SPECIFICATIONS

DR. F. J. MACDONALD CATHOLIC SCHOOL
HANDICAPPED LIFT
2860 AHEARN AVENUE,
OTTAWA, ONTARIO.
K2B 6Z9.
SPECIFICATION FOR

DR. F. J. MACDONALD CATHOLIC SCHOOL HANDICAPPED LIFT
2860 AHEARN AVENUE, OTTAWA, ONTARIO. K2B 6Z9.
FOR
OTTAWA CATHOLIC SCHOOL BOARD

BY

ARCHITECT
PYE & RICHARDS ARCHITECTS INC. Telephone: 613-724-7700
200-824 Meath Street E-mail: staff@pnrarch.com
Ottawa, Ontario. K1Z 6E8

STRUCTURAL CONSULTANT
Cleland Jardine Telephone: 613-591-1533
200-580 Terry Fox Dr. E-mail: mail@clelandjardine.com
Ottawa(Kanata), Ontario.
K2L 4B9

MECHANICAL, ELECTRICAL
CONSULTANT
Jp2G Consultants Inc. Telephone: 613-828-7800
1150 Morrison Drive, E-mail: ottawa@jp2g.com
Ottawa, Ontario.
K2H 8S9

OWNER’S CONSULTANTS

SOILS CONSULTANT
Paterson Group Telephone: 613-226-7381
1-28 Concourse Gate
Ottawa, Ontario. K2E 7T7

May 2014
<table>
<thead>
<tr>
<th>SECTION</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIVISION 0 - FRONT END DOCUMENTS</strong></td>
<td></td>
</tr>
<tr>
<td>00 01 10</td>
<td>Specification Index</td>
</tr>
<tr>
<td>00 01 15</td>
<td>List of Drawings</td>
</tr>
<tr>
<td>00 21 00</td>
<td>Instructions to Bidders</td>
</tr>
<tr>
<td>00 31 00</td>
<td>Information Available to Tenderers</td>
</tr>
<tr>
<td>00 41 00</td>
<td>Tender Form</td>
</tr>
<tr>
<td>00 43 36</td>
<td>Proposed Subcontractors Form</td>
</tr>
<tr>
<td>00 81 00</td>
<td>Supplementary General Conditions</td>
</tr>
<tr>
<td><strong>DIVISION 01 - GENERAL REQUIREMENTS</strong></td>
<td></td>
</tr>
<tr>
<td>01 00 00</td>
<td>General Instructions</td>
</tr>
<tr>
<td>01 21 00</td>
<td>Allowances</td>
</tr>
<tr>
<td>01 25 13</td>
<td>Product Substitution Procedures</td>
</tr>
<tr>
<td>01 30 00</td>
<td>Submittals</td>
</tr>
<tr>
<td>01 45 00</td>
<td>Quality Control</td>
</tr>
<tr>
<td>01 50 00</td>
<td>Temporary Facilities and Controls</td>
</tr>
<tr>
<td>01 59 00</td>
<td>Safety Requirements</td>
</tr>
<tr>
<td>01 60 00</td>
<td>Products/Workmanship Requirements</td>
</tr>
<tr>
<td>01 70 00</td>
<td>Closeout Requirements</td>
</tr>
<tr>
<td>01 78 36</td>
<td>Extended Warranties</td>
</tr>
<tr>
<td><strong>DIVISION 02 - SITE WORK</strong></td>
<td></td>
</tr>
<tr>
<td>02 25 50</td>
<td>Micropiles</td>
</tr>
<tr>
<td>02 41 00</td>
<td>Demolition</td>
</tr>
<tr>
<td><strong>DIVISION 03 - CONCRETE</strong></td>
<td></td>
</tr>
<tr>
<td>03 10 00</td>
<td>Concrete Formwork</td>
</tr>
<tr>
<td>03 20 00</td>
<td>Concrete Reinforcing</td>
</tr>
<tr>
<td>03 30 00</td>
<td>Cast-in-Place Concrete</td>
</tr>
<tr>
<td>03 35 00</td>
<td>Concrete Finishingways</td>
</tr>
<tr>
<td>03 35 05</td>
<td>Concrete Floor Hardeners</td>
</tr>
<tr>
<td><strong>DIVISION 04 - MASONRY</strong></td>
<td></td>
</tr>
<tr>
<td>04 20 00</td>
<td>Unit Masonry</td>
</tr>
<tr>
<td><strong>DIVISION 05 - METALS</strong></td>
<td></td>
</tr>
<tr>
<td>05 12 23</td>
<td>Structural Steel for Buildings</td>
</tr>
<tr>
<td>SECTION</td>
<td>TITLE</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>DIVISION 06 - WOOD PLASTICS AND COMPOSITES</td>
<td></td>
</tr>
<tr>
<td>06 10 00</td>
<td>Rough Carpentry</td>
</tr>
<tr>
<td>DIVISION 07 - THERMAL AND MOISTURE PROTECTION</td>
<td></td>
</tr>
<tr>
<td>07 84 00</td>
<td>Firestopping</td>
</tr>
<tr>
<td>DIVISION 08 - DOORS, WINDOWS AND GLASS</td>
<td></td>
</tr>
<tr>
<td>08 11 00</td>
<td>Steel Doors and Frames</td>
</tr>
<tr>
<td>08 71 00</td>
<td>Door Hardware</td>
</tr>
<tr>
<td>DIVISION 09 - FINISHES</td>
<td></td>
</tr>
<tr>
<td>09 21 00</td>
<td>Room Finish Schedule</td>
</tr>
<tr>
<td>09 51 00</td>
<td>Drywall</td>
</tr>
<tr>
<td>09 66 00</td>
<td>Acoustic Ceilings</td>
</tr>
<tr>
<td>09 91 00</td>
<td>Terrazzo Flooring</td>
</tr>
<tr>
<td>09 91 00</td>
<td>Painting</td>
</tr>
<tr>
<td>DIVISION 14 - CONVEYING EQUIPMENT</td>
<td></td>
</tr>
<tr>
<td>14 42 00</td>
<td>Handicap Lift</td>
</tr>
<tr>
<td>DIVISION 21 - FIRE SUPPRESSION</td>
<td></td>
</tr>
<tr>
<td>see drawings</td>
<td></td>
</tr>
<tr>
<td>DIVISION 22 - PLUMBING</td>
<td></td>
</tr>
<tr>
<td>see drawings</td>
<td></td>
</tr>
<tr>
<td>DIVISION 23 - HEATING, VENTILATION AND AIR CONDITIONING</td>
<td></td>
</tr>
<tr>
<td>see drawings</td>
<td></td>
</tr>
<tr>
<td>DIVISION 25 - INTEGRATED AUTOMATION</td>
<td></td>
</tr>
<tr>
<td>see drawings</td>
<td></td>
</tr>
</tbody>
</table>
SECTION TITLE

DIVISION 26 - ELECTRICAL
see drawings

DIVISION 27 - COMMUNICATIONS
see drawings

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY
see drawings

DIVISION 31 - EARTHWORK

31 00 00 Earthwork (for Structures)

END OF SECTION
Following is a list of drawings dated 7 May 2014 (except as indicated) which accompany these specifications and which form part of the Contract Documents for the Work:

ARCHITECTURAL
A.01  SITE PLAN, OVERALL PLANS
A.02  PARTIAL FLOOR PLANS, DEMOLITION, CONSTRUCTION, RCP
A.03  NEW LIFT SECTIONS, DOOR DETAILS

Drawings Bound into Specifications

Room Finish Schedule (before Section 09 21 00)

STRUCTURAL
S000  GENERAL NOTES AND DETAILS
S001  GENERAL NOTES AND DETAILS
S100  PARTIAL PLANS
S200  SECTIONS AND DETAILS

MECHANICAL
M-1  MECHANICAL DRAWING; FIRE PROTECTION, PLUMBING & HVAC, NEW WORK DEMOLITION

ELECTRICAL
E-1  ELECTRICAL SPECIFICATIONS, SCHEDULES AND LEGEND
E-2  ELECTRICAL LIGHTING POWER AND SYSTEMS NEW WORK
E-3  ELECTRICAL LIGHTING POWER AND SYSTEMS DEMOLITION

END OF SECTION
PART 1 - GENERAL

1. **Tenders**
   .1 The Owner reserves the right to waive any informalities and to accept or reject any or all tenders.

2. **Tender Forms**
   .1 Tenders will be submitted on forms provided by the Architect and enclosed in sealed opaque envelopes plainly marked:

   **TENDER:**
   **DR. F. J. MACDONALD CATHOLIC SCHOOL HANDICAPPED LIFT**

   .2 Address Tenders to:

   Mr. Fred Chrystal
   Superintendent of Planning & Facilities
   Ottawa Catholic School Board
   570 West Hunt Club Road
   Nepean, Ontario
   K2G 5W8

   .3 Complete the Tender Form in its entirety.

3. **Delivery**
   .1 Tenders shall be delivered to the Owner at the above-noted address not later than 2:59:59 p.m., local time on Thursday, 22nd May 2014. Deliver tenders to the reception desk inside the main entrance of the building.

   .2 No telephoned or telegraphed proposals or modifications will be considered.

   .3 Tenders will not be accepted that have been transmitted by facsimile machine.

   .4 Tenderers will not have the use of telephones at the Board’s offices at the tender closing time.

   .5 Tenders will be opened in private.

4. **Addenda**
   .1 Answers to questions directed to the Architect and any amendments to drawings and specifications during the tender period will be communicated in the form of Addenda to all General Contractors tendering. Such Addenda will be considered as part of the specifications and thereby be included in the Contract Documents. No allowance shall be made for any information given verbally by Architect and his Engineers.

5. **Completion**
   .1 Subject to necessary approvals and any negotiation, the commencement date for work on site shall be within four weeks after close of tenders.

   .2 The Contractor shall begin preparations for the work immediately upon award of Contract and shall commence work on site at the earliest opportunity.

   .3 The Work shall be completed to occupancy permit stage by
September 30th, 2014.

6. Tender Documents

Tender Documents may be obtained from the Architect's office for a deposit sum of $100.00 each in the form of a cheque made payable to Pye & Richards Architects Inc. A maximum of one set and a CD will be available to bidders with a deposit. The deposit will be refunded to bidders who return the tender documents in good condition within 10 days after receipt of tenders.

The Contractor receiving a Contract award may retain the tender documents and his deposit will be refunded.

.2 Tender documents will not be issued directly to subcontractors or others except by purchase of a full set of documents at $100.00 per set non-refundable.

.3 The Specifications are divided into divisions and sections for convenience but shall be read as a whole and neither such division nor anything else contained in the Contract Documents will be construed to place responsibility on the Owner or the Consultant to settle disputes among the Subcontractors and Suppliers with respect to such divisions.

The Drawings are, in part, diagrammatic and are intended to convey the scope of the Work and indicate general and appropriate locations, arrangements and sizes of fixtures, equipment and outlets. The Contractor shall obtain more accurate information about the locations, arrangements and sizes from study and coordination of the Drawings, including Shop Drawings and shall become familiar with conditions and spaces affecting those matters before proceedings with the Work. Where site conditions require reasonable minor changes in indicated locations and arrangements, the Contractor shall make such changes at no additional cost to the Owner. Similarly, where known conditions or existing conditions interfere with new installation and require relocation, the Contractor shall include such relocation in the Work. The Contractor shall arrange and install fixtures and equipment in such a way as to conserve as much headroom and space as possible. The schedules are those portions of the Contact Documents, wherever located and whenever issued, which compile information of similar content and may consist of drawings, tables and/or lists.

7. Agreement to Bond

The Contractor shall also include with his tender a written "Agreement to Bond" meaning a statement by letter from a Bonding Company indicating that the bidder, if successful in obtaining the Contract, will be covered by a 50% Performance Bond and a 50% Labour and Materials Payment Bond as required under General Conditions.

8. Performance and Labour and Materials Payment Bond

The Contractor shall be required to provide a 50% Performance Bond covering faithful performance of the Contract, and a 50% Labour and Materials Payment Bond guaranteeing that all claimants will be paid for labour and materials furnished to the Contractor or Subcontractor for use on the job.

.2 The Performance Bond and the Labour and Materials Payment Bond shall be provided before signing of the Contract with the successful
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td><strong>Bid Bond</strong>&lt;br&gt;Each tender shall be accompanied by a bid bond or a certified cheque in the amount of 10% of the tender price payable to the Ottawa Catholic School Board. Regardless of some delays which may occur, the successful bidder shall execute a contract on forms in the form noted in the Contract Documents for the stipulated sum stated in the tender. Delays may be of any duration up to 60 days. The bid bond or certified cheque will be returned as promptly as possible.</td>
</tr>
<tr>
<td>10.</td>
<td><strong>Examination of Site</strong>&lt;br&gt;The site is located as shown on the drawings. Before tendering, bidders shall visit and examine the site and shall take note of all conditions affecting conduct and completion of work. Submission of a tender will be deemed to be proof that tenderer has complied with the foregoing requirements.</td>
</tr>
<tr>
<td>11.</td>
<td><strong>Canadian Materials</strong>&lt;br&gt;Wherever possible and consistent with proper economy, Canadian materials shall be used throughout the work.</td>
</tr>
<tr>
<td>12.</td>
<td><strong>Specified Alternate Materials, Products, and Equipment</strong>&lt;br&gt;Where alternate materials, products and equipment are specified any of the specified materials, products or equipment may be used by the Contractor. Where specified alternate material, product or piece of equipment requires any modification or modifications to any other element of the building to accommodate the related item the necessary modification or modifications shall be provided at no cost to the owner.</td>
</tr>
<tr>
<td>13.</td>
<td><strong>Standard of Materials, Products, and Equipment</strong>&lt;br&gt;Material and equipment specifically described are named in this Specification to establish a standard of materials and workmanship to which the Contractor shall adhere. Where the manufacturers’ trade names are used, the Tender Price shall be based on the use of the materials, products or equipment, for any one of the names mentioned in these Specifications. The Architect will confirm acceptable alternative materials, products, or equipment by Addendum during the tender period. Under no circumstances will alternatives, submitted after the closing of the tenders, be considered. The Architect reserves the right to accept or reject alternatives as he sees fit and also to claim for the Owner the financial benefit of the alternatives, if an alternative is accepted. A rejection by the Architect of the proposed alternative material, products or equipment shall be final, and the Architect shall not be obligated to give any reason for his action.</td>
</tr>
</tbody>
</table>
4. Any alternative proposed by any bidder, Contractor or Subcontractor, and included with the tender, may be considered as outlined in .3 above provided the successful Contractor is in agreement with the alternative and the cost of same.

<table>
<thead>
<tr>
<th>14.</th>
<th>Cash Allowances and Contingency</th>
<th>.1</th>
<th>The following cash allowances and contingency shall be included in the Contract Price and shall be handled in accordance with the General Conditions of the Contract.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inspection and Testing</td>
<td>.1</td>
<td>$5,000.00</td>
</tr>
<tr>
<td></td>
<td>Construction Contingency</td>
<td>.2</td>
<td>$20,000.00</td>
</tr>
</tbody>
</table>

15. Harmonized Sales Tax | .1 | The Harmonized Sales Tax (HST) is NOT to be considered an applicable tax for the purposes of this bid. The bidder shall therefore NOT include in his bid price the said HST. The successful contractor shall indicate on each application for payment as a separate amount the appropriate HST the Owner is legally obligated to pay. This amount will be paid to the Contractor in addition to the amount certified for payment under the Contract and will therefore not affect the Contract Price. |

16. List of Subcontractors | .1 | Complete the partial list of subcontractors on page 3 of the Tender Form and submit with Tender. |

2. After the close of tenders and within 24 hours of the Architect's request, submit the following, duly completed, to the Architect: |

1. List of subcontractors in a format provided by the Architect; |
2. Proof of good standing with Workplace Safety and Insurance Board. |

17. Tender Sum Breakdown | .1 | After the close of Tenders, the low bidder is to provide a detailed breakdown of the lump sum Tender amount as requested by the Architect. |

2. The breakdown shall be broken down by building trades and shall be provided to the Architect within 24 hours of the request. |
3. The breakdown shall be formatted to suit the administrative requirements of the Owner. |

18. Schedule | .1 | After the close of Tenders and within 48 hours of the Architect’s request, after issuance of letter of intent, the Contractor shall provide a basic bar chart construction schedule. |

2. The schedule is to show each individual trade as a separate line item. |

19. Environmental Protection Act | .1 | All contractors to conform with the latest Ontario Regulations 101/94 to 105/94 with respect to waste management. |
.2 Prepare a Waste Reduction Work Plan Summary for the construction project as required by Ontario Regulation 102/94 of the Environmental Protection Act and submit to the Owner prior to the issuance of the Building Permit. It is a condition of Site Plan Approval that the Building Permit will not be issued until the Waste Reduction Work Plan Summary is submitted.

20. **Enquiries**

.1 All questions during the Tender Period should be directed to:

Pye & Richards Architects Inc.
200-824 Meath Street,
Ottawa, Ontario
K1Z 6E8
Attention: David Mungall
Telephone: 613-724-7700

21. **Site Tour**

Tour will

.1 A Mandatory site tour will occur on Monday 12th May 2014 at 1:30 p.m. start at the Main Office.

END OF SECTION
1. **Soils Report**  .1 Subsurface investigation memorandum is attached.
   .2 Report dated 23 April 2014, prepared by Paterson Group.
   .3 Neither the Architect nor the Owner offer a warranty to the Contractor that this information is representative of the conditions prevailing on site.

2. **Asbestos Survey**  .1 Report is attached.
   .2 Report is dated October 1990, prepared by T. Harris Partnership Incorporated.
   .3 Neither the Architect nor the Owner offer a warranty to the Contractor that this information is representative of the conditions prevailing on site.

END OF SECTION
April 23, 2014
File: PG3205-LET.01

Ottawa Catholic School Board
570 West Hunt Club Road
Ottawa, Ontario
K2G 3R4

Attention: Mr. Roy Pellatt

Subject: Geotechnical Investigation
Proposed Elevator for Dr. F.J. MacDonald Catholic School
2860 Ahearn Avenue - Ottawa

Dear Sir,

Paterson Group (Paterson) was commissioned by the Ottawa Catholic School Board (OCSB) to conduct a geotechnical investigation for the proposed elevator to be constructed at Dr. F.J. MacDonald Catholic School, located at 2860 Ahearn Avenue, in the City of Ottawa, Ontario. The following letter report presents our findings and recommendations.

It is understood that the proposed elevator is located within the central area of the school building. It is further understood that the existing building has been constructed over a series of end bearing piles extending to the bedrock surface.

1.0 Field Investigation

The fieldwork for the current investigation took place on March 24, 2014, and consisted of drilling two (2) boreholes. The boreholes were put down using a track mounted drill rig, operated by a two-person crew. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer from our geotechnical division. The drilling procedure consisted of augering to the required depths, sampling and testing the overburden at selected locations.
Mr. Roy Pellatt  
Page 2  
File: PG3205-LET.01

The location and ground surface elevation at the test hole locations were surveyed by Paterson field personnel. Ground surface elevations at the test hole locations were referenced to a temporary benchmark (TBM), consisting of the finished floor level at the north entrance of the school building. An assumed elevation of 100 m was assigned to the TBM. The locations and ground surface elevations of the test holes and the TBM are shown on Drawing PG3205-1 - Test Hole Location Plan attached to the present letter.

2.0 Field Observations

The subject site is currently occupied by an elementary school along with associated asphalt parking and landscaped areas. The majority of the ground surface across the subject site is relatively flat and at grade with Ahearn Avenue.

Generally, the subsurface profile encountered at the borehole locations consists of a topsoil overlying a loose to compact, silty sand fill layer by a compact, native silty sand. Practical refusal to augering was encountered at a 3.3 m and 3.2 m depth at BH 1 and BH 2, respectively. Reference should be made to the Soil Profile and Test Data sheets attached to the present letter for specific details of the soil profile encountered at the borehole locations.

Based on available bedrock mapping, the bedrock within the area of the subject site, consists of dolostone of the Oxford formation and interbedded sandstone, shaley limestone, and shale of the Rockcliffe formation and the overburden drift thickness extends between 2 and 10 m depth.

Based on soil colouring, moisture levels and consistency of the recovered soil samples, the long-term groundwater table is expected at a 2.4 m depth. It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.

3.0 Geotechnical Assessment

Stripping Depth

Deleterious fill, such as those containing organic materials, should be stripped from under the proposed elevator pad.

patersongroup
Fill used for grading beneath the proposed elevator pad should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the elevator pad should be compacted to at least 98% of its standard Proctor maximum dry density (SPMDD).

Foundation Design

It is understood that the proposed elevator pad will be placed at a 300 mm depth below the existing finished floor level. It is recommended that the proposed elevator pad be supported by hydraulically driven piles to ensure that differential settlement does not occur between the existing building and the elevator pad. The hydraulically driven piles should be extended to bedrock. The piles should be installed by a contractor specializing in interior piling operations and supervised by the geotechnical consultant.

For design purposes, an axial resistance value at SLS of 135 kN and a factored axial resistance value at ULS of 200 kN can be used for a 75 mm (3") by 75 mm (3") tube pile with a minimum 4.8 mm (3/16") thickness for the anticipated refusal depths.

Design for Earthquakes

Foundation design for the proposed elevator structure can utilize a seismic site response Class C as defined in the Ontario Building Code 2012 (OBC 2012; Table 4.1.8.4.A). The soils underlying the site are not susceptible to liquefaction.

Groundwater Control

The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

The flow of groundwater into the excavation through the overburden materials is not anticipated based on the proposed pad depth.
4.0 Recommendations

The following observation program should be performed by a geotechnical consultant and is required for the foundation design data provided herein to be applicable:

- Review of the proposed hydraulic pile design from a geotechnical perspective.
- Sampling and testing of the concrete and fill materials used.
- Observation of all bearing surfaces prior to the placement of concrete.
- Density tests to determine the level of compaction achieved.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon the completion of a satisfactory material testing and observation program by the geotechnical consultant.
5.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. Our recommendations should be reviewed when the project drawings and specifications are complete.

A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, we request that we be notified immediately in order to permit reassessment of our recommendations.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein, or by person(s) other Ottawa Catholic School Board or their agents, without review by this firm for the applicability of our recommendations to the altered use of the report.

Best Regards,

Paterson Group Inc.

Faisal Abou-Seido, B. Eng.

David J. Gilbert, P.Eng.

Attachments

- Soil Profile and Test Data sheets
- Figure 1 - Key Plan
- Drawing PG3205-1 - Test Hole Location Plan

Report Distribution

- Ottawa Catholic School Board (3 copies)
- Paterson Group (1 copy)
**SOIL PROFILE AND TEST DATA**

**Geotechnical Investigation**
**Proposed Elevator - 2860 Ahearn Avenue**
**Ottawa, Ontario**

**DATUM**
TBM - Finished floor level of existing building at entrance. An arbitrary elevation of 100.00m was assigned to the TBM.

**REMARKS**

**BORINGS BY**
CME 55 Power Auger

**DATE**
March 24, 2014

**FILE NO.**
PG3205

**HOLE NO.**
BH 1

### SOIL DESCRIPTION

<table>
<thead>
<tr>
<th>STRATA PLOT</th>
<th>SAMPLE</th>
<th>DEPTH (m)</th>
<th>ELEV. (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0 - 99.68</td>
<td>1 - 98.68</td>
</tr>
<tr>
<td>GROUND SURFACE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOPSOIL</td>
<td>0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FILL: Brown silty sand with crushed stone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.44</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compact, brown SILTY SAND with clay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of Borehole</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Pen. Resist. Blows/0.3m
- 50 mm Dia. Cone

<table>
<thead>
<tr>
<th>Water Content %</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
</tr>
</tbody>
</table>

### Shear Strength (kPa)

- ▲ Undisturbed
- △ Remoulded

(GWL @ 2.4m depth based on field observations)
DATUM: TBM - Finished floor level of existing building at entrance. An arbitrary elevation of 100.00m was assigned to the TBM.

REMARKS:

BORINGS BY: CME 55 Power Auger

DATE: March 24, 2014

SOIL DESCRIPTION

GROUND SURFACE

TOPOIL

Inferred FILL: Brown silty sand with crushed stone

SILTY SAND

End of Borehole

Practical refusal to augering at 3.20m depth

(GWL @ 2.4m depth based on field observations)
SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desiccated</td>
<td>having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.</td>
</tr>
<tr>
<td>Fissured</td>
<td>having cracks, and hence a blocky structure.</td>
</tr>
<tr>
<td>Varved</td>
<td>composed of regular alternating layers of silt and clay.</td>
</tr>
<tr>
<td>Stratified</td>
<td>composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.</td>
</tr>
<tr>
<td>Well-Graded</td>
<td>Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).</td>
</tr>
<tr>
<td>Uniformly-Graded</td>
<td>Predominantly of one grain size (see Grain Size Distribution).</td>
</tr>
</tbody>
</table>

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

<table>
<thead>
<tr>
<th>Relative Density</th>
<th>'N' Value</th>
<th>Relative Density %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Loose</td>
<td>&lt;4</td>
<td>&lt;15</td>
</tr>
<tr>
<td>Loose</td>
<td>4-10</td>
<td>15-35</td>
</tr>
<tr>
<td>Compact</td>
<td>10-30</td>
<td>35-65</td>
</tr>
<tr>
<td>Dense</td>
<td>30-50</td>
<td>65-85</td>
</tr>
<tr>
<td>Very Dense</td>
<td>&gt;50</td>
<td>&gt;85</td>
</tr>
</tbody>
</table>

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

<table>
<thead>
<tr>
<th>Consistency</th>
<th>Undrained Shear Strength (kPa)</th>
<th>'N' Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Soft</td>
<td>&lt;12</td>
<td>&lt;2</td>
</tr>
<tr>
<td>Soft</td>
<td>12-25</td>
<td>2-4</td>
</tr>
<tr>
<td>Firm</td>
<td>25-50</td>
<td>4-8</td>
</tr>
<tr>
<td>Stiff</td>
<td>50-100</td>
<td>8-15</td>
</tr>
<tr>
<td>Very Stiff</td>
<td>100-200</td>
<td>15-30</td>
</tr>
<tr>
<td>Hard</td>
<td>&gt;200</td>
<td>&gt;30</td>
</tr>
</tbody>
</table>
SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called “mechanical breaks”) are easily distinguishable from the normal in situ fractures.

<table>
<thead>
<tr>
<th>RQD %</th>
<th>ROCK QUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100</td>
<td>Excellent, intact, very sound</td>
</tr>
<tr>
<td>75-90</td>
<td>Good, massive, moderately jointed or sound</td>
</tr>
<tr>
<td>50-75</td>
<td>Fair, blocky and seamy, fractured</td>
</tr>
<tr>
<td>25-50</td>
<td>Poor, shattered and very seamy or blocky, severely fractured</td>
</tr>
<tr>
<td>0-25</td>
<td>Very poor, crushed, very severely fractured</td>
</tr>
</tbody>
</table>

SAMPLE TYPES

SS - Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW - Thin wall tube or Shelby tube
PS - Piston sample
AU - Auger sample or bulk sample
WS - Wash sample
RC - Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.
SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

- MC% - Natural moisture content or water content of sample, %
- LL - Liquid Limit, % (water content above which soil behaves as a liquid)
- PL - Plastic limit, % (water content above which soil behaves plastically)
- PI - Plasticity index, % (difference between LL and PL)

- Dxx - Grain size which xx% of the soil, by weight, is of finer grain sizes
  These grain size descriptions are not used below 0.075 mm grain size
- D10 - Grain size at which 10% of the soil is finer (effective grain size)
- D60 - Grain size at which 60% of the soil is finer

- Cc - Concavity coefficient = (D30)² / (D10 x D60)
- Cu - Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: 1 < Cc < 3 and Cu > 4
Well-graded sands have: 1 < Cc < 3 and Cu > 6
Sands and gravels not meeting the above requirements are poorly-graced or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay
(more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

- p'e - Present effective overburden pressure at sample depth
- p'e - Preconsolidation pressure of (maximum past pressure on) sample
- Ccr - Recompression index (in effect at pressures below p'e)
- Cc - Compression index (in effect at pressures above p'e)

- OC Ratio - Overconsolidation ratio = p'e / p'o
- Void Ratio - Initial sample void ratio = volume of voids / volume of solids
- Wo - Initial water content (at start of consolidation test)

PERMEABILITY TEST

- k - Coefficient of permeability or hydraulic conductivity is a measure of the ability of
  water to flow through the sample. The value of k is measured at a specified unit
  weight for (remoulded) cohesionless soil samples, because its value will vary
  with the unit weight or density of the sample during the test.
FIGURE 1
KEY PLAN
T. HARRIS PARTNERSHIP INCORPORATED

OTTAWA ROMAN CATHOLIC SEPARATE SCHOOL BOARD

ASBESTOS SURVEY

DR. F.J. MCDONALD SCHOOL
2860 Ahearn Avenue
Ottawa, Ontario

October 1990

270 MACLAREN STREET, OTTAWA, ONTARIO, K2P 0M3 (613) 234-1077
FAX (613) 234-1780
HALIFAX, OTTAWA, TORONTO, LONDON, WINNIPEG, CALGARY, EDMONTON, VANCOUVER
## ASBESTOS HAZARD ASSESSMENT ROOM INDEX

<table>
<thead>
<tr>
<th>Room</th>
<th>Friable Asbestos</th>
<th>Non Friable Asbestos</th>
<th>Protocol Required</th>
<th>Condition</th>
<th>Percent of Damage</th>
<th>Potential Damage</th>
<th>Hazard Rank</th>
<th>Date of Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>&lt;10%</td>
<td>Moder.</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>108</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>111</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>&lt;10%</td>
<td>Moder.</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>121</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>126</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>127</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>133</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>135</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>141</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>142</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>143</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>147</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>148</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>211</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>212</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>&lt;10%</td>
<td>Moder.</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>213</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>225</td>
<td>T.S.I.</td>
<td></td>
<td>Fair</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>226</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>0%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>227</td>
<td>T.S.I.</td>
<td></td>
<td>Good</td>
<td>&lt;10%</td>
<td>Low</td>
<td></td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

1. Friable asbestos includes Ceiling Tile (C.T.), Thermal System Insulation (T.S.I.), and Texture Coat (T.C.).
2. Non-friable asbestos includes Floor Tile (F.T.).
3. Conditions are ranked as Good (G), Fair (F) and Poor (P).
4. Potential Damage is ranked as High, Moderate, or Low.
5. Hazard Rank is assigned a value from #1-7, with "7" being associated with the highest level of hazard. Refer to discussion on Hazard Rank.
6. Condition, Percent of Damage, Potential Damage and Hazard Rank are Not Applicable (N.A.) for floor tile. Please refer to main text of report.

Page 1
1.0 INTRODUCTION

A survey was conducted in Dr. F.J. McDonald School, 2860 Ahearn Avenue, for the Ottawa Roman Catholic Separate School Board in order to determine the extent, location, types and conditions of friable and non-friable asbestos containing materials (ACM) present in the structure.

Asbestos is a general name for several varieties of highly fibrous silicate minerals. Commercially significant types are chrysotile, amosite and crocidolite. The fibres are valued for their heat-resistant and chemical resistant properties. The combination of fibrous structures, low heat conductivity, high electrical resistance, chemical inertness, strength, flexibility and its effectiveness as a reinforcing or binding agent when combined with cement or plastic, made it popular for wide industrial use.

In buildings sprayed friable asbestos containing material was used extensively as fireproofing and as thermal and acoustical insulation. Bound fibres were used to a great extent in several construction related products such as vinyl asbestos floor tiles and asbestos cement (transite) products in sheet form or as pipes.

However, due to the proven link between airborne asbestos fibres to lung cancer, asbestosis and mesothelioma, a number of products which contain asbestos are no longer in use and asbestos has been replaced in many others. In Canada no sprayed insulation, stucco or joint cements contain asbestos.

2.0 METHODOLOGY

Suspect ACM is classified into three types: surfacing materials, thermal system insulation, and miscellaneous materials as follows:
Surfacing Materials (SM): Sprayed or trowelled on or otherwise applied to surface such as fireproofing materials on a structural member, or other materials on surfaces for acoustical, fireproofing or other purposes.

Thermal System Insulation (TSI): Material applied to pipes, fittings, boilers, breeching, tanks, ducts, ventilation trunking, machinery operating at 85 degrees Celsius or above, or other structural components, to prevent heat loss or gain, or water condensation, or for other purposes.

Miscellaneous Materials (MM): Material on structural components, structural members or fixtures, such as floor or ceiling tiles, acoustic panels, or linings of mechanical rooms or other areas.

All individual rooms and spaces were inspected. Representative bulk material samples were collected of each homogeneous area. A homogeneous area is defined as an application of ACM which is uniform in colour, texture, purpose and is identical in every respect and is unlikely to consist of more than one type or formulation of material.

Eleven samples of suspect material were collected and analyzed. The bulk samples were analyzed by an independent laboratory ATEC Environmental Consultants, N.V.L.A.P. Lab Accreditation #1274, using polarized light microscopy (PLM) and dispersion staining techniques. This analysis determines the presence of asbestos, type (amosite, chrysotile, crocidolite, etc.) and the content by percentage of the various materials present. Bulk material sample results are provided in Appendix I.

The detection limit for routine PLM analysis is approximately 0.5%. Some types of samples, including plaster and cementitious material, are difficult to analyze for low concentrations of asbestos. Therefore, when no asbestos is detected or fibres cannot be identified during routine PLM examination of these types of sample, the sample is also examined by transmission light microscopy (TEM).

Marked drawings (Appendix II) are included to indicate the sample sites and the extent of any asbestos containing material.
ASBESTOS SURVEY - DR. F.J. MCDONALD SCHOOL, 2860 AHEARN AVENUE

This survey satisfies requirements of Ontario Regulation 654/85 respecting Asbestos on Construction Projects and in Buildings and Repair Operations - made under the Occupational Health and Safety Act. A copy of the regulation is enclosed (Appendix III).

3.0 DISCUSSION AND FINDINGS

Boiler Room

Seven representative samples of suspect material were analyzed. Floor and ceiling are concrete. Wall is concrete block. Boiler exhaust (Sample #3) contains 30-35% chrysotile. Insulation covering domestic hot water tank (Sample #5) contains 3-5% chrysotile and 15-20%amosite. All pipe runs including heating supply and return and hot water are insulated with fiberglass. Pipe elbows are insulated with chrysotile (Samples #2 and 6). Sample #1, taken from valve insulation on a water intake pipe, contains 25-30%chrysotile. Grey cement compound insulation on pipe elbows, boiler exhaust, domestic hot water tank and mechanical fittings should be considered to contain asbestos. Some ACM is exposed on the boiler exhaust and around the water intake valve.

First Floor

This floor comprises the boiler room, janitor room, gym, change rooms, nursery, washrooms, storage rooms, classrooms 1A, 1B, 1C, 2A, 2B, 2C and corridors.

All walls are concrete block. The deck is concrete.

Classroom floors are covered by 1' x 1' vinyl tiles. The ceiling is 2' x 4' lay-in tile (Sample #7) which does not contain asbestos.

Washroom floors and walls are terrazzo. Ceiling is 2' x 4' lay-in tile. Sample #2 taken from a pipe elbow above the ceiling contains chrysotile.

Janitor and storage room floors are terrazzo. Walls are concrete block. Deck is concrete. Pipe elbows contain ACM (See Samples #2,4,6,8).
ASBESTOS SURVEY - DR. F.J. MCDONALD SCHOOL, 2860 AHEARN AVENUE

Electrical room - floor and deck is concrete. Walls are concrete block. Pipe elbow in the room contains ACM.

Gym

Gym floor is 1' x 1' vinyl tile. Walls are concrete block. Deck is concrete supported by steel beams. Structural steel is not fireproofed. Change rooms have terrazzo floors, concrete block walls and gyprock ceilings. A drain pipe elbow in change room #2 was determined to contain chrysotile (Sample #9). The pipe runs (Sample #10) do not contain asbestos.

Second Floor

This floor consists of the resource centre, staff room, nurse's office, computer room, fan room, classrooms 3A, 3B, 3C, 4A, 4B and 4C, washrooms, janitor room, storage room and corridors. All walls are concrete block.

Classrooms and staff rooms: 1' x 1' vinyl floor tiles and 1' x 4' lay-in tile ceilings (See Sample #7) below the concrete deck.

Corridors have terrazzo floors, concrete block walls and 2' x 4' lay-in tile ceilings (See Sample #7), below the concrete deck. Pipe elbows above the ceiling contain ACM (See Samples #2,6,8).

Janitor's Room: concrete floor, concrete block walls and gyprock ceiling.

Fan Room

Ventilation ductwork is insulated with fibreglass, grey cement joint compound contains 25-30% chrysotile (Sample #11). Pipe runs are insulated with fibreglass. Pipe elbows are insulated with grey cement compound - suspected of being ACM (See Samples #2,6,8).

