.8 Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.

.9 Broom-clean paved surfaces; rake clean other surfaces of grounds.

.10 Clean exposed ductwork and structure.

.11 Replace filters.

.12 Clean bulbs and lamps and replace those burned out.

.13 Clean diffusers and grilles.

.14 Clean sinks, faucets, and water closets and controls.

.15 Remove snow and ice from access to building, if applicable.

.16 Maintain cleaning until project, or portion thereof, is occupied by Owner.

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.2 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 014500 - Quality Control.

.2 Section 011100 – *Summary of Work*, article: 'Documents Required at Start, During Contract and Close Out'.

1.2 SUBMISSION

.1 Submit one copy of completed volumes in final form minimum of 15 days prior to substantial performance. For equipment put into use with Owner's permission during construction, submit Operating and Maintenance Manuals within 10 days after start-up. For items of Work delayed materially beyond date of Substantial Performance, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

.2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.3 Copy will be returned after inspection with Consultant's comments.

.4 Revise content of documents as required prior to final submittal.

.5 Submit 2 copies of revised volumes of data in final form within 10 days after final inspection.

.6 For contract drawings (architectural, structural, mechanical, and electrical), transfer neatly as-built notations onto second and third set and submit all three sets. Preliminary submission of all manuals is required for Substantial Completion to be issued. Submission of final manuals to the Architect is a mandatory requirement of Total Performance of the Contract.

1.3 FORMAT

.1 Organize data in the form of an instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;

.1 date of submission; names,

.2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

1.5 AS-BUILTS AND SAMPLES

.1 In addition to requirements in Sections 002113 Instructions to Bidders, 011100 Summary of Work and Stipulated Price Contract-1998, maintain at the site for Owner one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to the Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Consultant.

1.6 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Consultant. Refer to Division 26 and 33 for additional mechanical and electrical requirements.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:

- .1 Measured depths of elements of foundation in relation to finish first floor datum.
- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- .4 Field changes of dimension and detail.
- .5 Changes made by change orders and Addenda
- .6 Details not on original Contract Drawings.
- .7 References to related shop drawings and modifications.

.5 Specifications: legibly mark each item to record actual construction, including:

- .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
- .2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.

1.7 DIGITAL AS-BUILT DRAWINGS

.1 Retain the services of a CAD drafting company acceptable to the Consultant.

.2 Transfer to digital file all information recorded on As-Built drawings. Layering of information as per Consultant’s instructions.

.3 The Consultant will provide CAD file of contract document.

.4 The cost for preparing digital As-Built drawings will be deducted from the Cash Allowances.

1.8 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance. Provide installed control diagrams by controls manufacturer.

.10 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.

.11 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.13 Include test and balancing reports as specified in Mechanical Sections.

.14 Additional requirements: As specified in individual specification sections.

1.9 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. [Provide information for re-ordering custom manufactured products.]

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.10 MAINTENANCE MATERIALS

.1 On completion of project, submit to Architect two (2) copies of Operations Data and Maintenance Manual in English, made up as follows:

.1 Bind data in vinyl hard covered, 3 ring loose leaf binder for 215 x 280 mm size paper.

.2 Enclose title sheet, labeled "Operation Data and Maintenance Manual", project name, date and list of contents.

.3 Organize contents into applicable sections of work to parallel project's specification break-down. Mark each section by labeled tabs protected with celluloid covers fastened to hard paper dividing sheets.

.2 Include following information, plus data specified.

.1 Maintenance instruction for finished surface and materials.

.2 Copy of hardware and paint schedules.

.3 Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.

.4 Names, addresses and phone numbers of sub-contractors and suppliers.

.5 Guarantees, Warranties and bonds showing:

.1 Name and address of project.

.2 Guarantee commencement date (date of Final Certificate of Completion).

.3 Duration of guarantee.

.4 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.

.5 Signature and seal of Contractor.

.6 Additional material used in project listed under various Sections showing name of manufacturer and source of supply.

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

.4 Include one complete set of final shop drawings (bound separately) indicating corrections and changes made during fabrication and installation.

.5 Preliminary submission of all manuals is required for Certificate of Substantial Completion to be issued. Submission of final manuals to the Architect is a mandatory requirement of Total Performance of the Contract.

1.11 STORAGE, HANDLING AND PROTECTION

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.12 GUARANTEES, WARRANTIES AND BONDS

.1 **Bonds:** Refer to Section 01102 'Stipulated Price Contract-PBE-1998', Section 011100 'Summary of Work' and to Section 002113 'Instructions to Bidders' for bonding requirements for this project, both at the time of tender submission and throughout the duration of the construction period.

