .9 Take care to protect all elements to remain within the construction area.

3.3 DISPOSAL OF MATERIAL

PROJECT NO. 24-053

20/11/2024
BASETECH CONSULTING INC.

HURON PARK COMFORT STATION

31 10 00

SECTION 31 10 00 - SITE CLEARING AND REMOVALS

- .10 Remove all garbage, building materials, concrete, asphalt, excess fill, topsoil and other excavated material as a result of removals in preparation of site for construction. Do not bury any materials on site.

END

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Site Clearing and Removals Section 31 10 00

1.3 QUALITY CONTROL

- .1 Owners may appoint, and pay for inspection and testing by independent agency out of allowance carried under Section 01000 General Requirements.
- .2 Testing agencies may do any or all of the following as directed by the Consultant in accordance with requirements of Section 01000:
 - .1 Determine at what depth existing soil are capable of supporting fill, granular, paving and superimposed loads without deleterious settlement.
 - .2 Carries out grain size analysis on samples of each type of granular fill to ensure that proper material is being placed.
 - .3 Determine the quantity of water to be added to or removed from each type of fill to attain correct moisture content for compaction and maximum density.
 - .4 Determine the in-situ density and moisture content of compacted fills.

1.4 EXAMINATION

- .1 Visit and examine the site and note all characteristics and features affecting the work of this Section. No allowance will be made for difficulties encountered or expense incurred resulting from conditions known or visible at the time of tendering.

1.5 SOIL CONDITIONS

- .1 Soil conditions and recommendations for excavating and backfilling are contained in a Geotechnical Investigation by Forward Engineering and Associates dated September 11, 2024.

1.6 TESTING

- 1. Compaction test required for subgrade and granular fill.
- 2. Payment under cash allowance.

1.7 PROTECTION

- .1 Protect excavations in accord with applicable regulations. Provide and maintain in safe condition lining, bracing and shoring required.
- .2 Prevent damage to existing structures and buried services. Make good any damage caused.

SECTION 31 23 00 - EXCAVATION, FILLING, GRADING

- .3 Protect bottoms and sides of all excavations from exposure to wet weather, snow and frost, and from drying out; prevent softening or weathering of any bearing surface. Take special care when excavating for walkways and stairs.

1.8 JOB CONDITIONS

- .1 If excavation reveals unexpected subsurface conditions, advise Consultant immediately.
- .2 Do not place fill material when temperature is at or below 0°C, nor while either fill material or subgrade is frozen.
- .3 Stockpile each type of fill material separately to prevent integration. Stockpile granular materials so as to prevent segregation.
- .4 As much as possible schedule excavation and backfilling operations during dry periods only.
- .5 Minimize deterioration of subgrade, particularly when operating during unfavorable weather conditions or when working in wet soil. Use only designated work areas as determined on site by the client.

1.9 BASIS OF EXCAVATION

- .1 Estimate excavation using existing grades.
- .2 All paving to be restored to existing grades.
- .3 Excavate to levels specified or indicated on drawings.

PART 2 - PRODUCTS

2.1 FILL MATERIAL

- .1 Topsoil to be removed and stored for re-use.
- .2 Any excavated material for re-use to be approved by a Geotechnical Engineer.

PART 3 - EXECUTION

3.1 EXCAVATION

- .1 Carry out excavation to the extent, and depth required for the construction of the work, and for a sufficient distance beyond to permit proper construction, shoring, curing and inspection of work.
- .2 Do all excavation required for work of this project, unless it is specifically covered in other Sections.
- .3 Take precautions when excavating adjacent to buried services; use hand tools only in locating services.
- .4 Unless otherwise indicated excavate to specified depths

SECTION 31 23 00 - EXCAVATION, FILLING, GRADING

- .5 Excavate and remove from site: debris, boulders, roots, concrete, asphalt, precast pavers where encountered in the execution of the work.
- .6 Where excavation is carried below the required depth use approved concrete fill.
- .7 After completion of excavation and prior to forms being erected, concrete, precast or stone work being installed, notify the Consultant for inspection and testing of exposed surfaces. Make good soft or spongy areas are located, as directed by Consultant and carry down the excavations to a greater depth until a suitable bearing is obtained.
- .8 Do not over excavate areas unless so instructed by the Consultant.

3.2 BACKFILLING

- .1 Backfill behind precast curbs and next to paving as required.
- .2 Do not place backfill materials until all sub grades, forms or paving has been inspected and approved by the Consultant.
- .3 Remove all debris, rubbish and temporary bracing before commencing backfilling.
- .4 Take care to avoid damage to or displacement of walls and other work. Wherever temporary unbalanced earth pressures are liable to develop in walls, provide and place the necessary bracing to counteract the imbalance and leave bracing members in place until their removal is approved by the Consultant. Make good, at no cost to the Owner,
- .5 Place fill material in layers not exceeding 150 mm uncompacted thickness and compact each layer providing the following minimum densities:
 - .1 Below paved areas: 98% SPMDD.
 - .2 Below landscaped areas: 90% SPMDD.
- .6 Remove and replace fill until compaction test reports by the independent inspection agency are satisfactory to the Consultant.

3.3 GRADING

- .1 Cut and fill to levels required for paved, areas. Make allowance for depth of finishes and base courses.
- .2 Establish and maintain line and grade stakes for duration of grading operations.
- .3 Conform to match existing grades. Uniformly slope grade between existing elevations unless otherwise directed.
- .4 Smoothly slope top and toe of slopes.
- .5 Proof roll existing subgrade below paved areas, after excavation with a heavy roller. Compact subsoil below paved areas to minimum 98% SPMDD. Sub-excavate loose, soft and excessively wet areas and areas containing organic material, and fill with suitable fill capable of being compacted to required density.

SECTION 31 23 00 - EXCAVATION, FILLING, GRADING

- .6 Establish subgrade parallel to the finished grades and shape in such a manner to permit drainage. Shape subgrade below paved areas to drain to perimeter drains or catch basins.
- .7 Fill, where required, in accordance with requirements for backfilling specified hereinbefore.

3.4 COMPLETION

- .1 Upon completion, remove all surplus excavated and graded materials from the site, and leave site clean and tidy.

END

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with the requirements of Division 1.