4.0 SUMMARY

No spray or trowelled on fireproofing or acoustical ceiling texture coat is present in the building.
Asbestos containing thermal insulation is present in the boiler room, the boiler exhaust, domestic hot water tank, pipe elbows, tees, mechanical fittings, and ductwork joints. ACM is present on pipe elbows above the corridor ceiling and in janitor rooms, change rooms, the electrical room and the fan room. Ductwork joint insulation in the fan room contains asbestos.

Floor tiles and ceiling tiles do not contain asbestos.

5.0 PRIORITIZATION

Physical condition of ACM identified in report has been rated. Priorities have been based on existing condition, location of material and hence likelihood of being disturbed, potential for future damage, and type of material.

Potential for Future Damage

Factors involved in potential for future damage include but are not limited to potential for future contact, vibration, air erosion, and likelihood of water damage. Potential for contact in a building is high in any area of public access, and in areas such as mechanical rooms, workshops, and corridor pipework where maintenance and service personnel work in the immediate vicinity of the material and may contact it accidentally or otherwise.

Potential for contact is low where ACM is not visible, i.e. sprayed fireproofing above suspended ceilings.

Potential for future disturbance is high where high velocity air movement occurs. This includes mechanical rooms, elevator machine rooms, elevator shafts and mechanical shafts.

Potential for future disturbance is moderate in areas of noticeable (but not high velocity) air movement such as that associated with above ceiling ventilation systems (i.e. return air plenums).

Priority ratings are as follows:

Priority 1

Materials with one or more of the following characteristics:
ASBESTOS SURVEY - DR. F.J. MCDONALD SCHOOL, 2860 AHEARN AVENUE

Missing jacketing, damage exposing ACM, severe delamination of exposed fireproofing, material containing asbestos where damage is likely to occur at some time.

Recommendations for Priority 1 ratings are immediate remedial action, whether it be patching, or removal and replacement of ACM. Condition could be re-rated to Priority 2 after Priority 1 remedial work.

.3 Priority 2

Materials with one or more of the following characteristics:

Materials located on equipment which may require work at some future time; indicates gouging or water staining; has been encapsulated.

Sprayed or trowelled on friable material used for fireproofing or acoustical texture coat which is in good condition however is exposed or potential, for future damage, delamination and/or disturbance is high due to air flow vibration and/or contact.

Recommendations for Priority 2 ratings are removal phased over time or as regular building and equipment upgrading demand.

Priority 3

Materials with one or more of the following characteristics:

Manufactured product in good condition which contains asbestos, such as transite panels, vinyl asbestos floor tiles or ceiling tiles; covered materials in good condition which is hard such as the grey cementitious layer of ceiling or wall plaster or covered cement insulation on pipe runs, tees, elbows and mechanical fittings and mechanical equipment or air cell type insulation on pipe runs.

Recommendations for Priority 3 ratings are to leave in place until eventual building or system demolition or renovation. However care must still be exercised in handling these materials. Transite panels must not be worked using power tools. Removal of transite panels and vinyl asbestos floor tiles must be undertaken following Type 1 procedures of Ontario Regulation 654/85. Any disturbance of ACM which would make it friable must follow procedures of Ontario Regulation 654/85.
6.0 RECOMMENDATIONS

Priority 1

Damaged, exposed asbestos containing thermal insulation on the boiler exhaust and a water intake valve in the boiler room should be patched or removed immediately. Repair work or small scale removal work must follow Type 2 procedures of Ontario Regulation 654\85 or employ the glove bag technique.

Priority 3

Asbestos containing thermal insulation on pipework, ductwork, and mechanical equipment which is covered and in good condition can be left in place until eventual building demolition or renovation. Any disturbance of the ACM which could make it friable must follow procedures of Ontario Regulation 654\85.
APPENDIX I

BULK MATERIAL SAMPLE RESULTS

T. HARRIS PARTNERSHIP INCORPORATED
# BULK SAMPLE ANALYSIS REPORT

**Client:** T. HARRIS PARTNERSHIP INC.
270 MACLAREN STREET
OTTAWA, ONTARIO

**Laboratory Batch #:** 74-90-0644
**Date Received:** 8-14-90
**Date Analyzed:** 8-16-90

**Project Identification:** OTTAWA SEP. SCHL BD. DR. J.F.MCDONALD SCHOOL 2850 AHERN AVE.

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Description</th>
<th>CHRY</th>
<th>AMOS</th>
<th>CROC</th>
<th>ANTH</th>
<th>FBGL</th>
<th>MM</th>
<th>CELL</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>GYM STORAGE RM #2 PIPE ELBOW</td>
<td>30-35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-3%</td>
<td>CACO 30-35%</td>
</tr>
<tr>
<td></td>
<td>DRAIN/GREY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>GYM STORAGE RM #2 PIPE RUN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>75-80</td>
<td>BINDER 10-15%</td>
</tr>
<tr>
<td></td>
<td>DRAIN/TAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>FAN RM JOINT-DUCT WORK/GRAY &amp; BROWN</td>
<td>25-30</td>
<td></td>
<td></td>
<td></td>
<td>3-5%</td>
<td></td>
<td>3-5%</td>
<td>CACO 35-40%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BINDER 10-15%</td>
</tr>
</tbody>
</table>

**Sample Not Homogenized**

Percentages Given Are Visual Estimates
Report Must Not Be Reproduced Without Laboratory Approval
Laboratory Not Responsible For Sampling Technique
Test Report Pertains Only To Items Submitted

**Analyst:**

Respectfully Submitted:
Laboratory Testing Division

CLIENT COPY
# BULK SAMPLE ANALYSIS REPORT

**Lab Accreditation #1274**
Polarized Light Dispersion Staining Method

**Client:** T. HARRIS PARTNERSHIP INC.  
270 MACLAAREN STREET  
OTTAWA, ONTARIO  
CAN K2P 0M3

**Laboratory Batch #:** 74-90-0644  
**Date Received:** 6-14-90  
**Date Analyzed:** 8-16-90  
**Project Identification:** OTTAWA SEP. SCHL BD. DR. J.F. MCDONALD SCHOOL 2860 AEARN AVE.

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Description</th>
<th>CHRY</th>
<th>AMOS</th>
<th>CROC</th>
<th>ANTH</th>
<th>FBGL</th>
<th>MM</th>
<th>CELL</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BOILER RM VALVE CASING WATER INTAKE/</td>
<td>25-30</td>
<td></td>
<td></td>
<td>3-5%</td>
<td></td>
<td></td>
<td></td>
<td>CACO 45-50% BINDER 10-15%</td>
</tr>
<tr>
<td>2</td>
<td>BOILER RM PIPE ELBOW WATER INTAKE/GRAY</td>
<td>30-35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CACO 55-60%</td>
</tr>
<tr>
<td>3</td>
<td>BOILER RM PIPE JOINT BOILER EXHAUST &amp; R/H/GRAY &amp; WHITE</td>
<td>30-35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CACO 60-65%</td>
</tr>
<tr>
<td>4</td>
<td>BOILER RM PIPE ELBOW M WATER SUPPLY/IVORY</td>
<td></td>
<td></td>
<td></td>
<td>10-15</td>
<td></td>
<td></td>
<td></td>
<td>LATEX 75-80%</td>
</tr>
<tr>
<td>5</td>
<td>BOILER RM INSULATION DOM. H WATER TANK/WHT</td>
<td>3-5%</td>
<td></td>
<td>15-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CACO 65-70%</td>
</tr>
<tr>
<td>6</td>
<td>BOILER RM PIPE ELBOW G. WATER SUPPLY/GRAY</td>
<td>35-40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CACO 50-55%</td>
</tr>
<tr>
<td>7</td>
<td>MAIN HALL ACCOUSIC CEILING TILE/GRAY</td>
<td>30-35</td>
<td></td>
<td></td>
<td></td>
<td>35-40</td>
<td></td>
<td></td>
<td>PERTITE 10-15% LATEX 3-5%</td>
</tr>
<tr>
<td>8</td>
<td>MENS W.RM PIPE ELBOW/GRAY</td>
<td>30-35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CACO 55-60%</td>
</tr>
</tbody>
</table>

**Legend:**  
CHR = Chrysotile  
CROC = Crocidolite  
AMOS = Amosite  
ANTH = Anthophyllite  
ACTR = Actinolite/Tremolite  
FBGL = Fiberglass  
CELL = Cellulose  
MM = Manmade  
HC = Human Trace  
NO ENTRY = None Detected

Sample Not Homogenized  
Percentages Given Are Visual Estimates  
Report Must Not Be Reproduced Without Laboratory Approval  
Laboratory Not Responsible for Sampling Technique  
Test Report Relates Only to Items Submitted

**Analyst:** [Signature]  
Respectfully Submitted,  
Laboratory Testing Division

**CLIENT COPY**
## SAMPLE TYPE | DESCRIPTION/LOCATION | VOLUME | DATE
--- | --- | --- | ---
1 | Boiler Rm Valve casing - water intake | Aug 3, 90 |
2 | Pipe elbow - water intake | |
3 | Pipe joint - boiler exhaust run | |
4 | Pipe elbow - Hot water supply | |
5 | Insulation - Domestic H.W. tank | |
6 | Pipe elbow - Cold water supply | |
7 | Main Hall Acoustic ceiling tile | |
8 | Men's Washroom Pipe elbow | |
9 | Gym - Storage Room Pipe elbow - drain | |
10 | Pipe run - drain | |
11 | Fan Rm Joint - ductwork | |

**TOTALS**

Performed by: R Mcclellen/McTaggart  Aug 2 1950
Delivered by: Parolator
Received by:
Key to Symbols on Plan

Sample number

Sample location

Areas containing sprayed asbestos-containing fireproofing on structure

Areas containing sprayed architectural finish (stucco, etc.)

Major mechanical equipment insulated with asbestos

Individual pipe runs insulated with asbestos, where applicable

General areas of concern, (see notes)

Areas containing cement-asbestos sheeting

Areas of suspected vinyl-asbestos tile

Some or all flexible connections in this area contain asbestos

T. HARRIS PARTNERSHIP INCORPORATED
## LEGAL ENTITIES

**PRIVACY STATEMENT**
http://ec.europa.eu/budget/execution/legal_entities_fr.htm

### PRIVATE COMPANIES

<table>
<thead>
<tr>
<th>TYPE OF COMPANY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NGO YES</td>
<td>NO</td>
</tr>
<tr>
<td>NAME(S)</td>
<td></td>
</tr>
<tr>
<td>ABBREVIATION</td>
<td></td>
</tr>
<tr>
<td>ADDRESS OF HEAD OFFICE</td>
<td></td>
</tr>
<tr>
<td>POSTCODE</td>
<td>P.O. BOX</td>
</tr>
<tr>
<td>TOWN/CITY</td>
<td></td>
</tr>
<tr>
<td>COUNTRY</td>
<td></td>
</tr>
<tr>
<td>VAT (1)</td>
<td></td>
</tr>
<tr>
<td>PLACE OF REGISTRATION</td>
<td></td>
</tr>
<tr>
<td>DATE OF REGISTRATION</td>
<td>D M Y Y Y</td>
</tr>
<tr>
<td>REGISTRATION No (2)</td>
<td></td>
</tr>
<tr>
<td>PHONE</td>
<td>FAX</td>
</tr>
<tr>
<td>E-MAIL</td>
<td></td>
</tr>
</tbody>
</table>

**THIS "LEGAL ENTITIES" FORM SHOULD BE COMPLETED AND RETURNED TOGETHER WITH:**
1. A COPY OF THE VAT REGISTRATION DOCUMENT IF APPLICABLE AND IF THE VAT NUMBER DOES NOT APPEAR ON THE OFFICIAL DOCUMENT REFERRED TO AT 2 BELOW.

**DATE AND SIGNATURE OF AUTHORISED REPRESENTATIVE**
# ANNEX IV b

## FINANCIAL IDENTIFICATION

 PRIVACY STATEMENT http://europa.eu.int/comm/budget/exeuction/flers_fr.htm

<table>
<thead>
<tr>
<th><strong>BENEFICIARY</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NAME</strong></td>
</tr>
<tr>
<td><strong>ADDRESS</strong></td>
</tr>
<tr>
<td><strong>TOWN/CITY</strong></td>
</tr>
<tr>
<td><strong>COUNTRY</strong></td>
</tr>
<tr>
<td><strong>CONTACT PERSON</strong></td>
</tr>
<tr>
<td><strong>TELEPHONE</strong></td>
</tr>
<tr>
<td><strong>E-MAIL</strong></td>
</tr>
</tbody>
</table>

## CHQ

**REMARKS:**

**SIGN HERE**

**DATE + SIGNATURE BENEFICIARY:**

Obligatory

The signature of the beneficiary is obligatory in all cases.
Dr. F. J MacDonald Catholic School Handicapped Lift
2860 Ahearn Avenue,
Ottawa, Ontario
K2B 6Z9

Date ________________

Ottawa Catholic School Board
570 West Hunt Club,
Ottawa, Ontario. K2G 3R4

Dear Sir:

1. I/We ____________________________
   (Legal Company Name)

   of ______________________________
   (Business Address)

   hereby offer to the Ottawa Catholic School Board to furnish all material, labour, plant, tools, deliver and erect all material, including freight charges, duty, exchange, equipment and supervision and all other charges to complete the work as set out in the tender documents and all prime costs, allowances and applicable Government sales and other taxes in force at this date, (but not including H.S.T.), for the stipulated sum of:

   ________________________________
   ________________________________ Dollars ($ ________________)

2. (a) IN SUBMITTING THIS TENDER, we recognize the right of the Owner to accept or reject any tender at the price submitted, it being understood that revised tenders shall not be called for if minor changes only are contemplated.

   (b) I/We, THE UNDERSIGNED, agree to accept the decision of the Owner if it is found to be in the best interest of the Owner, to cancel any section of this tender.

   (c) I/We, also agree to make minor changes to the work prior to award of the contract should it be in the Owner's best interest to do so, to promptly provide acceptable cost breakdowns related to such changes, and to make fair and reasonable adjustments to the contract price.

3. I/We enclose herewith as a Tender Security a surety bond, certified cheque, or bank draft written in favour of the Ottawa Catholic School Board in the amount of which is not less than ten percent (10%) of our tender to be held in escrow and dealt with (as described in Article 10 of Instructions to Tenderers.)

4. I/We the UNDERSIGNED agree to complete the Work ready for partial occupancy by 26 August 2014.
5. I/We the UNDERSIGNED agree to Substantially Perform the total Work in _________ consecutive weeks from after the official commence work order.

6. I/We, FURTHER DECLARE that this tender is made without knowledge, comparison of figures or arrangement with any other company, firm, or person submitting a tender for the same work.

7. I/We, FURTHER DECLARE THAT no member of the Ottawa Catholic School Board or any officer of the Ottawa Catholic School Board, or will become, interested directly or indirectly as a contracting party, partner, surety or otherwise or in the performance of the Contract, or in the supplies, work or business to which it relates or in any portion of profits thereof, or of any such supplies to be used therein, or any of the monies to be derived therefrom.

8. My/Our lump sum price tendered includes all allowances as noted in the specifications.

9. I/We, THE UNDERSIGNED, offer to perform the work in strict accordance with the full intent of the following documents:
   
   1. The Specifications titled "Dr. F. J MacDonald Catholic School Handicapped Lift".
   2. The Drawings, listed in the above mentioned specifications.
   3. The following addenda issued by Pye & Richards Architects Inc.

   ADDENDUM NO. _______ DATE ____________
   ADDENDUM NO. _______ DATE ____________
   ADDENDUM NO. _______ DATE ____________

10. I/We further declare that the following are the names of Sub-contractors whose tenders we have used to make this tender and whom we would employ to execute the representative trades:

   Drywall/Acoustic ____________________________________________
   Masonry ____________________________________________________
   Mechanical (HVAC) ________________________________________
   Electrical _________________________________________________
   Handicapped Lift __________________________________________

11. I/We, agree to provide Section 00 43 36 Proposed Subcontractors Form within 24 hours of request, completed as required.

12. I/We, have visited and carefully examined the site of the work and have satisfied and informed myself/ourselves as to all the existing conditions, limitations, and difficulties which may arise and govern the completion of the work.
13. I/We, the UNDERSIGNED, agree that within ten (10) days after the issuance of a commencement work order, I/We will commence the work, assembling all necessary labour forces and equipment on the site and will continue the work with the utmost diligence until completion.

14. I/We, THE UNDERSIGNED, agree to hold to the tender figures submitted for a period of sixty (60) days from date of Tender closing.

15. I/We, THE UNDERSIGNED, agree, if this tender is accepted, to furnish approved surety bonds for the proper fulfilment of the contract as required under the terms of the General Conditions, and to execute agreement in triplicate both within ten (10) days of being notified so to do by the Owner. In the event of default or failure on MY/OUR part so to do, I/WE agree that the Owner shall be at liberty to retain the money deposited by ME/US to the use of the Owner and to accept the next lowest or any tender, or to advertise for new tenders; or to carry on the work in any other way they may deem best; and I/WE also agree to pay to the Owner the difference between this tender and any greater sum which the Owner may expend or incur by reason of such default or failure, or by reason of such action, as aforesaid, on their part, including the cost of advertisement for new tenders, and to indemnify and save harmless the said Owner and their officers from all loss, damage, cost charges and expenses which they may suffer to be put to by reason by any such default, or failure on MY/OUR part.

16. CONTRACTOR’S SIGNATURE
OR IF TENDER IS SUBMITTED
BY AN INCORPORATED COMPANY
ITS SEAL ATTESTED BY THE
HANDBS OF ITS PROPER OFFICERS ____________________________ Seal

NAME & TITLE ________________________________________________
Herewith is the list of Proposed Subcontractors referred to in Item 11 of the

Tender submitted by: ____________________________

To: Ottawa Catholic School Board
For: Dr. F. J MacDonal Catholic School Handicapped Lift

dated __________, 2014 and which is an integral part of the above noted Tender. I/We agree that this list may only be changed in accordance with General Condition 3.7 and relevant Supplementary Conditions of the Contract. We have ascertained that these Subcontractors are capable of executing the work to the kind and quality specified and within the time and other limitations required.

(NOTE: Use of the term "Own Forces" must be documented as per Section 00 43 36)

Concrete Formwork _________________________________
Reinforcing Steel, Fabrication and Setting _________________________________
Concrete Finishing _________________________________
Caulking _________________________________
Steel Doors and Frames _________________________________
Door Hardware _________________________________
Painting _________________________________
Plumbing _________________________________
Earthwork _________________________________

Tenderer's Signature _________________________________
or if Tender is submitted by _________________________________
an incorporated company its _________________________________
seal attested by the hands _________________________________
of its proper officers. _________________________________

Seal
The Standard Construction Document CCDC 2 2008 for a Stipulated Price Contract, English version, consisting of the Agreement Between Owner and Contractor, Definitions and General Conditions of the Stipulated Price Contract, Parts 1 to 14 inclusive, governing same is hereby made part of these Contract Documents, with the following amendments, additions and modifications:

AGREEMENT BETWEEN OWNER AND CONTRACTOR

ARTICLE A-1 - THE WORK

1.3 Delete paragraph 1.3 and SUBSTITUTE the following:

1.3 Commence the Work by the 28th day of June in this year 2014, and subject to adjustment in Contract time as provided in the Contract Documents, complete the work ready for occupancy by the 26th day of August 2014, and obtain Substantial Performance of the Work by 30th day of September 2014.

ARTICLE A-3 - CONTRACT DOCUMENTS

3.1 Add the following to the list of Contract Documents in paragraph 3.1:

- Supplementary Conditions to CCDC 2 – 2008
- Specifications
- Drawings
- Performance Bond
- Labour and Material Payment Bond

ARTICLE A-5 - PAYMENT

5.1.3 Amend paragraph 5.1.3, in the first line, by deleting the words "...the issuance of the..." and replacing them with "...receipt of the Consultant's..."

DEFINITIONS

16. Amend Definition 16 by adding the following to the end of the Definition:

Provide has this meaning whether or not the first letter is capitalized.

Add the following new definitions:

27. Confidential Information

Confidential Information means all of the information or material that the Owner provides to the Contractor relating to the contract. Such information shall remain confidential unless such designation is rescinded in writing by the Owner.

28. Construction Schedule

Construction Schedule means the schedule for the performance of the Work provided by the Contractor pursuant to GC 3.5, including any amendments to the Construction Schedule made pursuant to the Contract Documents.

29. Force Majeure

Force Majeure means any cause, beyond the Contractor's control, other than bankruptcy or insolvency, which prevents the performance by the Contractor of any of its obligations under the Contract and the event of Force Majeure was not caused by the Contractor's default or active commission or omission and could not be avoided or mitigated by the exercise of reasonable effort or foresight by the Contractor. Force Majeure includes Labour Disputes, fire, unusual delay
by common carriers or unavoidable casualties, civil disturbance, acts, orders, legislation, regulations or directives of any government or other public authority, acts of a public enemy, war, riot, sabotage, blockage, embargo, lightning, abnormally adverse weather, earthquake, or acts of God.

30. **Install**
*Install* means install and connect. *Install* has this meaning whether or not the first letter is capitalized.

31. **Labour Dispute**
*Labour Dispute* means any lawful or unlawful labour problems, work stoppage, labour disruption, strike, job action, slow down, lock-outs, picketing, refusal to work or continue to work, refusal to supply materials, cessation or work or other labour controversy which does, or might, affect the *Work*.

32. **Overhead**
*Overhead* means all site and head office operations and facilities, all site and head office administration and supervision; all duties and taxes for permits and licenses required by the authorities having jurisdiction at the *Place of the Work*; all requirements of Division 1, including but not limited to submittals, warranty, quality control, calculations, testing and inspections; meals and accommodations; and, tools, expendables and clean-up costs.

33. **Request for Information/RFI**
*Request for Information or RFI* means written documentation sent by the *Contractor* to the *Owner* or to the *Owner's* representative or the *Consultant* requesting written clarification(s) and/or interpretation(s) of the *Drawings* and/or *Specifications*, *Contract* requirements and/or other pertinent information required to complete the *Work* of the *Contract* without applying for a change or changes to the *Work*.

**GENERAL CONDITIONS OF THE STIPULATED PRICE CONTRACT**

1.0 Where a General Condition or paragraph of the General Conditions of the *Contract* is deleted by these amendments, the numbering of the remaining General Conditions or paragraphs shall remain unchanged, unless stated otherwise herein, and the numbering of the deleted item will be retained, unused.

GC 1.1 **CONTRACT DOCUMENTS**

1.1.6 Add the following to the end of paragraph 1.1.6:

The *Specifications* are divided into divisions and sections for convenience but shall be read as a whole and neither such division nor anything else contained in the *Contract Documents* will be construed to place responsibility on the *Owner* or the *Consultant* to settle disputes among the *Subcontractors* and *Suppliers* with respect to such divisions. The *Drawings* are, in part, diagrammatic and are intended to convey the scope of the *Work* and indicate general and appropriate locations, arrangements and sizes of fixtures, equipment and outlets. The *Contractor* shall obtain more accurate information about the locations, arrangements and sizes from study and coordination of the *Drawings*, including *Shop Drawings* and shall become familiar with conditions and spaces affecting those matters before proceedings with the *Work*. Where site conditions require reasonable minor changes, where the change requires only addition labour of one half hour or less as indicated locations and arrangements, the *Contractor* shall make such changes at no additional cost to the *Owner*. Similarly, where known conditions or existing conditions interfere with new installation and require relocation, the *Contractor* shall
include such relocation in the Work. The Contractor shall arrange and install fixtures and equipment in such a way as to conserve as much headroom and space as possible. The schedules are those portions of the Contract Documents, wherever located and whenever issued, which compile information of similar content and may consist of drawings, tables and/or lists.

1.1.7 Amend paragraph 1.1.7.1 by adding "Amendments to CCDC 2 – 2008" before "the Agreement between the Owner and the Contractor"

Add new paragraph 1.1.7.5 as follows:

.5 Should reference standards and Specifications conflict with each other or if certain requirements of the Specifications conflict with other requirements of the Specifications, the more stringent requirements shall govern.

1.1.8 Delete paragraph 1.1.8 in its entirety and substitute as follows:

The Consultant, on behalf of the Owner shall provide the Contractor without charge, twenty (.20.) copies of the Contract Documents, exclusive of those required by jurisdictional authorities and the executed Contract Documents. Additional copies can be purchased by the Contractor at the Consultant's cost of reproduction, handling and applicable taxes. The Consultants shall provide the Contractor with one electronic set of PDF's of all drawings and specifications for the Contractor to print for the purpose of completing the Work. The Contractor may be required to sign an agreement with the Consultant for the use of these files.

GC 1.5 EXAMINATION OF DOCUMENTS AND SITE

Add new GC 1.5 - EXAMINATION OF DOCUMENTS AND SITE as follows:

1.5.1 Having undertaking reasonable due diligence, the Contractor declares and represents that in tendering for the Work, and in entering into a Contract with the Owner for the performance of the Work, it has either investigated for itself the character of the Work generally available from a site visit the Contractor has assumed and does hereby assume all risk of conditions now existing or arising in the course of the Work which might or could make the Work, or any items thereof more expensive in character, or more onerous to fulfil, than was contemplated or known when the tender was made or the Contract signed.

GC 1.6 TIME IS OF THE ESSENCE OF THE CONTRACT

Add new GC 1.6 - TIME IS OF THE ESSENCE OF THE CONTRACT as follows:

1.6.1 All time limits stated in the Contract Documents are of the essence of the Contract.

GC 2.2 ROLE OF THE CONSULTANT

2.2.7 Delete the words "Except with respect to GC 5.1 - FINANCING INFORMATION REQUIRED OF THE OWNER".

2.2.13 Amend paragraph 2.2.13 by the addition of the following to the end of that paragraph: If, in the opinion of the Contractor, the Supplemental Instruction involves an adjustment in the Contract Price or in the Contract Time, it shall, within ten (10) Working Days of receipt of a Supplemental Instruction, provide the Consultant with a notice in writing to that effect. Failure to provide written notification within the time stipulated in this paragraph 2.2.13 shall be deemed
an acceptance of the Supplemental Instruction by the Contractor, without any adjustment in the Contract Price or Contract Time.
Add new paragraph 2.2.1.9 as follows:

2.2.19 The Consultant or the Owner, acting reasonably, may from time to time require the Contractor to remove from the Project any personnel of the Contractor, including project managers, superintendents or Subcontractors. Such persons shall be replaced by the Contractor in a timely fashion to the satisfaction of the Consultant or the Owner, as the case may be, at no cost to the Owner.

GC 2.3 REVIEW AND INSPECTION OF THE WORK

2.3.3 Delete paragraph 2.3.3 in its entirety and replace it with the following:
The Contractor shall furnish promptly two copies to the Consultant and one copy to the Owner of all certificates and inspection reports relating to the Work.

2.3.4 Insert the word “review” after the word "inspections" in the first line of paragraph 2.3.4.
Add a new paragraph 2.3.8 as follows:

2.3.8 The Consultant will conduct periodic reviews of the Work in progress, to determine general conformance with the requirements of the Contract Documents. Such reviews, or lack thereof, shall not give rise to any claims by the Contractor in connection with construction means, methods, techniques, sequences and procedures, nor in connection with construction safety at the Place of Work, responsibility for which belongs exclusively to the Contractor.

GC 2.4 DEFECTIVE WORK

2.4.1 Amend GC 2.4.1 by inserting “, the Owner and/or its agent” in the first sentence following “rejected by the Consultant”.

Add new paragraph 2.4.1.1:

2.4.1.1 The Contractor shall prioritize the correction of any defective work, which, in the sole discretion of the Owner, adversely affects the day to day operations of the Owner or which, in the sole discretion of the Consultant, adversely affects the progress of the Work.

Add new paragraph 2.4.4 as follows:

2.4.4 Neither acceptance of the Work by the Consultant, nor any failure by the Consultant to identify, observe or warn of defective Work or any deficiency in the Work shall relieve the Contractor from the sole responsibility for rectifying such defect or deficiency at the Contractor’s sole cost, even where such failure to identify, observe or warn is negligent.

GC 3.1 CONTROL OF THE WORK

3.1.3 Add a new paragraph 3.1.3, 3.14 and 3.1.15 as follows:
Prior to commencing individual procurement, fabrication and construction activities, the Contractor shall verify at the Place of the Work, all relevant measurements and levels necessary for proper and complete fabrication, assembly and installation of the Work and shall further carefully compare such field measurements and conditions with the requirements of the
Contract Documents. Where dimensions are not included or exact locations are not apparent, the Contractor shall immediately notify the Consultant in writing and obtain written instructions from the Consultant before proceedings with any part of the affected Work.

3.1.4 notwithstanding the provisions of paragraphs 3.1.1 and 3.1.2, the Owner shall have access to the site at all times to monitor all aspects of construction. Such access shall in no circumstances affect the obligations of the Contractor to fulfill its contractual obligations.

3.1.5 Do not commence Work or procure any materials until both the Contractor and the Owner have either executed (signed) the Contract, or the Contractor has received a letter of acceptance of the Tender from the Owner or its agent AND the Contractor has delivered the required Workplace Safety and Insurance Board Certificate of Clearance, proof of insurance coverage, AND the Owner or its agent has unconditionally accepted such submissions, in writing, as being in compliance with the requirements of the Contract Documents.

GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

3.2.2.2 Delete paragraph 3.2.2.2 in its entirety.

3.2.3.2 Delete paragraph 3.2.3.2 and replace it with the following:

The Contractor shall co-ordinate and schedule the activities and work of other contractors and Owner's own forces with the Work of the Contractor.

Add new paragraph 3.2.3.4 as follows:

3.2.3.4 The Contractor shall subject to GC 9.4 CONSTRUCTION SAFETY, for the Owner's own forces and for other contractors, the Contractor assumes overall responsibility for compliance with all aspects of the applicable health and safety legislation in force at the Place of the Work including all responsibilities of the "constructor", pursuant to the Occupational Health and Safety Act of Ontario.

GC 3.4 DOCUMENT REVIEW

3.4.1 Delete paragraph 3.4.1 in its entirety and substitute new paragraph 3.4.1:

The Contractor shall review the Contract Documents and shall report promptly to the Consultant any error, inconsistency, or omission the Contractor may discover. Such review by the Contractor shall be undertaken with the standard of care described in paragraph 3.14.1 of the Contract. Except for its obligation to make such review and report the result, the Contractor does not assume any responsibility to the Owner or to the Consultant for the accuracy of the Contract Documents. Provided it has exercised the degree of care and skill described in this paragraph 3.4.1, the Contractor shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the Contract Documents, which the Contractor could not reasonably have discovered through the exercise of the required standard of care.

Add new paragraph 3.4.2. As follows:

3.4.2 If, at any time, the Contractor finds errors, inconsistencies, or omissions in the Contract Documents or has any doubt as to the meaning or intent of any part thereof, including laying out of the Work, the Contractor shall immediately notify the Consultant, and request instructions, a Supplemental Instruction, Change Order, or Change Directive, as the case may require, and the Contractor shall not proceed with the work affected until the Contractor has received such
instructions, a Supplemental Instruction, Change Order or Change Directive. Neither the Owner nor the Consultant will be responsible for the consequences of any action of the Contractor based on oral instructions that have not been confirmed in a proper written form in a timely manner.

Add new paragraphs 3.4.3 as follows:

3.4.3 Errors, inconsistencies and/or omissions in the Drawings and/or Specifications which do not allow completion of the Work of the Contract shall be brought to the Consultant’s attention prior to the execution of the Contract by means of an RFI.

GC 3.5 CONSTRUCTION SCHEDULE

3.5.1 Delete paragraph 3.5.1 in its entirety and replace with the following:

The Contractor shall:

1. within five (5) calendar days of receiving written confirmation of the award of the Contract, prepare and submit to the Owner and the Consultant for their review and acceptance, a construction schedule in the format indicated below that indicates the timing of the activities of the Work and provides sufficient detail of the critical events and their inter-relationship to demonstrate the Work will be performed in conformity with the Contract Time and in accordance with the Contract Documents. Such schedule is to include a delivery schedule for Products whose delivery is critical to the schedule for the Work or is required by the Contract to be included in a Products delivery schedule. The Contractor shall employ construction scheduling software that permits the progress of the Work to be monitored in relation to the critical path established in the schedule. The Contractor shall provide the schedule and any successor or revised schedules in both electronic format and hard copy. Once accepted by the Owner and the Consultant, the construction schedule submitted by the Contractor shall become the baseline construction schedule; and,

2. provide the expertise and resources, such resources including manpower and equipment, as are necessary to maintain progress under the accepted baseline construction schedule or revised schedule accepted by the Owner pursuant to GC 3.5 CONSTRUCTION SCHEDULE; and,

3. monitor the progress of the Work on a weekly basis relative to the baseline construction schedule, or any revised schedule accepted by the Owner pursuant to GC 3.5 CONSTRUCTION SCHEDULE, update and submit to the Consultant and Owner the electronic and hard copy schedule on a monthly basis, at a minimum, or as required by the Consultant and advise the Consultant and the Owner weekly in writing of any variation from the baseline or slippage in the schedule; and,

4. provide overtime work without change to the Contract Price if such work is deemed necessary to meet the schedule; and,

5. ensures that the Contract Price shall include all costs required to phase or stage the Work.

Add new paragraph 3.5.2 and 3.5.3 as follows:

3.5.2 If, at any time, it should appear to the Owner or the Consultant that the actual progress of the Work is behind schedule or is likely to become behind schedule, or if the Contractor has given
notice of such to the Owner or the Consultant pursuant to subparagraph 3.5.1.3, the Contractor shall, either at the request of the Owner or the Consultant, or following giving notice pursuant to subparagraph 3.5.1.3, take appropriate steps to cause the actual progress of the Work to conform to the schedule or minimize the resulting delay. Within five (5) calendar days of the request by the Owner or the Consultant or the notice being given pursuant to subparagraph 3.5.1.3, the Contractor shall produce and present to the Owner and the Consultant a plan demonstrating how the Contractor will achieve the recovery of the last accepted schedule.

3.5.3 The Contractor is responsible for performing the Work within the Contract Time. Any schedule submissions revised from the accepted baseline construction schedule or revised schedule accepted by the Owner pursuant to GC 3.5 CONSTRUCTION SCHEDULE, during construction are not deemed to be approved extensions to the Contract Time. All extensions to the Contract Time must be made in accordance with the Contract Documents.

GC 3.6 SUPERVISION

3.6.1 Delete paragraph 3.6.1 in its entirety and replace with the following:

The Contractor shall employ a competent full-time superintendent, acceptable to the Owner and Consultant, who shall be in full time attendance at the Place of Work while the Work is being performed. The superintendent shall not be changed by the Contractor without valid reason which shall be provided in writing and shall not be changed without prior consultation with and agreement by the Owner and the Consultant. The Contractor shall replace the superintendent within 7 Working Days of the Owner’s written notification, if the superintendent’s performance is not acceptable to the Owner. The Contractor shall provide the Owner and the Consultant with the names, addresses and telephone numbers of the superintendent referred to in this paragraph 3.6.1 and other responsible persons who may be contacted for emergency and other reasons during non-working hours.

Add new paragraph 3.6.3, 3.6.4, and 3.6.5 as follows:

3.6.3 The Owner may, at any time during the course of the Work, request the replacement of the appointed representative(s). Immediately upon receipt of the request, the Contractor shall make arrangements to appoint an acceptable replacement, which is approved by the Owner.

3.6.4 The Consultant and Owner shall reserve the right to review the record of experience and credentials of supervisory staff assigned to the Project prior to commencement of the Work.

3.6.5 A superintendent assigned to the Work shall be “Gold Seal Certified” as per the Canadian Construction Association; or a superintendent that can demonstrate the requisite experience and success related to the Project to the sole satisfaction of the Owner.

GC 3.7 SUBCONTRACTORS AND SUPPLIERS

3.7.1.2 In subparagraph 3.7.1.2 after the words “the Contract Documents” insert the words “including any required surety bonding”.

Add new paragraphs 3.7.7 as follows:

3.7.7 Where identified in the Contract, the Owner may assign to the Contractor, and the Contractor agrees to accept, any contract procured by the Owner for Work or services required on the Project that has been pre-tendered or pre-negotiated by the Owner.
GC 3.8 LABOUR AND PRODUCTS

3.8.3 Amend paragraph 3.8.3 by adding the words, ", agents, Subcontractors and Suppliers" after the word "employees" in the first line.

GC 3.11 USE OF THE WORK

3.11.1 In the second line between the words "permits and "or" add", by direction of the Owner or Consultant.

Add new paragraph 3.11.3 as follows:

3.11.3 The Owner shall have the right to enter or occupy the Work in whole or in part for the purpose of placing fittings and equipment, or for other use before Substantial Performance of the Work, if, in the opinion of the Consultant, such entry and occupation does not prevent or substantially interfere with the Contractor in the performance of the Contract within the Contract Time. Such entry or occupation shall neither be considered as acceptance of the Work, nor in any way relieves the Contractor from its responsibility to complete the Contract.