.2 Refer to Section 'Stipulated Price Contract-PBE-1998 for Warranty requirements and conditions for the standard warranty which is required for the work of this contract.

.3 Refer to Section 011100 'Summary of Work', under 'Warranties' and also individual specifications sections for requirements of extended warranties required for particular sections or items of work.

.4 Extended warranties are required to be issued by manufacturers, fabricators, suppliers and/or installers, sometimes jointly, due to their unique position in the construction process and their ability to guarantee a particular section of work. Refer to individual requirements of extended warranties requested.

.5 Unless specifically noted otherwise, all extended warranties shall commence on the date of Substantial Performance of the Work as certified by the Consultant.

.6 Separate each warranty or bond with index tab sheets keyed to the List of Contents listing.

.7 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal. Use Guarantee/Warranty Form as provided in Section 017810 whenever standard preprinted trade or manufacturer's Guarantee/Warranty forms are not available. Provide written form for each warranty specified in each Section or if none, in Section 011100, article 1.24.

.8 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

.9 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.

.10 Verify that documents are in proper form, contain full information, and are notarized.

.11 Co-execute submittals when required.

.12 Retain warranties and bonds until time specified for submittal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

1. Notes

1. To be made out on the letterhead of Guarantor or Warrantor which usually is a Subcontractor.

2. This format is to be used only when standard preprinted trade or manufacturer's forms are not available. Preprinted forms are to include all elements of information shown on this sample or as a minimum.

3. Comply with Requirements for Guarantee/Warranty as specified in Section 017810, Closeout Submittals.

To: Peel District School Board
H.J.A.B. Education Centre
5650 Hurontario Street
Mississauga, ON L5R 1C6

Date: _____

SECTION _____

TITLE _____

GUARANTEE/WARRANTY TO:

OWNER The Peel District School Board

PROJECT Addition to Allan A Martin Public School

ARCHITECT Hossack Architecture

REFERENCE (to specifications or drawings)

TIME Period of Guarantee/Warranty:_____ years

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

Date: _____

(Description of Guarantee/Warranty)

_____

_____

_____

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

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

SUBCONTRACTOR

_____ _____
Signature Date

Authorized Signing Officer:

_____
(Name Printed)

_____
Title

Name of Firm: _____

Address: _____

Telephone Number _____

CONTRACTOR

_____ _____
Signature Date

Authorized Signing Officer:

_____ _____
(Name Printed)

_____
Title

Name of Firm: _____ CORPORATE SEAL

Address: _____

Telephone Number _____

END OF SECTION

Part 1 General

1.1 QUALITY ASSURANCE

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

.2 Performance of the building envelope shall be guaranteed by the Contractor.

1.2 DESIGN

.1 General: Design and engineer as required, fabricate, erect, and/or install building envelope in compliance with the Ontario Building Code, other regulations and requirements of authorities having jurisdiction.

.2 Take into account construction tolerance limitations, creepage, deflection and other movements of the structure.

.3 Accommodate, by means of expansion and contraction provisions, any movement in the building envelope assemblies themselves and between the assemblies and the building structure. Allow for expansion and contraction of components caused by ambient temperature range, surface temperature variation of components, wind, seismic forces, structural deflection and racking; without causing misalignment of joints, breakage of joints and air/vapour barriers, water and air penetration through the assembly, glass breakage, or other defects detrimental to appearance or performance.

.4 Method of attachment to the structure shall take into account site peculiarities so that site and air vibrations or normal temperature movements of the building do not loosen, weaken and/or fracture the connection between building envelope assembly components and the structure or between the components themselves.

.5 Reinforce building envelope assembly components, as required, so that the members can safely sustain design loads.

.6 Assemble and secure assemblies in manner which will keep stresses on sealants within the sealant manufacturer's recommended maximum performance levels.

.7 Rain Screen Principle: Except where detailed otherwise, construct building envelope assemblies based on the "Rain Screen" principle as advocated by the National Research Council of Canada. All voids between the assembly components as well as those between components and the structure shall have:

.1 Gaskets, baffles, overlaps, seals and compartmentalization as required providing a barrier "Rain Screen" to effectively prevent excessive rain water entry into any of the building envelope cavities but to allow pressure equalization of cavity air spaces.

.2 Air barriers and seals are required to prevent entry of interior building air into building envelope cavities, and exterior air into the building. Air barriers and seals shall be able to withstand wind design pressures.