1.2 RELATED WORK

- .1 Excavation, Filling and Grading Section 31 23 00
- .2 Concrete Curbs and Paving Section 32 13 13

1.3 QUALITY ASSURANCE

- .1 All work under this Section shall be done by a bonafide road building contractor engaged in paving work for at least five years and having the equipment necessary to carry out the work as specified.
- .2 Comply with requirements of Ontario Provincial Standard Specifications (OPSS) 310, 1003, 1010, 1103 and 1150.

1.4 QUALITY CONTROL

- .1 Comply with requirements of Section 01400.
- .2 Testing agency may do any or all of the following as directed by the Consultant.
 - .1 Carry out grain size analysis.
 - .2 Determine minimum and maximum moisture content of densities of granular fill.
 - .3 Determine in-situ density, thickness and moisture content of compacted fills.
 - .4 Check properties of asphalt mixes, including aggregate gradation of asphalt content.
 - .5 Check suitability of equipment used.

1.5 SUBMITTALS

- .1 Prior to delivery of materials to site submit gradation tables and, upon Consultant's request, representative samples of base course materials to be used.

1.6 JOB CONDITIONS

- .1 Environmental Conditions.
 - .1 Perform base, sub-grade preparation and paving only during dry frost-free months.
 - .2 Lay granular base courses and asphalt paving courses when weather is dry and only on dry bases.

SECTION 32 12 16 - ASPHALT PAVING

- .3 Place granular base courses only when ambient temperature is above 0°C. Do not place granular materials while either material or subgrade is frozen.
- .4 Place asphalt paving courses only when ambient temperature is 5°C or above.
- .2 Protection.
 - .1 Make special provisions to minimize deterioration of subgrade, particularly when operating during unfavorable weather conditions or when working in wet soil. Use special designated traffic lanes, build temporary roads, reduce traffic to half-loads or take other suitable measures.
 - .2 Do not permit vehicular traffic on finished asphalt pavement until it has cooled and hardened and in no case sooner than 6 hours after completion.
 - .3 Provide barricades and warning devices to protect pavement.

1.7 WARRANTY

- .1 At no cost to Owner, remedy any defects in work, including work of this and other Sections, due to faults in materials or workmanship provided under this Section of Specifications appearing within a period of two (2) years from date of Substantial Performance.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Base Materials:
 - .1 Clean, hard, durable aggregate free of shale, clay, organic matter and other deleterious substances.
 - .2 Base material: 19mm Crushed Limestone, in accordance with OPSS. Prov 1010.
 - .3 Subbase material: 50 mm Crusher Run Limestone, in accordance with OPSS. Prov 1010.
- .2 Asphalt:
 - 1 Base Asphalt: HL8 hot mixed, hot laid asphalt meeting requirements of OPSS.
 - .2 Base Asphalt: HL3 hot laid asphalt meeting requirements of OPSS.

PART 3 - EXECUTION

3.1 LINES AND LEVELS

- .1 Establish and maintain line and grade stakes for duration of work.
- .2 Conform to contours and grades shown on Drawings. Uniformly slope grade between elevations.
- .3 Slope paving away from building minimum 2%. Slope paving minimum 2% for drainage

in all locations unless specifically indicated otherwise on Drawings.

3.2 PREPARATION OF SUBGRADE

- .1 Examine rough graded sub-grade over which asphalt paving system is to be installed to ensure it is suitable for installation. Start of work shall imply acceptance of conditions.
- .2 Remove all topsoil in areas to be filled.
- .3 Fine grade subgrade as required to bring it to required levels and slopes. Meet compaction densities and fill material requirements specified in Section 02200. Slope fine graded subgrade to permit drainage to catch basins and sub drains.
- .4 Proof roll the exposed subgrade with a large ride on vibratory roller to compact subgrade to at least 98% of its Standard Proctor Maximum Dry Density (SPMDD), (ASTM D698). Some reconditioning of the fill and silty clay may be required to achieve 98% SPMDD.
- .5 Sub-excavate soft spots that develop during compaction and bring to proper grade by the addition of engineered fill material and then thoroughly compact until satisfactory, adding more fill material as required. Maximum loose lifts of 30cm and compacted to at least 98% SPMDD.
- .6 Base shall be naturally sloped and graded to be self-draining or sloped to sub drains.

3.3 BASE COURSES

- .1 Place, shape and compact granular base course material in accordance with OPSS.
- .2 Compact base courses by rolling with power rollers capable of reversing without backlash. Use hand tamping or mechanical hand compaction equipment in areas inaccessible to rollers.
- .3 Install base courses in layers not exceeding 200 mm thickness. Compact to density at least 100% of their SPMDD in accordance with OPSS specification 310.
- .4 Add water as required to obtain optimum density.

3.4 ASPHALT PAVING COURSES

- .1 Place hot asphalt mixture over prepared dry base. Asphalt mixture shall be minimum 118° C when applied.
- .2 Roll each asphalt paving course to be smooth and uniform. Trim and tamp edges of pavement to a clean and straight line. There shall be no visible aggregate.
- .3 Compact each asphalt paving course in accordance with OPS specification 310 requirements, between 92 and 96.5% Maximum Relative Density (MRD).
- .4 Thoroughly and uniformly compress the asphalt mixture by rolling soon after being spread, so that it will bear the roller without checking or undue displacement. Delays in rolling freshly spread mixture will not be permitted.
- .5 Consolidate with a power-driven roller of sufficient weight until all roller marks are eliminated, and no further compression is possible.

SECTION 32 12 16 - ASPHALT PAVING

- .6 Along all places which are not accessible to the roller, thoroughly compact by means of hot tampers.
- .7 Curves: all curves shall conform to radii and lines indicated on the drawings. When necessary, construct forms, sufficiently braced to withstand the stress of placing and compacting the asphalt.
- .8 Leave edges of asphalt pavement exposed where indicated. Where edges are straight, lay pavement up to a wooden batter board. On completion of rolling, remove batter board and tamp edges. Where edges are curved, trim asphalt after rolling with a cutting tool and tamp edge.
- .9 Each asphalt paving course after final compaction shall be smooth and true to established crown and grade, and shall comply with the following dimensional tolerances:
 - .1 Thickness: ± 5 mm.
 - .2 Surface variation: max. ± 5 mm in 4.5 m.