GC 3.14 CONTRACTOR STANDARD OF CARE

Add a new General Condition 3.14 - CONTRACTOR STANDARD OF CARE as follows:

3.14.1 In performing its services and obligations under the Contract, the Contractor shall exercise the standard of care, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar services for similar projects. The Contractor acknowledges and agrees that throughout the Contract, the performance of the Contractor's obligations, duties and responsibilities shall be judged against this standard. The Contractor shall exercise the same standard of care, skill and diligence in respect of any Products, personnel or procedures which it may recommend to the Owner.

3.14.2 The Contractor further represents covenants and warrants to the Owner that:

1. the personnel it assigns to the Project are appropriately experienced;

2. there are no pending threatened or anticipated claims, liabilities or contingent liabilities that would have a material effect on the financial ability of the Contractor to perform its work under the Contract.

GC 3.15 OCCUPANCY OF THE WORK

Add a new General Condition 3.15 - OCCUPANCY OF THE WORK as follows:

3.15.1 The Owner reserves the right to take possession of and use for any intended purpose any portion or all of the undelivered portion of the Project even though the Work may not be substantially performed, provided that such taking possession and use will not interfere, in any material way, with the progress of the Work, having obtained all necessary approvals from the Authorities having Jurisdiction. The taking of possession or use of any such portion of the Project shall not be deemed to be the Owner's acknowledgment or acceptance of the Work or the Project, nor shall it relieve the Contractor of any of its obligations under the Contract.
3.15.2 Whether the Project contemplates Work by way of renovations in buildings which will be in use or be occupied during the course of the Work or where the Project involves Work that is adjacent to a structure which is in use or is occupied, the Contractor, without in any way limiting its responsibilities under the Contract, shall take all reasonable steps to avoid interference with fire exits, building access and egress, continuity of electric power and all other utilities, to suppress dust and noise and to avoid conditions likely to propagate mould or fungus of any kind and all other steps reasonably necessary to promote and maintain the safety and comfort of the users and occupants of such structures or adjacent structures.

GC 4.1 CASH ALLOWANCES

4.1.1 Delete the second sentence in paragraph 4.1.1

4.1.4 Delete paragraph 4.1.4 in its entirety and substitute the following:

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

4.1.5 Delete paragraph 4.1.5 in its entirety and substitute the following:

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

Add new paragraphs 4.1.8 and 4.1.9 as follows:

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

4.1.9 Cash allowances cover the net cost to the Contractor of services, Products, Construction Equipment, freight, unloading, handling, storage, installation, all applicable taxes, and other authorized expenses incurred in performing any Work stipulated under the cash allowances but does not include any Value Added Taxes payable by the Owner and the Contractor.

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

5.1.1 Delete paragraph 5.1.1 in its entirety.

5.1.2 Delete paragraph 5.1.2 in its entirety.

GC 5.2 APPLICATIONS FOR PROGRESS PAYMENT

5.2.2 Delete paragraph 5.2.2 in its entirety and substitute the following:

Applications for payment shall be dated the last day of each payment period, which is the last day of the month or an alternative day of the month agreed in writing by the parties. The amount claimed shall be for the value, proportionate to the amount of the Contract, or work
performed and Products delivered into the Work at that date. No amount claimed shall include products delivered and not incorporated into the work, unless the products are free and clear of all security interests, liens and other claims of third parties.

Each application for payment, except the first, shall include a statutory declaration, in the current CCDC 9A form, up to the date of the application for payment, in a form approved by the Consultant. Each application for payment (including the first, the holdback upon Substantial Performance and final payments), shall also include:

1. A certificate, issued by an agency or firm providing workers' compensation insurance to the Contractor, verifying that coverage is in force at the time of making the application for payment, and that coverage will remain in force for at least sixty (60) days thereafter.

2. A declaration by the Contractor, verifying that the performance of the Work is in compliance with all applicable regulatory requirements respecting environmental protection, first safety, public safety and occupational health and safety.

3. A pre-approved schedule of values, supplied by the Contractor, for Divisions 1 through 14 of the Work, aggregating the total amount of the Contract Price.

4. A separate pre-approved schedule of values, supplied by each Subcontractor, for each of Division 15, 16, and 17 of the Work, aggregating the total amount of the Subcontract Price.

5. Invoices to support all claims against the cash allowance.

GC 5.3 PROGRESS PAYMENT

5.3.1.3 Delete subparagraph 5.3.1.3 in its entirety and substitute as follows:

The Owner shall make payment to the Contractor on account as provided in Article A-5 of the Agreement – PAYMENT no later than 20 calendar days after the date of a complete certificate of payment is issued by the Consultant.

Add new paragraph 5.3.2 as follows:

5.3.2 If the Contractor fails to provide all documentation as required by GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT, the Consultant or Owner shall be entitled to return the application for progress payment to the Contractor for completion. The 10 day review period by the Consultant and 20 day payment period by the Owner will commence upon receipt of a complete application for progress payment.

GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK

5.4.2 Delete paragraph 5.4.2 in its entirety and substitute the following:

The Consultant will review the Work to verify the validity of the application and shall promptly, and in any event, no later than 20 calendar days after receipt of the Contractor's complete deficiency list and application, the Consultant shall:

1. prepares a final deficiency list incorporating all items to be completed or corrected. Each item is to have an indicated value for correction or completion. Determination of
the value is defined in GC 5.10 - DEFICIENCY HOLDBACK. The final deficiency list complete with values is to be included with the Consultant's draft verification.

.2 having completed 5.4.2.1, the Consultant shall:
.1 advise the Contractor in writing that the Work or the designated portion of the Work is not substantially performed and give reasons why, or
.2 states the date of Substantial Performance of the Work in a certificate and issue a copy of that certificate to each the Owner and the Contractor.

5.4.3 Delete paragraph 5.4.3 in its entirety and substitute the following:

Following the issuance of the certificate of Substantial Performance of the Work, the following shall apply to completing the Work:

.1 Contractor is to complete the Work within sixty (60) calendar days.
.2 No payments will be processed between Substantial Performance of the Work and the completion of the Work.
.3 The Owner reserves the right to contract out any or all unfinished Work if it has not been completed within sixty (60) days of Substantial Performance of the Work without prejudice to any other right or remedy and without affecting the warranty period. The cost of completing the Work shall be deducted from the Contract Price.

Add new paragraphs 5.4.4, 5.4.5 and 5.4.6:

5.4.4 Within the time prescribed by the construction/builder's lien legislation in force at the Place of the Work, or where there is no legislation or no time prescribed, within a reasonable time of receiving a copy of the certificate of Substantial Performance of the Work signed by the Consultant, the Contractor shall take whatever steps are required to publish or post a signed copy of the certificate, as is required by such legislation. If the Contractor fails to comply with this provision, the Owner may take the required steps pursuant to the legislation and charge the Contractor for any costs so incurred.

5.4.5 Prior to submitting its written application for Substantial Performance of the Work, the Contractor shall submit to the Consultant all:
.1 guarantees;
.2 warranties;
.3 certificates;
.4 final testing and balancing reports;
.5 distribution system diagrams;
.6 spare parts;
.7 maintenance manuals;
.8 samples;
.9 reports and correspondence from authorities having jurisdiction in the Place of the Work;
.10 shop drawings;
.11 inspection certificates;
.12 marked-up as-built drawings from the construction trailer.

and other materials or documentation required to be submitted under the Contract, together with written proof acceptable to the Owner and the Consultant that the Work has been substantially performed in conformance with the requirements of municipal, governmental, and utility authorities having jurisdiction in the Place of the Work. The Consultant shall refuse to certify Substantial Performance of the Work if the submittals referred to in this paragraph 5.4.5 are
not provided by the Contractor. Alternatively a sum may be withheld pending the Consultant establishing a value for some or all of the remaining work to be completed from the list above.

5.4.6 The Contractor shall submit full and complete digital record or as-built drawings to the Consultant within forty-five (45) days of the issuance of the certificate of Substantial Performance of the Work and the Owner shall be at liberty to withhold, from amounts otherwise payable to the Contractor, an amount not to exceed one (1) percent of the Contract Price or approved value by the Consultant as security for the obligation of the Contractor to deliver such digital record or as built drawings.

GC 5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

5.5.1.1 Add to end of sentence “, and the application by the Contractor shall be accompanied by:

1. a certificate, issued by an agency or firm providing workers compensation insurance to the Contractor, verifying that coverage is in force at the time of making application for payment, and that coverage will remain in force for at least sixty (60) days thereafter; and,

2. a declaration by the Contractor, in a form approved by the Consultant, verifying performance of the Work in compliance with all applicable regulatory requirements respecting environmental protection, fire safety, public safety and occupational health and safety.”

Add new subparagraph 5.5.1.3 as follows

5.5.1.3 submit a statement that no written notices of liens have been received by it

5.5.3 Delete paragraph 5.5.3 in its entirety.

5.5.5 Delete paragraph 5.5.5 in its entirety.

GC 5.6 PROGRESSIVE RELEASE OF HOLDBACK

Delete GC 5.6 in its entirety.

GC 5.7 FINAL PAYMENT

5.7.1 Delete paragraph 5.7.1 in its entirety and substitute as follows:

When the Contractor considers that the Work is completed, as defined in the lien legislation applicable to the Place of the Work or if such definition does not exist, in accordance with other applicable legislation, industry practice or provisions which may be agreed to between the parties, the Contractor shall submit an application for final payment. The Contractor's application for final payment shall be accompanied by any documents or materials not yet delivered pursuant to paragraph 5.4.5, together with complete and final as-built drawings and:

1. the Contractor's written request for release of the deficiency holdback, including a statement that no written notices of lien have been received by it;

2. a Statutory Declaration CCDC 9A;

3. the evidence of workers' compensation compliance required by GC 5.2.2.1.
The Work shall be deemed not to be completed until all of the aforementioned documents have been delivered, and the Owner may withhold payment in respect of the delivery of any documents in an amount determined by the Consultant in accordance with the provisions of GC 5.8 - WITHHOLDING OF PAYMENT.

5.7.2 Delete from the first line of paragraph 5.7.2 the words, “calendar days” and substitute the words “Working Days”.

5.7.4 Delete from the second line of paragraph 5.7.4 the words, “5 calendar days after the issuance” and substitute the words “20 calendar days after receipt of”.

GC 5.10 DEFIICIENCY HOLDBACK

Add a new General Condition 5.10 - DEFIICIENCY HOLDBACK as follows:

5.10.1 Notwithstanding any provisions contained in the Contract Documents concerning certification and release of monies to the Contractor, the Owner reserves the right to establish a deficiency holdback, at the time of the review for Substantial Performance, based on a 200% dollar value of the deficiencies listed by the Consultant. No individual deficiency will be valued at less than two hundred dollars ($200.00) or the values based on the Consultant’s review. The Owner shall retain the entire deficiency holdback amount until completion of all of the deficiencies listed by the Consultant to the satisfaction of the Consultant.

GC 6.1 OWNER’S RIGHT TO MAKE CHANGES

Add new paragraphs 6.1.3, 6.1.4, 6.1.5, 6.1.6, and 6.1.7 as follows:

6.1.3 Labour costs shall be actual, prevailing rates at the Place of the Work paid to workers, plus statutory charges on labour including WSIB, unemployment insurance, Canada pension, vacation pay, hospitalization and medical insurance. The Contractor shall provide these rates, when requested by the Consultant, for review and/or agreement.

6.1.4 Quotations for changes to the Work shall be accompanied by itemized breakdowns together with detailed, substantiating quotations or cost vouchers from Subcontractors and Suppliers, submitted in a format acceptable to the Consultant and including any costs associated with extensions in Contract Time.

6.1.5 When both additions and deletions covering related Work or substitutions are involved in a change to the Work, payment, including Overhead and profit, shall be calculated on the basis of the net difference, if any, with respect to that change in the Work.

6.1.6 No extension to the Contract Time shall be granted for changes in the Work unless the Contractor can clearly demonstrate that such changes significantly alter the overall construction schedule submitted at the commencement of the Work. Extensions of Contract Time and all associated costs, if approved pursuant to GC 3.4.2, are to be included in the relevant Change Order.

6.1.7 When a change in the Work is proposed or required, the Contractor shall within 10 calendar days submit to the Consultant for review a claim for a change in Contract Price and/or Contract Time. Should 10 calendar days be insufficient to prepare the submission, the Contractor shall within 5 calendar days, advise the Consultant in writing of the proposed date of submission of the claim. Claims submitted after the dates prescribed herein will not be considered.
GC 6.2 CHANGE ORDER

6.2.1 Add after the last sentence in the paragraph:

The adjustment in the Contract Time and the Contract Price shall include an adjustment, if any, for delay or for the impact that the change in the Work has on the Work of the Contractor, and once such adjustment is made, the Contractor shall be precluded from making any further claims for delay or impact with respect to the change in the Work, except for unforeseen conditions that arise in the process of completion of the change in the Work.

Add new paragraph 6.2.3 6.2.4, 6.2.5 and 6.2.6 as follows

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

1. by estimate and acceptance of a lump sum;
2. by negotiated unit prices which include the Contractor's Overhead and profit, or;
3. by the actual cost to the Owner, such costs to be the actual cost after all credits included in the change have been deducted, plus the following ranges of mark-up on such costs:

   1. for Change Orders with a value of $0 to $25,000 the total Subcontractor/Supplier mark-up including Overhead and profit shall be 15% and the total Contractor mark-up including overhead and profit shall be 10%.

   2. For Change Orders in excess of $25,000, the portion in excess of $25,000 the Overhead and profit shall be half the rates stated above.

6.2.4 All quotations will be submitted in a complete manner listing:

1. quantity of each material,
2. unit cost of each material,
3. man hours involved,
4. cost per hour,
5. Subcontractor quotations submitted listing items 1 to 4 above and item 6 below.
6. mark-up

6.2.5 The Owner and the Consultant will not be responsible for delays to the Work resulting from late, incomplete or inadequately broken down valuations submitted by the Contractor.

6.2.6 Notwithstanding the foregoing, errors, inconsistencies, discrepancies and/or omissions shall not include lack of reference on the Drawings or in the Specifications to labour and/or Products that are required or normally recognized within respective trade practices as being necessary for the complete execution of the Work. The Contractor shall not use subsequent RFIs, issued during execution of the Work to establish a change and/or changes in the Work pursuant to Part 6 - CHANGES IN THE WORK. The contractor shall include the pricing for all work and all trades involved in the scope of the change.

GC 6.3 CHANGE DIRECTIVE

6.3.6.1 Amend paragraph 6.3.6.1 by deleting the final period and adding as follows:
.1 for Change Orders with a value of $0 to $25,000 the total Subcontractor/Supplier mark-up including Overhead and profit shall be 15% and the total Contractor mark-up including overhead and profit shall be 10%.

.2 For Change Orders in excess of $25,000, the portion in excess of $25,000 the Overhead and profit shall be half the rates stated above.

6.3.6.2 Delete paragraph 6.3.6.2 and replace it with the following:

If a change in the Work results in a net decrease in the Contract Price in excess of $25,000 the amount of the credit shall be the net cost, with deduction for Overhead and profit. If a change in the Work results in a net decrease in the Contract Price of $25,000 or less, the amount of the credit shall be the net cost, without deduction for Overhead or profit.

6.3.7.1 In subparagraph 6.3.7.1 insert “while directly engaged in the work attributable to the change” after the words ‘in the direct employ of the Contractor’.

6.3.7 At the end of paragraph 6.3.7 add the following:

All other costs attributable to the change in the Work including the costs of all administrative or supervisory personnel are included in Overhead and profit calculated in accordance with the provisions of paragraph 6.1.5 of GC6.1 - OWNER’S RIGHT TO MAKE CHANGES.

GC 6.5 DELAYS

6.5.3 Add 6.5.3.5 as follows:

If the Contractor is delayed in the performance of the work by an act of Force Majeure, then the Contract Time shall be extended for such reasonable time as the Consultant may recommend in consultation with the Contractor. The extension shall not be less than the time lost as a result of the event causing the delay, unless the Contractor agrees to a shorter extension. The Contractor shall not be entitled to payment for costs incurred by such delays result from the actions of the Owner.

GC 8.2 NEGOTIATION, MEDIATION AND ARBITRATION

8.2.1 Amend paragraph 8.2.1 by changing part of the second line from “shall appoint a Project Mediator” to “may appoint a Project Mediator, except that such an appointment shall only be made if both the Owner and the Contractor agree.”

8.2.4 Amend paragraph 8.2.4 by changing part of the second line from “the parties shall request the Project Mediator” to “and subject to paragraph 8.2.1 the parties may request the Project Mediator”.

8.2.6 Delete paragraphs 8.2.6 in its entirety and substitute with:

The dispute may be finally resolved by arbitration under the Rules for Arbitration of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing, provided that both the Contractor and the Owner agree. If the Contractor and the Owner agree to resolve the dispute by arbitration, the arbitration shall be conducted in the jurisdiction of the Place of the Work.

Delete paragraphs 8.2.7 and 8.2.8 in their entirety.
GC 9.1 PROTECTION OF WORK AND PROPERTY

9.1.1 Delete subparagraph 9.1.1.1 in its entirety and substitute the following:

errors in the Contract Documents which the Contractor could not have discovered applying the standard of care described in paragraph 3.14.1;

9.1.2 Delete paragraph 9.1.2 in its entirety and substitute as follows:
Before commencing any Work, the Contractor shall determine the locations of all underground or hidden utilities and structures indicated in or inferable from the Contract Documents, or that are inferable from an inspection of the Place of the Work exercising the degree of care and skill described in paragraph 3.14.1.
Add new paragraph 9.1.5 as follows:

9.1.5 With respect to any damage to which paragraphs 9.1.3 or 9.1.4 apply, the Contractor shall neither undertake to repair or replace any damage whatsoever to the work of other contractors, or to adjoining property, nor acknowledge that the same was caused or occasioned by the Contractor, without first consulting the Owner and receiving written instructions as to the course of action to be followed from either the Owner or the Consultant. Where, however, there is danger to life, the environment, or public safety, the Contractor shall take such emergency action as it deems necessary to remove the danger.

GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

Add a new subparagraph 9.2.5.5 as follows:

9.2.5.5 in addition to the steps described in subparagraph 9.2.5.3, take any further steps it deems necessary to mitigate or stabilize any conditions resulting from encountering toxic or hazardous substances or materials.

9.2.6 Add the following to paragraph 9.2.6, after the word "responsible" in the second line:

....or whether any toxic or hazardous substances or materials already at the Place of the Work (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the Contractor or anyone for whom the Contractor is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damages to the property of the Owner or others,........

9.2.8 Add the following to paragraph 9.2.8, after the word "responsible" in the second line:

....or whether any toxic or hazardous substances or materials already at the Place of the Work (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the Contractor or anyone for whom the Contractor is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damages to the property of the Owner or others,....

Add new paragraphs 9.2.10 as follows:

9.2.10 The Contractor, Subcontractors and Suppliers shall not bring on to the Place of the Work any toxic or hazardous substances and materials except as required in order to perform the Work. If such toxic or hazardous substances or materials are required, storage in quantities sufficient to allow
work to proceed to the end of any current work week only shall be permitted. All such toxic and hazardous materials and substances shall be handled and disposed of only in accordance with all laws and regulations that are applicable at the Place of the Work.

GC 9.4 CONSTRUCTION SAFETY

9.4.1 Delete paragraph 9.4.1 in its entirety and substitute as follows:

The Contractor shall be solely responsible for construction safety at the Place of the Work and for compliance with the rules, regulations, and practices required by the applicable construction health and safety legislation and shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Work.

Add new paragraphs 9.4.2 to 9.4.10 as follows:

9.4.2 Prior to the commencement of the Work, the Contractor shall submit to the Owner:

.1 the evidence of workers' compensation compliance required by GC 10.4.1;

.2 copies of the Contractor's insurance policies having application to the Project or certificates of insurance, at the option of the Owner;

.3 documentation setting out the Contractor's in-house safety programs;

.4 copies of any documentation or notices to be filed or delivered to the authorities having jurisdiction for the regulation of occupational health and safety at the Place of the Work.

9.4.3 The Contractor shall indemnify and save harmless the Owner, its agents, trustees, officers, directors, employees, consultants, successors, appointees, and assigns from and against the consequences of any and all safety infractions committed by the Contractor under the occupational health and safety legislation in force at the Place of the Work including the payment of legal fees and disbursements on a substantial indemnity basis.

9.4.4 The Owner undertakes to include in its contracts with other contractors and in its instructions to its own forces the requirement that the other contractor or its own forces, as the case may be, comply with the policies and procedures of and the directions and instructions from the Contractor with respect to occupational health and safety and related matters.

9.4.5 If the Owner is of the reasonable opinion that the Contractor has not taken such precautions as are necessary to ensure compliance with the requirements of paragraph 9.4.1, the Owner may take any remedial measures which it deems necessary, including stopping the performance of all or any portion of the Work, and the Owner may use its employees, the Contractor, any Subcontractor or any other contractors to perform such remedial measures.

9.4.6 The Contractor shall file any notices or any similar document required pursuant to the Contract or the safety regulations in force at the Place of the Work. This duty of the Contractor will be considered to be included in the Work and no separate payment therefore will be made to the Contractor.

9.4.7 Unless otherwise provided in the Contract Documents, the Contractor shall develop, maintain and supervise for the duration of the Work a comprehensive safety program that will effectively incorporate and implement all required safety precautions. The program shall, at a minimum, respond fully to the applicable safety regulations and general construction practices for the
safety of persons or property, including, without limitation, any general safety rules and regulations of the Owner and any workers’ compensation or occupational health and safety statutes or regulations in force at the Place of the Work.

9.4.8 The Contractor shall provide a copy of the safety program described in paragraph 9.4.7 hereof to the Consultant for delivery to the Owner prior to the commencement of the Work, and shall, ensure, as far as it is reasonably practical to do so, that every employer and worker performing work in respect of the Project complies with such program.

9.4.9 The Contractor shall arrange regular safety meetings, and shall supply and maintain, at its own expense, at its office or other well-known place at the job site, safety equipment necessary to protect the workers and general public against accident or injury as prescribed by the authorities having jurisdiction at the Place of the Work, including, without limitation, articles necessary for administering first-aid to any person and an emergency procedure for the immediate removal of any injured person to a hospital or a doctor’s care.

9.4.10 The Contractor shall promptly report in writing to the Owner and the Consultant all accidents of any sort arising out of or in connection with the performance of the Work, whether on or adjacent to the job site, giving full details and statement of witnesses. If death or serious injuries or damages are caused, the accident shall be promptly reported by the Contractor to the Owner and the Consultant by telephone or messenger in addition to any reporting required under the applicable safety regulations.

GC 10.1 TAXES AND DUTIES

10.1.2 Amend paragraph 10.1.2 by adding the following sentence to the end of the paragraph:

For greater certainty, the Contractor shall not be entitled to any mark-up for overhead or profit on any increase in such taxes and duties and the Owner shall not be entitled to any credit relating to mark-up for overhead or profit on any decrease in such taxes. The Contractor shall provide a detailed breakdown of additional taxes if requested by the Owner in a form satisfactory to the Owner.

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

10.2.5 Amend paragraph 10.2.5 by addition the words "Subject to paragraph 3.4" at the beginning of the paragraph. Add the following to the end of the second sentence:

......and no further Work on the affected components of the Contract shall proceed until these directives have been obtained by the Contractor from the Consultant.

Add new paragraph 10.2.8 as follows:

10.2.8 The Contractor shall furnish all certificates that are required or given by the appropriate governmental authorities as evidence that the Work as installed conforms with the laws and regulations of authorities having jurisdiction, including certificates of compliance for the Owner's occupancy or partial occupancy. The certificates are to be final certificates giving complete clearance of the Work, in the event that such governmental authorities furnish such certificates.
GC 10.4  WORKERS' COMPENSATION

10.4.1  Delete paragraph 10.4.1 and replace with the following:

Prior to commencing the Work, and with each and every application for payment thereafter, including the Contractor's application for payment of the holdback amount following Substantial Performance of the Work and again with the Contractor's application for final payment, the Contractor shall provide evidence of compliance with workers' compensation legislation in force at the Place of the Work, including payments due there under.
GC 11.1 INSURANCE

Delete paragraph 11.1.1.

Add new paragraph 11.1.9 and 11.1.10 as follows:

10.1.9 Wrap-Up Liability Insurance: Must be issued on an occurrence basis for an amount of no less than $5,000,000 per occurrence and $5,000,000 annual aggregate. Project specific to cover all sums which the insured shall become obligated to pay by reason of liability imposed by law for damages arising out of the insured’s operation in connection with the project. Such Insurance shall include, but not be limited to, bodily injury and property damage including, loss of use, broad form products, broad form completed operations, premises, property and operations, personal injury, blanket contractual liability, non-owned automobile, broad form property damage, owners and contractors protective, occurrence property damage, medical payments, employees as additional insured, contingent employers liability, cross liability and severability of internet clause.

11.1.10 ‘Wrap-up’ general liability insurance in the joint names of the Owner, the Contractor, the Consultant, The City of Ottawa, all Trade Contractors, all sub consultants, and all trade subcontractors with limits of not less than $5,000,000 per occurrence and a deductible not more than $10,000. The insurance coverage shall be primary to all other insurance policies and shall not be substantially less than the insurance provided by IBC Form 2100 (including an extension for a standard provincial and territorial form of non-owned automobile liability policy) and IBC Form 2320, except for liability arising from damage to the Project during construction, which shall be limited to the completed operations period. The insurance shall be maintained from the date of commencement of the Project until 90 calendar days after Substantial Performance of the Work. The policy is to provide coverage for completed operations hazards from the Substantial Performance of the Work for a period of 2 years. The Contractor shall then provide, maintain and pay for liability insurance coverage for completed operations hazards with limits of not less than $5,000,000 per occurrence and a deductible not more than $10,000 on an ongoing basis for a further period of 4 years.

GC 11.2 CONTRACT SECURITY

11.2.2 Delete paragraph after the word “provided” and replace with the following:

Such bonds shall be issued by a duly licensed surety company, which has been approved by the Owner, authorized to transact a business of suretyship in the province or territory of the Place of the Work and shall be maintained in good standing until the fulfilment of the Contract, including all warranty and maintenance periods set out in the Contract Documents.

Add new paragraph 11.2.3 as follows:

11.2.3 It is the intention of the parties that the performance bond shall be applicable to all of the Contractor's obligations in the Contract Document and, wherever a performance bond is provided with language which conflicts with this intention, it shall be deemed to be amended to comply. The Contractor represents and warrants to the Owner that it has provided its surety with a copy of the Contract Documents prior to the issuance of such bonds.

GC 12.1 INDEMNIFICATION

Delete General Condition 12.1 - INDEMNIFICATION in its entirety and substitute as follows:
12.1.1 The Contractor shall indemnify and hold harmless the Owner, its parent, subsidiaries and affiliates, their respective partners, trustees, officers, directors, agents and employees and the Consultant from and against any and all claims, liabilities, expenses, demands, losses, damages, actions, costs, suits, or proceedings (hereinafter called “claims”), whether in respect of claims suffered by the Owner or in respect of claims by third parties, that directly or indirectly arise out of, or are attributable to, the acts or omissions of the Contractor, its employees, agents, Subcontractors, Suppliers or any other persons for whom it is in law responsible (including, without limitation, claims that directly or indirectly arise out of, or are attributable to, loss of use or damage to the Work, the Owner’s property or equipment, the Contractor’s property or equipment or property adjacent to the Place of the Work or death or injury to the Contractor’s personnel).

12.1.2 The provisions of GC 12.1 - INDEMNIFICATION shall survive the termination of the Contract, howsoever caused and no payment or partial payment, no issuance of a final certificate of payment and no occupancy in whole or in part of the Work shall constitute a waiver or release of any of the provisions of GC 12.1.

GC 12.3 WARRANTY

12.3.2 Delete from the first line of paragraph 12.3.2 the word, “The” and substitute the words “Subject to paragraph 3.4.1, the...”

Add new paragraphs 12.3.7 to 12.3.11 as follows:

12.3.7 The Contractor shall provide a copy to the owner fully and properly completed and signed copies of all warranties and guarantees required by the Contract Documents containing the following:

.1 the proper name of the Owner;
.2 the proper name and address of the Project;
.3 the date the warranty commences, which shall be at the “date of Substantial Performance of the Work” unless otherwise agreed upon by the Consultant in writing.
.4 a clear definition of what is being warranted and/or guaranteed as required by the Contract Documents; and
.5 the signature and seal (if required by the governing law of the Contract) of the company issuing the warranty, countersigned by the Contractor.

12.3.9 The Contractor shall ensure that its Subcontractors are bound to the requirements of GC 12.3 - WARRANTY for the Subcontractor’s portion of the Work.

12.3.10 The Contractor shall ensure that all warranties, guarantees or other obligations for Work, services or Products performed or supplied by any Subcontractor, Supplier or other person in connection with the Work are obtained and available for the direct benefit of the Owner. In the alternative, the Contractor shall assign to the Owner all warranties, guarantees or other obligations for Work, services or Products performed or supplied by any Subcontractor, Supplier or other person in connection with the Work and such assignment shall be with the consent of the assigning party, where required by law, or by the terms of that party's contract. Such assignment shall be in addition to, and shall in no way limit, the warranty rights of the Owner under the Contract Documents.

12.3.11 The Contractor shall commence or correct any deficiency within 2 Working Days after receiving a notice from the Owner or the Consultant, and shall complete the Work as expeditiously as possible, except in the case where the deficiency prevents maintaining security or where basic
systems essential to the ongoing business of the Owner and/or its tenants cannot be maintained operational as designed. In those circumstances all necessary corrections and/or installations of temporary replacements shall be carried out immediately as an emergency service. Should the Contractor fail to provide this emergency service within 8 hours of a request being made during the normal business hours of the Contractor, the Owner is authorized, notwithstanding GC 3.1, to carry out all necessary repairs or replacements at the Contractor's expense.

PART 13 OTHER PROVISIONS

Add new Part 13 and 14 OTHER PROVISIONS as follows:

GC 13.1 OWNERSHIP OF MATERIALS

13.1.1 Unless otherwise specified, all materials existing at the Place of the Work at the time of execution of the Contract shall remain the property of the Owner. All Work and Products delivered to the Place of the Work by the Contractor shall be the property of the Owner. The Contractor shall remove all surplus or rejected materials as its property when notified in writing to do so by the Consultant.

GC 13.2 CONSTRUCTION LIENS

13.2.1 In the event that a claim for lien is registered against the Project by a Subcontractor, Sub-subcontractor or Supplier, and provided the Owner has paid all amounts properly owing under the Contract, the Contractor shall, at its own expense:

1. within 10 calendar days, ensure that any and all claims for lien and certificates of action are discharged, released, or vacated by the posting of security or otherwise; and

2. in the case of written notices of lien, ensure that such notices are withdrawn, in writing.

13.2.2 In the event that the Contractor fails to conform with the requirements of paragraph 13.2.1, the Owner may fulfil those requirements without Notice in Writing to the Contractor and set off and deduct from any amount owing to the Contractor, all costs and associated expenses, including the costs of posting security and all legal fees and disbursements associated with discharging or vacating the claim for lien or certificate of action and defending the action, unless caused by the owner. If there is no amount owing by the Owner to the Contractor, then the Contractor shall reimburse the Owner for all of the said costs and associated expenses.

13.2.3 Notwithstanding any other provision in the Contract, the Consultant shall not be obligated to issue a certificate and the Owner shall not be obligated to make payment to the Contractor if, at the time such certificate or payment was otherwise due:

1. a claim for lien has been registered against the Project lands, or

2. if the Owner or mortgagee of the Project lands has received written notice of a lien, or

3. the Owner or Consultant reasonably believe that any party has purported to retain title to Products or materials in respect of which an application for payment has been made.

13.2.4 Without limiting the foregoing, the Contractor shall, if requested by the Owner, defend, indemnify and save the Owner harmless from the amount of all such claims and the costs of defending any and all actions commenced against the Owner pursuant to the construction/builder's lien legislation in force at the Place of the Work, including the legal costs.
of the Owner, unless the lien was a direct result of a breach of the Contract by the Owner or the non-payment by the Owner of a valid charge or claim under the Contract.

13.2.5 GC 13.2 - CONSTRUCTION LIENS does not apply to construction/builder's liens claimed by the Contractor.

GC 14 CONFLICT OF INTEREST

14.1 The Contractor, all of the Subcontractors and Suppliers and any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall not engage in any activity or provide any services where such activity or the provision of such services creates a conflict of interest (actually or potentially, in the sole opinion of the Owner) with the provision of the Work pursuant to the Contract. The Contractor acknowledges and agrees that a conflict of interest, includes, but is not limited to, the use of Confidential Information where the Owner has not specifically authorized such use.

14.2 The Contractor shall disclose to the Owner, in writing, without delay, any actual or potential situation that may be reasonably interpreted as either a conflict of interest or a potential conflict of interest, including the retention of any Subcontractor or Supplier that is directly or indirectly affiliated with or related to the Contractor.

14.3 The Contractor covenants and agrees that it will not hire or retain the services of any employee or previous employee of the Owner where to do so constitutes a breach by such employee or previous employee of the Owner's conflict of interest policy, as it may be amended from time to time, until after completion of the Work under the Contract.

14.4 Notwithstanding paragraph 7.1.2 of GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, SUSPEND THE WORK OR TERMINATE THE CONTRACT, a breach of this Article by the Contractor, any of the Subcontractors, or any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall entitle the Owner to terminate the Contract, in addition to any other rights and remedies fails to comply with the requirements of the Contract, and if the Consultant has given a written statement to the Contractor that sufficient cause exists to justify such action, the Owner may notify the Contractor, in writing, that the Contractor is in default of the Contractor's contractual obligations and instruct the Contractor to correct the default in the five (5) Working Days immediately following the receipt of such notice that the Owner has in the Contract, in law, or in equity.

END OF AMENDMENTS TO CCDC 2 - 2008
1. Examination

.1 The Contractor and all Subcontractors shall familiarize themselves with conditions at the site. Each one shall bear complete responsibility for familiarization with conditions and the affect that same may have on Work.

.2 Every Subcontractor and the Contractor shall examine the Contract Documents, the conditions on site and the work in place prior to commencing the various portions of his Work.

.3 Each Subcontractor and the Contractor shall report in writing to the Consultant and the Contractor any defects affecting the work of that trade.

.4 Commencement of work shall be construed as evidence of acceptance of underlying surfaces, conditions, arrangement and location as satisfactory.

2. Supervision

.1 The overall superintendence of the project, ensuring the complete performance of all Subcontractors and Suppliers as laid down in the specifications, is the responsibility of the Contractor. A fully competent site superintendent acceptable to the Architect shall be in charge of the work at all times throughout the Contract. The Superintendent shall study the plans and specifications in detail and be completely familiar with the project at the outset. Once conversant with the documents, the Site Superintendent shall relate them to the existing conditions. Any errors or discrepancies in dimensions, details, etc., in the plans and specifications or their relationship to the existing conditions shall be reported to the Architect for clarification or correction before beginning the work. Allow Architect time for clarification or correction as required.

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

.3 Verify that all work as it proceeds is executed in accordance with dimensions and positions indicated, which maintain levels and clearances to adjacent work as set out by requirements of the drawings; and ensure that work installed in error is rectified before construction continues.

.4 Check and verify all dimensions referring to the work and the interfacing of all services. Verify with the trade concerned all dimensions pertaining to the work of other trades.
.5 Any errors, discrepancies, or trade conflicts arising during construction shall, when necessary, be referred to the Architect for clarification and/or decision. Allow Architect time for deliberation as required.

3. Cooperation and Coordination

.1 Coordinate all Subcontractors and Suppliers so that work proceeds smoothly without interruption and in strict accordance with approved schedules. Cooperation so that work is executed in proper sequence, items to be built-in are built-in on time, erected work is protected against damage from the work of other trades and defective work is removed and made good to the satisfaction of the Architect.

.2 Study all documents which describe, or are related to, any operation before commencement of that operation. Report discrepancies discovered between elements of documentation and obtain ruling on required interpretation before beginning work. Allow Architect time to make ruling as required.

.3 Ensure that material, equipment, services and operatives are brought to site at proper times, in sufficient quantity and quality and in accordance with requirements of work.

.4 Contractor shall ensure that each Subcontractor informs him of requirements for site conditions and surfaces necessary for the execution of the work and that he provides setting drawings, templates and all other information necessary for the location and installation of material, holes, sleeves, inserts, anchors, accessories, fastenings, connections and access panels. The Contractor shall inform other Subcontractors whose work is affected by these requirements and preparatory work.

.5 Contractor and Subcontractors shall cooperate fully with other contractors and subcontractors working on this project. Perform necessary coordination to install equipment supplied, or supplied, or supplied and installed by Owners.

.6 Remove and replace ceilings as required to accommodate the installation by other contractors of phone, data, security and other service lines in ceiling space.
4. Contractor's Use of Site

.1 Use of site: Exclusive and complete for execution of the Work and as otherwise noted or indicated.

.2 Confine operation, storage, access and parking to construction areas as indicated and directed. Coordinate and cooperate with users.

.3 Do not unreasonably encumber site with materials or equipment.

.4 Move stored products or equipment which interfere with operations of Owner or other contractors.

.5 Obtain and pay for use of additional storage or work areas needed for operations.

.6 Maintain project grounds and public properties free from accumulation of waste materials and rubbish.

.7 Maintain corridors and exits of occupied areas free from waste materials, rubbish, stored materials, plant and equipment during hours building is occupied.

.8 When school is student occupied, restrict vehicular movements and deliveries to at least 40 minutes before school start and at least 30 minutes after closing time. Vehicular movement and deliveries are not to occur during recess or lunch times.

.9 From 40 minutes before school start until 30 minutes after school closing, confine operations to "basic construction areas".

.10 After school is occupied schedule use of exceptionally noisy tools and equipment in cooperation with users.

.11 Limit vibration, impact and noise to levels which will not interfere with occupants normal use of existing building.

5. Documents Required

.1 Maintain at job site copies of contract drawings, specifications, addenda, regulatory authority approved drawings, permits and certificates, reviewed shop drawings, contemplated change orders, change orders, change directives, supplemental instructions, other modifications to Contract, field test reports, inspection reports, job minutes, approved schedule, manufacturers' installation and
application instructions, Material Safety Data Sheets, set of drawings for record drawings, OHS Act and regulations for construction projects.

.2 Provide, in a timely manner, copies of Consultants' site review reports, supplemental instructions and change orders to municipal building inspectors.

6. Job Meetings
   .1 Hold job meeting at times, frequency, and locations approved by Architect. Notify all parties concerned of meetings. Ensure Subcontractors attend.

   .2 Record minutes of meetings and distribute to Subcontractors, Owner and Consultants within three (3) Working Days of meeting.

7. Inspection, Tests and Approval
   .1 At least one (1) full working day's notice shall be given to the Architect in order that all inspections and tests called for by these specifications may be implemented. Failure to give such notice will result in complete retesting if deemed necessary by the Architect. No work shall be covered up until inspection and approval by the Architect or Inspector.

8. Building and Other Permits
   .1 The Building Permit will be applied, paid for and obtained by the Owner.

   .2 Provide Authorities with such plans and information as may be required for the issuance of Acceptance Certificates.

   .3 Obtain all Inspection Certificates required by Authorities having jurisdiction. Hand over copies of same to Architect.

   .4 Contractor shall obtain and pay for all other permits required for the Work.
9. Setting Out Lines and Levels

.1 Contractor shall confirm all elevations and/or dimensions of existing conditions on site and allow for same in tendering price.

.2 Employ qualified Ontario Land Surveyor to establish and layout in the field all grid lines, exterior wall and other main lines and levels, verify known geodetic elevation, establish bench marks or permanent monuments and correlate geodetic elevations with public utility elevations.

.3 Verify and record on the record drawings: elevations of footing, bearing surfaces, tops of footings, new services, existing utilities encountered; all related to finished floor elevation or geodetic elevations.

.4 Install substantial batter boards, lines, stakes, etc., as required during the progress of the work.

10. Cutting and Patching

.1 Execute cutting (including excavation), fitting and patching required to make the work fit properly together. Cut and patch for mechanical and electrical work.

.2 Coordinate work with other trades so that there is a minimum of cutting, fitting and patching.

.3 Drilling, cutting, fitting and patching and making good where necessary due to failure to deliver items to be built in time or installation in wrong location, shall be executed as directed at no cost to the Owner.

.4 Drilling and cutting of load bearing structural members shall be done on prior express written permission of the Architect for each instance.

.5 Cut holes accurately, with smooth, true, clean edges. Fit units to tolerances specified or shown or, if not noted, to best standard practice for applicable work. Patched work shall be invisible. Size holes and openings for pipes so as to allow for expansion and contraction of such pipes.

.6 Employ tradesmen skilled in the work and execute work to standards specified for that work on this project.
.7 Patch new work as required to maintain integrity of fire separations, ratings and assemblies. Patch new work as required to maintain air and moisture tightness of construction.

11. Overloading

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

.2 Be solely responsible and liable for resulting damages.

.3 Provide temporary supports to Consultant's approval.

.4 Do not place loads on concrete floors until they have obtained their 28 day design strength.

12. Concealment

.1 Conceal pipes, ducts, and wiring in floor, wall and ceiling construction except where indicated otherwise on architectural drawings.

.2 Install and arrange duct, piping, tubing, conduit, equipment and fixtures in such a way as to conserve headroom and space as much as possible, to provide minimal interference and to be neat, orderly and tidy. Unless otherwise noted, run pipe duct, tubing, conduit vertical, horizontal and square with building grid.

13. Location of Equipment and Fixtures

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Architect of impending installation and obtain his approval for actual location.
14. Coordination Drawings
   .1 Prepare coordination drawings of installation for efficient use of available space, for proper sequence of installation, and to resolve conflicts including at congested areas and where unforeseen conditions encountered. Show:
      .1 Relative portions of various components, services and equipment.
      .2 New and previously installed work.
   .2 Prepare for review prior to commencement of the work in area.
   .3 Submit in accordance with Section 01 30 00.

15. Inserts, Sleeves and Anchors
   .1 Provide all sleeves, inserts, anchors, hangers, supports, adhesives and the like necessary for execution of the work.
   .2 Co-ordinate work with other trades. Arrange and pay for installation of sleeves, inserts, anchors, etc. by appropriate trade.
   .3 Employ workmen skilled in the work and execute work to the standards specified for that work on the project.

16. Public and Private Utilities and Services
   .1 Verify limitations imposed on the Work by presence of public and private utilities and services (including wiring), and ensure no damage occurs to them.
   .2 Use licenced and insured underground services locating firms to locate all public and private underground services.
   .3 Notify service authorities concerned so that they protect, remove, relocate, or disconnect them as they may require.
   .4 Make arrangements and pay for connection charges for services required for the Work.
   .5 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
17. **Survey Pins**

.1 Property markers, iron pins and square iron pins, bars, etc., disturbed or lost in the course of construction shall be replaced by an Ontario Land Surveyor at no cost to the Owner.

18. **Rubbish**

.1 Do not burn or bury rubbish and work materials on site.

.2 Dispose of rubbish and surplus material off site.

.3 Do not dispose of volatile or corrosive materials in sewers and drains.

.4 Dispose of waste in a manner not detrimental to public, private or Owner's property, or to any portion of the Work completed or under construction.

.5 Remove sediments, suspended solids, pollutants or other materials which would degrade or impair water or soil quality before disposing of waste water.

.6 Except as otherwise noted, materials indicated for removal become the Contractor's property and shall be taken from the site.

.7 Dispose of rubbish and waste in accordance with governing regulations.

19. **Recycling**

.1 In accordance with Ontario Regulation 102/94;
   .1 Conduct a solid Waste Audit before construction begins;
   .2 Prepare a solid Waste Reduction Workplan and post summary visible to all workers.

.2 In accordance with Ontario Regulation 103/94:
   .1 Establish Source Separation Programs to collect, handle and store;
   - brick, concrete block and concrete
   - corrugated cardboard
   - wood
   - drywall
   - steel
2. Ensure;
   - use of programme
   - that materials are recycled
   - that workers are instructed on how to source separate, what is to be collected, and in what form materials will be collected.

3. Submit record copy of solid Waste Reduction Workplan to Consultant within 21 days of Contract award.

20. Occupancy Permit
    1. Prior to Owner's occupancy of the Work, or part of the Work, apply, pay for, obtain and submit to the Owner Temporary Occupancy Permits as required by the phasing of the Work.
    
2. Prior to Substantial Performance, obtain and submit to the Owner an Occupancy Permit for the Work.

3. All fire alarm systems, sprinklers, emergency light, power systems, fire separation assemblies and closures, barrier-free facilities, as well as other items required by the Authorities having jurisdiction shall be provided, operating satisfactorily, certified and licensed prior to any occupancy.

4. Fire alarm system to be fully operational 3 weeks prior to scheduled occupancy.

21. Schedule
    1. Work may commence on 28 June 2014 and must be completed by 26 August 2014.

2. Occupancy:
   1. School will be occupied by students up to and including 27 June 2014.
   2. School will be re-occupied by teaching staff on 26 August 2014.
   3. School will be re-occupied by students on 2 September 2014.

3. Occupancy hours by students: Start 9:10am, Close 3:40pm.

4. Bus arrival and departure times:
   1. 8:55am
   3:35pm to 3:50pm
.5 Summer Hours of Work: Except for Statutory Holidays, existing building will be open weekdays, 7:00am to 6:00pm.

22. Smoking

.1 Smoking is not permitted on Owner’s property.

END OF SECTION
1. General

   .1 Inclusion of Allowances in Tender Price is not to be construed as implying that any or all the Allowances will be expended.

2. Inspection and Testing Allowance

   .1 Inspection and testing will be carried out under cash allowances in Inspection and Testing Allowance. Inspection services invoices will be paid by Owner directly and the costs assigned to this allowance.

   .2 Inspection and Testing Allowance cover only net cost for inspection and testing services provided by independent testing companies. Include in Contract Price all costs associated with testing services, including provision of materials, coordinating assistance, overhead and profit, and other costs listed in Para. 3.3 governing Cash Allowances.

   .3 Refer to Section 01 45 00, Quality Control and the following sections of the specifications for further details:

       .1 Division 03 Concrete Tests

   .4 Include the following testing and Inspection Allowance:

       $ 5,000.00.

   .5 Include the following Construction Contingency Allowance:

       $ 20,000.00.

END OF SECTION
1.
   General

.1 Base the Work of this Contract and the Contract Price upon using new materials and products specified.

.2 Where materials and products are specified only by reference to standards, provide any material or product which meets the standard.

.3 Products specified by their proprietary names or by part or catalogue number shall form the basis for the Work. No substitutes for these may be used without the Consultant's approval in writing.

.4 Where a material or product is specified by naming two or more acceptable materials or proprietary products, provide any one of the specified materials or products. If compliance with a referenced standard is also specified, the material or product selected shall meet the standard.

.5 Substitutions will be considered only when submitted in sufficient time to permit proper investigation by the Consultant, and under the conditions specified herein.

.6 There is no obligation on the part of the Consultant of Owner to review or accept proposed substitutions.

.7 Materials and products specified without a "or other approved manufacturer" or a "or approved equal" clause, following the name of the specified material or product, shall be provided without request for substitution.

.8 Where the specifications include a "or other approved manufacture" or "or approved equal" clause, substitutions proposed with tender submission or after award of Contract will be considered only under the following conditions:
   .1 if the materials and products specified are not available; or
   .2 if substitute materials and products to those specified, which are brought to the attention of and considered by the Consultant as equivalent to those specified, will result in a credit to the Contract Price; or
   .3 if substitute materials and products to those specified, which are brought to the attention of and considered by the Consultant as superior to those specified, will not increase the Contract Price; or
   .4 if substitute materials and products to those specified will not substitute a product manufactured outside Canada for a Canadian made product; or
.5 if a material or product is specified together with a requirement for performance and, in the opinion of the Contractor, the specified material or product will not produce the required results; or

.6 when a substitution is otherwise advantageous to the Owner or to the execution of the Work, as determined by the Consultant.

.9 Substitutions proposed shall comply with the following requirements:

.1 When proposing substitutions, submit with each application the material and product names and complete specifications substantiating compliance of the proposed substitution with the requirements of the Contract Documents including:

.2 detailed, item-by-item comparison between the properties and characteristics of the specified material or product and the proposed substitution;

.3 manufacturer's name, address and telephone number;

.4 manufacturer's literature;

.5 performance, technical and test data;

.6 reference standards;

.7 product limitations;

.8 samples;

.9 list of existing installations;

.10 changes to the Contract Time;

.11 changes to the Contract Price.

2. Should the proposed substitution be accepted either in part or in whole, the Contractor assumes full responsibility when the substitution affects any other part of the Work.

.3 When proposing substitutions, satisfy all design conditions and other specified requirements. Properties including but not limited to the following, as applicable, will be considered:

.1 physical dimension requirements to satisfy the space limitations;

.2 static and dynamic weight limitations;

.3 structural properties;

.4 audible noise levels;

.5 vibration generation;

.6 interchangeability of parts or components;

.7 accessibility for maintenance;

.8 possible removal or replacement;

.9 colours and textures;

.10 compatibility with other materials, products, assemblies and components.
10. Ensure that substitutions are accommodated by space allotted for the specified materials, products, methods or processes.

11. Be responsible for the cost of changes in the work of all trades necessitated by the use of proposed substitutions.

12. Be responsible for substitutions to methods or processes concerning such work, and ensure that the warranty covering all parts of the Work is not affected.

13. Substitutions shown on shop drawings which have not been accepted through the process described in this Section will be rejected whether shop drawings have been reviewed or not.

14. Substitutions which require changes to the Contract Documents will not be considered unless agreement exists between the Owner and the Consultant to compensate the Consultant for costs required to execute such changes.

15. Materials, appliances, equipment and other products are sometimes specified by reference to brand names, propriety names, trademarks or catalogue number or catalogue designation or symbols. In such cases, the name of manufacturer, distributor, supplier or a dealer is sometimes given to assist the Contractor to find a source of supply. The naming of a source of supply does not relieve the Contractor from their responsibility for finding his own source of supply even if the source named no longer supplies the product specified. If the Contractor is unable to obtain the specified product, he/she shall supply a substitute product of equal to or better than the specified product, as acceptable to the Consultant, with no extra compensation. Should the Contractor be unable to obtain a substitute product equal to or superior than the specified product and the Owner accepts an inferior product, the Contract Price shall be adjusted accordingly, as acceptable to the Consultant.

2. Substitutions for Code Requirements

1. Ensure that proposed substitutions for materials, products, methods and processes meet the requirements of the applicable building code and other requirements of authorities having jurisdiction.
.2 Ensure that proposed substitute materials, products, methods and processes do not negate the compliance of adjacent materials, products and constructions with the requirements of the applicable building code and other requirements of authorities having jurisdiction, to which the proposed substitutions may be applied or attached.

.3 Obtain written approval of proposed substitutions from the authority having jurisdiction and submit the approval with the proposed substitution for the Consultant's consideration.

3. Credits Arising from Substitutions

.1 Credits arising from accepted substitutions will be credited to the Contract in such sums as may be agreed upon between the Owner and the Contractor after being assessed by the Consultant, and the Contract Price will be adjusted accordingly. No substitutions will be permitted without the prior written approval of the Consultant.

4. Mechanical-Electrical Manufacturers

.1 If materials or apparatus manufactured and/or supplied by a manufacturer is other than the manufacturer upon which the design is based, ensure that the other material or apparatus is equivalent in performance and operating characteristics to the materials or apparatus upon which the design is based, and pay costs for larger starters, additional space, larger power feeders and changes to associated or adjacent work. In addition, in mechanical and electrical rooms where the apparatus is used in lieu of apparatus upon which the design is based and the dimensions differ from the apparatus upon which the design is based, prepare and submit for approval, accurately dimensioned layouts of rooms affected.

END OF SECTION
1. General

.1 Refer to General Conditions and Supplementary Conditions for additional contractual information concerning submittals.

.2 Refer to individual sections of specifications, Division 02 to 31, for detailed information on submittal requirements.

.3 Schedule submissions at least two (2) weeks before dates reviewed submission will be needed.

.4 Do not proceed with work until relevant submissions are reviewed.

.5 Submittals which have not been requested will be returned to the Contractor with no action taken by the Consultant. Submittals to which the Consultant's standard "Received" stamp is affixed have not been reviewed by the Consultant.

2. Identification of Submittals

.1 Identify each submittal made with project, Owner's, Architect's, Contractor's, Subcontractor's and Supplier's name. Indicate origin and intended use in work. Submittal to be accompanied by transmittal letter recording the above information. Samples to be permanently identified with the same information.

3. Documentation Required Before Construction Start

.1 Insurance Forms

.2 Performance Bond and Labour & Material Payment Bond as called for.

.3 WSIB Clearance Certificate.

.4 Names and C.V.'s of proposed Superintendent and Project Manager for Owner's review.

4. Statutory Declaration

.1 Submit, with second and each subsequent application for payment a Statutory Declaration on the applicable CCDC 9-2001 form.
5. WSIB Clearance Certificates
   .1 Submit with each monthly progress claim, Workplace Safety and Insurance Board Clearance Certificate.
   .2 Should the successful tenderer be registered as a Schedule 2 employer under the Workplace Safety and Insurance Act, the successful bidder shall provide written confirmation from the Workplace Safety and Insurance Board that it has complied with the requirements of the Workplace Safety and Insurance Act and that it is in good standing with the Workplace Safety and Insurance Board. The successful tenderer is required to notify the Board of any material change in circumstances in connection with their obligations under the Act within ten days after the material change occurs.

6. Construction Schedule
   .1 Within fourteen (14) days of authorization to proceed, submit six (6) copies of proposed construction schedule for Architect's approval.
   .2 Schedule shall be in a format acceptable to the Architect and the Owner. Show clearly proposed progress of all main items. Indicate each trade or operation separately. Order chronologically for beginning of each item of work. Identify first workday of each week. Identify critical sequence of work.
   .3 Include or show separately shop drawing review, decision dates for allowances, fabrication and delivery lead time. Show dates for beginning and completion of each element of construction including subtrade work, concrete placement, equipment installation and testing.
   .4 Include or show separately delivery dates for equipment and materials which have a critical delivery period.
   .5 Identify work of separate blocks or phases, or other logically grouped activities. Show projected percentage of completion for each item of work at least as frequently as of 1st and 15th day of each month.
   .6 Predicate schedule on basis of Substantial Performance prior to date stated in agreement.
.7 Provide commissioning schedule (including start up) for all mechanical and electrical systems, prior to Substantial Performance.

.8 Revise or elaborate on schedule if requested by Architect and submit 6 copies of approved schedule for distribution to Owner.

.9 Revise and update schedule weekly during construction, and provide copy of updated schedule to the Architect and Owner weekly.

7. Schedule of Values

.1 Conform to GC 5.2 and relevant Supplementary Conditions.

.2 Itemize separately: individual sections of specifications, different phases of the work, bonds, permits, mobilization, field supervision and layout, temporary facilities and controls, major equipment, material costs delivered, installation costs, each allowance, clean up, maintenance manuals, record drawings hand over and commissioning.

.3 Submit for approval of Owner and consultant at least fourteen days prior to first application for payment.

8. Shop Drawings & Product Data

.1 Submit shop drawings for Architect's review in accordance with GC-3.10.

.2 For non-custom items of equipment manufacturer's publications or catalogue excerpts are acceptable if suitably annotated in ink.

.3 For line drawings maximum 11 x 17 size, submit one (1) copy only; otherwise submit maximum two (2) copies of which one copy shall be unfolded and reproducible.

.4 E-mailed submissions are acceptable.

.5 Shop drawings shall be dated and contain name of project, description or names of material and items and complete identification of locations of which materials are to be installed.

.6 Accompany shop drawings by transmittal letter containing project name, Contractor's name, number of drawings, titles, description of drawings, and other pertinent data.
.7 Shop drawings submitted which have not been thoroughly reviewed, coordinated, stamped, dated and signed by a responsible person in Contractor's office will be returned without review for resubmittal.

.8 Present submittals in SI metric units; if not produced in metric convert all values.

.9 Individual submissions will not be reviewed until all related information is available. Incomplete submission will be rejected and returned to Contractor and Contractor may be charged for Consultant's time and expense involved.

.10 Show in complete detail, items to be provided and their relation to structure or area in which they are to be installed. Note related items not intended to be supplied as part of the Work of the trade concerned. Clearly note all dimensions and detail methods of fastening.

.11 Delete product data information not relevant to project.

.12 Supplement standard information to provide details applicable to project.


9. Samples

.1 Submit samples requested in various sections of specification and as may be reasonably required by Architect.

.2 Submit samples of adequate size and range of colours or textures to represent material in intended use on project.

.3 Unless the precise colour and pattern is specifically described in the Contract Documents, wherever a choice of colour or pattern is available in a specified product, submit accurate colour and pattern charts to the Architect for selection.

.4 Material used on project shall match approved samples for quality, colour and texture, finish and performance. Do not proceed with work until samples are approved.

10. Mock-Ups

.1 Mock-Up: Field erected example of work complete with specified materials and workmanship.
.2 Provide mock-ups requested in various sections of specifications and as may be reasonably required by the Consultant.

.3 Erect mock-ups at locations acceptable to Consultant.

.4 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be verified.

11. Record Drawings

.1 Maintain Contract Drawings at site office for record purposes. Record accurately deviations from Contract Documents caused by site conditions, change orders, site instructions, and addenda. Mark in red ink.

.2 Include depth of various elements of foundation, horizontal and vertical location of new, maintained, rerouted and abandoned underground utilities and of utilities concealed in construction. All unseen or hidden components must be located by dimension.

.3 Ensure that drawings are updated weekly and in good condition at all times.

.4 Submit record drawings to Architect just prior to Substantial Completion.

.5 Consult Divisions 21 to 48 for other particular requirements.

12. Progress Reports

.1 Contractor shall prepare daily reports of his operations. Daily report shall contain at least the following information:
   - weather conditions
   - manpower on the job in each trade
   - major items of equipment on the job
   - a brief summary of work accomplished that day
   - materials, equipment, or owner-furnished items arriving or leaving site
   - inspection reports
   - significant events
   - any tests made and their final results, if known
   - any oral instructions received
   - visitors to the job
.2 Contractor shall maintain a file of copies of all daily reports on the site and make it available to Consultant or Owner upon request.

13.
Manuals of Instruction and Maintenance

.1 Prior to substantial performance inspection, submit to Architect three (3) copies in English of Instruction and Maintenance Manuals as follows:
.1 Bind data in 8½" x 11", vinyl covered three-ring loose-leaf binders.
.2 Enclose title sheet, labelled "Instruction and Maintenance Manual" with project name, list of contents, date and names of Owner, Architect, and Contractor.
.3 Organize contents into applicable sections of work to parallel project specification breakdown. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.

.2 Neatly type lists and notes. Use clear drawings, diagrams or manufacturer's literature.

.3 Contents:
.1 As called for in individual sections of these specifications.
.2 Maintenance instructions for exterior and interior floor, wall, and ceiling surfaces as well as all installed fittings as printed by manufacturer.
.3 Operating and maintenance instructions for mechanical and electrical equipment called for in Division 21 and 28, bound separately.
.4 Colour schedule; hardware schedule.
.5 Copies of all guarantees and warranties.
.6 Complete set of final approved shop drawings, bound separately, indicating corrections and changes made during fabrication and installation.
.7 Names, addresses, and phone numbers of Subcontractors and suppliers.
.8 WHMIS Manual described in Section 01 59 00.

14.
Maintenance Materials

.1 Turn over materials and spare parts called for in various sections of specifications to Owner's authorized representative and obtain receipt. Submit receipt to Architect.
.2 Submit materials in unbroken cartons or if not available in cartons, strongly packed. Identify colour, room number, unit number or area materials used.

.3 Provide tools with identifying tag reference. Identify equipment or system for which tools are applicable and provide instructions for use.

.4 Identify spare parts with part number, equipment or system for which parts are applicable. Provide installation instructions and name of supplier.

15.
Documents Required
Before Substantial Performance

.1 Documents required prior to Substantial Performance include:
   .1 Record Drawings.
   .2 Manuals of Instruction and Maintenance including:
      .1 Warranties.
      .2 Final approved shop drawings.
      .3 Schedules.
      .4 WHMIS Manual.

END OF SECTION
1. **General**
   Specific testing & inspection requirements are outlined in various sections of specifications.

2. **Appointment**
   Owner shall appoint an independent testing company or companies to conduct tests and/or perform inspections of materials and workmanship under this contract.

3. **Other Testing**
   Where no testing requirements are specified but Owner decides that testing is required, Owner reserves right to have such testing or inspections performed.
   
   
   Payment for extra testing requested by Owner shall be an addition to the Contract as outlined in GC6, Changes in the Work.

4. **Scheduling**
   Notify Architect at outset of project of requirements for testing services so that requisite testing and inspection activities can be coordinated into work on schedule.

5. **Notification**
   Notify Architect two weeks in advance of date when the first work will be ready for inspection.
   
   Notify testing company at least 24 hours before such inspection or test is required.
   
   When testing laboratory is ready to test according to the above notification, but is prevented from testing or taking specimens due to incompleteness of work, all extra costs for testing attributable to the delay shall be deducted by Owner from Contract Price.

6. **Cooperation**
   Provide representatives of testing company with access to work at all times. Permit testing laboratory to take materials and specimens required for testing and assist as requested. Deliver samples of material to testing company as specified.
   
   Make good work disturbed by inspection and test.
7. Reports
   .1 Testing company shall promptly issue test reports simultaneously and directly to Contractor (1 copy), Owner (1 copy), Architect (1 copy), Engineer (1 copy).

8. Failure to Meet Requirements
   .1 Non-compliance: When initial tests indicate non-compliance with contract documents, costs of initial test associated with non-compliance shall be deducted by Owner from Contract Price.

   .2 Re-testing: When initial tests indicate non-compliance with the contract documents, all subsequent re-testing occasioned by non-compliance shall be performed by same testing company and costs thereof deducted by Owner from Contract Price.

9. Contractual Responsibility
   .1 Review of construction by the Consultant and inspection and testing by an independent Inspection and Testing Agency, are precautions against oversight or error. They do not relieve Contractor of his contractual responsibilities. Review, inspection, and testing, are based on representative samples of the work and do not relieve the Contractor from carrying out his own quality control and for completing all work in accordance with contract documents.

   .2 Costs for uncovering and making good work that is covered before required inspection or testing is completed and approved, are the Contractor's responsibility.

   .3 Contractor shall furnish all labour and facilities and be responsible for:
      .1 Inspection and testing required by laws, ordinances, rules, regulations or order of public authority.
      .2 Inspection and testing performed exclusively for Contractor's convenience.
      .3 Testing, adjustment and balancing of conveying mechanical and electrical equipment and systems.
      .4 Mill tests and certificates of compliance.
      .5 Tests specified to be carried out by the Contractor.

END OF SECTION
1. Construction Offices
   .1 Provide weather tight office to accommodate construction meetings, drawing lay-down table, drawing storage rack, filing cabinet, and first aid equipment, coat hooks, meeting table and chairs.
   .2 Provide and pay for adequate heat, light and ventilation.
   .3 Keep clean and orderly. Do not use for storage of construction materials.
   .4 Make available for use by Owner and Consultants at all times.

2. Storage Sheds
   .1 Provide and maintain, in approved locations on site, temporary offices and sheds for storage of materials, tools and equipment. Construct temporary buildings with raised floors, weatherproof, of neat appearance and subject to Architect's approval.
   .2 Store materials and equipment in areas on site designated by Architect.
   .3 Do not use space within existing building to store combustible or flammable materials.

3. Sanitary Facilities
   .1 Provide temporary lavatory accommodation and sanitary conveniences, in accordance with Provincial and Municipal regulations, for use of all workers. Keep clean.

4. Hoarding
   .1 Provide temporary hoarding or fencing wherever required by applicable codes, by-laws and as shown on drawings.
   .2 Construct fencing/hoarding and other protection at least to municipal and provincial standards.
   .3 The work site shall be enclosed by means of 2.1m height steel mesh fencing. The fence shall have suitable means of entry from the road for trucks carrying supplies. Maintain the fences in good condition until the completion of the project and remove when instructed by the Architect. The erection of the snow fence in no way relieves the Contractor from the responsibility of complying with ordinances and by-laws of the Municipality or local authorities.
5. **Enclosure**

1. Provide temporary enclosures as required by construction operations and to ensure continuous execution of the Work.

2. Provide temporary weathertight enclosures and protection for exterior openings until permanent exterior doors, windows and roof closures are installed.

3. Design enclosures to withstand wind pressure.

6. **Services**

1. Provide and pay for all temporary power, lighting, water supply for use of all trades as required to perform the Work.

7. **Service Shut Downs**

1. Give the Consultant and Owner two (2) Working Days notice related to each pre-scheduled interruption of any mechanical or electrical service throughout the course of the Work. Schedule new interruptions so as to provide Owner with 5 Working Days notice. Keep duration of these interruptions to a minimum.

2. Notify the Consultant, Owner and utility companies of intended interruption of services, obtain requisite permission.

3. Where unknown services are encountered, immediately advise Consultant, confirm findings in writing and await instructions.

8. **Power and Lighting**

1. Provide and pay for all temporary power and lighting for use of trades as required to perform the work except as otherwise permitted.

2. Pay for all permits and/or installation costs and make necessary arrangements.

3. Electrical power and lighting systems installed under this Contract may be used for construction requirements provided that guarantees are not affected thereby. Make good damage. Replace lamps which have been used over a period of 3 months.
9. **Water Supply**

Existing water supply system may be used for construction requirements. Make good any damage.

10. **Heating and Ventilating**

Provide and pay for temporary ventilation required during construction, including costs of installation, fuel, operating, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted unless prior approval is given by Architect.

Provide and pay for temporary heat required to ensure ground below footings construction is not and will not become frozen and to ensure ground is and continues unfrozen under interior concrete slabs.

Furnish and install temporary heat and ventilation in enclosed areas as required to:

1. Facilitate progress of work.
2. Protect work and products against dampness and cold.
3. Prevent moisture condensation on surfaces.
4. Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
5. Provide adequate ventilation to meet health regulations for safe working environment.

Maintain minimum temperature of 10°C or higher where specified, as soon as finishing work is commenced and maintain until Substantial Performance.

**Ventilating:**

1. Prevent hazardous accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
2. Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
3. Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
4. Ventilate storage spaces containing hazardous or volatile materials.
5. Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements.

Maintain strict supervision of operation of temporary heating and ventilating equipment.

1. Enforce conformance with applicable codes and standards.
2. Enforce safe practices.
3. Prevent abuse of services.
.4 Prevent damage to finishes
.5 Vent direct-fired combustion units to outside.

.7 Permanent heating systems may be used on the written approval of Owner, engineer, and Architect, and provided provisions relating to guarantee, operation, and maintenance are satisfactory to the Owner and Architect.

.8 Activate permanent heating system under direction of Engineer to provide temporary heat after taking precautions to assure proper operation of system.

.9 Protect existing and new duct systems with filters at all times; replace as necessary. Finally, vacuum clean entire duct system in addition and renovated areas, and renew filters.

11. Streets and Traffic

.1 Provide all necessary flagmen, detour signs, warning lights, signs and barricades, necessary to direct and protect pedestrian and vehicular traffic during the work.

.2 Remove mud and clay from vehicles leaving site. Provide dust controls on site.

.3 Provide dust control to meet municipal regulations.

12. Access

.1 Provide and maintain adequate access to project site.

.2 Supplement municipal and school board snow clearing operations as required to keep access and work areas and adjacent walkways free of snow and ice.

13. Access to Site When Student Occupied

.1 After occupancy of the building by the Owner, vehicular access to the site, including the construction area, must conform to the following:
.1.1 Clearance must be obtained from the school Principal or designate before gaining vehicular access during the hours in which the site is occupied by students. Access immediately before or after school, during opening or dismissal periods and during recess or lunch periods is prohibited.
.2 Should permission be granted to access site during those particular times in which the playgrounds and general exterior premises are occupied by students, the vehicle must be accompanied by an adult who will walk with the vehicle to its required destination.
.3 All vehicles must exercise extreme care when frequenting any Board properties, in particular, any areas near or adjacent to playgrounds during school hours.

.2 Access to occupied school must conform to the following:
.1 As a matter of courtesy, all contractors, suppliers, service or trades personnel entering occupied areas of the school must advise the School Building Superintendent of the scope, progress and completion of his particular work.
2. Work in occupied areas must be scheduled through the General Contractor and Owner’s Facilities Department, who, in consultation with the Principal, will arrange for appropriate access, scheduling and safety measures.

14.
Drainage

.1 Provide temporary drainage and pumping as necessary to keep excavations, project site and adjacent properties free from water at all times.

.2 Protect open excavations against flooding and damage due to surface run-off.

.3 Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction.

.4 Use Best Management Practices including flocculation tanks, settling basins, or other treatment facilities as required to remove sediments, suspended solids, pollutants, or other materials which would degrade or impair water quality before discharging to storm sewers, water courses or drainage areas. Monitor regularly to ensure effectiveness at methods and compliance with Provincial/Federal Legislation pertaining to water quality and habitat.

15.
Shutdown

.1 Should work be stopped for any cause, provide protection for work, and all necessary cold weather heating during the work stoppage.
16. Pollution Control
   .1 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
   .2 Use methods and/or additional operators required to conform with local bylaws including those governing noise, dust, debris, and lights.

17. Fire Protection
   .1 Provide and maintain temporary fire extinguishing equipment until Owner's extinguishing equipment is in place.
   .2 Keep all fire hydrants free of obstructions of all kinds.
   .3 Maintain fire protection systems in operation at all times except for local area being worked on. Keep fire hose cabinets free of obstructions of all kinds.
   .4 Organize work to maintain required fire exit paths in safe condition.
   .5 Keep fire routes clear for emergency access. Keep clear of snow and obstructions. Do not store materials nor park vehicles in fire routes.
   .6 Relocate or cover combustible materials in the vicinity during welding, cutting, or other hot work including foam plastic insulation in walls and roofs.
   .7 Conform to Owner's requirements for Hot Work Permits.

18. Roofing Protection
   .1 Provide and maintain protection from anything that may damage or be detrimental to the waterproofing qualities of the various membranes. Include protection from construction work such as falling objects, wheel and foot traffic, failure to remove debris, scaffolding, hoisting equipment.
   .2 Minimum Protection: 6mm waferboard over 25mm Type 1 polystyrene over 6 mil polyethylene.
19. Relocations of Furnishings

.1 Shift furnishings in rooms requiring alterations incidental to functioning of such rooms.

.2 Where Owner's furnishings are required to be relocated from rooms to be altered, give Owner written notice minimum two (2) weeks prior to commencement of work.

20. Protection

.1 Protect all adjacent construction to remain from damage arising out of the performance of the work.

.2 Cover and protect furnishings which are to remain in rooms being worked on, against dust, debris, and damage.

.3 Be responsible for damage incurred.

21. Construction Screens

.1 As the work progresses erect temporary enclosures to divide off areas of finishing work from other areas. Enclosures to be neatly constructed and dust tight.

.2 Take all necessary means to prevent transmission of dust and dirt from construction to occupied areas.

22. Protection of Off-Site and Public Property

.1 Protect surrounding private and public property from damage during performance of work.

.2 Be responsible for damage incurred.

23. Removal of Temporary Facilities

.1 Remove all temporary facilities from site when directed by Architect.

.2 Repair or replace items damaged by temporary facilities to Architect's approval.
24. 
Security

.1 Ensure equipment material and construction on site are protected from theft and vandalism. Provide site security to ensure no delay in the completion of the work, and no additional costs are incurred by Owner as a result of such theft or vandalism.

.2 Owner will not accept responsibility for any construction equipment or materials that are stolen or vandalized.

.3 Be responsible for theft from areas under construction.

.4 Ensure security of existing building is not jeopardized by construction operations. Protect all openings in exterior walls under Contractor's control against unauthorized entry.

25. 
Tree Protection

.1 Prior to commencement of other work on site, protect trees and plants within fenced construction area which are to remain.

.2 Encircle trees beyond dripline with snow fence.

.3 When snow fence must be removed to do work immediately adjacent to trees, first wrap in burlap trees and shrubs adjacent to construction work, storage areas and trucking lanes and encase with protective wood framework from grade to 2m height.

.4 Route traffic and construction operations away from overhanging branches. Do not dump or store materials over root zones.

.5 Protect roots of designated trees to drip line during excavation and site grading.

END OF SECTION
1. Safety Regulations

The Contractor shall comply with the latest edition and amending regulations of the following documents, and in the case of conflicts between documents, the more stringent rule shall apply:

.3 The Workplace Safety & Insurance Act 1997, and regulations as amended.
.4 Ontario Building Code 2006 Regulation 350/06 as amended.
.6 Ontario Environmental Protection Act, and Regulations as revised.
.7 Workplace Safety and Insurance Board First Aid Regulations.

2. Temporary Stairs, Hoists, Scaffold, Etc.

Furnish and maintain all equipment such as stairs, ladders, ramps scaffolds, hoists, runways, derricks, chutes, elevators, etc., as required for proper execution of work.

Construct and maintain scaffolding in rigid, secure and safe manner. Erect scaffolding independent of walls. Remove promptly when no longer required.