3.5 JOINTS

- .1 Construct joints to have same texture, density and smoothness as adjacent paving. Cut back edges of previously placed course to expose an even, vertical surface for full course thickness. Clean contact surfaces and apply asphalt tack coat.
- .2 Offset transverse joints in succeeding courses not less than 600 mm. Offset longitudinal joints in succeeding courses not less than 150 mm.
- .3 Paint surfaces of curbs, manholes, gutters and other elements in contact with asphalt concrete paving with asphalt tack coat.

3.6 REPAIRS

- .1 Where repairs are required, including repairs under warranty, cut asphalt to its full depth. Making straight and neat cuts.
- .2 Compact base in approved manner, adding crushed material as required.
- .3 Coat all exposed cut edges of existing asphalt pavement with tack coat. Place hot asphalt mixture and consolidate as specified to thickness required.

3.7 SCHEDULE

- .1 Dimensions indicated are compacted, minimum thicknesses.
- .2 Provide heavy duty paving as follows:
 - 40 mm H.L.3 asphalt surface course
 - 60 mm H.L.8 asphalt binder course
 - 150 mm base course – 19mm crushed limestone
 - 300 mm subbase course - Granular 'B', consisting of 50mm crusher run limestone

SECTION 32 12 16 - ASPHALT PAVING

- .2 Provide medium duty paving as follows:
- 40 mm H.L.3 asphalt surface course
 - 40 mm H.L.8 asphalt binder course
 - 150 mm base course – 19mm crushed limestone
 - 200 mm subbase course - Granular 'B', consisting of 50mm crusher run limestone

END

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Excavation, Filling and Grading Section 31 23 00
- .2 Asphalt Paving Section 32 12 16

1.3 QUALITY ASSURANCE

- .1 Do concrete work in accordance with requirements of Division 3 except where otherwise specified herein.
- .2 Do concrete curb and paving work located on public property in accordance with requirements of municipality.

1.4 SUBMITTALS

- .1 Provide sample of colours, finishes and impressed pattern design.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Concrete materials: CSA A23.1-94.
- .2 Reinforcing steel:
 - .1 Bars: CAN/CSA-G30.18-M92, Grade 400.
 - .2 Mesh: CSA G30.5-MI983 (R1991).
- .3 Formwork: steel or wood, capable of producing smooth and flat surfaces.
- .4 Concrete curing compound: ASTM C309 ID, suitable for exterior use:
 - .1 Ritecure Green by Sternson.
 - .2 Sealtight 3100-D by W.R. Meadows.
- .5 Expansion joint: asphalt impregnated fibre board, 12 mm thick, unless indicated otherwise; ASTM D1751.
- .6 Granular base: 19 mm Crusher Run Limestone, in accordance with OPSS. Prov 1010
- .7 Sealer: A-H anti-spaulding compound by Anti-Hydro or Sealtight CS-309 by W.R. Meadows.

2.2 CONCRETE MIX

- .1 Unless otherwise indicated provide ready mix concrete designed by concrete producer, meeting the following requirements:
 - .1 Coarse aggregate: Standard weight, maximum size 19 mm.
 - .2 Water-cement ratio: max. 0.45 by weight.
 - .3 Compressive strength: 35 MPa at 28 days.
 - .4 Air content: 6% +/- 1% achieved by air entrainment.
 - .5 Slump at point of discharge: 50 mm +/- 25 mm.

PART 3 - EXECUTION**3.1 INSTALLATION CAST-IN-PLACE CURBS**

- .1 Excavate for curbs to lines and grades required.
- .2 Carefully consolidate curb grade; erect form work to obtain the required curb section.
- .3 Obtain approval of forms from Consultant before pouring concrete.
- .4 Side forms shall be free of warp, and properly supported to maintain alignment and grade. Treat all form lumber with a non-staining mineral oil prior to concrete placement.
- .5 Unless otherwise detailed, place two continuous 10 m reinforcing bars, one near the top and one near the bottom of the curb. Cut reinforcing at expansion joints.
- .6 Cut expansion joint material to the full cross-sectional shape of the curb and place at approximately 5 m o.c. and at the beginning and end of all curved sections. Place before pouring concrete; do not force into freshly poured concrete.
- .7 Pour concrete in accordance with Section 03300.
- .8 Do not deposit concrete on frozen ground. When deposited in forms concrete shall have a temperature between 10°C and 30°C and these limits shall be maintained for 72 hours.
- .9 Fill forms with an excess of concrete and, after compacting strike to the required level in such a manner as to force the coarse aggregate below the mortar surface; finish top surface with a wood float to an even, smooth, dense surface.
- .10 Finish top edges of curb with tool to produce a rounded edge of 50 mm radius.
- .11 Where indicated provide curb cuts and depressed drains.
- .12 Do not strip forms for 24 hours after pouring.
- .13 After finishing and after stripping the forms, treat exposed curb surfaces with approved curing compound, or use other curing method acceptable to Consultant.

- .14 Protect concrete from harmful effects of sunshine, drying winds and cold running of surface water for a minimum period of five days.

3.2 INSTALLATION OF PAVING

- .1 Excavate to required depths. Examine subgrade over which concrete paving is to be installed to ensure it is suitable for installation.
- .2 Fine grade subgrade to required levels and slopes. Slope subgrade to permit drainage.
- .3 Stake out layout of paving and obtain Consultant's review prior to proceeding.
- .4 Grade and compact to subgrade to 98% SPMDD. Place minimum 200 mm compacted thickness of Granular 'A' and compact to 98% SPMDD.
- .5 Erect form work for paving to achieve lines and grades shown on the Drawings.
- .6 On top of compacted base, place wire reinforcing mesh; before pouring concrete, raise mesh 25 mm above base. Unless otherwise detailed, provide 150 x 150 mm, W18.7/W18.7 mesh. Cut mesh at expansion joints.
- .7 Pour paving minimum 150 mm thick with a transverse slope of 1:50 unless otherwise detailed.
- .8 Cut expansion joint material to full cross-sectional shape of paving and place at approximately 5m o.c. in both directions and where paving abuts curbs, walks and other elements.
- .9 Fill forms with concrete in accordance with Section 03300. Provide broom finish non-slip surface.
- .10 Treat exposed surfaces with curing compound in accordance with manufacturer's instructions, or moist cure in accordance with CSA A23.1-94.
- .11 Immediately after stripping forms, treat exposed edges with curing compound; do not strip forms for a minimum of 24 hours after pouring.
- .12 Divide paving sections between expansion joints into the pattern indicated on the Drawings. Unless otherwise indicated, provide tooled joints during finishing stage at maximum 1500 mm o.c. in each direction or saw cut, if directed by Consultant after completion of finishing.