Where such structures are of a complicated nature, employ the services of a Registered Professional Engineer to design such scaffolding, framework, or other temporary supports.

Provide all necessary temporary barricades, fencing, guardrails, night lights, and barriers as necessary for the work.

3. Safety Equipment

Enforce use of CSA approved hard hats and safety boots for all entering or working on construction site. Refuse admission to those refusing to conform to this regulation.

Provide and maintain adequate lighting where workmen or public may be subject to hazards and in all working areas.
.3 Comply with the requirements of the Federal and Ontario Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, and regarding labelling and the provision of material safety data sheets.
   .1 Establish and maintain a manual for WHMIS. Include all WHMIS data sheets as required above. Turn over the complete manual to Consultant at completion of the work.
   .2 WHMIS manual to include, but not be limited to all:
      - adhesives
      - solvents
      - sealants
      - resilient flooring
      - paint, varnish, other coatings
      - membrane waterproofing and air barriers
      - special coatings, sealers, waxes
      - solder, brazing and welding and other metal filler
      - pressure treated wood and surface treatment of cuts
      - other products where particles or vapours may become air borne after installation.

.4 In addition to the requirements of the Occupational Health and Safety Act, and Regulations for Construction Projects, provide temporary safeguards and protection against:
   .1 Accident or injury to any workmen or other persons on the site, adjacent work and property, roads and walks.
   .2 Damage to any part of the work and to any adjoining or adjacent structure, properties, pavements, walks, services, and other similar items by frost, weather, overloading, and any other cause resulting from the execution of the work.

.5 Make good with material identical with existing and adjoining surfaces any damage resulting from the execution of the work to any part of the work or any buildings, pavements, landscaping, poles, hydrants, services, etc., on or surrounding the site.

.6 Provide all necessary fall protection equipment and facilities required for the Consultant and his agents to review construction.

END OF SECTION
1. Codes and Standards
   .1 Conform to or exceed the minimum requirements of the National Building Code, Ontario Building Code Act, CMHC Residential Standards, Ministry of Housing Guide for Family Housing, and all Provincial and Municipal By-Laws and regulations affecting the work and working conditions. Latest editions and revisions and most conservative provisions, in the opinion of the Architect, apply.

   .2 Part 9 of the Ontario Building Code shall serve as a minimum quality of work and materials.

   .3 All materials or assembly of materials or manufactured items or tests of these shall conform to applicable requirements of the Canadian Standards Association (CSA) standards, the Canadian Government Specifications Board (CGSB) specifications, Underwriters Laboratories of Canada (ULC), Ontario Provincial Standards (OPS) specifications and drawings, or in the absence of these, the standards of the American Society for Testing Materials (ASTM).

   .4 Where Contract Documents exceed these minimum code standards, specified standards, and referenced documents, perform the work in accordance with the additional requirements of the Contract Documents.

2. Acceptable Materials and Products
   .1 Means that item named and specified by catalogue name or number forms parts of specification and sets standard regarding performance, quality of material and workmanship, and when used in conjunction with a referenced standard, shall be deemed to supplement the standard.

   .2 Equipment and products shall be one of the named suppliers.

3. V.O.C.'s
   .1 Adhesives cleaning agents, shall whenever possible, and consistent with performance requirements, be V.O.C. free or of low V.O.C. content.

4. Asbestos
   .1 Products shall be asbestos free.
5. Uniformity of Source

.1 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.2 Like products visible in the finished work shall be identical in appearance, colour, texture, sheen, configuration, arrangement and other characteristic affecting uniformity of appearance in the work.

6. Trade Names

.1 Wherever an item or class of material is specified exclusively by trade names or by names of the maker by catalogue reference, only such items shall be used, unless Architect’s approval for a substitution is secured in writing during tender period.

.2 Should the Contractor desire to substitute another material for one or more specified by name, he shall apply in writing for such permission and state the credit or extra involved by the use of such material. He shall also provide data or samples for the Architect’s consideration. No such material shall be used unless approved in writing by the Architect. In no case will the substitution of a product manufactured outside Canada for a Canadian-made product be considered.

7. Manufacturer’s Directions

.1 All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as recommended by the manufacturer.

.2 Do not rely on labels or enclosures provided with products. Obtain written instructions from manufacturers.

.3 Notify Architect in writing of any conflict between these specifications and manufacturer’s instructions. Architect will designate which document is to be followed.

8. Workmanship

.1 Execute work in accordance with the best standard practice utilizing mechanics skilled in their trades. Adequately brace and anchor work with proper provision for expansion shrinkage. Erect work true to lines, levels, dimensions,
square and plumb. Finish surfaces to be without perceptible sag, warp or surface defects and suitable for the purpose intended. Work shall conform to site conditions and measurements.

9. Patching

.1 In patching and making good, and in extending existing construction match in colour and texture all finishes visible within one area and all items of a similar nature to the full satisfaction of the Architect.

10. Handling

.1 Deliver, store and handle all material and products in a manner to prevent damage and deterioration. Ensure they are not exposed to an environment which would increase their moisture content beyond that specified.

.2 Package materials and products to protect them from damage or adulteration. Packaging shall be secure and retained unopened and with labels intact until use. Label packages with manufacturer's name, and to describe contents, quantity, location in building if applicable, and other information as may be specified.

.3 Handle equipment in accordance with manufacturer's and supplier's recommendations.

.4 Repair or replace damaged material as directed by Architect.

11. Protection

.1 Protect all work against damage until takeover by the Owner. Remove and replace, at own expense, any damaged work that cannot be repaired or restored to the Architect's satisfaction.

.2 Provide protection against spread of dust and dirt beyond work areas.

.3 Take particular care of all finished work as construction progresses and cover it with the necessary protective materials. Inspect all surfaces, wash and clean as directed upon removal of protective coverings.

.4 Note all buried services and take care not to damage them.
12. **Confining of Operations**

   .1 All materials and equipment shall be confined so as to prove no hazard to those frequenting the site. It is the responsibility of each trade to ensure that all materials, equipment, plant, tools, etc., that have not been incorporated into the construction are safely stored.

13. **Local Industry**

   .1 Obtain specified construction materials and equipment from suppliers in the same locality as the project in-so-far as possible.

14. **Fastenings**

   .1 Supply all fastenings, anchors, supports and accessories required for fabrication and erection of the Work.

   .2 Where exposed use metal fastenings and accessories, etc., of same texture, colour and finish as base metal on which they occur.

   .3 Use metal fastenings of same material as the metal component they are anchoring and of metal which will not set up an electrolytic action which would cause damage to the fastening or metal component under moist conditions. Use isolating material to permanently prevent the occurrence of electrolysis due to materials being fastened. In general, use non-corrosive or hot dip galvanized steel anchors for exterior anchors for windows, sheet metal roofing and anchors occurring on or in exterior walls or slabs.

   .4 Use fastenings of such type and size and install in such a manner to provide positive permanent anchorage of the unit to be anchored in position. Install anchors at required spacing to provide required load bearing or shear capacity.

   .5 Keep exposed fastenings to a minimum, evenly spaced and neatly laid out.

   .6 Supply adequate instructions and/or templates, and if necessary, supervise installation where fastenings or accessories are required to be built into work performed by other subcontractors or suppliers.

   .7 Fastenings shall be of a permanent type. Do not use wood plugs.
.8 Do not use fastenings which cause spalling or cracking of material to which anchorage is being made.

.9 Do not use powder activated fastenings on any portion of the work except in conformance with Occupational Health and Safety Act, and Regulations for Construction Projects.

.10 Protect all metals from other materials which may cause corrosion or deterioration - example, concrete on aluminum.

.11 Coordinate work with other trades. Arrange and pay for installations of sleeves, inserts, anchors, etc. by appropriate trade.

15. Expansion, Contraction And Deflection

.1 Provide for expansion and contraction between and within building components, products and assemblies due to changes in temperature, humidity and other phenomena.

.2 Provide for movement between and within building components, product assemblies due to deflection, sway, twist, creep, column shortening, vibration and other phenomena.

.3 Prevent damage to building components, products and assemblies due to expansion, contraction and building movement.

.4 At tops of partitions and walls, provide for deflection and shrinkage of the structure as well as for lateral and earthquake restraint. Maintain sound, fire, air, moisture, and thermal integrity of wall or partition. Determine requirements from Consultant where additional information is required.

16. Cleaning: General

.1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

.2 Store volatile wastes in covered metal containers, and remove from premises daily.

.3 Prevent accumulation of wastes which create hazardous conditions.
4. Provide adequate ventilation during use of volatile or noxious substances.

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

17. Cleaning During Construction

1. Maintain project grounds and public properties free from accumulations of waste materials and rubbish.

2. Provide on-site dump containers for collection of waste materials, and rubbish.

3. Remove waste materials and rubbish from work on a daily basis and remove from site on a regular basis.

4. Vacuum clean interior of building areas of this contract's dirt when ready to receive finishes and continue vacuum cleaning at least daily until building is ready for substantial completion or occupancy. Sweep floors and pavements clean on a daily basis.

5. Schedule cleaning operations so that resulting dust and other contaminants will not fall on wet, newly painted surfaces.

18. Final Cleaning

1. In preparation for substantial completion or occupancy, conduct inspection of sight-exposed interior and exterior surfaces.

2. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from sight exposed interior and exterior finished surfaces including glass and other polished surfaces.

3. Clean lighting reflectors, lenses, and other lighting surfaces.

4. Clean and polish all glass, mirrors, hardware, tile, chrome, aluminum, stainless steel, plastic laminate and plumbing, mechanical and electrical fixtures and equipment.

5. Broom clean paved surfaces; rake clean other surfaces of grounds.
.6 Remove debris and surplus materials from roof areas and accessible concealed spaces.

.7 Replace heating, ventilating and air conditioning filters, clean ductwork and clean coils.

.8 Remove snow and ice from access to building including exits and fire lanes.

END OF SECTION

.2 Refer also to GC 5 Payment and relevant Supplementary Conditions.

.3 Costs for additional or unnecessary inspections occasioned by contractor's unjustified request for same will be deducted from amounts owing under the contract.

2. Occupancy .1 Owner reserves the right to occupy and use portions of work whether partially or entirely completed, or whether completed on schedule or not.

.2 Partial occupancy shall not imply acceptance of work in whole or in part, nor shall it imply acknowledgement that the terms of Agreement are fulfilled.

3. System Demonstration .1 Prior to Substantial Performance:

.1 Demonstrate operation of each system to Owner and Consultant.

.2 Instruct personnel in operation, adjustment and maintenance of equipment and systems, using provided operation and maintenance date as basis for instruction.

4. Warranties .1 Refer to Section 01 78 36 for details about extended warranties.

5. Submittals .1 Refer to Section 01 30 00 for submissions required at project completion.

6. Final Cleaning .1 Refer to Section 01 60 00.
1. Submittals

.1 Provide extended warranties called for in specifications.

.2 Submit warranty through Architect immediately after issuance of Certificate of Substantial Performance, to facilitate release of holdback monies.

.3 Where noted, submit as per "Sample Form of Extended Warranty" below. Contractor and Trade Contractor shall both sign and seal the Warranty.

.4 Refer to individual sections of the specifications for specific requirements of the warranties.

.5 Refer to GC 12.3: Warranty and Relevant Supplementary Conditions for general requirements.

.6 If validity of extended guarantee is related to proper maintenance and servicing of equipment, etc., full details must be provided in maintenance manuals.
SAMPLE FORM OF EXTENDED WARRANTY

TO Ottawa Catholic School Board

RE Dr. F. J MacDonald Catholic School Handicapped Lift, 2860 Ahearn Avenue, Ottawa, Ontario. K2B 6Z9.

EXTENDED WARRANTY

FOR (Name of Trade and Specification Sections or brief identification of work covered)

WORK COVERED (Clear description of work covered including specific requirements noted in individual specification sections)

WARRANTY:

1. We agree to be responsible for the proper performance of the work only to the extent that the design and specifications permit such performance.

2. Subject to para. 1, We agree to correct promptly at our own expense, defects or deficiencies in the work which appear prior to and during the period of __________ years from the date of Substantial Performance of the Work, provided prompt written notice of observed defects and deficiencies is given.

3. We agree to correct or pay for damage resulting from defects or deficiencies referred to in para. 2.

4. We agree that the Owner may carry out detailed and exhaustive inspection of our work prior to expiry of this warranty.

5. Nothing in the above intends or implies that this warranty shall apply to work which has been abused or neglected.

(Name and Address of General Contractor)  (Name and Address of Trade Contractor)

(Signature & Corporate Seal)  (Signature & Corporate Seal)
PART 1 – GENERAL

1.1 WORK INCLUDED

1. This specification establishes the material, fabrication, handling, installation and testing of micropiles.

1.2 REFERENCE STANDARDS

.1 The micropile shall be manufactured according to these specifications and approved shop-drawings.

.2 ASTM A615 "Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement"

.3 ASTM C150-68 "Standard Specification for Portland Cement"

.4 ASTM A36 "Standard Specification for Carbon Structural Steel"

.5 ASTM 0638 "Standard Test Method for Tensile Properties of Plastic"

.6 ASTM A722 "Standard Specification for Uncoated High-Strength Steel Bar for Prestressing Concrete"

.7 ASTM 0790 "Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials"

.8 ASTM 0256; 02240 "Standard Test Method for Determining the Izod Pendulum Impact Resistance of Plastics"

.9 ASTM 01784 "Standard Test Method for rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride (CPVC) Compounds"

1.3 DEFINITIONS

.1 Micropile is a small diameter pile (usually less then 12 inches), which consists of central reinforcement (one, two, or three threadbars) encased in pressure injected cement grout. The grout cylinder completely encases the central bars from the base of the drilled hole to the base of the concrete footing. The micropile carries both compression and tension loads and is connected to the footing by a bearing plate assembly.

.2 Micropiles are to be a fully bonded system without free stressing length.

1.4 RESPONSIBILITY OF THE CONTRACTOR

.1 Firms undertaking to bid this work shall have a minimum of five (5) years experience in projects of this magnitude and shall have equipment and manpower suitable and available for the entire duration of the project. The Contractor shall submit with his proposal a reference list of work performed of equal magnitude and qualifications of the project superintendent that will remain on the site during entire project.
1.5 INSPECTION AND TESTING

.1 The contract is to include all costs associated with the testing of the piles, concrete, and grout. Submit mill test reports of the steel used to fabricate the micropiles. Costs to include all necessary reviews and engineering certifications of the pile installation/material reports/test data.

1.6 SHOP DRAWINGS

.1 Shop Drawings shall include the following information:

.1 Pile layout details (section and plan view)
.2 Pile design capacity of the steel bars
.3 Grade and properties of the steel bars
.4 Grade and properties of the bearing plates
.5 Method and details of proposed grouting procedure
.6 Double Corrosion Protection (DCP) details
.7 Grout/Concrete - cement type, strength, additives
.8 Pile bond length, hole diameter
.9 Proposed drilling method
.10 Pile design capacity

.2 Shop drawings shall be signed and sealed by a qualified Engineer registered in the Province of Ontario.

1.7 COMPLIANCE INSPECTION

.1 General site review will be carried out by the Engineer to ensure that the Contractor follows the shop drawings and good engineering practice.

1.8 ACCEPTABILITY

.1 Failure of any pile to meet the performance test criteria will result in rejection of the pile in question. The criteria for acceptance are outlined under testing sections of this specification.

1.9 PRICES

.1 For pricing purposes, Micropiles of guaranteed capacity as shown (or approved), are to be based on an average length as noted on the drawings.
Pricing for Micropile elements to be provided as follows:

1. Lump Sum: $__________

2. Revised Elevations:
   - Additional Length: $__________ per m length
   - Reduced Length: $__________ per m length

3. Pile Load Test: Performance Testing:
   - $__________ per pile

PART 2 - PRODUCTS

2.1 MICROPILES

1. Micropiles shall be GEWI-piles by DYWIDAG Systems International Inc.

2. Micropiles shall be manufactured according to these specifications and approved shop-drawing details made by DYWIDAG Systems International Inc.

2.2 Reinforcement Steel

1. Reinforcement steel shall be Dywidag Threadbar grade 75 or 80, conforming to ASTM A615 or A722 grade 150 as specified by the Engineer.

2.3 Corrosion Protection

1. Corrosion protection, if required, bars can be protected with:
   
   1. Double corrosion protection system (DCP):
      
      1. Each bar shall be shop encased in PVC, HDPE or PP corrugated sheathing and the annular space around the steel bar will be shop cement grouted.

2.4 Centralizers

1. Centralizers shall be fabricated from a material other than wood that is not deleterious to the steel tendon or corrugated sheathing. The centralizers shall be of sufficient strength to support the weight of the tendon in the drilled hole and provide a minimum of 12 mm of grout cover.

2.5 Grout

1. Grout inside of the corrugated PVC sheathing shall be a neat cement mixture as per manufacturer’s specification. Accelerators shall not be used. Water shall be clean and free from oil, alkali, organic water and other chemical materials. Cement shall conform to ASTM C150, "Portland Cement."
PART 1 — GENERAL

1.1 WORK INCLUDED

1. This specification establishes the material, fabrication, handling, installation and testing of micropiles.

1.2 REFERENCE STANDARDS

.1 The micropile shall be manufactured according to these specifications and approved shop-drawings.

.2 ASTM A615 "Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement"

.3 ASTM C150-68"Standard Specification for Portland Cement"

.4 ASTM A36 "Standard Specification for Carbon Structural Steel"

.5 ASTM 0638 "Standard Test Method for Tensile Properties of Plastic"

.6 ASTM A722 "Standard Specification for Uncoated High-Strength Steel Bar for Prestressing Concrete"

.7 ASTM 0790 "Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

.8 ASTM 0256; 02240 "Standard Test Method for Determining the Izod Pendulum Impact Resistance of Plastics

.9 ASTM 01784 "Standard Test Method for rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride (CPVC) Compounds"

1.3 DEFINITIONS

.1 Micropile is a small diameter pile (usually less then 12 inches), which consists of central reinforcement (one, two, or three threadbars) encased in pressure injected cement grout. The grout cylinder completely encases the central bars from the base of the drilled hole to the base of the concrete footing. The micropile carries both compression and tension loads and is connected to the footing by a bearing plate assembly.

.2 Micropiles are to be a fully bonded system without free stressing length.

1.4 RESPONSIBILITY OF THE CONTRACTOR

.1 Firms undertaking to bid this work shall have a minimum of five (5) years experience in projects of this magnitude and shall have equipment and manpower suitable and available for the entire duration of the project. The Contractor shall submit with his proposal a reference list of work performed of equal magnitude and qualifications of the project superintendent that will remain on the site during entire project.
1.5 INSPECTION AND TESTING

.1 The contract is to include all costs associated with the testing of the piles, concrete, and grout. Submit mill test reports of the steel used to fabricate the micropiles. Costs to include all necessary reviews and engineering certifications of the pile installation/material reports/test data.

1.6 SHOP DRAWINGS

.1 Shop Drawings shall include the following information:

.1 Pile layout details (section and plan view)
.2 Pile design capacity of the steel bars
.3 Grade and properties of the steel bars
.4 Grade and properties of the bearing plates
.5 Method and details of proposed grouting procedure
.6 Double Corrosion Protection (DCP) details
.7 Grout/Concrete - cement type, strength, additives
.8 Pile bond length, hole diameter
.9 Proposed drilling method
.10 Pile design capacity

.2 Shop drawings shall be signed and sealed by a qualified Engineer registered in the Province of Ontario.

1.7 COMPLIANCE INSPECTION

.1 General site review will be carried out by the Engineer to ensure that the Contractor follows the shop drawings and good engineering practice.

1.8 ACCEPTABILITY

.1 Failure of any pile to meet the performance test criteria will result in rejection of the pile in question. The criteria for acceptance are outlined under testing sections of this specification.

1.9 PRICES

.1 For pricing purposes, Micropiles of guaranteed capacity as shown (or approved), are to be based on an average length as noted on the drawings.
PART 2 - PRODUCTS

2.1 MICROPILES

.1 Micropiles shall be GEWI-piles by DYwidag Systems International Inc.

.2 Micropiles shall be manufactured according to these specifications and approved shop-drawing details made by DYwidag Systems International Inc.

2.2 Reinforcement Steel

.1 Reinforcement steel shall be Dywidag Threadbar grade 75 or 80, conforming to ASTM A615 or A722 grade 150 as specified by the Engineer.

2.3 Corrosion Protection

.1 Corrosion protection, if required, bars can be protected with:

.1 Double corrosion protection system (DCP):

.1 Each bar shall be shop encased in PVC, HDPE or PP corrugated sheathing and the annular space around the steel bar will be shop cement grouted.

2.4 Centralizers

.1 Centralizers shall be fabricated from a material other than wood that is not deleterious to the steel tendon or corrugated sheathing. The centralizers shall be of sufficient strength to support the weight of the tendon in the drilled hole and provide a minimum of 12 mm of grout cover.

2.5 Grout

.1 Grout inside of the corrugated PVC sheathing shall be a neat cement mixture as per manufacturer’s specification. Accelerators shall not be used. Water shall be clean and free from oil, alkali, organic water and other chemical materials. Cement shall conform to ASTM C150, "Portland Cement."

.1 Grout Composition:

.1 Grout mix shall be a cement grout with a w/c ratio of 0.45 and a minimum compressive strength of 3,000 psi after 7 days. Tests about the flow ability (Marsh Cone), composition (Mud balance) and compressive strength (cubes) may be required before the beginning of the works for the Engineer acceptance of the grout mix.
.2 Pre-mixed product can be used with prior approval from the Engineer.

2.6 Bearing Plate Criteria

.1 The bearing plate shall be fabricated from mild steel conforming to ASTM A36.

.2 Unless specified, bearing plate dimensions shall be designed for 95% of the minimum ultimate tensile strength (GUTS) of the steel tendon. The concrete or structural steel support bearing stress shall not exceed allowable limits shown in the contract specifications and drawings. Bending stress of the bearing plate shall not exceed specified allowable yield strength (FY) of the steel material.

2.7 Corrugated sheathing for DCP

.1 Corrugated PVC sheathing for the outer corrosion protection of the anchor tendon shall have a minimum compressive strength of 100 MPa (14,500 psi) and a minimum tensile strength of 48 MPa (7,000 psi) and shall develop a minimum bond stress of 4.8 MPa (700 psi) at a grout strength of 27 MPa (4,000 psi).

2.8 Hexnut and Coupler

.1 Hexnut shall be hexagonal head of the heavy-duty type. Coupler shall have circular type profile. Both hexnut and coupler shall be as per dywidag material specification. Manufacturer will certify that hexnut and coupler develop the ultimate load of the Threadbar. If couplers and DCP are used, the couplers must be Double Corrosion Protected with heat shrink sleeve or anti-corrosion compounds (tape or equivalent). In case of drilling with casing and using couplers, the coupler shall be provided with setscrews or equivalent to ensure the couplers will not be loosened during the casing extraction.

2.9 Product Handling and Storage

.1 Handling, shipping and storage shall be such that the material is properly identifiable and protected against mechanical damage, corrosion, chemical attack and dirt.

.2 Materials stored at the site shall be placed above ground on well-supported platform and covered with plastic or other approved material.

PART 3 – EXECUTION

3.1 DRILLING

.1 The drilling method will be chosen by the contractor depending on the soil conditions and as approved by Engineer and owner in writing. The drilled hole must be clear and open to have the possibility to install and grout the micropile without collapsing of the
hole. Casing or Hollow Steam Auger or equivalent method is required for drilling through unstable soils or rock (sands, gravel or weathered rock). Drilling equipment shall be electric.

.2 The minimum diameter of the hole shall be as shown on contract drawings or as per manufacturer’s recommendation and subject to approval by the Engineer.

.3 Boreholes shall be drilled to the inclination and position shown on the drawings within the following tolerances:

.1 Centerline of piling shall not be more than 25 mm from indicated plan location.
.2 Micropile shall be plumbed within 2% of total plan alignment
.3 Top elevation shall be plus 25 mm maximum from vertical elevation indicated in the plans.

.4 Boreholes shall be thoroughly cleaned prior to installation of micropile.

.5 The Contractor shall keep a record of all-drilling data (procedures, times and soil conditions), which shall be made available to the Engineer.

3.2 INSTALLATION

.1 A registered professional Engineer shall supervise the installation of the micropile.

.2 Centralizers shall be provided to ensure that the micropile assembly is centrally located in the hole. The spacing of the centralizer shall be approximately 1.5 meter in soil, 2.5 meter in rock.

.3 The Contractor shall maintain a record showing the pile number, cement quantity and installation date for each micropile. In case couplers are used, the position and corrosion protection used shall be recorded.

3.3 GROUTING

.1 Grout Procedures

.1 Depending from the soil conditions and the type of micropile, the following grouting procedures can be adopted:

.2 The grout is pumped from the bottom of the hole, with a simple grout hose, without pressure in the hole. (Micropile Type I - Gravity pressure)

.3 The grout is pressured through the casing. The grout mix is injected (0.5 to 1 MPa) through the casing cap, simultaneously while extracting the casing. (Micropile Type II - Pressure through the casing).
.4 Two stage grouting (Post grouting): neat cement grout is placed from the bottom of the hole without pressure in the hole (see point 1). After hardening of the initially placed grout, additional grout is injected via a special DSI valve (DSI post-grouting system) at a pressure of 2 to 8 MPa. Post grout tubes shall be flushed with water for further reuse. After each grouting operation, the anchors shall remain in an undisturbed condition until the necessary grout strength has been achieved.

.5 The quantity of the grout and the grout pressures shall be recorded. Prior to installing each assembly into the hole, the pile assembly shall be clean and free of oil, grease or other extraneous substance. Excessive amounts of water shall not be used in any of the pile installation procedures.

.6 Grouting equipment shall be sufficient for completion of grouting of each pile in one continuous operation at the required rate. The grouting equipment shall be capable of producing uniformly mixed grout with adequate fluidity.

.7 Grout Quality Control

.1 The following test on the grout mix shall be performed:

.1 Flow ability (marsh cone)
.2 Specific weight (mud balance)
.3 Compressive strength (cube at 7, 14 and 28 days)

3.4 PERFORMANCE TESTING (COMPRESSION)

.1 A maximum of 2 of the micropiles to be quoted by unit price may be selected by the Engineer and loaded in compression for performance testing. As indicated by the contract plans, non-production micropile groups can be installed also for performance testing. When loading micropiles in compression, adjacent micropiles can be used to take reaction forces. Engineer to be present during the performance testing.

.2 All performance testing equipment must be used in accordance with the specifications of the manufacturer and must, at all times be maintained in good condition.

.3 Performance loading shall not be carried out until the grout has reached its specified strength. All acceptance test data shall be recorded and made available to the Engineer upon request.

.4 All micropiles displacements for creep testing under constant loading shall be plotted as displacement versus the log of time in minutes.

.5 Performance testing for the micropiles shall be conducted as follows:
.1 An initial load, equivalent to 10% of the design load T (0.1 T), shall be applied to remove the slack from the pile and testing equipment. At this time the dial gage for elongation measurement shall be initialized to zero. The pile shall then be loaded by a hydraulic jack in a single operation to 0.5 T and maintained at that load for 30 minutes for creep measurement. The creep measurement shall be recorded at 1, 2, 3, 5, 10, 15, 20, and 30 minutes. The pile shall then be unloaded to 0.1T and record the permanent displacement of the pile.

.2 Repeat the test at 1.0 T, 1.5 T and 2.0 T. Hold load at each increment for 30 minutes for creep movement. Unload the pile to 0.1T and record the permanent displacement between each consecutive load increment.

.3 T = Design load shown on the contract plans

3.5 Acceptance Criteria

.1 Acceptance criteria are met when:

.1 The slope of the creep displacement versus log time plot is less than 0.08 in per log cycle at the load level of 2.0 T
.2 The elastic deformation corresponds to less than 80% of the pile length. (Only tension test)
.3 The total permanent displacement shall not exceed 0.5 inches

.2 The allowable elastic deformation shall be calculated on the actual bar® steel area provided by the mill certifications. Based on the observed creep rate at the working load, the Contractor shall submit for each tested micropile, calculations indicating the possible total creep displacement of the micropile.

3.6 Measurement and Payment

.1 Micropiles will be measured and paid for by the unit, and the number of units for payment will be determined by the requirements of the details shown on the plans.

.2 The contract unit price paid for micropiles shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the micropiles (including testing), complete in place, as shown on plans, as specified in these special provisions, and as directed by the Engineer.

END OF SECTION
PART 1 - GENERAL

1.1 Related Work

.1 Recycling
Section 01 00 00

.2 Electrical Demolition
Division 26

1.2 General

.1 The requirements of Division 01 form part of this section.

1.3 References


1.4 Submittals

.1 Where required by authorities having jurisdiction, and as called for by structural drawings, submit for review, prior to proceeding, drawings, diagrams or details showing sequence of disassembly work or supporting structures.

.2 Drawings for shoring, underpinning and other structural elements shall bear stamp of qualified professional engineer registered in Province of Ontario.

1.5 Methods

.1 Prior to commencing demolition, submit for review proposed procedures and list of equipment to be used. Use methods which will minimize vibration.

.2 Schedule work which would disturb users' operations, outside users normal work hours.

1.6 Waste Management and Disposal

.1 Separate waste materials for recycling in accordance with Section 01 00 00.

1.8 Existing Drawings

.1 Copies of some of the previous permit drawings are available at the Architect's office for viewing.
PART 2 - PRODUCTS

.1 Not applicable.

PART 3 - EXECUTION

3.1 Protection

.1 Prevent movement, settlement or damage of adjacent structures, services, and parts of existing building to remain. Provide bracing, shoring and underpinning required. Make good damage and be liable for injury caused by demolition.

.2 Take precautions to support structures and, if safety of building being demolished or adjacent structures or services appears to be endangered, cease operations and notify Consultant.

3.2 Work

.1 Dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

.2 Carefully remove materials and equipment designated for reuse, store, protect and leave ready for reinstallation by qualified trades persons.

.3 Demolish and remove all walls, roofs, structures, foundations, footings, slabs, mechanical and electrical systems.

.4 Remove all contents, furniture and equipment that remain in the building.

3.3 Preparation

.1 Co-ordinate any particular demolition or dismantling operations covered under mechanical and electrical or other sections of this specification. Determine and arrange with appropriate and competent forces or trades their respective work.

.2 Do not disrupt active or energized utilities designated or required to remain undisturbed.

.3 Notify Consultant before disrupting building services in accordance with Section 01 50 00.

3.4 Demolition

.1 Demolish selected components of the existing building as indicated.
.2 Remove items as authorized for removal on the drawings, as required to install new materials, finishes, and equipment, indicated, and where existing items are no longer required for functioning of the completed work. Consult all drawings and examine site to determine extent of work.

.3 Remove existing plant equipment and fitments where called for to be replaced by new or no longer required for the functioning of the finished work.

.4 At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling. At all times, protect interiors of parts of building not to be demolished from exterior elements.

.5 Demolish to minimize dusting. Keep dusty materials wetted.

.6 Demolish masonry and concrete walls in small sections. Carefully remove and lower structural framing and other heavy or large objects.

.7 Remove contaminated, hazardous, or designated materials from site and dispose of in safe manner, to minimize danger at site or during disposal; in accordance with governing regulations.

.8 Remove all demolished materials from site except as otherwise noted.

.9 Remove from substrate, fasteners and adhesives used to attach material being demolished, except as otherwise approved.

.10 Do not sell or burn materials on site.

3.5 Restoration

.1 Upon completion of work remove debris, trim surfaces and leave work site clean.

.2 Reinstate areas and existing works outside areas of demolition to conditions satisfactory to Owner and to authorities having jurisdiction.

END OF SECTION
PART 1 - GENERAL

1.1 Related Sections
   .1 Section 03 20 00 - Concrete Reinforcing.
   .2 Section 03 30 00 - Cast-In-Place Concrete.
   .3 Section 03 35 05 - Concrete Floor Hardeners.
   .4 Section 03 35 00 - Concrete Finishing.

1.2 References
   .1 Canadian Standards Association (CSA)
     .1 CAN/CSA-A23.1-09, Concrete Materials and Methods of Concrete Construction.
     .2 CAN/CSA-O86-09, Engineering Design in Wood (Limit States Design).
     .3 CSA O121 (R2003), Douglas Fir Plywood.
     .4 CSA O151-04, Canadian Softwood Plywood.
     .5 CSA O437 (R2006), Standards for OSB and Waferboard.
     .6 CSA S269.1-1975 (R2003), Falsework for Construction Purposes.
     .7 CAN/CSA-S269.3 (R2003), Concrete Formwork.
     .8 CAN/ULC-S701-05 Thermal Insulation, Polystyrene, Boards and Pipe Covering.
   .2 Council of Forest Industries of British Columbia (COFI)
     .1 COFI Exterior Plywood for Concrete Formwork.
   .3 ACI
     .1 ACI 302.1R.96 Guide for Concrete Floor and Slab Construction.

1.3 Shop Drawings
   .1 Submit shop drawings for formwork and falsework in accordance with Division 1.
   .2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, camber, special architectural exposed finishes, ties, liners, water stops, dovetail anchor slots, and locations of temporary embedded parts. Show size of tie hole, plastic plug, and plug recess. Comply with CSA S269.1, for falsework drawings Comply with CAN/CSA-S269.3 for formwork drawings.
.3 Indicate formwork design data, such as permissible rate of concrete placement, and
temperature of concrete, in forms.

.4 Indicate sequence of erection and removal of formwork/falsework.

.5 Each shop drawing submission shall bear stamp and signature of qualified professional
engineer registered or licensed in Province of Ontario, Canada.

.6 Assume full responsibility for complete design and engineering of formwork including
shoring and bracing to resist loads due to wet concrete, forms, wind and other forces
arising from use of equipment to place concrete.

1.4 Delivery, Storage and Handling

.1 Store materials on site in a manner to prevent damage thereto. Protect from weather.
Comply with CSA A23.1, Clause 9.

.2 Protect work of this Section from damage. Protect other work from damage resulting
from this work. Replace damaged work which cannot be satisfactorily repaired.

PART 2 - PRODUCTS

2.1 Materials

.1 Formwork materials:

.1 For concrete without special architectural features, use wood and wood product
formwork materials to CSA-O121 and CAN/CSA-O86.1.

.2 For concrete with special architectural features, use formwork materials to CAN/CSA-
A23.1 (09).


.2 Tubular column forms: round, spirally wound laminated fiber forms, internally
treated with release material. Use seamless plastic liner for exposed columns.

.3 Form ties:

.1 For concrete not designated 'Architectural', use removable or snap-off metal ties,
fixed or adjustable length, free of devices leaving holes larger than 25 mm (1")
dia. in concrete surface.

.4 For Architectural concrete:

.1 Form Ties: Threaded internal disconnecting, spreader type, adjustable in length.
Ties to have maximum break back of 40 mm (1- ½") from concrete surface.
Ensure ties incorporate removable tapered plastic spreader cones, with setback
of 40 mm (1- ½”). Ensure taper of spreader matches taper of tie hole plugs.
Wire ties not permitted.
.2 Tie Hole Plugs: Plastic set back plugs, grey to match concrete, 40 mm (1 - ½") setback, to fit tightly into tie holes. Include for tie hole plug quantity on basis of 1,000 mm (30") each way plug spacing pattern.

.5 Form liner:

.1 Plywood: Douglas Fir to CSA O121 T and G.

.6 Form release agent: non-staining, chemically active release agent containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing set of film of concrete in contact with form.

.1 For temperatures less than 0°C: Formwork Release Agent: Eucoslip by Euclid Admixture Canada Inc., C.R.A. by Sika Canada Inc., CPD Chemical Form Release Agent by CPD Construction Products or Duogard by W.R. Meadows of Canada Ltd.. For formed concrete work in contact with soil, use material that does not alter sulphate resistant qualities of concrete.

.2 For temperatures greater than 0°C: Water Based Formwork Release Agent: Eucoslip VOX by Euclid Admixture Canada Inc. or Sealight Duogard II by W.R. Meadows of Canada Ltd.

.7 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 0.75 mm to 1.00 mm (0.03 to 0.04 in) at 40°C, flashpoint minimum 150°C, open cup.

.8 Falsework materials: to CSA-S269.1.

.9 Sealant: to Division 7.

.10 Waterstops: Extrusions of plasticized PVC low temperature compound to sizes and shapes indicated on drawings by W.R. Meadows of Canada Ltd., W.R. Grace and Co. of Canada Ltd., Coodco Ltd., CPD Construction Products or Sika Canada Inc.

.11 Dovetail Anchors and Slots: Minimum 24 ga overall thickness zinc coating Z275 galvanized steel dovetail anchor slots with fillers to prevent entry of concrete during placing and minimum 14 ga overall thickness. Zinc coating Z275 galvanized steel dovetail anchors. Anchors shall project to within 20 mm (3/4") of masonry face.