3.3 IMPRESSED CONCRETE PAVING

- .1 Place coloured slab to detailed depth (minimum 125mm thickness), similar to requirements specified for standard paving. Colour to be throughout the concrete mix and thoroughly mixed. Surface application of colour will not be accepted.
- .2 Strike off slab to final finished grade using a darby and/or bullfloat to level surface.

SECTION 32 13 13 – CONCRETE CURBS AND PAVING

- .3 Place forms and install pattern on concrete surface without disturbing flatness of finished surface.
Impression to be uniform depth, mated so form joints are not visible and pattern(s) are continuous.
- .4 Sawcut construction joints as soon as concrete is set.

3.4 SEALER

- .1 Apply sealer to impressed paving in two coats and in accordance with manufacturer's directions. Prevent contamination of adjacent surfaces.

END

SECTION 32 90 00 – PLANTING

PART I – GENERAL

1.1. Description

- .1 The work covered by this section includes the furnishing of all labour, materials, equipment and incidentals for the inspection, maintenance and planting of trees, shrubs, ground covers and perennials as shown on the Construction Drawings and as described by the Contract Specifications.
- .2 Comply with all requirements of the General Requirements – Section 01 00 00.

1.2. Quality Assurance

- .1 Planting work is to be carried out by experienced personnel under the direction of skilled foreman and in strict accordance with the Specifications and best horticultural practice.

1.3. Product Delivery, Storage and Handling

- .1 Supply manufactured items such as super phosphate, fertilizer tablets, mulch, etc., in standard containers, clearly indicating contents, weight, component analysis, and the name of the manufacturer.
- .2 Store manufactured materials, subject to deterioration, in a weatherproof place on site and in such a manner that their effectiveness is not impaired.
- .3 Supply plant materials as specified on the plant list. Confirm quantities as specified on the drawings, plant list and bid form. Report any discrepancies.
- .4 Dig materials specified “B.R.” (bare root) on the plant list, while in a dormant state and with the majority of the root system intact. Immediately after digging, wrap the roots in wet burlap and keep burlap wet during transport and storage.
- .5 Provide all material, specified “B. & B.” (balled and burlapped) on the plant list, with a solid, earth root ball, wrapped in burlap.
- .6 Provide all material, specified “WB” (wire basket) on the plant list, with a solid, earth root ball, bound by a wire basket.
- .7 Do NOT plant material with broken or abraded trunks or branches, or with broken or cracked root balls, or plants which are strongly desiccated, as they will be subject to rejection upon arrival on the project site.
- .8 Provide root balls of the following minimum sizes to meet the corresponding tree size. Ensure the root ball is large enough to accommodate at least 75% of the fibrous root system.

Deciduous Trees Caliper	Minimum Root Ball Diameter
50 mm	75 cm
60 mm	80 cm
70 mm	85 cm
80 mm	90 cm
90 mm	100 cm

SECTION 32 90 00 – PLANTING

1.00 m	60 cm
1.50 m	60 cm
Coniferous Tree Height	Minimum Root Ball Diameter
1.75 m	65 cm
2.00 m	70 cm
2.25 m	75 cm
2.50 m	80 cm

- .9 Cut all roots cleanly when digging plants. Split roots are not acceptable. Cut roots even with the edges of the root ball.
- .10 Protect all plant material from damage and breakage. Protect all parts of the plant material from drying out from the time of digging until they are installed.
- .11 Do not transport plant material in an open truck unless it is adequately protected from sun and wind.
- .12 Carefully tie in all branches before transporting.
- .13 Pad all points of contact between plant material and equipment.
- .14 Heel in any plant material that cannot be planted during the current day's operations.
- .15 Keep all roots and root balls moist prior to planting.
- .16 Do not remove labels attached to plants, until after final inspection.

1.4. Soil Testing

- .1 If required by the Landscape Architect, the soil shall be tested for N, P, K and minor element values, soluble contents, organic matter and pH value.
- .2 Arrange for, and assume all costs for such testing. Testing shall be carried out by a reputable firm, approved by the Landscape Architect.
- .3 The Contractor shall submit the soil analysis report to the Consultant prior to the commencement of work. When the source of such topsoil is exhausted, topsoil from a new source shall not be used until it is tested, and approved by the Landscape Architect.

1.5. Job Conditions

- .1 Proceed with planting operations during suitable weather conditions.

1.6. Substitutions

- .1 Supply and install plant material as specified on the plant list. Substitutions with other plant material will only be allowed with the written approval of the Landscape Architect.
- .2 Give timely notice, in writing, to the Landscape Architect when applying for substitutions.

1.7. Inspections

SECTION 32 90 00 – PLANTING

-
- .1 Make plant material available for inspection at source of supply and/or upon arrival on the site by the Landscape Architect. Notify Landscape Architect of delivery date and notify prior to shipment.
 - .2 Approval of plant material at source will not impair the right of the Owner or Landscape Architect to inspect plants upon arrival on the site or during the course of construction and to reject plants which have been damaged, or which, in any way, do not conform to the specifications.
 - .3 If partial acceptance is desired, give timely notice to the Landscape Architect in writing.
 - .4 Partial acceptance will be given when planting work has been delayed due to circumstances beyond the control of the contractor or where planting would be in conflict with good horticultural practices and would jeopardize the performance.
 - .5 Planting of materials, prior to inspection by the Landscape Architect will be the Contractor's responsibility.
 - .6 Remove all rejected materials from the site immediately.
 - .7 Furnish all inspection certificates as may be required by federal, provincial and other applicable regulations.
 - .8 Labels shall indicate variety, grade and size of each plant specimen or bundle. Do not remove any labels from plants until final or partial approval by the Landscape Architect, or as directed.
 - .9 Final inspection of all plant material will be made at the end of the specified guarantee period. All plants must be in a healthy growing condition at the time of this inspection.
 - .10 The contractor is to provide the Landscape Architect with a full scale marked plan showing any substitutions or changes in colour.

1.8. Maintenance

- .1 Prepare and present to the Landscape Architect, two copies of a maintenance schedule prior to the beginning of the guarantee period.
- .2 All plant materials shall be maintained by the Contractor immediately after any planting has been installed and shall continue until the date of final acceptance.
- .3 Maintenance shall include all measures necessary to establish and maintain all plants in a vigorous and healthy growing condition, including but not limited to:
 - a. Weeding of planting beds and tree pits. Use herbicides in accordance with the manufacturer's directions. Make good any damage, resulting from herbicide use at no extra cost.
 - b. Watering when required and in sufficient quantities to saturate the root system.
 - c. Pruning, including the removal of dead or broken branches, and treatment of pruning wounds with approved dressing.

SECTION 32 90 00 – PLANTING

- d. Disease and insect control when required. Use chemical methods in accordance with the manufacturer's directions. Make good any damage at no extra cost.
- e. Keep all accessories in good condition and properly adjusted. Repair or replace accessories when required at no extra cost.
- .4 The Contractor shall be responsible for making monthly inspections of all plantings during the guarantee period and submit a written report of each inspection to the Landscape Architect.
- .5 The Contractor shall instruct the Landscape Architect in writing of any corrective or preventative measures necessary to ensure healthy plant growth. Any damage to plants shall be reported in writing to the Landscape Architect.
- .6 At the time of acceptance, all material must be in a healthy vigorous growing condition. Beds and tree pits must be free of weeds, rubbish or debris.

1.9. Guarantee

- .1 Submit written guarantee that all caliper plant materials shall be guaranteed for a period of twelve (12) months (or as specified in the warranties section, whichever is greater), commencing on the date of acceptance of substantial performance or client acceptance, whichever is later.
- .2 The guarantee period for approved "collected plants" shall extend for a period of one (1) year beyond the period stated above.
- .3 During the guarantee period, the Contractor shall make monthly inspections and replace all plants which are dead, missing or which are not in a healthy vigorous growing condition.
- .4 Supply and plant all replacements in strict accordance with Contract Documents and guarantee replacement as specified.
- .5 Tag or mark, in a permanently visible manner, all replacement plant material and notify the Landscape Architect, in writing of the date on which replacements were planted. Include a sketch showing location of replaced plants.
- .6 Plant replacements at a time which is in accordance with good horticultural practice.
- .7 Remove all accessories and cut at grade, those trees which are to be replaced at a later date. Remove plants, which are to be replaced, when found, or when notified by the Landscape Architect.

PART II – PRODUCTS

2.1. Plant Material

- .1 All plant material must be nursery grown and meet the specifications set out in the latest Guide Specifications for Nursery Stock prepared by the Canadian Nursery Trade Association (CNTA) for quality and method of cultivation.
- .2 Nomenclature of specified plants shall conform to the International Code of Nomenclature for Cultivated Plants and the latest edition of Standardized Plant Names.

SECTION 32 90 00 – PLANTING

- .3 Any plant material not conforming to 2.1.1 above will be designated as collected plants.
- .4 Collected plants may only be used when approved in writing, by the Landscape Architect.
- .5 Plant Material: true to name and type, structurally sound, well branched; healthy and vigorous and free from disease, insect infestations, rodent damage, sun scald, frost cracks, and other abrasions to the bark and densely foliated with a healthy, well developed root system. Pruning wounds must show vigorous bark on all edges and all parts must show live and green cambium tissue when cut.
- .6 All material must conform to the sizes shown on the plant list, except that larger material may be used when approved by the Landscape Architect. Use of larger plants will not increase the contract price.
- .7 Plant material sizes must conform to the following standards:
 - a. caliper – diameter of the trunk measured 150 mm above the normal grade around the plant.
 - b. height – measured from the normal grade around the plant to the top of the main foliage mass.
 - c. spread – the diameter of the main foliage mass, at its widest point.

2.2. Other Material

- .1 Topsoil: a fertile, friable, natural loam; mechanically screened, containing not less than 4% organic matter for clay loams and not less than 4% 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 25mm diameter, reasonably free of weeds (as determined by the Landscape Architect) and having a pH ranging from 6.0 to 7.5.
- .2 Peat moss: partially decomposed fibrous form of cellular stems and leaves of sphagnum moss, free of woody substance and harmful mineral matter, having a pH range of 4.5 to 6.0 and furnished in air dry state packed in standard bags of bales showing the name of the manufacturer.
- .3 Tree Wrap: 225 g burlap supplied in strips 150 mm minimum to 250 mm maximum width or heavy, waterproof crepe paper 100 mm to 150 mm wide.
- .4 Anchor stakes: metal 'T' bars: 51 x 51 x 5mm – 2500mm long, or
Wood stakes: 50 x 50mm - 2130mm long (as specified)
- .6 Wire: #10 galvanized wire for trees 75mm caliper or larger and #11 gauge galvanized wire for smaller trees. Alternative: Use 19mm (3/4") Hemp Rope if specified.
- .7 Hose: two ply, reinforced, 20mm diameter, new, black rubber garden hose.
- .8 Mulch: as specified on details.
- .9 Rodent Guards: 300mm Big 'O' pipe, 200mm MIN Height.

SECTION 32 90 00 – PLANTING

- .10 Rodent Wrap Tree Protectors : spiral, plastic tree wrap.
- .11 Fertilizer Tablets: as per details.

2.3. Mixes

- .1 Provide standard planting soil mix as follows: 6 parts dark loam topsoil, to 2 parts well-rotted cow manure and 1 part peat moss. (Mix thoroughly and provide sample prior to planting.)
- .2 Add bone meal at the rate of .58 kg per cubic metre and mix thoroughly for each tree or planting bed.
- .3 Be prepared to adjust the above rate in response to the soil analysis report.

2.4 Planter Soil Mixes

- .1 Provide soil mix equal as per drawings, or approved.