.12 Mechanical Fasteners: Galvanized steel screw and washer with screw of length to secure insulation to formwork without penetrating concrete finish surface.

.13 Formwork Insulation: Extruded, expanded polystyrene, CAN/ULC-S701, Type 4, minimum RSI (R) value of 5.0 per 25 mm (1") compressive strength 0.2 MPa (30 psi), thickness as indicated on Drawings.

PART 3 - EXECUTION

3.1 Fabrication and Erection

.1 Verify lines, levels and column centres before proceeding with formwork and ensure dimensions agree with drawings. Verify the locations of all inserts, anchor bolts, cast-ins, etc. with structural, architectural, mechanical, electrical, and shop drawings prior to proceeding with formwork. Report any discrepancies to Consultant immediately.
.1 Construct forms to produce plumb and level concrete and true to linear building lines. Maximum variations (not accumulative) as follows:

.2 Variation from plumb in concrete surfaces not to exceed 6 m (1/4") in 3 m (10') nor 10 mm (3/8") in 6 m (20') or more.

.3 Variation from level or grade indicated on Drawings for tops of walls not to exceed 6 m (1/4") in 3 m (10') nor 10 mm (3/8") in 6 mm (20') in building length.

.4 Variation of linear building lines from established position in plan and related positions of walls not to exceed 6 mm (1/4") in 3 m (10'), 10 mm (3/8") in 1 bay nor 25 mm (1") in building length.

.5 Variation of concrete slabs and toppings from dead level or slopes as indicated on Drawings not to exceed 4 mm (1/8") in 3 m (10').

.2 Obtain Consultant's approval for use of earth forms framing openings not indicated on drawings.

.3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.

.4 Fabricate and erect falsework in accordance with CSA S269.1 and COFI Exterior Plywood for Concrete Formwork.

.5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.

.6 Do not place shores and mud sills on frozen ground.

.7 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.8 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1.

.9 Align form joints and make watertight. Keep form joints to minimum.

.10 Locate horizontal form joints for exposed columns 2,400 mm (8'-0") above finished floor elevation.

.11 Use 25 mm (1") chamfer strips on external corners and/or 25 mm (1") fillets at interior corners, joints, unless specified otherwise.

.12 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
.13 Camber:

.1 Provide upward slab and beam cambers as indicated on plans. Camber both the underside and the top of the concrete in a parabolic profile so as to maintain the structural thickness shown. Adjust cambers as directed by Consultant for “non-typical bays” based on the span and the support conditions.

.2 Prior to concreting verify formwork in place cambers by survey and report the results to the Consultant.

.3 Place, screed, and finish the slab concrete to specified beam and slab thicknesses. Verify thickness of slab/beams at midspan and support conditions. Verify cover to reinforcing steel at midspan and support conditions.

.4 Carry out surveying in accordance with Div 1. Cambers on subsequent floors may be adjusted to suit the actual behaviour of the first typical floor slabs under approval of Consultant. Repeat items 1-4 for all floors.

.5 Where not noted on plans, camber beams for Span/500 (span as defined as centerline of supports). Camber slabs for Span/400 in middle of bays (center of mid-strips) and Span/500 along column lines (center of column-strips).

.14 Construct forms for architectural concrete to achieve the following:

.1 Water-tight forms at corners, panel joints, recesses, arises and at construction joints.

.2 Accurate alignment of concrete surfaces.

.3 Surfaces without indentations other than those indicated.

.4 Sharp and straight corners (unless otherwise indicated).

.15 Build in anchors, sleeves, ties, bolts, nailers, templates, shelf angles and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.16 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.

.17 If slip forming and flying forms are used, submit details of equipment and procedures for Consultant's approval.

.18 Use full size contact form sheeting panels wherever possible. Install contact surfaces of formwork to produce neat and symmetrical joint patterns. Ensure joints are vertical or horizontal and, where possible, stagger to maintain structural continuity. Back vertical joints solidly and nail edges of abutting sheets to same stud. Likewise solidly back horizontal joints. Ensure adjacent form panels fit accurately, tight and flush. Use straightest available lumber.

.19 Align forms to ensure no visible defects appear on finished work.
.20 Locate wall form ties in accordance with reviewed shop drawings; align on a particular member both vertically and horizontally. Arrange reuse of form so tie holes are also reused. Tighten form ties, particularly at corners.

.21 Form slab soffits using full size panels where possible. Keep number of smaller size panels to minimum.

.22 Take particular care in forming corners and openings. Ensure formwork is tight and braced so no movement occurs.

.23 Use templates to secure and align anchor bolts in formwork prior to placement of the concrete. Report any interference with reinforcing or other inserts to Consultant prior to the placement of the concrete. Concrete should not be placed until interference issues are resolved in writing by the Consultant.

.24 For walls and shear walls, leave one side of form open for review of reinforcing steel. Close form only after Consultant has reviewed bar placement.

3.2 Removal and Reshoring

.1 Leave formwork in place for following minimum periods of time after placing concrete. Proposed removal times to be approved by Consultant in writing prior to work. Contractor required to submit shop drawings/scheduling of proposed stripping time for all elements. Multi-storey slab construction to outline reshoring scheduling and methodology. All information to be stamped and certified by formwork Engineer.

.1 3 days for walls and sides of beams.
.2 3 days for columns.
.3 28 days for beam soffits, slabs, decks and other structural members, or 3 days when replaced immediately with adequate shoring to standard specified for falsework, and when concrete has reached at least 75% of specified 28 day strength.
.4 3 days for footings and abutments.

.2 Remove formwork when concrete has reached 75% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.

.3 Provide all necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

.4 Space reshoring in each principal direction at not more than 3,000 mm (10'-0") apart.

.5 Re-use formwork and falsework subject to requirements of CAN/CSA-A23.1.
.6 Strip fibre forms off architectural concrete 2 days after placing, using power operated saw. To strip form, set power saw blade slightly less than thickness of the form, make 2 vertical cuts and remove form. Then, using broad bladed tool, carefully pry form off with short strokes by pushing handle toward column. Exercise care so not to mar concrete surface. After stripping, replace form halves on column and wire in place to protect column during construction. Leave around columns until after scaffolding and other formwork have been removed at end of construction to ensure column protection.

.7 Be responsible for safety of structure, both before and after removal of forms until concrete has reached its specified 28 day compressive strength.

.8 Take particular care when removing forms to ensure no damage occurs at corners, arises and the like.

.9 To help avoid colour variations in architectural concrete, ensure length of time between concrete placing and form removal is approximately same for each portion of work.

.10 In hot weather, wood forms remaining in place should not be considered adequate for curing but should be removed or loosened so concrete surfaces may be kept moist or coated with curing agent.

.11 In cold weather, defer removal of formwork or insulate formwork, to avoid thermal shock and consequent cracking of concrete surface.

.12 Install tie hole plugs immediately following removal of spreader cones. Install to a snug fit, maximum setback from concrete surface as specified.

.13 When concrete is dry, install temporary polyethylene rope in reglets to prevent contamination of same.

3.3 Construction Joints

.1 Form construction joints where required and where indicated. Construction joints shall conform to CSA A23.1 (09). Construction joint locations to be approved by Engineer in writing prior to performance of work. See also Section 03 30 00.

.2 Form 38 x 89 (2" x 4") beveled shear keys full length on construction joints, unless detailed otherwise.

END OF SECTION
PART 1 - GENERAL

1.1 Related Sections

.1 Section 03 30 00 - Cast-in-Place Concrete.

1.2 Measurement Procedures

.1 Reinforcing steel will be measured in pounds of steel incorporated into work, computed from theoretical unit mass specified in CAN/CSA-G30.18 for lengths and sizes of bars as indicated or authorized in writing by Consultant.

.2 No measurement will be made under this section. Include costs in items of concrete work for which reinforcement is required.

1.3 References

.1 American Concrete Institute (ACI)

.1 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.

.2 American National Standards Institute/American Concrete Institute (ANSI/ACI)

.1 ANSI/ACI 315-80, Details and Detailing of Concrete Reinforcement.

.3 American Society for Testing and Materials (ASTM)

.1 ASTM A 775/A 775M- 07b, Specification for Epoxy-Coated Reinforcing Steel Bars.

.4 Canadian Standards Association (CSA)

.1 CAN/CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction.

.2 CAN3-A23.3-04, Design of Concrete Structures for Buildings.

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

.4 CSA G30.5-M1983 (R1998), Welded Steel Wire Fabric for Concrete Reinforcement.

.5 CSA G30.14 M1983 (R1991), Deformed Steel Wire for Concrete Reinforcement.


.7 CAN/CSA-G30.18-M-92 R2002, Billet-Steel Bars for Concrete Reinforcement.

.8 CAN/CSA-G40.21-04, Structural Quality Steels.

.9 CAN/CSA-G164-M-92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.10 CSA W186 (R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
1.4 Shop Drawings

.1 Submit shop drawings including placing of reinforcement in accordance with Division 1.

.2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Consultant, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.

.3 Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated. Provide type B tension lap splices unless otherwise indicated.

.4 Show walls (foundation/retaining/shearwall/corewall) in full elevation and indicate bar size, spacing, laps, bends, etc.

.5 Show beams in full elevation and indicate bar size, spacing, laps, bends, etc. Beam reference labels to be used on shop drawings.

.6 Show columns in full elevation and indicate bar size, spacing, laps, bends, etc.

.7 Show slab reinforcing full length on drawings. Slab drawings to be provided as noted on separate sheets:
   1. Top Layer Reinforcing
   2. Bottom Layer Reinforcing
   3. Secondary Reinforcing (i.e. additional dowels/ties/bars at inserts/integrity steel)
   4. Slab Band Layer Reinforcing

.8 Detail placement of reinforcing where special conditions occur.

1.5 Delivery, Storage & Handling

.1 Store materials on site in a manner to prevent damage thereto. Protect from weather. Comply with CSA A23.1, Clause 9.

.2 Protect work of this Section from damage. Protect other work from damage resulting from this work. Replace damaged work which cannot be satisfactorily repaired.

.3 Handle, transport and install epoxy coated reinforcing steel bars carefully to avoid damage thereto. Conform to OPSS 1442, Clause 1442.07.03.

PART 2 - PRODUCTS

2.1 Materials

.1 Substitute different size bars only if permitted in writing by Consultant.

.2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.

.3 Deformed steel wire for concrete reinforcement: to CSA G30.14.
.4 Welded steel wire fabric: to CSA G30.5. Provide in flat sheets only.

.5 Epoxy coating of non-prestressed reinforcement: to ASTM A 775/A 775M.

.6 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1. To be adequate for strength and support of reinforcing construction required. Use chairs with plastic coated feet where slab and beam soffits will be exposed.

.7 Mechanical splices: subject to approval of Consultant.

.8 Plain round bars: to CAN/CSA-G40.21.

2.2 Fabrication

.1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada, unless indicated otherwise.

.2 Obtain Consultant’s approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.

.4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 Source Quality Control

.1 Provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.

.2 Inform Consultant of proposed source of material to be supplied.

PART 3 - EXECUTION

3.1 Field Bending

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

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars which develop cracks or splits.

3.2 Placing Reinforcement

.1 Place reinforcement in accordance with reviewed shop drawings and in accordance with CAN/CSA-A23.1. Support with chairs, bolsters, bar supports or spacers in as close spacing as possible to prevent displacement of reinforcement from intended bar position, before and during placing of concrete. Pieces of block, wood, and/or similar items, are not acceptable as chairs and spacers.
Maximum chair spacing:  
10M - 600 mm (24")
15M - 1,200 mm (48")
20M - 1,600 mm (64")
25M - 1,900 mm (78")

.2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.

.3 Prior to placing concrete, obtain Consultant's review of reinforcing material and placement. Provide minimum 24 hours notice prior to concrete placement for review.

.4 Ensure cover to reinforcement is maintained during concrete pour.

.5 Protect epoxy coated portions of bars with covering during transportation and handling. Repair in accordance with EM-69.

.6 Lap wire mesh sections at least 6" and wire tighter securely; discontinue wire mesh at joints.

.7 Clean reinforcing before placing concrete.

.8 Ensure welded wire fabric is lifted to centre of slab (or where indicated) during concrete placing.

### 3.3 Field Touch-Up

.1 Touch up damaged and cut ends of epoxy coated reinforcing steel with compatible finish to provide continuous coating.

### 3.4 Field Quality Control

.1 Independent inspection and testing company may be appointed and paid for by Owner to conduct mill tests – physical and chemical analysis of reinforcing steel supplied. Refer to Division 1.

.2 Cooperate with and assist inspection and testing company’s personnel during inspection and tests.

.3 Remove defective materials and complete work which fails tests and replace as directed by Consultant.

END OF SECTION
PART 1 - GENERAL

1.1 Related Sections

.1 Section 03 10 00 - Concrete Formwork.
.2 Section 03 15 00 - Concrete Accessories – Anchors.
.2 Section 03 20 00 - Concrete Reinforcing.
.3 Section 03 35 05 - Concrete Floor Hardeners.
.4 Section 03 35 00 - Concrete Finishing.
.5 Section 05 12 23 - Structural Steel for Buildings.

1.2 References

.1 American Society for Testing and Materials (ASTM)
   .2 ASTM C 260-06, Specification for Air-Entraining Admixtures for Concrete.
   .3 ASTM C 309-07, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
   .4 ASTM C 332-07, Specification for Lightweight Aggregates for Insulating Concrete.
   .5 ASTM C 494/C494M-08, Specification for Chemical Admixtures for Concrete.
   .6 ASTM C 827-1827M-02, Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures.
   .7 ASTM C 939-02, Test Method for Flow of Grout for Preplaced-Aggregate Concrete.
   .8 ASTM D 412-06a, Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
   .9 ASTM D 624-00 (2007), Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
   .10 ASTM D 1751-04, Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
   .11 ASTM D 1752-04a, Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

.2 Canadian General Standards Board (CGSB)
   .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
.2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 CGSB 81-GP-1M-10M-79, Flooring, Conductive and Spark Resistant.

.3 Canadian Standards Association (CSA)
   .1 CAN/CSA-A5-93, Portland Cement.
   .2 CAN/CSA-A23.1-09, Concrete Materials and Methods of Concrete Construction.
   .3 CAN/CSA-A23.2-09, Methods of Test for Concrete.
   .4 CAN/CSA-A23.5-M86(R1992), Supplementary Cementing Materials.
   .5 CAN/CSA A363-M88(R1996), Cementitious Hydraulic Slag.

1.3 Samples
   .1 Submit samples in accordance with Division 1.
   .2 At least 4 weeks prior to commencing work, inform Consultant of proposed source of aggregates and provide access for sampling.

1.4 Certificates
   .1 Submit certificates in accordance with Division 1.
   .2 Minimum 4 weeks prior to starting concrete work submit to Consultant manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
      .1 Portland cement.
      .2 Blended hydraulic cement.
      .3 Supplementary cementing materials.
      .4 Grout.
      .5 Admixtures.
      .6 Aggregates.
      .7 Water.
      .8 Waterstops.
      .9 Waterstop joints.
      .10 Joint filler.
      .11 Bonding agent
      .12 Curing compound
      .13 Column anchor bolts
      .14 Sealant
      .15 Specified admixtures
.3 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.

.4 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.

.5 Anchor Bolt Setting Diagrams: Submit detailed drawings for anchor bolt setting.

.6 Records: Keep a written record of concrete pours, showing location, date, cubic yards or metres of concrete including signed trip ticket for each truck, ambient air temperature, and unusual occurrences during placement of each pour. Permit inspection of records by Consultant at any time. At completion of work, submit a summary of such data in 6 copies to Consultant.

1.5 Quality Assurance

.1 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures in accordance with Division 1 for Consultant's approval for following items:

.1 Falsework erection.
.2 Hot weather concrete.
.3 Cold weather concrete.
.4 Curing.
.5 Finishes.
.6 Formwork removal.
.7 Joints.

.2 Qualifications: Provide work of this Section executed by competent installers with minimum of 5 years experience in application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

1.6 Delivery, Storage and Handling

.1 Store materials on site in a manner to prevent damage thereto. Protect from weather. Comply with CSA A23.1, Clause 9.

.2 Protect work of this Section from damage. Protect other work from damage resulting from this work Replace damaged work which cannot be satisfactorily repaired.
1.7 General

.1 Do not place concrete during or before rain. If rain occurs after placing and before initial set of concrete, cover with waterproof material until set. Embedded materials used in parking structural slab for floor drains, pipes and other hardware shall be non-metallic; and a low copper aluminum alloy, as designated in CAN3-B79 or an equally corrosion resistant metal, coated on surfaces in contact with concrete to prevent galvanic corrosion with steel reinforcing or protected against corrosive effects of de-icing chemicals by an effective and durable coating.

.2 Do not use calcium chloride or other chemical in mix to reduce freezing point of concrete.

.3 When ready mixed (mixed in transit) concrete is used, complete discharge of concrete within period of 1 hour after mixing water has been added to dry material except when concrete materials are heated, in which case reduce this period to 30 minutes. When concrete is delivered at air temperature below 4 deg C (39 deg F), ensure temperature at work of not less than 16 deg C (61 deg F) or more than 32 deg C (90 deg F).

PART 2 - PRODUCTS

2.1 Materials

.1 Portland cement to CAN/CSA-A5-93 Type 10 & Type 20 (MS or MSb)


.3 Supplementary cementing materials: to CAN/CSA-A23.5.

.4 Cementitious hydraulic slag: to CAN/CSA-A363.

.5 Water: to CAN/CSA-A23.1.

.6 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density fine aggregates to CAN/CSA-A23.1.

.7 Air entraining admixture: to ASTM C 260.

.8 Chemical admixtures: to ASTM C 494. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.

.1 Admixtures may be added to concrete to provide following specific qualities as required or permitted in this Section shall meet the following criteria:

.1 Workability.

.2 Entrained air content.

.3 Controlled rate of handling.

.4 Compressive or flexural strength.
.2 Admixtures shall conform to ASTM C260 and ASTM C494M except they shall not, individually or in combination, increase shrinkage of concrete compared with a reference specimen of same mix but not contained admixture. Where used individually, following water reducing admixtures are acceptable.

.9 Concrete retarders: to ASTM C 494 water based, low VOC, solvent free. Do not allow moisture of any kind to come in contact with the retarder film.

.10 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents.

.1 Compressive strength: 50 MPa (7,250 psi) at 28 days.

.2 Consistency:

.1 Fluid: to ASTM C 827. Time of efflux through flow cone (ASTM C 939), under 30s.

.2 Flowable: to ASTM C 827. Flow table, 5 drops in 3s, (ASTM C 109, applicable portion) 125 to 145%.

.3 Plastic: to ASTM C 827. Flow table, 5 drops in 3 s, (ASTM C 109, applicable portions) 100 to 125 %.

.4 Dry pack to manufacturer's requirements.

.11 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compressive strength of 35 MPa at 28 days.

.12 Curing compound: to CAN/CSA-A23.1 and at ASTM C309.

.13 Ribbed waterstops: extruded PVC of sizes indicated with shop welded corner and intersecting pieces.

.14 Labyrinth waterstops: extruded PVC of sizes indicated with prewelded corner and intersecting pieces.

.15 Premoulded joint fillers:

.1 Bituminous impregnated fiber board: to ASTM D 1751.

.2 Sponge rubber: to ASTM D 1752, Type I, flexible grade.

.3 Self-expanding standard cork: to ASTM D 1752, Type III.

.16 Weep hole tubes: plastic.

.17 Damproofing below slab on grade:

.1 Place as per Architectural specifications (Division 7).

1. Where not noted in Division 7, provide:

a. Reinforced: two 10 mil thick polyethylene films bonded each side of asphalt treated creped kraft paper, reinforced with 12 mm x 12 mm (½” x ½”) fiberglass scrim.
b. Membrane adhesive: as recommended by membrane manufacturer.

c. Lap damp proof membrane minimum 150 mm (6") at joints and seal. Carry up walls to top of slabs.

d. Seal punctures in damp proof membrane before placing concrete. Use patching material at least 150 mm (6") larger than puncture and seal.

.18 Dampproofing on Foundation Walls:

.1 Place as per Architectural specifications (Division 7).

.19 Bonding agent: Supply ST-433 by Sternson, Sika-Dur Hi-Mod by Sika Chemical or Bondlok by W.R. Meadows of Canada Ltd., SBR Latex by Euclid Chemical or Acrylic Adhesive by C C Chemicals Limited.

.20 Water: Conforming to CSA A23.1 (09).

.21 Anchor Bolts: To meet specified requirements of ASTM A307, Section 1.3. Provide suitable nuts and washers to meet specified requirements of ASTM A563M, Table 11 (Hot dip galvanized to CSA G164-M).

.22 Wet Curing: Water conforming to CSA A23.1, Clause 4, clear and entirely free from any elements which might cause staining of concrete, and minimum 4 mil thick polyethylene film as specified herein.

2.2 Mixes

.1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, to give the quality for all concrete as indicated on drawings and plans.

.2 Ready-mixed concrete and concrete proportions shall be in accordance with CSA A23.1, Clause 12 and as follows:

.1 Minimum allowable compressive strength shall be 30 MPa (4350 psi) at 28 Days of age, unless otherwise noted or shown.

.2 If blended normal Portland cement/cementitious hydraulic slag is used except for floor mixes, slag content shall not be more than 25% of total mass of cement. Total volume of cement in concrete floor mixes shall be 100% Normal Portland Cement.

.3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CAN/CSA-A23.1-09.

.4 Mix designs submitted to outline anticipated 24 hour concrete strength for each type of concrete produced.

.5 Use of calcium chloride not permitted.
.6 Do not change concrete mix without prior approval of Consultant. Should change in material source be proposed, new mix design to be approved by Consultant.

.7 Where air entrainment is required, air content should have a range which is dependant on the exposure class and the aggregate size, based on the requirements outlined in CSA A23.1(09).

PART 3 - EXECUTION

3.1 Preparation

.1 Obtain Consultant's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

.2 Pumping of concrete is permitted only after approval of equipment and mix in writing by Consultant.

.3 Ensure reinforcement and inserts are not disturbed during concrete placement.

.4 Prior to placing of concrete obtain Consultant's approval of proposed method for protection of concrete during placing and curing.

.5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.6 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.

.7 Do not place load upon new concrete until authorized by Consultant.

.8 Confirm surfaces on which concrete is to be placed are free of frost, water and debris before placing concrete.

3.2 Construction Joints

.1 Where construction joints other than those indicated on Drawings are required, locate in consultation with Consultant.
.2 Unless agreed otherwise for specific locations by Consultant, provide shear keys in all construction joints. Normally, form keys from 38 x 89 (2" x 4") material. Depth of keys shall total approximately 1/4 of the depth of member. In deep members, use 2 or more keys. Face of previously placed concrete to be roughened to minimum amplitude of 6.4mm (1/4") at all construction joints (horizontal/vertical). Joints to be free of all debris/loose materials prior to concrete placement.

.3 Construction joints shall be straight and plumb unless otherwise agreed for specific conditions.

.4 Install PVC waterstops in horizontal and vertical construction joints in walls at or below grade, and at other locations where shown. Waterstops shall be continuous throughout length of joint.

.1 Install waterstops to provide continuous waterseal. Do not distort or pierce waterstop in such a way as to hamper performance. Do not displace reinforcement when installing. Tie waterstops in place.

.2 Use only straight heat sealed butt joints in field. Use factory welded corners and intersections, unless otherwise approved by Consultant.

.5 Unless otherwise detailed on the Structural Drawings, reinforcement shall be continuous throughout construction joints.

.6 Maximum length of pour not to exceed 18 m (60 ft.)

3.3 Control Joints

.1 In walls, form grooves for control joints on both faces, as detailed. Unless otherwise noted, cut or stop alternate horizontal reinforcing bars at the joints. Sealant and sealant backing - under Sealant Section in Division 7.

.2 In slab on grade floors, form or sawcut control joints as detailed. Where 'diamonds' or other isolation joints are shown to be constructed around columns or piers, place after the floor has been concreted and sawcuts have been made.

.3 Use 10 mm (3/8") thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 10 mm (3/8") of finished slab surface unless indicated otherwise.

3.4 Expansion Joints

.1 Provide expansion joints where shown and as detailed.

.2 In exterior walls, or interior walls against soil, install PVC waterstop for full length of joint. Fill joint with pre-moulded plastic foam filler to within 25 mm (1") of wall faces. Sealant and Sealant Backing - under Sealant Section in Division 7.

.3 Take special care to prevent concrete 'bridging' over expansion joints. Carefully pack around bearing pads with expansion joint material to maintain freedom of movement of joint.

.4 Expansion joints in floors and walls shall be continuous from one to the other.
3.5 Construction

.1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1 (09).

.2 Sleeves and inserts.
   .1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where indicated or approved by Consultant in writing.
   .2 Where approved by Consultant in writing, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 mm x 100 mm (4” x 4”) not indicated, must be approved by Consultant.
   .3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Consultant before placing of concrete.
   .4 Check locations and sizes of sleeves and openings shown on drawings.
   .5 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

.3 Anchor bolts.
   .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
   .2 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
   .3 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.

.4 Drainage holes and weep holes:
   .1 Form weep holes and drainage holes in accordance with Section 03100 - Concrete Formwork. If wood forms are used, remove them after concrete has set.
   .2 Install weep hole tubes and drains as indicated.

.5 Dovetail anchor slots:
   .1 Install continuous vertical anchor slot to forms where masonry abuts concrete wall or columns.
   .2 Install continuous vertical anchor slots at 800 mm (32”) o.c. where concrete walls are masonry faced.

.6 Grout under base plates and machinery using procedures in accordance with manufacturer’s recommendations which result in 100 % contact over grouted area.

.7 Finishing.
   .1 Finish concrete in accordance with CAN/CSA-A23.1 and Section 03362.
.2 Use procedures acceptable to Consultant or those noted in CAN/CSA-A23.1 to remove excess bleed water. Ensure surface is not damaged.

.3 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.

.8 Installation

.1 Preparation for placing concrete:

.2 Ensure that foundation excavations are free of frost or water before placing concrete. If a sump is required for pumping water from the excavation, excavate it outside the area of the foundation. Remove any wet or disturbed soil just prior to placing concrete.

.3 Before placing concrete, check that all forms are rigid and structurally safe, and that all reinforcing steel, formwork, sleeves, anchor bolts and other items are installed in accordance with the drawings and specifications. Ensure that all trades have checked the security and location of all components required in the concrete by those trades.

.4 Ensure that the electrical conduits have been properly set in the mid-height of the slab, beam, or other concrete. Avoid concentrations and crossing of conduit. Any such concentrations which are required shall be approved by the Consultant before concrete is placed. The Contractor shall co-ordinate the placing of reinforcement with the Electrical Subcontractor to ensure that both conduit and reinforcement are properly placed.

.5 Immediately prior to placing concrete slabs on granular base, moisten the base material to reduce absorption of moisture from the concrete.

3.6 Site Tolerance

.1 Concrete tolerance in accordance with CAN/CSA-A23.1 straight edge method and Section 03 35 00.

3.7 Field Quality Control

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory approved by Consultant in accordance with CAN/CSA-A23.1 and Division 1.

.2 Costs of tests as specified in Division 1.

.3 Contractor will take additional test cylinders during cold and hot weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.4 Concrete cylinder test. Three cylinders from each Day's pour for each 76.5m³ (100yd³) of concrete, or for each 30.5m³ (40yd³) of concrete poured in small amounts on successive Days.
.5 Air entrainment test and slump test made from same batch of concrete from which test cylinders are made.

.6 Tests will be made in accordance with CSA A23.2.

.7 Inspection Company's reports of tests will be forwarded to Consultant and Contractor with an opinion or reason for any abnormalities noted thereon.

.8 Cooperate with and assist Inspection Company's personnel during inspection and tests.

.9 Remove defective materials and completed work which fails tests and replace as directed by Consultant.

.10 Where work or materials fail to meet strength requirements as indicated by test results, pay costs of additional inspection and testing required for new replacement work or materials.

.11 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.

.12 Inspection or testing by Consultant will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

3.8 Depositing

.1 Notify the Consultant at least 24 hours before each day's operation of placing concrete.

.2 Convey concrete from the mixer to the place of final deposit by methods which will prevent:

   .1 The separation or loss of ingredients. Chutes, if used, shall be rounded in cross-section and have a minimum diameter of 8 times the maximum aggregate size.

   .2 Do not displace rebar and/or mesh from their specified location.

   .3 Do not deposit any concrete in the work which has partly hardened or which has been contaminated with foreign matter.

   .4 Cast footings, beams and slabs their full design depth in 1 operation. In upstand beams, stepped footings and similar details cast the upper portion as soon as stiffening of the lower portion will permit. The consistency of the lower portion shall be of lower slump than generally specified for the class of work. Remove any free water or laitance from the lower portion before the subsequent layer of concrete is placed.

   .5 Immediately before placing concrete in walls, cover the bottom of the form with a layer of stiff grout. Proportions of cement and sand in the grout shall be similar to that in the concrete being used in the wall.

   .6 Place and consolidate concrete in floors (suspended and on grade) and screed to level ready for finishing under the concrete floor finish section.

   .7 Do not exceed 1.5 m (5'-0") for the free vertical drop of the concrete unless special measures are taken to prevent segregation.
.8 Where pumps are to be used for placing concrete design the concrete mix accordingly. Maintain design slump at point of entry into pumps and add superplasticizer to take into account the slump lost during the pumping process.

.9 Unless otherwise agreed by the Consultant, consolidate concrete including slabs on grade in place by means of internal vibrators. Use the largest vibrator consistent with the type and location of concrete being placed. Vibrators shall be in accordance with CSA A23.1, table 14.

.10 When concrete is being placed in deep members (such as walls and footings) vibrators shall be inserted and withdrawn vertically, and shall not be used to flow concrete into final position. They shall be lowered through the full lift of concrete into the lift below, so as to ensure blending of the concrete in the two lifts.

.11 Apply vibrators systematically and at such spacing that the zones of influence over-lap. Do not over-vibrate.

.12 Keep 1 spare vibrator for every three vibrators in use, in case of breakdown.

.13 After completing concrete in walls or columns, allow at least two hours before placing slabs and beams supported thereon.

.14 Install continuous waterstops in location shown, fixed rigidly in forms prior to concreting. Waterstop splices to be heat welded in such a manner that the water stopping action will not be impaired.

.15 Install dovetail anchor slots where masonry abuts or covers concrete walls and columns. Make maximum spacing on concrete walls 600 mm (24”).

.16 Architectural Exposed Concrete: Place concrete conforming to Clause 28 or CSA A23.1 and in accordance with 03 35 00.

.17 Floor slabs with Surface Hardener Finish: Cast with a maximum slump of 75 mm (3”) when being placed; with an air content not exceeding 3%. Add no admixture to concrete mix that will increase bleeding.

3.9 Cold Weather Protection

.1 When the air temperature is below, or is likely to fall below 5 deg C (40 deg F) (as forecast by the local meteorological office) carry out all concrete work in accordance with the recommendations of CSA A23.1, Clause 21.2. Have all equipment prepared and operational before commencing to place concrete.

.2 When heated concrete is exposed to drying effects of wind, provide adequate windbreaks to protect the surface.

.3 Methods of heating shall be such as to prevent discharge of combustion products over, or drying of, surface of fresh concrete.

.4 Keep a permanent temperature record conforming to following requirements:
.1 Records to show date, time, outside temperature and maximum and minimum temperature at several points within any enclosure, before the placing of concrete in or above enclosure.

.2 Use maximum and minimum type thermometers for measuring temperature. If concrete is placed on forms heated from an enclosure below, place thermometers close to the underside of the forms. Temperature record to be kept available for Consultant's inspection at any time.

.3 Temperature of air within enclosures shall not exceed 32 deg C (90 deg F). Maintain concrete temperatures at 21 deg C (70 deg F) for 5 days. Removal of concrete protection shall conform to CSA A23.1, clause 21.2.6.

.4 Do not place concrete on frozen ground, on ground which contains frozen materials, nor on or against any surface which is at a temperature of less than 10 deg C (50 deg F.).

3.10 Hot Weather Protection

.1 Carry out hot weather concreting, unless otherwise specified, in accordance with CSA A23.1.

.2 Protect concrete from effect of hot or drying weather conditions. Protect forms and reinforcing from the direct rays of the sun, or cool by fogging and evaporation.

.3 Refer to curing article for special curing precautions in hot weather.

3.11 Curing

.1 Protect and cure concrete in such a manner as to prevent evaporation of moisture from the concrete and injury to the surface.

.2 When the air temperature may exceed 27 deg C (80 deg F) curing shall be by methods which keep the surface continually moist for at least 7 days after placing, commencing immediately the concrete has set sufficiently. Moisture shall be applied by fogging or by the application of wetted burlap, or by other acceptable methods which will not damage the surface. A curing membrane is not acceptable under these conditions.

.3 When the temperature will not exceed 27 deg C (80 deg F) a curing membrane specified herein may be used. Membrane curing over slab shall be compatible with finish to be applied. For sidewalks, curbs and similar exterior concrete, use a membrane specified herein.

.4 Do not use a curing membrane on architectural exposed concrete or where a topping is to be applied.
For vertical surfaces, forms shall be left in place for a minimum of seven curing days or alternatively forms may be stripped earlier, and the surfaces kept covered with wet burlap, subject to the Consultant's approval. Wood forms remaining in place shall be wetted down during periods of hot weather.

Except as noted herein above, curing of finished concrete floors and concrete toppings under Concrete Floor Finishes Section.

3.12 Non Shrink Grout

.1 Grout between column and base plates and bearing surface of concrete piers and foundations and/or masonry walls. Use a premix non-shrink grout in accordance with the manufacturers directions, and with a minimum 28 day strength of 50 MPa. Base plates up to 15" square shall be dry-packed. Place a rigid form on 2 adjacent sides and pack grout against the form from the other sides.

.2 Where accessibility is difficult and for bases in excess of 15" square use a flowable grout. Install the grout with a positive hydraulic head and ensure that provision is made for escape of air from below the baseplate.

.3 In areas where the grout is exposed in the finished work, use a non-staining material.

.4 When grout is being placed at air temperatures below 4 deg C (40 deg F), ensure that concrete, grout and steel is preheated to 21 deg C (70 deg F) before grouting. Enclose grouted area (including nearest 1.5 m (5') length of all steel connecting to the base) and maintain at 10 deg C (50 deg F) for a minimum of 3 days. If required by Consultant, submit a written proposal describing the heating methods to be adopted.

3.13 Miscellaneous Concrete

.1 Be responsible for grouting and concrete work, reinforcement, formwork, and similar items including supply and placing of all materials for exterior concrete, platforms, toppings, housekeeping pads and curbs for mechanical and electrical work, benches, stairs, paving and landscape components:

.2 Construct trenches and pits. Angle frames and covers to be supplied under Division 05 but installed under this Section.

.3 Provide and install concrete fill for treads and landings of steel stairs where shown. Use concrete with 10 mm (3/8") maximum aggregate in treads 20 mm (3/4") in landings, and reinforced with 4 x 4 x w1.5/w1.5 welded wire mesh, tied to 6 mm (1/4") studs welded to steel pans. Studs to be provided and installed under the Steel Stair and Railling Division 05.
.4 Construct catch basins and manholes as shown and detailed. Install standard safety ladder rungs. Pipe connections to be supplied and installed under the Plumbing and Drainage Section. Masonry top, frames and grating to be supplied under the Masonry and Manufactured Specialties Sections 04200 and 10999 respectively.

.5 Construct concrete bases, as shown on Drawings and as required by other sections.

.6 Construct concrete curbs as shown on Drawings.

.7 Follow Division 32 Concrete Paving for concrete construction for landscape applications.

.8 Division 33 Utilities: Utility Structures requiring concrete to follow Division 03 requirements.

3.14 Patching

.1 Make good temporary openings left in concrete work for pipes, conduit, ducts, shoring and other such work, using mix or mortar of same proportions as surrounding work, reinforced with wire mesh as required, and finish to match surrounding work.

.2 Have enough expert cement finishers available to complete required patching on same day as forms are stripped.

.3 Make good/patch/infill all openings in slabs/walls in existing buildings that are no longer being used/or have been previously abandoned. Where the demolition of any mech/elect/arch elements passing through/embedded in slabs and walls leaves openings/penetrations these are to be patched/infilled. Refer to typical details for infill requirements u/n otherwise on plans and sections.

END OF SECTION
PART 1 - GENERAL

1.1 Related Sections
  .1 Section 03 30 00 - Cast-In Place Concrete.

1.2 References
  .1 Canadian General Standards Board (CGSB)
    .1 CAN/CGSB-25.20-95, Surface Sealer for Floors.
    .2 CAN/CGSB-25.20-95, Surface Sealer for Floors.
  .2 Canadian Standards Association (CSA)
    .1 CSA-A23.1-09, Concrete Materials and Methods of Concrete Construction.