PART III – EXECUTION

3.1. Preparation

- .1 Obtain the approval of the Landscape Architect of all planting excavations
- .2 Apply topsoil to a depth of 450 mm for shrub and ground cover beds.

3.2. Installation of Plant Material

- .1 Planting shall be done during periods suitable with respect to weather conditions and locally accepted practice and to the Landscape Architect's approval.
- .2 Ensure width of all planting excavations is 3 times the diameter of the root ball.
- .3 Place plant plumb in the centre of the planting pit with a minimum of 150mm of compacted planting soil mixture under the root ball. Face the plant to give the best appearance or relationship to adjacent structures. Cut away any ropes which might girdle the tree. Remove all rope, wire, and burlap from top 1/3 of the root ball.
- .4 Place bare root plants so that the roots lie in a natural position.
- .5 Backfill with planting soil in 150mm layers and firmly tamp each layer to ensure the plant remains plumb. Ensure no air pockets remain around the roots.
- .6 Water thoroughly when hole is 1/2 full of tamped soil mixture and again when the operation is complete.
- .7 Except for plants in planting beds, construct an earth saucer around each plant equal to the diameter of the rootball and 100mm minimum depth to retain water around the roots.

3.3. Installation of Planting Accessories

SECTION 32 90 00 – PLANTING

- .1 Wrap all trees over 50mm caliper. Apply wrapping in a spiral manner from grade to above the second branch. Secure wrapping with suitable cord.
- .2 Stake or guy all trees as outlined in the drawings and detail.

3.4. Pruning

- .1 Prune plants after planting to compensate for root loss and in such a manner that the natural shape and character are retained. Do not cut a leader. Use only clean and sharp tools, conforming to proper horticultural practice.

3.5. Mulching

- .1 Where a mulch is called for, place a minimum 100mm depth of shredded bark mulch over the planting area. Use only specified mulch. No other type of mulch is acceptable unless approved in writing by the Landscape Architect.
- .2 Cut and spread a 1200 x 1200 mm piece of approved landscape cloth around the base of each tree and shrub before mulch is spread.

3.6. Clean-up

- .1 At the completion of planting operations, remove all surplus material from the site at no extra cost.
- .2 Make good all damage resulting from planting operations at no extra cost.
- .3 Maintain all areas neat and tidy at all times until final acceptance.

End of Section

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- .1 Excavation, backfilling, grading Section 31 23 00
- .2 Subdrainage: Section 33 46 00

1.3 DESCRIPTION OF WORK

- .1 The supply and installation of all watermain, sanitary sewers, storm sewers and appurtenances shall be as detailed by these specifications and as shown on the Contract Drawings.
- .2 The price tendered for watermain, sanitary sewers, storm sewers and appurtenances shall include the supply, excavation, bedding, cover material, backfilling, restoration, including associated materials and testing as specified on the Contract Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Storm and Sanitary Sewer bedding:
The subgrade of trenches must be inspected and approved by qualified field personnel from the soils engineering company.
The bedding and backfilling of trenches is to be carried out as per OPSD 802.010 and 802.03 Class B.
- .2 PVC Gravity Storm Sewer Pipe: PVC gravity storm sewer pipe shall Conform to CSA Specification B182.1 or B182.2, or the latest revisions thereof. Dimension ratio (DR) of PVC sewer pipe shall be 35.
Concrete pipe shall conform to the requirements of CSA Specification A257-M 1982 for the classes shown below:
 - a) Non-reinforced Concrete Pipe, CSA Standard A257.1 Class 1, 2 and 3.
 - b) Reinforced Concrete Pipe, CSA Standard A257.2 Strength Class 50-D, 65-D, 100-D and 140-D.

Watertight bell and spigot connections will be required for all pipe joints.

- .3 Catchbasins: Catchbasins to be as per OPSD 705.010.
- .4 All PVC gravity sanitary sewer pipe shall conform to CSA Specification B182.1 or B182.2, or the latest revision thereof. Dimension ratio (DR) of PVC sewer pipe shall be 35.

SECTION 33 90 00 - SITE SERVICES

- .5 Sewer Connections: Sewer connections to manholes shall be done by means of a PVC manhole adaptor.
- .6 Manholes: All manholes to be OPSD 701.010.
- .7 All watermain piping, hydrants and valves to be tested in accordance with ULC or equivalent testing. All watermain piping, fittings and appurtenances shall be ULC labeled.
- .8 Bedding shall conform to OPSD 802.010 and 802.030.
Contractor shall use bedding with cover material to 300 mm above the top of the pipe. Bedding material should consist of 20mm crusher-run limestone meeting the OPS Granular 'A' specifications. Cover material shall be select granular materials free of stones in excess of 35 mm. Bedding and cover materials shall be mechanically compacted to a minimum density of 98% Standard Proctor Density.
- .9 Watermain piping to be PVC manufactured in accordance with the latest edition of AWWA C900. Minimum Class 150 (DR18) shall be used. When using PVC watermain, a tracer wire shall be provided along the top of all watermains. The wire is to be secured to the top of the watermain at every fitting and valve and at intervals not to exceed 3.0 metres. All tracing wire shall be 12 gauge, standard copper wire complete with outer plastic coating. Tracer wire shall be connected to valves in chambers and the tracer wire is to be carefully extended along the bottom of the chamber, up the backside of the steps along the chamber wall and securely fastened to the top rung with fiberglass tape. Tracer joints are to be continuous with no joints. Where joints are needed (between rolls) they are to be soldered together plus wrapped in dielectric tape over wrapped with vinyl tape.
- .10 Hydrants and Valves – as per OPSD 1105.01. All hydrants are to be self-draining (unless in areas with high water table). All hydrants are to be equipped with one (1) four inch (4”) pumper port. Hydrants are Canada Valve (CanVal) or other approved equipped with one (1) 100 mm pumper port with manufacturer’s “Stortz” nozzle facing the street.
- .11 All bends and tees must be OPSD 1103.01 and 1103.02 and blocked to undisturbed ground.
- .12 All mechanical connections to be protected against corrosion through the use of corrosion protection duration nuts. Nuts to be used on 50% of all T-bolts per connection and are to be used in addition to standard fastening nuts, **not** in place of standard nuts.
- .13 When watermain does not have sufficient cover the watermain must be insulated.
- .14 Backfill Material: Select subgrade material in accordance with Section 31 23 00 – Excavation, Backfilling, Grading from top of pipe cover to underside of granular subgrade in paved areas from top of pipe cover to underside of topsoil in landscaped areas.

PART 3 - EXECUTION

3.1 LAYOUT

- .1 Clean pipes and fittings of debris and water before installation and remove defective materials from site.
- .2 Establish grades and inverts from appropriate benchmarks. Lay out lines as shown.

3.2 TRENCHING

- .1 Trench excavation shall conform to the requirements of the Occupational Health and Safety Act and Regulations for Construction Projects, Regulation 691/80.
- .2 Do trenching work in accordance with OPSS 410.
- .3 Do not allow contents of any sewer or sewer connection to flow into trench.
- .4 Trench alignment and depth to approval of Consultant prior to placing bedding material and pipe.

3.3 GRANULAR BEDDING AND COVER

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding and cover material in uniform layers not exceeding 150mm compacted thickness. Minimum bedding thickness is 150mm, cover material to 300mm above top of pipe.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe. Do not use blocks when bedding pipes.
- .4 Shape transverse depressions as required to suit joints.
- .5 Compact each layer full width of bed to at least 98% Standard Proctor Maximum Dry Density.
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with compacted bedding material.

3.4 INSTALLATION

- .1 Lay and join pipe in accordance with OPSS 410 and manufacturer's recommendations.
- .2 Reaction blocking to be placed at all bends, tees, etc. on watermain.

3.5 BACKFILL

- .1 Place backfill material in unfrozen condition.

SECTION 33 90 00 - SITE SERVICES

- .2 Place backfill material above pipe cover in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
- .3 Under paving and walks, compact backfill to at least 98% Standard Proctor Maximum Dry Density. In other areas, compact to at least 90% Standard Proctor Maximum Dry Density.

3.6 FIELD TESTING

- .1 Leakage testing/deflection testing if required, shall be done in accordance with OPS Specification No. 410.
- .2 Watermain piping shall be hydrostatically tested at 200 psi for two hours and in accordance with OPS Specifications No. 701.
- .3 All new main storm and sanitary sewers shall be inspected by a closed circuit television camera (CCTV) after the maintenance holes are raised to grade. The sewer pipes will be flushed prior to starting the CCTV survey. CCTV inspections shall be performed in accordance with OPSS 409. Video recordings will be provided on DVDs in a format satisfactory to the engineer. An inspection report will be prepared detailing the sections of pipe between manholes and describing the condition of the pipe. Any defects or obstructions will be noted.

3.7 DISINFECTION OF PIPES AND INSERTED FITTINGS

1. Responsibility

- .1 Disinfection of water distribution system shall be the responsibility of the General Contractor.

2. Disinfection

- .1 Before new piping systems for potable water which can be completely filled and isolated are taken into service, observe following procedures:
 - .1 Clean and flush to Engineer's approval.
 - .2 Fill tanks or piping systems with potable water containing 50 mg/L residual chlorine, ensure even distribution and leave for 24 hours. If a residual of less than 25 mg/L remains at end of 24 hours period, repeat.
 - .3 Drain chlorinated water and dispose of as specified below.
 - .4 Flush system and fill with potable water.
 - .5 Obtain one or more samples, as directed by Engineer, and submit for bacteriological testing.
 - .6 When test results indicate that water is of acceptable quality, piping systems may be connected and taken into service.
- .2 Before piping sections that cannot be isolated, or fittings to be inserted into existing pipe lines, are taken into service, observe following procedure:
 - .1 Clean and flush to Engineer's approval.
 - .2 Swab or wash all surfaces in contact with potable water with 250 mg/L residual chlorine solution.
 - .3 Have all persons handling above equipment wear sterilized gloves.

SECTION 33 90 00 - SITE SERVICES

- .4 Complete insertion or connection under supervision of Engineer.
- 3. Discharge of Chlorinated Water
 - .1 Chlorinated water used for disinfection is toxic to plants and wildlife and fish.
 - .2 Permissible disposal methods are:
 - .1 Discharge to storm sewer or stream only if concentration at edge of mixing zone is below 0.002 mg/L.
 - .2 Open drainage ditch, well separated from receiving stream. Presence of weeds, sunlight and high temperature is required. Monitor rate of discharge.
 - .3 If above disposal method conditions cannot be met, dechlorinate as follows:
 - .1 Use any of chemicals listed.
 - .2 Determine quantity required from:
"excess chlorine residual x Factor = dosage required".
 - .3 Hydrogen Peroxide (Factor = .479). Most recommended. Overdose will add more oxygen to stream.
 - .4 Sulphur Dioxide (Factor = .901). Will lower pH in receiving water.
 - .5 Sodium Thiosulphate (Factor = 2.225). Will cause harmless sulphur turbidity.
 - .6 Sodium Sulphate (Factor = 1.775). Excess will lower dissolved oxygen content in stream.
 - .7 Sodium Pyrosulphate (Sodium Metabisulphite) (Factor = 1.338). Excess will lower dissolved oxygen content.
 - .8 Example: 11,000 L of 21 mg/L to be discharged at 1.0 mg/L residual, using Hydrogen Peroxide. Dosage required $20 \times 0.479 = 9.6$ mg/L. Total amount needed $9.6 \times 10^{-3} \times 11,000 = 105.6$ g of H_2O_2 . For 35% commercial grade, total quantity required is $100/35 \times 105.6 = 302$ g.

END

SECTION 32 92 23 - SODDING AND TOPSOIL

0PART I - GENERAL

1.1. Description

- .1 The work covered by this section includes the furnishing of all labour, materials, equipment and incidentals for inspection and placement of sod over topsoil as shown on the Construction Drawings and as described by the Contract Specifications.
- .2 Comply with all requirements of the General Requirements – Section 01 00 00.

1.3. Quality Assurance

- .1 The contractor must have 5 years experience in sodding work.

1.4. Product, Delivery, Storage and Handling

- .1 Deliver sod to site within 24 hours of being harvested and lay sod within 48 hours thereafter, depending on suitable weather conditions and in accordance with good horticultural practice.
- .2 Small irregular or broken pieces of sod will not be accepted.
- .3 Prevent sod from drying out on site.