1.3 Performance Requirements
  .1 Product quality and quality of work in accordance with Division 1.
  .2 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.
  .3 Provide mock-ups of Architectural Concrete elements as outlined as well as mock-ups of landscape concrete at planters.

1.4 Product Data
  .1 Submit product data in accordance with Division 1.
  .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Division 2. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for concrete floor treatment materials. Indicate VOC content.
  .3 Include application instructions for concrete floor treatments.

1.5 Environmental Requirements
  .1 Temporary lighting:
    .1 Minimum 1200 W light source, placed 2.5 m (8'-0") above floor surface, for each 40 sq m (430 ft2) of floor being treated.
  .2 Electrical power:
    .1 Provide sufficient electrical power to operate equipment normally used during construction.
  .3 Work area:
    .1 Make the work area water tight protected against rain and detrimental weather conditions.
.4 Temperature:
   .1 Maintain ambient temperature of not less than 10°C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.

.5 Moisture:
   .1 Ensure concrete substrate is within moisture limits prescribed by finish manufacturer.

.6 Safety:
   .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.7 Ventilation:

PART 2 - PRODUCTS

2.1 Chemical Hardeners
   .1 Type 1 - Sodium silicate.
   .2 Water: potable.

2.2 Sealing Compounds
   .1 Surface sealer: to CAN/CGSB-25.20, Type 2 - water based, clear.
   .2 Surface sealers may not be manufactured or formulated with aromatic solvents formaldehyde halogenated solvents mercury lead cadmium hexavelant chromium and their compounds.

2.3 Curing Compounds
   .1 Select low VOC, water-based, organic-solvent free curing compounds.

2.4 Concrete Stains
   .1 Select low VOC, water-based concrete stains.

2.5 Mixes
   .1 Mixing, ratios and application in accordance with manufacturer's instructions.
2.6 Sealants
   .1 EUCO QWIKJOINT 200 (The Euclid Chemical Company) or similar equivalent approved.

2.7 Carborundum Strips
   .1 Extruded Aluminum Self Anchoring Anit-Slip Strip: CT-22/34A (K.N. Crowder MFG. Inc.) or similar equivalent approved.
   .2 Epoxy/Sand Mix: Sika Dur 30 epoxy and black silica sand or similar equivalent approved.

PART 3 - GENERAL

3.1 Finishing
   .1 Formed Concrete Surfaces
      .1 After removal of fins, replace or treat honeycombing or defects in exposed concrete surfaces according to CSA A23.1 for Formed Surfaces. Refer honeycombed areas to the Consultant for designation as structural or non-structural, and repair according to CAN3 Specifications
      .2 Bring the surfaces of all exposed interior and exterior concrete to a smooth rubbed finish not later than 5-6 hours after removal of forms and in accordance with the requirements of CSA A23.1.
      .3 The producing of smooth surfaces by means of cement plaster will not be permitted unless otherwise specified or scheduled.
   .2 Concrete Floors:
      .1 Leave slabs reasonably level or sloped to drains, ready for finishing.
      .2 Refer to Item 4.2 for finishing.
   .3 Finish types for walls, columns, and other vertical elements are as follows:
      Type 1 – Concrete Exposed with Surface Coatings: Sack rubbed finish, interior - all interior surfaces and any and all exposed rectangular concrete columns noted to be painted or to have applied coatings as noted on finish schedule.
      Type 2 – Concrete Exposed in the Finished Work: Use high density overlay formwork or patterned formwork as detailed on the drawings. Repair imperfections only after consultation with the Architect. For exposed walls in stairwells with patterned finish, refer to architectural drawings and specifications for formwork patterns and tie layouts.
      Type 3 – Concrete Not Exposed in the Finished Work: As formed finish. Fill all surface imperfections (voids & honeycombing) as directed on site by Consultant. Patching material to be approved by Consultant prior to application.
.4 Concrete not exposed in the finished work e.g. exterior concrete below grade, concealed ceiling spaces and wall surfaces to be finished to CAN/CSA-A23.1-M00.

.5 Refer to CSA A23.1, Clause 24 for descriptions of above finishes.

PART 4 - EXECUTION

4.1 Examination

.1 Verify that all surfaces are ready to receive work and elevations are as indicated on drawings.

4.2 Workmanship

.1 Steel trowel concrete slabs to be left exposed or to receive resilient flooring or carpeting. For concrete containing air entrainment float/trowel slab in accordance with A23.1 (09).

.2 Other concrete slabs to be screeded off to true lines and levels shown and left ready to receive finish. Depress slabs where required.

.3 Where floor drains occur, floors to be level around walls and have a minimum 6mm in 1m (1/4" in 30") uniform pitch to drains, unless indicated otherwise.

.4 Co-ordinate with equipment suppliers regarding additional requirements for tolerances on floor level finishes etc.

.5 Plain Floor Finish (unexposed)

.1 Roll or tamp concrete to force coarse aggregate into concrete mix, then screed.

.2 Float surface with wood or metal float or with power finishing machine and bring surface to true elevation.

.3 Steel trowel to smooth and even surface. For concrete containing air entrainment float/trowel slab in accordance with A23.1 (09).

.4 Unless otherwise noted, follow with second steel trowelling to produce smooth burnished surface to within 6mm tolerance when measured in any direction using 3 m (10') straight edge. Do not over trowel.

   a. For floor areas to receive ceramic tile, produce fine broom finished surface to within 3 mm (0.12") tolerance when measured in any direction using 3,000 mm (10') straight edge and not more than 1.5mm (0.06") in 305mm (12") when measured from high points.

   b. For floor areas to receive ceramic tiles that are 300 x 600 mm (12"x24") in size, produce fine broom finished surface to within 1.5 mm (0.06") in 600 mm (24") tolerance when measured in any direction from the high points in the surface.
c. For floor areas to receive epoxy terrazzo flooring or resilient floor finishes, produce fine broom finished surface to within 3 mm (0.12") tolerance when measured in any direction using 3,000 mm (10') straight edge and not more than 1.5mm (0.06") in 305mm (12") when measured from high points.

d. For any floor areas that are to support working equipment/procedure rooms/other floor level sensitive elements, floor flatness to be in accordance with architectural requirements and equipment manufacturer's data where these requirements exceed the tolerances outlined in this specification/construction documents. All equipment requirements/room data sheets to be coordinated prior to placement of concrete.

.5 Sprinkling of dry cement or dry cement and sand mixture over concrete surfaces is not acceptable.

.6 Apply curing compound in accordance with manufacturer's instructions. Do not use curing compound when slab is to receive bonded finish. Damp curing or other approved method shall then be employed.

.7 After curing and when concrete is dry, seal control joints and joints at junction with vertical surfaces with sealing compound.

.6 Floor Finish (exposed)

.1 Finish concrete floors as per Paragraph 4.2, Clauses .1 to .5, and apply floor hardener, non-metallic aggregate at a rate of 5 kg/m2 (1lb / ft2) to manufacturer's instructions.

.2 Apply approved curing/sealing compound to manufacturer's instructions.

.3 After curing/sealing and when concrete is dry, seal control joints and joints at junction with vertical surfaces with sealing compound.

.4 Clean surfaces and apply second coat curing/sealing compound before handing building over to Owner.

.7 Saw cut Joints (Slabs-on-Grade):

.1 Saw cut control joints and construction joints in slab where shown, in straight lines.

.2 Perform saw cutting 12 to 24 hours after concrete has been placed, depending on when saw can be run over concrete surface without leaving tread marks, when concrete can be sawn without dislodging aggregate and before uncontrolled shrinkage has occurred. Do not postpone sawing operations beyond these time limitations.

.3 Spray water on saw blade at all times during sawing. Grind edges of sawcuts to eliminate burrs; do not grind to bevel or chamfer joint edges.

.4 After sawing and grinding, clean joints with a jet of water, and blowout with compressed air. Broom clean residue caused by sawing operation. Seal with joint filler.
.5 When cleaned joints are dry and prior to traffic being allowed over the area, install temporary polyethylene rope in such joints to prevent contamination of same.

4.3 Application

.1 Curing/Sealing:

.1 Liquid Compound Curing/Sealing: Apply compound after saw cutting operations have been completed to all horizontal concrete surfaces, at a rate recommended by compound manufacturer. Clean concrete floor of laitance, tire marks, oil, grease, etc. to the satisfaction of the Consultant prior to applying sealing compound.

.2 Water Curing: Water cure slabs where so designated. Do not use curing/sealing compound. Water down entire area and cover with polyethylene sheets for a minimum of 7 Days. Sheet coverage to include exposed edges. Provide suitable weights to prevent blow-off or displacement of sheets. Remove cover after minimum 7 consecutive Days. Allow to air dry until concrete has developed design strength.

.2 Anchor Bolt Protection:

.1 Adequately protect unburied portion of anchor bolts set in concrete, including nuts and washers from rusting, corrosion and damage by a heavy coating of specified coating material; wrap in a manner to exclude moisture.

.2 Clean surfaces to be protected to bare steel followed by the specified protection system.

.3 Grouting: Grout column base plates and miscellaneous work to be grouted in accordance with grout manufacturer's printed directions. Form around bases, place grout in a manner, which will ensure positive bearing of the full area of the steel plate on top of the supporting surface. Thoroughly compact, leaving no voids.

.4 Sealants:

.1 Sealant At V-Joints: Prime, prepare substrate and apply sealant full joint depth in accordance with manufacturer's printed directions. Tool to a smooth semi-concave finish. Exclude joints in surfaces to receive waterproofing treatment.

.2 Sealant at Saw cut Joints/Reglets/Isolation Joints: Do not fill saw cut joints and isolation joints sooner than 30 days after concrete pours. Comply with curing and saw cutting requirements as specified herein. Execute joint sealing as specified herein during cool, dry ambient conditions when slab is in a contracted state to minimize future joint separation at sealant filled joints.

.1 Application:

.1 Remove temporary polyethylene rope from joints or reglets. Clean joints and blow clean with compressed air.
.2 Fill sawn joints in concrete slabs full depth with saw cut joint sealant in accordance with manufacturer's printed directions.

.3 Caulk over isolation joints and reglets with specified sealant per manufacturer's instructions.

.4 Comply with application and substrate temperature requirements. Mask floor to edge of joints and fill joint with sealant. After initial set, prime sealant surface and refill joints with sealant as required to produce slightly convex joint surface.

END OF SECTION
PART 1 - GENERAL

1.1 Section Includes
.1 Materials and installation for concrete floor hardeners, slip resistant coatings, and sheet curing materials.

1.2 Related Sections
.1 Section 03 10 00 - Concrete Formwork.
.2 Section 03 35 00 – Concrete Finishings.

1.3 References
.1 Health Canada - Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).

1.4 Submittals
.1 Submit product data in accordance with Division 1.
.2 Include application instructions for concrete hardener curing compound and slip resistant coating.
.3 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Division 2.
  .1 WHMIS MSDS acceptable to Human Resources Development Canada-Labour and Health Canada for concrete floor hardeners.
  .2 Indicate VOC content.

PART 2 - PRODUCTS

2.1 Floor Hardener
.1 Non-metallic hardener: premixed, dry shake surface hardener, abrasion resistant.

2.2 Slip Resistant Abrasive Aggregate
.1 Emery aggregate: crushed emery, minimum 50 % aluminum oxide.
.2 Homogeneous aluminum oxide, minimum 95%.
.3 Ferric oxide, minimum 25%.
.4 Silicon carbide.
PART 3 - EXECUTION

3.1 Examination
   .1 Verify that slab surfaces are ready to receive Work.

3.2 Hardening
   .1 Apply floor hardener aggregate at rate of 5 kg/m² (1 lb per sq. ft.) in accordance with manufacturer's written instructions.
   .2 Apply slip resistant coating on floor surfaces as scheduled. Apply in strict accordance with manufacturer's written instructions.

3.3 Protection
   .1 Protect finished installation until floor treatment has completely cured.

END OF SECTION
PART 1 - GENERAL

1.1
Related Work

.1 Setting Pressed Steel Frames: Section 06 10 00

1.2
General

.1 The requirements of Division 01 form part of this section.

1.3
Reference Standards

.1 Do masonry work to CAN3-A371-04 except where specified otherwise.

.2 Do mortar and grout work to CSA A179-04 except where specified otherwise.

.3 Do masonry reinforcing and tying to CSA A370-04 and CSA-S304.1-04 unless specified otherwise.

1.4
Source Quality Control

.1 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements, in accordance with Section 01 30 00.

1.5
Samples

.1 Submit samples in accordance with Section 01 30 00:

.1 One of each type of horizontal reinforcement, ties, fasteners and accessories.

.2 As required for testing purposes.

.3 Bricks indicating full range and proportion of colours, texture, pattern.

1.6
Testing

.1 Inspection and testing will be carried out by Testing Laboratory designated by Consultant.

.2 Costs will be paid as specified in Section 01 21 00, except as specified in Section 01 45 00.

1.7
Delivery and Storage

.1 Deliver materials to site in dry condition.

.2 Keep materials dry until use, except where wetting of bricks is specified.
.3 Store materials under waterproof cover on platforms held off ground and in other ways that prevent water from entering the materials.

1.8
Hot Weather
Requirements

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

.2 Pre-dampen manufactured stone units under extremely hot weather conditions. Pre-dampen to manufacturer’s instructions.

1.9
Protection

.1 Keep masonry dry using waterproof non-staining coverings. Drape over wall and extend down both sides sufficient to protect walls from wind driven rain until masonry work is completed and protected by flashings or other permanent construction.

.2 Protect adjacent facework from droppings, marking or damage due to masonry work.

.3 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

PART 2 - PRODUCTS

2.1
Materials

.1 Concrete block: To CSA A165 Series-04. Size: metric modular. Block to be manufactured by a O.C.B.A. member and conform to the Quality Assurance Program. All blocks autoclave cured or "Bubble Cure, Auto-Cure" or equivalent high early strength, low pressure steam cured block such as manufactured by Permacon or Hoffman.

.1 Classification: H/15/A/M (net area). Provide gross area strength per structural drawings. Use lightweight (type H/7.5/B/M) blocks of L-20S concrete or higher percent solid block as required to achieve fire-rating indicated.

.2 Special Shapes: Provide bullnosed units for exposed corners. Provide purpose made units for lintels, columns, and bond beams.
2.2 Reinforcement

.1 Reinforcing bars: CSA G30.18-M92, Grade 400.

.2 Horizontal reinforcement: Galvanized, truss type, 50mm narrower than wall. Side rods min. 3.7mm dia., use heavier rods where called for.

.3 Corrugated ties: Min. 1.6mm thick x 25mm x length to suit, steel, hot dip galvanized. Use only to tie new blockwork to existing blockwork.

2.3 Mortar Types

.1 To CSA A179. Use only clean washed sand, clean potable water, and low-alkali cement (i.e. 0.6% alkali or less by weight).

.1 Blockwork: Type "S" based on property specifications.

.2 Grout: 15 MPa pea gravel concrete conforming to Section 03 30 00 with sufficient water to produce pouring consistency without separation of ingredients. Grout slump shall be not less than 225mm and not more than 270mm.

.2 Admixtures: Do not incorporate admixtures without prior written approval from Consultant.

2.4 Material Source

.1 Use same brands of materials and source of aggregate for entire project.

2.5 Exposed Masonry Faces

.1 Notwithstanding visual inspection requirements of CSA standards, masonry units shall be free of surface indentations, surface cracks due to manufacture, or chipping. Cull units so delivered from use for exposed purposes.

PART 3 - EXECUTION

3.1 Workmanship

.1 Build masonry work true-to-line, plumb, and level, with vertical joints in alignment.

.2 Assume complete responsibility for dimensions, plumbs, and levels of this work and constantly check same with graduated rod.
.3 Layout coursing and bond to achieve correct coursing heights, continuity of bond above and below openings, with minimum of cutting.

.4 Remove excess mortar daily and mortar contamination of adjacent work immediately.

.5 Lay masonry in running stretcher bond except as otherwise noted or indicated.

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

.7 Carry up walls in a uniform manner, raise no one portion more than 1.2m above another at any time. Build no more than 1.5m of wall measured vertically in any one day.

.8 Extend non-bearing partitions to underside of floor or roof above except as otherwise specified.

.9 Clean sand, dirt and other contaminants from bonding surfaces of masonry units before laying.

.10 Align masonry units within 15 seconds of placement.

.11 Lay hollow masonry units with face shell and head joints fully mortared on both faces.

.12 Except for head joints left open for weep holes and ventilation, lay solid masonry units with full head and bed joints.

3.2 Tolerances

.1 Tolerances in notes to Clause 5.3 of CAN3-A371 apply. Variation in vertical alignment : 20mm over height of building. Variation in lateral alignment : 13mm. Variation in level alignment ( joints) : 13mm. Variation of mortar tickness : 3mm. Variation in opening size : 6mm.

3.3 Mortar Mixing

.1 Mix mortar in accordance with CSA-A-A179.

.2 Mortar mixing to be supervised by a competent experienced person with min. 7 years of concrete block construction.

.3 Accurately measure all mortar ingredients, including water.
and thoroughly mix using a mechanical mixer for at least five minutes.

.4 Use mortar within two hours of mixing.

.5 Do not use re-tempered mortars.

3.4 Jointing

.1 Allow joints to set just enough to remove excess water then tool with round jointer to provide smooth, compressed, uniformly concave joints. (except as indicated or noted). Tool joints at consistent mortar hardness.

.2 Rake out joints to accept metal flashing and wedging where indicated.

.3 Make exposed joints in lintels and bond beams to match adjacent walls.

3.5 Cutting Masonry

.1 Cut out neatly for electrical switches, outlet boxes, and other recessed or built-in items. Make cuts straight, clean, and free from uneven edges. Use approved type power saw to cut masonry units exposed in finished work.

3.6 Building-In

.1 Build in items required to be built into masonry including door and window frames, anchors, nailing strips and other items.

.2 Brace metal frames to prevent distortion. Fill frame voids with mortar or grout as wall is erected.

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

.4 Build in sleeves, frames and boxes for passage of pipes, ducts and conduits.

.5 Prevent displacement of built-in items during construction.

.6 Do not cover any pipe, conduit chases or enclosures until that work has been reviewed by the Consultant.

.7 Ensure door bumpers are in place prior to grouting door frames.
Provision for Movement

.1 Leave space below structural shelf angles; 12mm or as indicated.

.2 Leave space at top of non-load bearing elements. Do not use wedges.
   .1 Under concrete slabs leave 20mm space.

3.8 Horizontal Reinforcing

.1 Install continuous horizontal reinforcing in concrete block walls at max. 400mm o.c. (or 200mm where indicated).

.2 Bond walls of two or more wythes using adjustable horizontal reinforcement at max. 400mm vertically and 600mm o.c. horizontally, except as otherwise noted.

.3 Additionally place reinforcing in the first and second joints above and below openings. Extend 600mm beyond each side of opening.

.4 Reinforce masonry where thickness is reduced by a column or chase with a length of horizontal reinforcing in the joint of every block course and extending 1.2m beyond each end of column or chase.

.5 Utilize "L" and "T" shaped joint reinforcement at corners and abutting partitions.

.6 Tie intersecting non-bearing walls together with reinforcing in every second course.

3.9 Earthquake Reinforcing

.1 Reinforce load bearing masonry in accordance with Ontario Building Code and as indicated.

.2 Reinforce following masonry elements in accordance with CAN3-A371 and as indicated, supplemented as follows:
   .1 Load bearing and lateral load-resisting masonry, and
   .2 Masonry used as exterior cladding, and
   .3 Masonry partitions exceeding 200kg/m2 or 3m in height.

.3 Provide lateral support and anchorage in accordance with CAN3-A371 and as indicated and specified.
   .1 Locate cavity walls veneer reinforcement at max. 400mm o.c. one way and max. 600mm o.c. the other way.

.5 Set dowels in foundations and floor slabs at cores of block to be reinforced.
.6 Install vertical rod reinforcing in cores, sized and spaced as shown on drawings.

.7 Lap reinforcing min. 36 bar diameters at splices.

.8 Anchor reinforcing to floor or foundation and to structure above.

.9 Anchor masonry to structural beams, columns, and walls at max. 800mm oc. vertically and max. 1.2m oc. horizontally.

.10 Embed bolts and anchors solidly in mortar or grout to develop maximum resistance to design forces.

.11 Consult drawings for additional reinforcing.

3.10 Filling Cores

.1 Place and grout reinforcing in accordance with CAN3-A371 and as indicated. Use Hi Lift grouting techniques with maximum pour height of 4.5m. Contractor shall submit grout mix design for approval. Maximum advance of masonry on pour is limited to the grout pour height.

.2 Grout all block cores which are reinforced.

.3 Grout parapet walls solid down to top of structural deck.

.4 Grout block cores solid for two courses below bearing points of structural and stair members, and as indicated on drawings.

.5 Grout and reinforce block cores where required to anchor work of other trades.

.6 Install building paper and wire mesh in the course below cores to be filled. Keep 25mm back from face of units.

3.11 Openings

.1 At all openings in walls form, brace, and set lintel blocks for concrete block lintels. Provide min. 200mm bearing. Install reinforcing and concrete as per structural drawings (or if not shown, use two 15M bars for lintels up to 1.2m wide and use 400mm deep lintel with four -15M bars for lintels up to 2.4m wide.)
.2 At all openings in block masonry walls exceeding 600mm in depth, fill core at each side and for 600mm past the top and bottom of opening with grout and reinforce with reinforcing as specified for wall. Similarly treat openings over 1.2m in depth but extend grout and reinforcement the full storey height.

.3 Place and grout reinforcement for intels and bond beams in accordance with CSA-S304.1, CSA-A371 and CSA-A179.

3.14 Cleaning Concrete Block

.1 Allow mortar droppings on unglazed concrete masonry to partially dry, then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.

.2 Do not use acid, steel wool, wire brushes, or abrasives.

END OF SECTION
PART 1 - GENERAL

1.1 Related Sections
   .1 Section 05 31 00 - Steel Decking.

1.2 References
   .1 American Society for Testing and Materials International, (ASTM)
     .1 ASTM A 36/A36M-05, Specification for Structural Steel.
     .2 ASTM A 193/A193M-07, Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
     .3 ASTM A 307-76, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
     .4 ASTM A 325-07a, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
     .5 ASTM A 325M-07a, Specification for High-Strength Bolts for Structural Steel Joints.
     .6 ASTM A 490M-08a, Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric).
   .2 Canadian General Standards Board (CGSB)
     .1 CAN/CGBS-85.10-99, Protective Coatings for Metals.
   .3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer’s Association (CPMA)
     .1 CISC/CPMA 1-73b, Quick-Drying, One-Coat Paint for Use on Structural Steel.
     .2 CISC/CPMA 2-75, Quick-Drying, Primer for use on Structural Steel.
     .3 CISC Code of Standard Practice (2009)
   .4 Canadian Standards Association (CSA International)
     .1 CAN/CSA G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
     .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
     .3 CAN/CSA-S16-09(10), Limit States Design of Steel Structures.
     .4 CAN/CSA-S136-07, Cold Formed Steel Structural Members.
     .6 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel Structures.
     .7 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.

.9 CSA W59-M1989(R2001), Welded Steel Construction (Metal Arc Welding).

.5 Master Painters Institute
   .1 MPI-INT 5.1-98, Structural Steel and Metal Fabrications.
   .2 MPI-EXT 5.1-98, Structural Steel and Metal Fabrications.

.6 The Society for Protective Coatings (SSPC)
   .1 SSPC SP-6/NACE No. 3-00, Commercial Blast Cleaning.

1.3 Design Requirements

.1 Design details and connections in accordance with requirements of CAN/CSA-S16 and CAN/CSA-S136 (with CSA-S136.1) to resist forces, moments, shears and allow for movements indicated.

.2 Shear connections:
   .1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction" when connection for shear only (standard connection) is required.
   .2 Select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam, when shears are not indicated.

.3 Submit sketches and design calculations stamped and signed by qualified professional engineer licensed in Province of Ontario, Canada for non standard connections.


1.4 Shop Drawings

.1 Submit shop drawings including fabrication and erection documents and materials list in accordance with Division 1.
   .1 Verify site conditions and dimensions on site before shop drawing preparation. Show all on shop drawings.
   .2 Shop drawings must be original. Reproduction of Engineer's design drawings is not acceptable.
   .3 Provide separate fabrication and erection drawings for AESS assemblies, including connection design details and shop details for review by Architect and Engineer.

.2 Erection drawings: indicate details and information necessary for assembly and erection purposes including:
   .1 Description of methods.
.2 Sequence of erection.
.3 Type of equipment used in erection.
.4 Temporary bracings.
.5 Connections.

.3 Ensure Fabricator drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the province of Ontario, Canada.

1.5 Samples
.1 Submit samples in accordance with Division 1.
.2 Prepare sample of typical exposed structural connections in accordance with CISC Code of Standard Practice (Appendix I) Specifications of Architecturally exposed structural steel for approval of Consultant. Samples to be judged upon alignment of surfaces, uniform contact between surfaces, smoothness and uniformity of finished welds. When approved, sample units will serve as a standard for workmanship, appearance and material acceptable for entire project.

1.6 Quality Assurance
.1 Submit 5 copies of mill test reports 4 weeks prior to fabrication of structural steel.
.1 Mill test reports to show chemical and physical properties and other details of steel to be incorporated in project.
.2 Provide mill test reports certified by metallurgists qualified to practice in province of Ontario, Canada.
.3 Provide structural steel Fabricator's affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified and indicated.

1.7 Delivery, Storage and Handling Of Architecturally Exposed Structural Steel (Aess)
.1 Transport, deliver and handle AESS in accordance with Appendix I of the CISC Code of Standard Practice.
.2 Store on site protected from all damage and effects of moisture/environment.

PART 2 - PRODUCTS

2.1 Materials
.1 Structural steel: to CAN/CSA-G40.20/G40.21 Grade 350W and CAN/CSA-S136.
.2 Anchor bolts: to CAN/CSA-G40.20/G40.21, Grade 300W (A307) (unless otherwise noted on drawings).
.3 High strength anchor bolts: to ASTM A 325M.
.4 Bolts, nuts and washers: to ASTM A 325M.
.5 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.
.6 Shop paint primer: to CISC/CPMA 2.
.7 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 0.75 kg/m2 (0.15 lb/ft²).
.8 HSS Sections: to CAN/CSA-G40.21-M01, Type 350W (Class H).

2.2 Fabrication
.1 Fabricate structural steel in accordance with CAN/CSA-S16 and CAN/CSA-S136 and in accordance with reviewed shop drawings.
.2 Continuously seal members by intermittent welds and plastic filler, unless otherwise indicated. Grind smooth.
.3 Provide holes in top and bottom flanges for attachment of wood nailers, as required.
.4 Hot dip galvanize after fabrication.
.5 Architecturally Exposed Steel: Fabricate in accordance with CISC Code of Standard Practice (2009), Appendix I to Category 3 requirements.

2.3 Shop Painting
.1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16 and CAN/CSA-S136.
.2 Clean members, remove loose mill scale, rust, oil, dirt and other foreign matter. Prepare surface according to SSPC-SP-6.
.3 Apply one coat of primer in shop to steel surfaces to achieve minimum dry film thickness of 0.065 to 0.080 mils, except:
   .1 Interior Steel: Concealed
      .1 Surface preparation: to SSPC SP 3-89.
      .2 Primer: One coat iron oxide type: to CAN/CGSB-1.40-M89 (or equivalent).
   .2 Interior and Exterior Steel: Exposed
      .1 Surface preparation: to SSPC SP 6-89 commercial blast cleaning using mechanical shot blast techniques. Hand cleaning not permitted.
      .2 Primer: One coat applied in accordance with architectural finish schedules.
   .3 Loose Lintels/Shelf Angles/Masonry Support Plates: Hot dipped galvanized.
.4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
.5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.
.6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

.7 Primer for steel to receive intumescent paint to be compatible with finish paint specified.
   .1 Refer to Division 07.
   .2 Primer for steel to receive intumescent fireproofing: Determined to be acceptable based on adhesion and compatibility characteristics under laboratory conditions in accordance with ASTM D3359-09e2, Method A and/or ASTM D4541-09e1, and approved by manufacturer of Intumescent fireproofing to be applied.
   .3 Surfaces to receive intumescent fireproofing shall be free and clean of dust, grease, or other foreign matter. Existing coatings (except compatible coating manufacturer approved primer), mill scale or surface contaminants shall be removed.
   .4 Coating manufacturers recommend Commercial Blast Cleaning (SSPC-SP6/NACE No.3). The quality of finish will depend on the quality of the surface to which the coating is applied. The coating will not hide substrate defects.

2.4 Shop Priming for Architecturally Exposed Structural Steel
   .1 Clean and prepare surfaces of as specified for structural steel.
   .2 Immediately after surface preparation, apply primer according to manufacturer's instructions to provide a dry film thickness of 0.038 mm (1.5 mils). Use priming methods that result in full coverage of joints, corners, edges and exposed surfaces.
      .1 Stripe paint corners, crevices, bolts, welds and sharp edges.
      .2 Apply two coats of shop primer to surfaces that will be inaccessible after assembly or erection

PART 3 - EXECUTION

3.1 General
   .1 Structural steel work: in accordance with CAN/CSA-S16 and CAN/CSA-S136.
   .2 Welding: in accordance with CSA W59
   .3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

3.2 Connection to Existing Work
   .1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Consultant for direction before commencing fabrication.
3.3 Markings
   .1 Mark materials in accordance with CAN/CSA G40.20/G40.21. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
   .2 Match marking: shop mark bearing assemblies and splices for fit and match.

3.4 Erection
   .1 Check anchor bolt layout before erection. Arrange for discrepancies.
   .2 Erect structural steel, as indicated and in accordance with CAN/CSA-S16 and CAN/CSA-S136 in accordance with reviewed erection drawings.
   .3 Field cutting or altering structural members: to approval of Consultant in writing.
   .4 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
   .5 Continuously seal members by continuous welds where indicated. Grind smooth.
   .6 Use erection techniques and equipment that will not mark or abrade surfaces of exposed structural steel.

3.5 Field Quality Control
   .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Consultant.
   .2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Engineer.
   .3 Submit test reports to Consultant within 1 week of completion of inspection.
   .4 Owner will pay costs of tests as specified in Division 1.

3.6 Field Painting
   .1 Paint in accordance with Division 9.
      .1 Touch up damaged surfaces and surfaces without shop coat with primer to SSPC-SP-6 except as specified otherwise. Apply in accordance with CAN/CSGB 85.10.

3.7 Galvanizing Touch-Up
   .1 Touch up galvanized surfaces damaged during transportation, handling, storage, and erection and as a result of work of other sections.
   .2 Touch up in accordance with ASTM A780.
   .3 Clean damaged surfaces with stiff wire brush to remove rust, loose and cracked coatings.
.4 Clean welds, bolted connections and abraded areas.
.5 Apply galvanizing repair materials to match hot dip coating weight and appearance.

3.8 Erection of AESS
.1 Erect AESS in accordance with Appendix I of the CISC Code of Standard Practice.

END OF SECTION
ROUGH CARPENTRY

1. The requirements of Division 01 form part of this section.
2. Lumber: CLSAB identified softwood to CSA O141-99 and NLGA 2004, max. 19% MC, S4S. Finger jointed material unacceptable.
3. Joists, studding, framing: SPF, No. 2 structural grade or better.
4. Exposed boards: White Pine, No. 2 common grade or better.
5. Furring blocking, nailing strips, grounds, rough bucks: SPF or DF; boards to be #3 common, dimension sizes to be structural grade.
6. Cants, curbs, nailers, for roofing: #3 structural, northern species.
7. Plywood: DFP to CSA O121-03 or CSP to CSA O151-98.
8. Plywood: DFP or CSP; sheathing grade, 19mm or as indicated. Use exterior grade for roofing, wall openings, sills and where indicated.
9. Nails: To NBC 9.23.3, galvanized for exterior, exterior wall, roof work and for pressure treated wood: spiral. Rough hardware, hot dipped galvanized with 600g zinc/m² to CAN/CSA G164-92 or “Climaseal” or “Sentri” coated. Electroplated galvanizing is not acceptable.
10. Fur, frame and strap at max. 400mm o.c. except as noted.
11. Provide furring and blocking for items to be attached. Provide electrical back boards.
12. Rough carpentry indicated shall not be regarded as complete or exact. Conform to OBC Section 9.23 and as additionally indicated.
13. Install all doors in frames as per Sections 08 11 00.
14. Prepare for and install all hardware specified under Section 08 71 00.

- END -
PART 1 - GENERAL

1.1 Related Work .1 Fire Dampers: Division 23

1.2 General .1 The requirements of Division 01 form part of this section.

1.3 Scope of Work .1 Do all firestopping except as specified under other sections.

1.4 References .1 CAN/ULC-S102-03, Test for Surface Burning Characteristics of Building Materials and Assemblies.
 .2 CAN4-S115-05, Fire Tests of Firestop Systems.

1.5 Shop Drawings .1 Submit shop drawing and product data in accordance with Section 01 30 00.
 .2 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.
 .3 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation.

PART 2 - PRODUCTS

2.1 Materials .1 Firestopping and Smoke Seal Systems: in accordance with CAN4-S115.
 .1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115 and not to exceed opening sizes for which they are intended and
conforming to special requirements specified in 3.5.
.2 Firestop system ratings: equal to abutting assembly, Type "F".
.3 In return air plenums: flame spread max. 25 and smoke developed max. 50 to CAN/ULC-S102.

.2 Service penetration assemblies: certified by ULC in accordance with CAN4-S115 and listed in ULC Guide No. 40U19.

.3 Service penetration firestop components: certified by ULC in accordance with CAN4-S115 and listed in ULC Guide No. 40 U19.13 and ULC Guide NO. 40 U19.15 under the Label Service of ULC.

.4 Fire resistance rating of installed firestopping assembly not less than the fire resistance rating of surrounding floor and wall assembly.

.5 Firestopping at openings intended for ease of re-entering such as cables: elastomeric seal.

.6 Firestopping and smoke seal at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.10 Sealants for vertical joints: non-sagging.

PART 3 - EXECUTION

3.1 Preparation .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are dry and frost free.
.2 Prepare surfaces in contact with firestopping materials and smoke seal to manufacturer’s instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.2 Installation

.1 Install firestopping and smoke seal material and components in accordance with ULC certification and manufacturer’s instructions.

.2 Seal holes or voids made by penetrations, poke-through termination devices, and unpenetrated openings or joints and gaps in construction continuity to ensure continuity and integrity of fire separations are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to a neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

3.3 Inspection

.1 Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 Schedule

.1 Firestop and smoke seal at:
   .1 Penetrations through fire resistance rated masonry, gypsum board partitions, ceilings and walls.
   .2 Top of fire resistance rated masonry, gypsum board partitions, and walls.
   .3 Intersection of fire resistant rated gypsum board partitions with masonry and concrete.
   .4 Penetrations through fire resistant rated gypsum board ceilings.
.5 Openings and sleeves installed for future use through fire separation.
.6 Around new mechanical and electrical assemblies penetrating existing floors, ceilings, corridor walls, service room walls, and other fire rated separations.
.7 Around mechanical and electrical assemblies penetrating rated fire separations including new in new, new in old, old in new.

.2 Smokeseal at locations in item 3.4.1 which are unrated fire separations where abutting materials cannot be tightly fitted.

3.5 Special Requirements

.1 Location of special requirements for firestopping materials at openings and penetrations in fire resistant rated assemblies are as follows:
   .1 Movement: 10% at intersection of dissimilar construction assemblies.
   .2 Designed for reentry: at openings for data, phone and TV cables of walls, of electrical rooms, computer rooms, and server rooms.
   .3 Designed for sound and vibration control: mechanical rooms and music rooms.

3.6 Clean-Up

.1 Remove excess materials and debris and clean adjacent surfaces immediately after application.

.2 Remove temporary dams after initial set of firestopping materials.

END OF SECTION
STEEL DOORS AND FRAMES

1. **General:**
   1. The requirements of Division 01 form part of this section.
   2. Fabricate welded steel doors and frames to Canadian Steel Door and Frame Manufacturer’s Association. “Canadian Manufacturing Standards for Steel Doors and Frames 1990”. Fire doors and frames: ULC or W.H. listed, labelled and certified to CAN4-S104M and CAN4-S105M. Install fire-rated doors and frames to NFPA-80-99.
   3. Submit shop drawings.

2. **Materials:**
   1. Sheet steel: Commercial grade to ASTM A568 M-04 with ZF001 zinc finish to ASTM A653-04.
   2. Honeycomb core: Structural core consisting of resin impregnated kraft paper, having 19mm cell size.
   3. Primer: For touch-up to CGSB 1-GP-181M.

3. **Fabrication:**
   1. Door faces: Min. 18ga.
   2. Locate screws for glazing stops at maximum 200mm o.c.
   3. Fit butting stops, channels and components tightly to adjacent corners free of sharp corners.
   4. Repair any surface depressions and butted joints with metallic paste filler. Sand to uniform smooth surface.
   5. Touch-up primer where galvanized finish damaged.
   6. Provide black neoprene rubber bumpers.
   7. Fire rated construction: As indicated. Provide ULC or Warnock-Hersey labels.