1.5. Sample

- .1 Complete the installation of one sample panel of sod of a minimum 25 m² (one side minimum 2.0m) and have inspected and approved by the Contract Administrator prior to proceeding with the balance of sodding operations. All other work shall conform to this approved sample.

1.6. Soil Testing

- .1 If required by the Contract Administrator, the soil shall be tested for N, P, K and minor element values, soluble salt contents, organic matter content, and pH value.
- .2 If required by the Contract Administrator, in-situ soil shall be tested for compaction levels with a soil compaction meter (penetrometer) in pounds-per-square-inch (psi).
- .3 Arrange for, and assume all costs for such testing. Testing shall be carried out by a reputable firm, approved by the Contract Administrator.
- .4 The contractor shall submit the soil analysis report to the Contract Administrator prior to the commencement of the works. When the source of such topsoil is exhausted, topsoil from a new source shall not be used until it is tested, and approved by the Contract Administrator.

1.7. Inspection

- .1 The Contractor shall verify that the final site grades are in accordance with the grading plan. Obtain the approval of the Contract Administrator of the finished topsoil surface before proceeding with sodding.
- .2 The Contractor shall give timely notice, in writing, that all work has been completed and maintenance period is to begin.

SECTION 32 92 23 - SODDING AND TOPSOIL

1.8. Acceptance

- .1 Maintain sod in good condition until acceptance.
- .2 At the time of acceptance, the grass must not be more than 50mm high. Minimum acceptable cut height is 45mm. All sod must have a healthy and even stand of grass, free of thin, poor or burned-out patches.
- .3 Acceptance will be given when the sod is properly rooted, free of bare and dead spots and reasonably free of weeds in the opinion of the Contract Administrator.
- .4 Acceptance will not be given if the topsoil and/or sod layer are excessively compacted (compaction exceeding 200 PSI).
- .5 Replace any deteriorated sod with new sod at the direction of the Contract Administrator.
- .6 The Contractor is responsible for a minimum of one cut of grass or as many cuts as required until acceptance.

1.9. Guarantee

- .1 Submit written guarantee that all sodding shall be guaranteed for a period of one (1) year commencing on the date of acceptance of substantial performance.
- .2 During the guarantee period, the Contractor shall make monthly inspections and replace all sod which is dead, or is not in a healthy vigorous growing condition.
- .3 Soil testing for N, P, K and minor element values, soluble salt contents, organic matter content, pH value and compaction shall be conducted if issues with sod growth and/or health are widespread or persistent. Arrange for, and assume all costs for such testing. Testing shall be carried out by a reputable firm, approved by the Contract Administrator. Perform remedial actions as recommended by the soil testing results and approved by the Contract Administrator.

PART II - PRODUCTS

2.1. Materials

- .1 Grass sod: Certified No.1 grade cultivated turf grass sod with a composition of 50% Kentucky Blue Grass and 50% Blue Cultivar either "Fylking" or "Baron" or as specified on the drawings, grown and sold in accordance with NSGA classifications. At the time of sale it must have a strong, fibrous root system and be free of stones and burned or bare spots. Damaged and broken pieces shall not be laid and shall be removed from the site immediately.
- .2 Sod pegs: 25mm x 25mm x 230mm (minimum length). Ensure pegs are long enough to securely anchor sod.
- .3 Topsoil: a fertile, friable, natural loam; containing not less than 4% organic matter for clay loams and not less than 2% organic matter for sandy loams to a maximum of 15%. Topsoil must be capable of sustaining vigorous plant growth, free of subsoil contamination, roots and stones over 25mm diameter, reasonably free of weeds (as determined by the Contract Administrator), and having a pH ranging from 6.0 to 7.5.

PART III - EXECUTION

3.1. Preparation

- .1 Rototill all areas that are to receive new sod. Cultivate to a minimum depth of 100mm. Remove all rocks, roots and grass or weed clumps from the surface.
- .2 Compact surface to 85% Standard Proctor Dry Density.
- .3 Scarify to a depth of 25mm before placing additional topsoil or sod.

3.2. Spreading of Topsoil

- .1 Spread dry topsoil during dry weather over approved, dry, unfrozen subgrade where sod is to be installed.
- .2 Keep topsoil 25mm below finished grade for sodded areas.
- .3 Fine grade topsoil eliminating rough and low areas and to ensure positive drainage.
- .4 Roll topsoil with a 50 kg roller to compact and retain surface. Finished depth of prepared, compacted topsoil to be minimum 150mm. Do not overcompact soil.
- .4 Provide a finished topsoil surface that is smooth and firm against footprints with a fine, loose texture before sod is placed. Topsoil level shall not be compacted beyond 200 PSI.

3.3. Installation

- .1 Lay sod with tight butt joints. Do not leave any open joints or overlap adjacent pieces of sod. Alternate joints on each row of sod.
- .2 Ensure finished sod surface is flush with adjoining grass areas, pavement or top surface of curbs.
- .3 On slopes steeper than 4:1, lay sod perpendicular to the slope and peg each row at intervals of not more than 600mm on each side of the sod strip. Drive pegs flush with surface of sod.
- .4 Immediately after installation, water the sod with sufficient quantity of water to penetrate the sod and the top 50mm of the underlying topsoil.
- .5 Apply 8-32-16 slow release commercial fertilizer at the rate of 22 kg per 1000 square metres.
- .6 When sod has dried sufficiently to prevent damage, roll all sodded areas to ensure a good bond between sod and topsoil. Imperfections in the surface should be corrected prior to the laying of the sod and not by rolling with a heavy roller.
- .7 Protect all newly sodded areas with warning signs or barricades.

3.4. Protection after Completion

SECTION 32 92 23 - SODDING AND TOPSOIL

- .1 Assume full responsibility for protection of all sodded areas from all sources until performance acceptance.
- .2 Erect protective barriers and post signs where necessary and maintain same until performance acceptance.
- .3 Remedy all damages, wash-outs and eroded areas resulting from weather, improper protection, excessive compaction, or other causes.

3.5. Clean Up

- .1 The Contractor must leave the site in a neat and orderly condition upon completion of work on a daily basis, all to the satisfaction of the Contract Administrator.

End of Section