4. **Installation:**
   1. Set frames plumb and level with maximum diagonal distortion of 2.4mm.
   2. Securely anchor to adjacent construction.
   3. While building in, brace frames at mid-height (and if over 1.2m wide; at centre).
   4. Adjust doors to close without binding. Provide even margins; 1.0mm at hinge, 1.5mm at head and latch side, 13mm at floor.
   5. Reinforce, drill, cut and make good existing frames and doors as required by modifications indicated by drawings and schedules.

- END -
DOOR HARDWARE

1. General:
   1. The requirements of Division 01 form part of this section.
   2. Submit hardware and keying schedules prepared by registered AHC member and verified as to its appropriateness. All similar items to be of same manufacture. Submit catalogue cuts.
   3. Provide door and frame manufacturers with necessary templates.
   4. All doors to be keyed different and master keyed to existing system. Supplier to turn keys over to Owner directly.
   5. Stainless steel: Types 302 or 304.

2. Hardware Items:
   1. Butts: Use Hager, Stanley or McKinney, 1.5 pair per door, or if over 7'-2" high; 2 pair. Exterior doors NRP and stainless steel. Use 4.5" x 4" hinges or if over 3'-4" wide use 5"x4". Metal doors and closer equipped doors to be ball bearing. Standard of acceptance: Hager 1279/BB1279. Finish C26D.
   2. Locksets: Schlage "D" Series, RHO trim, or Corbin CL3300 Series with Newport trim or Sargent "10" Series with LAL trim. Finish C26D. Provide rim or mortise cylinders to suit for exit devices, aluminum doors, shutters.
   3. Closers: LCN 1461 or equivalent by Corbin or Sargent. Provide closers on all fire-separation, exterior and public washroom doors. Use closers conforming to OBC Section 3.8 (barrier free) except as noted. Provide all necessary brackets and accessories. Mount inside room. Through bolt to wood doors. Finish: 689.
   4. Stops: Gallery #200B, 218B or 250 as applicable, or equal by Hager. Finish C26D/C32.
   5. Kickplates: Gallery #80 or equal by Hager, 0.064" x 8" high, C32D.
   6. Overhead Stops: Glynn-Johnson 100 ADJ or 90 or equal by Rixson or Sargent. Through bolt on wood doors.

3. Hardware Types:

   Type 1 closer
   butt hinges
   storeroom lockset
   overhead stop
   Kickplate

4. Installation:
   1. Set angle for stops and holders to Consultant’s approval. Mount floor stops out of line of travel.

- END -
**LEGEND**

<table>
<thead>
<tr>
<th>NEW</th>
<th>EXISTING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Floors</strong></td>
<td></td>
</tr>
<tr>
<td>C  Concrete, sealed</td>
<td>-</td>
</tr>
<tr>
<td>T  Terrazzo</td>
<td>t</td>
</tr>
<tr>
<td>V  Sheet Vinyl</td>
<td>-</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td></td>
</tr>
<tr>
<td>R  rubber 100mm ht.</td>
<td>r</td>
</tr>
<tr>
<td>T  terrazzo 130mm ht</td>
<td>t</td>
</tr>
<tr>
<td><strong>Walls</strong></td>
<td></td>
</tr>
<tr>
<td>D  Drywall</td>
<td>d</td>
</tr>
<tr>
<td>CB Concrete block</td>
<td>cb</td>
</tr>
<tr>
<td>- Plaster</td>
<td>pl</td>
</tr>
<tr>
<td><strong>Ceiling</strong></td>
<td></td>
</tr>
<tr>
<td>D  Drywall</td>
<td>d</td>
</tr>
<tr>
<td>LIT Lay in Tile 610x1220</td>
<td>lit</td>
</tr>
<tr>
<td>existing concrete slab</td>
<td>c</td>
</tr>
<tr>
<td><strong>Finish</strong></td>
<td></td>
</tr>
<tr>
<td>P  Paint</td>
<td>p</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Finish all new interior surfaces. Paint all surfaces in rooms being refinished.
2. Paint all interior doors and frames within work area.
3. Extend all finishes into recesses, closets, etc.
4. Only the predominant substrate is indicated in finish schedule, examine drawings and notes for secondary and miscellaneous substrate and paint them.
5. Paint all exposed gypsum board bulkheads and ceilings.
<table>
<thead>
<tr>
<th>Room No.</th>
<th>Room Name</th>
<th>Floor</th>
<th>Base</th>
<th>Walls North</th>
<th>East</th>
<th>South</th>
<th>West</th>
<th>Ceiling Type</th>
<th>Ceiling Ht.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>102</td>
<td>EXISTING CORRIDOR</td>
<td>t/T</td>
<td>t/T</td>
<td>b-P</td>
<td>b-</td>
<td>b-</td>
<td>b-</td>
<td>lit</td>
<td>+/- 2450</td>
<td>patch and paint at fin wall and repair terrazzo base</td>
</tr>
<tr>
<td>102B</td>
<td>NEW MACHINE RM</td>
<td>C</td>
<td>R</td>
<td>B-P</td>
<td>B-P</td>
<td>B-P</td>
<td>B-P</td>
<td>C-P</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>148</td>
<td>EXISTING CORRIDOR</td>
<td>t/T</td>
<td>t/T</td>
<td>b-</td>
<td>B-P</td>
<td>-</td>
<td>b-</td>
<td>lit/LIT</td>
<td>+/- 2450</td>
<td></td>
</tr>
<tr>
<td>149</td>
<td>PRINCIPALS OFFICE</td>
<td>vct</td>
<td>r</td>
<td>b-</td>
<td>b-</td>
<td>b-</td>
<td>b-</td>
<td>lit</td>
<td>+/-2450</td>
<td>remove and replace LIT panels for Mech work</td>
</tr>
<tr>
<td>LIFT</td>
<td></td>
<td>V</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>CORRIDOR</td>
<td>t</td>
<td>t/T</td>
<td>b-p</td>
<td>b-p/B-P</td>
<td>b-</td>
<td>b-</td>
<td>lit/LIT</td>
<td>2450 +</td>
<td></td>
</tr>
<tr>
<td>231</td>
<td>STORAGE RM</td>
<td>C</td>
<td>R</td>
<td>B-P</td>
<td>B-P</td>
<td>B-P</td>
<td>B-P</td>
<td>c-</td>
<td>3050+-</td>
<td></td>
</tr>
</tbody>
</table>
DRYWALL

1. **General:**
   1. The requirements of Division 01 form part of this section.
   3. Construct fire-rated assemblies to OBC Guidelines, referenced ULC or WHI Designs, or OBMEC Authorizations.

2. **Framing and Furring:**
   1. Non-load bearing channel stud framing: To ASTM C645-04a stud size as shown, roll formed from 25ga. electrogalvanized steel sheet, for screw attachment of gypsum board. Knock out service holes at 450mm o.c. Ceiling and floor track to suit.
   3. Ceiling runner channels 38 x 19mm x 16ga. cold rolled channels, Z275 galvanized.
   4. Runners, hangers, tie wires, inserts, anchors; galvanized.

3. **Gypsum Board:**
   1. Plain: To ASTM C36-M03, 1200mm wide x max. practical length, ends square cut, edges tapered with round edges.
   2. Fire rated: As item 1., but fire-rated and ULC labelled.

4. **Accessories:**
   1. Corner and casing beads: To ASTM C1047-04, fill type, 25ga. galvanized, concealed except as otherwise noted.
   2. Acoustic sealant: CGSB 19-GP-21M.
   3. Acoustic insulation: Glass fibre or mineral wool to ULC S702, purpose made for fitting between steel studs, 100% of wall cavity thickness. ULC labelled in fire rated walls.

5. **Furring and Framing:**
   1. Anchor tracks at maximum 600mm o.c. and at ends to floor, deck, abutting walls, columns.
   2. Frame at 400mm o.c. except as indicated. Frame to structure above except as otherwise noted, but allow for structural deflection. Double stud full wall height at each side of openings and secure studs together.
   3. Screw studs to bottom track, but only to top tracks at ceiling height partitions.
   4. Provide two runner channels over head of openings over 1m in width extending out to engage third stud on each side.
   5. Provide reinforcing and backing for items to be attached.
   6. Diagonally brace bulkheads @ max. 1.2m o.c. Run furring channels at 1.2 max. across unfaced wall faces.
   7. Install ceilings to 1:1200 tolerance, walls and furring to 1:1000 tolerance.
   8. Suspend ceiling runner channels at 1.2m o.c. to support furring channels. Rigidly brace soffits.
   9. Provide for control joints at max. 10m centres in walls and ceilings.
6. **Gypsum Board Application:**
   1. Use screws. Maximum spacing 300mm o.c. on edges and 400mm o.c. in field, except 300mm for fire rated, 150mm for tile backer and cement board. 200mm for gypsum sheathing.
   2. Offset vertical and horizontal joints between layers of gypsum board. Run ceilings boards perpendicular to furring. Run sheathing horizontally.
   3. Laminate gypsum board to Manufacturer's directions.
   4. Install casing beads where gypsum board butts against surfaces having no trim concealing junction. Install continuous insulating strips where gypsum board abuts exterior window and door frames, and above ceiling height partition tracks.
   5. Install access doors to electrical and mechanical services.
   6. Furr in all pipes, ducts, conduits and other services in finished areas.
   7. Provide control joints using back-to-back concealed casing beads in walls and ceilings. Install metal corner beads at external corners.
   8. Extend gypsum board to structure to 100mm above ceiling except as indicated.
   9. Patch: defects in existing drywall construction, where fixtures removed, and where new work installed.

7. **At Fire Separations:**
   1. Shape gypsum board to fit deck profile.
   2. Box in interfering beams, joists, pipes, conduits to maintain integrity.
   3. Line door frame heads and fire damper openings with gypsum board.
   4. Use ULC or WHI labelled acoustic batts.
   5. Box in lights recessed in fire-rated gypsum board ceilings.

8. **Taping & Filling:**
   1. Complete taping, filling and sanding ready for painting: smooth, level, plumb, wave free.
   2. Tape and fill joints covering plastic installation, in acoustic walls, fire separations and behind ceramic tile.

9. **Acoustic Battts and Caulking:**
   1. Wedge acoustic blanket in all voids in partitions indicated so entire wall and all gaps are covered. Pack around built in fitments, electric outlets, door and window frames.
   2. Where noted, continuously caulk junction between gypsum board and abutting construction and around all penetrations. Caulking to be concealed.

- END -
PART 1 - GENERAL

1.1 Related Work .1 Mechanical and Electrical Fixtures: Division 23 and Division 26

.2 Supplementary Light Support Chains: Division 26

1.2 General .1 The requirements of Division 01 form part of this section.

1.3 Reference .1 ASTM-C635-04 Specifications for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

.2 ASTM C636-04 Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

.3 CAN/CGSB 92.1-M89 Acoustical Units, Prefabricated.

1.4 Design Criteria .1 Maximum deflection: 1/360th of span to ASTM C635 deflection test.

1.5 Samples .1 Submit duplicate samples of acoustical units in accordance with Section 01 30 00.

1.6 Environmental Conditions .1 Commence installation after building enclosed and dust generating activities completed.

.2 Permit wet work to dry prior to commencement of installation.

.3 Maintain uniform minimum temperature of 15 degrees celsius and humidity of 20 - 40% before, curing and after, installation.

.4 Store material in work area 48h prior to installation.
1.7 Maintenance Materials

.1 Provide maintenance materials in accordance with Section 01 30 00.

.2 Provide acoustical units amounting to at least 2% of gross ceiling area for each pattern and type required for project. Provide in packages sealed as received from manufacturer.

.3 Materials to be same production run as installed materials.

1.8 Certification

.1 Loading capacity of ceilings to meet requirements of O.H.E.P.C. and referenced ASTM standards. Provide certificate of same signed by both manufacturer and installer if required by Consultant. General Contractor to countersign.

.2 Light support chains are specified in Division 26.

PART 2 - PRODUCTS

2.1 Suspension System for Acoustical Ceilings

.1 Heavy duty systems to ASTM C635.

.2 Basic Material: Commercial quality cold rolled steel, zinc coated, min. 0.50mm core thickness.

.3 Suspension Systems:
   .1 LIT : Fire resistance rated, two directional exposed tee bar grid, certified for use in rated roof assembly.

   .4 Exposed tee bar grid components: Shop painted satin sheen, white. Components die cut. 25mm exposed face. Main tee with double web, rectangular bulb and rolled cap on exposed face. Cross tee: with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.

   .5 Hangers Wire: Galvanized soft annealed steel wire; to ULC design requirements for fire rated assemblies, otherwise 2.6mm diameter (12ga.)

   .6 Hanger Inserts: Purpose made.
.7 Carrying channels: Min. 38 x 19mm channels, min. 1.2mm core thickness, galvanized steel.

.8 Accessories: Splices, clips, wire ties retainers and wall mouldings to complement suspension system components and as recommended by system manufacturer.

2.2 Lay-in Acoustical Panels

.1 Type LIT: To CAN2-92.1-M77; certified for use in 1 hour roof/ceiling and floor/ceiling assembly. Type D (mineral) medium scale non-directional fissured pattern, flame spread rating of 25 or less, smoke developed 50 or less, NRC 0.70min., LR min. 0.83, CAC 35 min., square edge, white, 610 x 1220 x 19mm, flat.

PART 3 - EXECUTION

3.1 Grid Installation

.1 Installation: In accordance with ASTM C636 except where specified otherwise.

.2 Install suspension system to manufacturer's instructions.

.3 Do not erect ceiling suspension system until work above ceiling has been inspected and approved by Consultant.

.4 Secure hangers securely to overhead steel structure (but not to steel roof deck). Use attachment methods acceptable to Consultant.

.5 Support suspension system main tees at maximum 1220mm o.c. and within 150mm from ends of main tees.

.6 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter, with border units not less than 50% of standard unit width, or according to reflected ceiling plan.

.7 Arrange grids so ends of recessed fluorescent fixtures and linear diffusers rest on main tees.

.8 Ensure suspension system is co-ordinated with location of related components.

.9 Hang ceilings independent of walls, columns, fascias, ducts, pipe and conduit. Tie off ends of cross tees.
.10 Install wall mould to provide correct ceiling height.

.11 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles and speakers.

.12 Interlock cross member to main runner to provide rigid assembly.

.13 Frame at openings for light fixtures, air diffusers, speakers, valences, louvres, at changes in ceiling heights, and at perimeter of installation.

.14 Provide pairs of cold rolled carrying channels nested together and tied with hanger wire from structure where required to supplement structural layout and at interferences.

.15 Install grid straight, square, continuous and parallel to building lines.

.16 Finished ceiling system to be level within 1:1000.

.17 Use basket weave installation for 610 x 610 grids.

3.2 Panel Installation

.1 Do not install acoustic panels until painting is mostly complete in the building.

.2 Do not install acoustic panels until the grid and the work above ceiling have been reviewed by Consultant.

.3 Co-ordinate ceiling work to accommodate components of other sections such as light fixtures, diffusers, detectors, speakers, sprinkler heads, to be built into ceiling components.

.4 Install acoustic panels into ceiling suspension system.

.5 Maintain directional pattern running in same direction.

.6 Scribe acoustic units to fit adjacent work and cut holes in tiles to suit all ceiling fixtures.

3.3 Cleaning

.1 Touch up scratches, abrasions, vcids and other defects in painted surfaces.
3.4
Finished Ceiling .1
Finished ceiling shall present a smooth, flush, even, level, continuous surface at elevations called for on the drawings, without perceptible sag, distortion, warp, or surface defects. Warped, soiled or otherwise defective panels shall be removed and replaced with new panels to the satisfaction of the Consultant and at no cost to the Owner. Exposed grid shall be straight, square, continuous and parallel to building lines.

3.5
Existing Ceilings .1
Carefully remove and install existing fire rated grid as required to do work of this project. Replace grid components damaged prior to or during construction with undamaged components salvaged from demolition. Provide hold down clips in existing fire rated ceiling system.

3.6
Cleaning Existing Grid .1
Clean grid, trim and edge mouldings, which are to remain. Remove dirt, grime, and adhesive tape. Use mild, non-abrasive cleaner and applicators with minimal water but sufficient “elbow grease”. Damp rinse away cleaner.

END OF SECTION
TERRAZZO FLOORING

1. General:
   1. The requirements of Division 01 form part of this section.

2. Products:
   3. Accessories: 2.0mm zinc.
   4. Reinforcing mesh: 50 x 50 x 1.6 galvanized steel wire.
   5. Mixes: - Underbed; 1p cement to 4p sand.
      - Topping, base, border; to match existing.

3. Execution:
   1. Install dividers and accessories to match existing layout.
   2. Clean substrate of laitancy, foreign matter.
   3. Floating terrazzo: To TTMAC Detail 2.
   4. Terrazzo base: Similar to TTMAC Detail 5 to match existing.
   5. Clean, seal and finish to TTMAC recommendations.

- END -
PAINTING

1. **General:**
   1. The requirements of Division 01 form part of this section.
   2. Do painting and finishing to CGSB 85-GP series standards, MPI Painting Specification Manual and to material manufacturer’s instructions.
   3. Use MPI “premium grade” finish system.
   4. Paint shall be manufacturers “Top-Line” MPI approved product, meeting or exceeding CAN/CGSB “1” series standards as manufactured by Benjamin-Moore, Pittsburgh, ICI, Para, Pratt & Lambert, Sherwin-Williams or Sico.
   5. Colours as selected by Consultant from Benjamin-Moore Pittsburgh, Glidden, Para, Pratt & Lambert or Sherwin-Williams. If manufacturer used is other than manufacturer selected; submit triplicate samples of each colour selected on white cardstock for approval, along with exact colour formula.

2. **Application:**
   1. Paint paintable surfaces in rooms to be finished, except as otherwise noted.
   2. Finishes and number of coats specified in the schedule are intended to cover surfaces completely. If they do not, apply further coats until complete coverage is achieved as required.
   3. When patching or touching up, paint entire plane to Consultant’s satisfaction.
   4. Paint shall be uniform in sheen, colour and texture, free from brush or roller marks, sags, runs or other defects.
   5. Finish paint exposed mechanical and electrical equipment occurring in finished areas.
   8. Clean existing interior and exterior surfaces to be repainted. Thoroughly remove loose paint and fill flush with suitable material. Clean off bubbled, cracked, crazed or otherwise defective paint by stripping or burning, flatten gloss paint with sandpaper. Leave the entire surface suitable to receive the designated finishes as listed herein and in accordance with the manufacturer’s instructions.
   9. Remove from existing surfaces to be coated, rust, scale, oil, grease, mildew, chemicals and other foreign matter. Thoroughly and heavily sand existing alkyd paint and apply conversion coating.
   10. If coatings on existing surfaces have failed so as to affect the proper performance or appearance of the coatings to be applied, or if such coatings can be easily scraped off, remove them and prepare the substrates properly.

3. **Schedule:**
   1. Use acrylic-latex, two coats, plus one suitable primer except as noted. Use two coats alkyd, plus suitable primer on exterior metal and wood, except as noted.
   2. **Gloss:**
      - Walls - eggshell.
      - Ceilings - flat.
      - Painted doors, frames, cabinetry - semi-gloss.
      - Exterior metal and wood - medium gloss.
      - Service rooms - semi-gloss.
      - Washrooms - semi-gloss.
      - Finish Carpentry - varnish - satin
3. Apply block filler to concrete block and concrete at rate of 1.64 sq.m. per litre. Apply two coats interior acrylic latex (not alkyd enamel).

4. Prime coat on existing surfaces may be deleted except for touch-up.

5. Hardwood to receive stain and two coats satin polyurethane varnish. Confirm specified finishes suitable for thin veneers before proceeding. Submit samples for approval.

- END -
PART 1 - GENERAL

1.1
Related Work .1 Electrical Service: Division 26

.2 Painting Doors and Frames: Section 09 90 00

.3 Phone Line to Machine Room: Division 26

1.2
General .1 The requirements of Division 1 form part of this section.

1.3
Manufacture .1 Approved Product: Garaventa Elvoron CPL 42" x 60" or Savaria Prolift HD42" x 60", with 1:2 cable hydraulics.

1.4
Alternate Manufacture .1 Alternate manufacturers will be considered prior to tender closing as per conditions of Section 00 21 00.

.2 Changes to the work necessitated by use of any alternate will be entirely the responsibility of the elevator supplier.

1.5
Reference Standards .1 Do handicapped lift work to CSA B355, CSA B44, ASME A17.25, Ontario Building Code, applicable codes and regulations, requirements of authorities having jurisdiction, and as additionally called for.

1.6
Associated Work .1 Advise Consultant in writing minimum five (5) days before close of tenders of all necessary associated work not included in this Section and not called for in Tender Documents.

.2 Assume responsibility for providing all necessary work not so reported to Consultant.
1.7
Description of System

.1 Provide one handicap lift as follows:
   .1 Car dimensions: 1067mm wide x 1525mm deep inside.
   .2 Rated load: 635kg exclusive of car and drive.
   .3 Travel: From ground to second floor, a distance of about 3505m serving two landings.
   .4 Openings: 2 front.
   .5 Speed: 0.15 m.p.s. up and down.

1.8
Source Quality Control

.1 Use major lift components from standard product line of one manufacturer except they may be products, either wholly or in part, of another manufacturer provided such items are designed and produced under coordinated specification to ensure high grade, safe and smooth operating system.

.2 Use components only which have performed satisfactorily together under conditions of normal use in not less than two other lift installations of similar design and for a period of at least one year. Furnish names and addresses of owners or managers of buildings in which proposed combination of major components have so performed.

.3 Major components means elevator drive, motor, controller.

.4 Welding:
   .1 Where welding is used for cylinder and pressure piping of hydraulic system, use welders fully qualified for pressure vessel welding.
   .2 Subject welds to radiographic or other non-destructive inspection.

1.9
Continuous
Pressure Operation

.1 Include continuous-pressure operation with operating device in car consisting of flush mounted case with stainless steel faceplate containing "UP" and "DOWN" push buttons, emergency stop button. Cause car to travel in desired direction upon constant pressure of "UP" or "DOWN" button and to stop upon release of button.

.2 Provide keyed call button mounted in door jamb adjacent to each hoistway opening which will cause car to travel to call station.
.3 Arrange controller so that when "UP" or "DOWN" button in car is pressed, landing button circuit is rendered ineffective and remains so until car has stopped and car door opened and again closed.

1.10 Levelling

.1 Provide adjustable terminal limit switch to ensure stopping accurate within 12mm under varying load conditions. Include anti-creep protection and optical sensor levelling device.

1.11 Performance

.1 Provide smooth acceleration and deceleration of car so adjusted as not to cause passenger discomfort.

1.12 Samples

.1 Submit 100 x 100mm samples of elevator finishes in accordance with Section 01 30 00 for cab floor, walls, and ceiling.

1.13 Shop Drawings

.1 Submit shop drawings in accordance with Section 01 30 00.

.2 Indicate on shop drawings:

.1 Driving machine, controller, and other components.
.2 Car guide rails.
.3 Reactions at points of supports.
.4 Top, bottom, and running clearances.
.5 Overall travel of cab.
.6 Location of circuit breakers, disconnect switches, light switch in shaft, travelling cable connections.
.7 Operating fixtures.
.8 Hoistway entrances and door details and method of fastening to building members.
.9 Cab showing details of construction, fastening to platform, lighting, location of car equipment and operating devices.

.3 Include catalogue illustrations of signal and operating devices and hardware.

.4 Furnish component recommendations as per Article 1.7, components above.
.5 Shop drawings to bear stamp and signature of Professional Engineer, registered in Ontario.

.6 Verify site dimensions prior to manufacture.

1.14
Maintenance Data

.1 Provide maintenance data for elevator maintenance. Incorporate into maintenance manual specified in Section 01 30 00.

.2 Include following maintenance data:
   .1 Description of elevator system's method of operations and control including motor control system, door controls, operating devices, and special non-standard features.
   .2 Parts catalogues giving complete list of repair and replacement parts with cuts and identifying and identifying numbers.
   .3 Legible schematic wiring diagrams covering electrical equipment as supplied and installed including changes made in the final work, with symbols listed corresponding to identity or markings on equipment. Cover one copy in plastic or glass, frame and mount on back of access door.
   .4 Lubrication chart, covered, framed, and mounted as above.

.3 Provide Maintenance data lock box: 350H x 75W x 250mm D prefinished steel box with piano hinged end door. Size to accommodate maintenance and regulatory data documents. Piano hinged lockable door on end with eight (8) keys. Mount on wall in machine room.

1.15
Maintenance Service

.1 Include complete maintenance of elevator equipment for a period of twelve (12) months from date of the Certificate of Substantial Performance or installation of initial licence, which ever is later.

.2 Regularly, systematically, semi-monthly examine, clean, adjust and lubricate equipment.

.3 Repair or replace electrical and mechanical parts of elevator equipment as required due to defect and normal wear and tear.

.4 Use only genuine standard parts produced by manufacturer of equipment.
.5 Perform all work by competent personnel under supervision and in direct employ of elevator manufacturer or manufacturer’s licensed agent.

.6 Schedule all work during regular working hours of the trade, with Owner.

.7 Maintain locally adequate stock of parts for replacement or emergency purposes and provide qualified men to ensure fulfilment of this service without undue loss of time in reaching job site.

.8 Owner assumes responsibility for cleaning, repairs, or replacement of car enclosure, hoistway enclosure, hoistway doors and door frames, due to other than defect and normal wear and tear.

.9 Include emergency call-back service at all times at no additional cost.

1.16
Power Supply

.1 Lift: 208v, 3ph., 30amp, 5hp with auxiliary contacts (for cab lowering.)

.2 120v, 1ph, 15amp for car lights and accessories.

PART 2 - PRODUCTS

2.1 Basic Materials and Design

.1 Include basic materials as follows:
.1.1 Steel sheet metal: To ASTM A568M-04 cold rolled sheet, commercial quality to ASTM A653/A653M-01a with galvanizing Z275 coating.
.1.2 Stainless steel sheet metal: To ASTM A666-03, Type 304, with No. 4 belt sanded line finish.
.1.3 Plastic laminate: to CAN3-A172-M79, Group GP, Type HD, 1.5mm thick matt finish. Backing sheet: min. 0.5mm thick sanded surface of same manufacture as facing sheets. Maximum flame spread 25.

.2 Where practical and subject to approval, provide concealed fastenings hidden from public view and designed to withstand normal use. Exposed fastenings to be tamper-proof type, removable only with special tool.
3. Galvanize or treat with rust resistant paint, structural parts of elevator equipment.

4. Language: Use numeric, symbolic or otherwise bilingual identification of operating controls. Provide both French and English instructions.

2.2

Landing Entrance

Door and Frames

1. Doors and frames to be constructed to standards of Section 08 11 00 except as otherwise called for.

2. Purpose designed for handicap lift use, flush with face of shaft.

3. Door and frame to bear ULC labels of 1½ hours. Hardware to be ULC approved for intended use.

4. Glazing: 6mm georgian wired glass panel 75 x 680mm (or to maximum permitted by ULC label). Bottom at 900 above floor.

5. Provide the following hardware:
   1. Concealed automatic power door operator with adjustable speed control and pressure sensitivity.
   2. Swing clear, non exposed heavy duty hinges.
   3. 200mm high stainless steel kickplate.
   4. Aluminum pull on exterior, flush push plate on interior.
   5. True electric and mechanical interlock which prevents opening of other door or movement of cab if one door not fully closed.
   6. Metal thresholds for flush mounting in slab, anti-slip.
   7. Lock shall be time delayed electrically controlled for vandal resistant security.

6. Provide audio alert and digital signal to activate upon door opening/floor arrival.

7. Size of doors: 915mm wide by 2030mm high.

8. Assume complete responsibility for entire installation including doors, frames, hardware, thresholds, wiring and anchors.

2.3

Car Platform

1. Provide structural steel car platform of cantilevered design. Fill platform with steel sub-flooring and plywood sheeting. Include metal door thresholds. Provide sound isolation for bearing surface of platform frame.
2.4
Cab Enclosure

1. Fabricate walls and ceiling of melamine panels on strong rigid enclosure. Provide stainless steel trim. Wall panels to be removable.

2. Include two independent, low voltage, stainless steel trimmed ceiling lights.
   - 1 Design for illumination of 50 foot candles at 760mm above floor.
   - 2 Provide automatic light feature to allow the lights in the car to automatically turn on when the elevator door is open and to stay on when elevator is in use. When elevator is not in use timer will automatically shut off lights.

3. Finish above ceiling metal components in white enamel.

4. Provide 2030 clear height under ceiling.

5. Provide stainless steel and lexan licence holder to suit certificate issued by enforcing authority. Design holder with hidden or tamper-proof fastenings.

6. Provide one piece anti-slip sheet vinyl flooring: Armstrong “Crosswalk” or approved equal.

7. Provide side rail with ends returned to wall. Locate on control side of cab.

8. Provide telephone cabinet in car with telephone symbol and telephone wiring within elevator hoistway to machine room. Identify elevator and name of building on back of cover.

2.5
Emergency Operation

1. Include emergency lighting as follows:
   - 1 Use automatically recharging battery operated emergency lighting equipment, to provide general illumination in car at operating panels and telephone and provide current to alarm bell.
   - 2 Include means for convenient manual operation and testing of each unit from within car
   - 3 Include means of containing any leakage or spillage of electrolyte.

2. Provide manual lowering device which will actuate on failure of normal power supply.
2.6
**Cab Control Panel**

1. Vandal resistant buttons for emergency stop, and alarm, and on/off key switch. Engrave buttons with characters.

2. Provide card-reader activated switch to cause car to proceed to other landing.


4. Mount buttons, switches and indicators in stainless steel panel.

2.7
**Hall Control Buttons**

1. At each entrance, mounted directly on door frame jamb, provide vandal resistant:

2.8
**Keys**

1. Provide ten (10) keys for elevator.

2.9
**Pumping Unit & Motor Control**

1. The pumping unit and motor controller shall be integrally mounted on the pump unit frame and prewired and tested prior to shipment. Control circuitry to be 'solid state' and located in car control station enclosure. The pump unit control valve shall be a 'unit' type which includes all hydraulic control valving inherently. This valve shall incorporate the following features:
   1. Up direction acceleration speed adjustment, for a smooth start.
   2. Smooth stops, at each landing shall be an inherent feature of the valve.
   3. Adjustable pressure relief valve
   4. Manually operable down valve to lower lift in the event of an emergency.
   5. Pressure gauge, indicating in BARS/psi.
   6. Pressure gauge isolating valve, manually operable.
   7. Gate valve, to isolate cylinder from pump unit.
   8. Adjustable flow control valve to set maximum down direction speed.
   9. Electrical solenoid for down direction control.
2.10
Cylinder and Plunger .1 The cylinder shall be constructed of steel pipe of sufficient thickness and suitable safety margin. The top of the cylinder shall be equipped with a cylinder head with an internal guide ring and self-adjusting packing.

.2 The plunger shall be constructed of a steel shaft of proper diameter machined true and smooth. The plunger shall be provided with a stop electrically welded to the bottom to prevent the plunger from leaving the cylinder.

2.11
Cable .1 Minimum two 3/8" IWRC Galvanized Aircraft Cable. Minimum breaking strength is 14,400 lbs. each.

2.12
Safety Device .1 A "Slack/Broken Cable" safety device shall be supplied which will stop and sustain the lift and its rated load, if either of the hoisting cables become slack or breaks. The safety device shall be resettable by the operation of the elevator in the upward direction. A switch shall be mounted in such a position to sense the operation of the safety device, and will open the safety circuit to the controller to prevent operation of the lift in either direction.

2.13
Guide Yoke .1 The 1:2 guide yoke/sheave arrangement shall be supplied with a sheave, guide shoes, roller bearings and adjustable cable guards. The sheave shall be finished with rounded grooves to fit the cables supplied.

2.14
Hydraulic Valve .1 In addition to the standard operating features of the hydraulic control valve, there shall be a pressure sensitive check valve which will activate when negative pressure is sensed in the hydraulic system. The check valve will close and stop the hydraulic jack from descending immediately on sensing negative pressure.
2.15 Terminal Stopping Devices

.1 Normal terminal stopping devices shall be optical sensed at the top and bottom of runway to stop the car automatically.

2.16 Guide Rails and Brackets

.1 One piece steel machined "T" Guide Rails and brackets shall be securely fastened to the building structure.

.2 Brackets shall securely hold the guides in a plumb and straight position regardless of cab loading.

.3 In concealed and service locations, guides shall be bolted through the hoistway enclosure with back-up plates, washers and nuts. In other locations use anchorage concealed on finished side.

.4 Planed "T" elevator rails spliced with machine surfaced fishplates.

.5 Equip each guide shoe with long wearing, low friction, removable, non-metallic wearing inserts.

2.17 Car Sling

.1 Car sling shall be fabricated from structural steel members with adequate bracing to support the platform and cab. The buffer striking member on the underside of the cab sling must stop the elevator before the plunger reaches its down limit of travel. Guide shoes shall be mounted down the top and bottom of the car sling to engage the guide rails. Guide shoes to be solid slipper type with polyurethane inserts.

2.18 Wiring

.1 All wiring and electrical connections shall comply with applicable codes. Insulated wiring shall have flame retardant and moisture proof outer covering and shall be run in conduit, or electrical wireways. Travelling cables shall be flexible and suitably suspended to relieve strain.

2.19 Noise

.1 Limit noise from driving machines to 70dBA measured 1m from machine and 70dBA measured 1 m above platform surface.
PART 3 - EXECUTION

3.1 Arrangement of Equipment

.1 Arrange equipment in shaft so that components can be readily removed for repairs or replacement without dismantling or removing other components.

.2 Arrange equipment for ease of servicing.

.3 Accommodate equipment in space provided.

.4 Except for cab control panel and hall control buttons, arrange equipment to be inaccessible to unauthorized persons.

3.2 Guide Rails and Brackets

.1 Erect guide rails plumb and parallel within maximum deviation of 3mm.

.2 Use metal shims only and provide lockwashers under nuts and tapped bolts.

.3 Compensate for expansion and contraction of guide rails.

.4 Use splice plates and guide rails with contact surfaces accurately machined to form smooth joints.

.5 Where pits are waterproofed, anchor guide rails in pit so as not to reduce effectiveness of waterproofing.

.6 Anchor guide rails to building structure.

3.3 Entrances

.1 Set entrances in perfect alignment with cab, and flush with face of shaft.

.2 Erect and mount entrances and all their components in accordance with labelling requirements.

3.4 Protection

.1 Provide protective coverings for finished surfaces.

.2 Remove protective coverings and clean exposed surfaces after completion.
3.5 Field Quality Control

.1 Perform and meet tests required by CSA B44-04 and authorities having jurisdiction.

.2 Furnish test and approval certificates issued by jurisdictional authorities.

3.6 Permits, Inspections and Licence

.1 Apply and pay for and obtain all permits and arrange for and make all inspections and tests required for lift installation inspection and registration.

.2 Obtain and pay for initial licence.

END OF SECTION
1. The requirements of Division 01 form part of this section.
2. Excavate to shape and dimensions required by the drawings to give bearings satisfactory to the Consultant. Maintain support for footing within their zone of influence. Leave sufficient space to permit construction and inspection of the work. Arrange for inspection and approval of subgrade and placing of footings within 24 hours of exposure of subgrade.
3. Prevent damage to bottoms and sides of excavations from exposure to sun, rain, or frost. Remedy softening of bearing surfaces and over excavation as directed by Consultant. Pump excavations free of water.
4. Take precautions to prevent movement, or settlement of, or damage to, any adjacent buildings, structures, pavements, services or landscaping. Repair any damage caused to satisfaction of Consultant.
5. Granular materials: To OPSS Form 1010; granular, max. 100mm size but max. 50mm size under slab-on-grade. Engineered Fill: Granular A or B, Type 2 compacted to 100%. Crushed stone: Clear crushed stone, free from fines. Sand bedding to OPSS 1004. Place granulars in maximum 200mm lifts. Compact to standard proctor dry density to ASTM-D698; min. 98% under S.O.G.; min. 92% under landscaping; min. 100% under pavings. Do underground power, water and sewer work to Municipal and Utility standards.
6. Backfill from excavated subgrade: Up to underside of foundations: Granular B, Type II. Up to base for concrete slab: min. 300mm Granular B. Compact excavated subgrade. Base for concrete slabs: 200mm Granular A. At trenches, backfill from frost line to underside of granular pavement bases with drier excavated materials.
7. Soils Report may be inspected at Consultant's office, but it is not a warranty of sub-surface conditions. Follow its recommendations.
8. Inspection and testing of soil compaction shall be carried out by independent testing laboratory.

- END -