.3 such provisions in the form of openings between cavities and the building exterior of sufficient cross sections to provide adequate pressure equalization. All openings shall be effectively baffled against direct rain water entry. Air spaces shall be baffled and compartmentalized to prevent chimney effect within the air spaces vertically and horizontally.

.4 Thermal separators, isolators and seals placed to eliminate contact between interior humid air and a cold surface or structural component to prevent condensation and ice build-up on such surfaces during cold weather.

1.3 WATER, VAPOUR AND MOISTURE

.1 Comply with the design and performance requirements specified in the building code, and as specified herein, including the following principles:

.2 Drain to the exterior face of the assembly, any water entering at joints and any condensation occurring within the building envelope assembly.

.3 Design, fabricate and install the assembly to be watertight to the interior under the interior and exterior design conditions in combination with movements occurring due to loads imposed.

.4 At design conditions no water penetration to the building interior side of the assembly shall occur.

.5 The requirements for an air barrier and a vapour barrier are intended to be provided at the same plane in the building envelope design unless otherwise indicated or specified. In such cases, the Drawings and Specifications refer to "air/vapour barrier". The definition of the air/vapour barrier for the purpose of these Specifications is "a continuous membrane including joints of membrane between components and to adjacent construction which prevents or retards penetration of moisture laden air and the diffusion of water vapour through it".

.6 The maximum water vapour transmission of all components forming the vapour barrier shall be (1.72 ng/Pa x s x sq.m.) (0.3 Imperial Perms) unless specified otherwise.

.7 At design conditions no condensation shall occur on room side surfaces.

.8 Sound: Provide completed installations free from vibrations, wind whistles and noise due to thermal and structural movement and wind pressure.

.9 Seismic: Fabricate and erect cladding assemblies to prevent damage due to earthquake forces as required by The Ontario Building Code.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

1. Section 01 11 00 - Summary of Work
2. Section 01 56 00 – Temporary Barriers and Enclosures
3. Section 01 73 03 – Execution Requirements (Cutting and Patching)
4. Section 04 21 13- Brick and Block Masonry
5. Section 01 33 00 - Submittal Procedures
6. Section 08 11 14- Metal Doors and Frames
7. Section 08 71 15 – Finish Hardware
8. Section 09 91 22- Painting
9. Section 09 21 16- Gypsum Board Assemblies
10. Section 09 51 13- Acoustic Panel Ceilings
11. Section 10 11 25- Manufactured Specialties
12. Mechanical and Electrical Sections

1.2 Scope

1. Scope includes but is not limited to:

   .1 Demolition or alteration of all structural, architectural, mechanical, electrical or site components, equipment, fitments and finishes as required to execute the work.

   .2 The removal, repair and reinstallation as required to make good of existing acoustic unit ceilings gypsum board bulkheads, hollow metal screens and partition walls where required to be removed for routing new services or revising demising walls.

   .3 Removal and reinstallation as indicated of any existing fixed in place millwork, chalkboards or tackboards or similar fitments or devices identified to remain and be reinstalled.

   .4 Grinding and patching of walls where chalkboards or fitments have been removed and surface adhesives or similar surface deficiencies remain.

   .5 Cutting and removal of slabs on grade to remove existing drains, oil interceptors, trenches and sub slab services contained within them, not previously removed by Abatement work..

   .6 Making good of all walls and floors remaining where sections of walls or floors have been removed and surfaces require repair.

   .7 Making good of all finishes to remain as result of selective demolition.

1.3 Existing Conditions

1. Take over structures to be demolished or altered based on their condition on date that tender is accepted, at time of examination prior to tendering.
2. Contractor may confirm the prior removal of all asbestos containing materials in documentation left on site following prior abatement work contract. Should areas of asbestos be found which are not documented as removed or included in the scope of this

work for removal, it shall be reported to the Consultant and Owner's representative for review and instructions for removal.

3. Prior to beginning alteration or demolition, confirm with Owner that no items to be salvaged or turned over to the owner remain in the work areas.

1.4 Protection

.1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades 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 **Refer to Section 01 11 00 and Section 01 33 00 for requirements to provide Shoring Designs and Method Statements**.

.4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

Part 2 Products

NOT USED

Part 3 Execution

3.1 Work

.1 Dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction. Confirm in Divisions 15 and 16 for removal and re-use of mechanical and electrical materials and equipment.

.2 Refer to drawings for furniture, materials or equipment to be removed and turned over to the owner. Carefully remove such items and store in location designated by Owner.

3. For a scope of work refer to all Drawings and also coordinate items to be altered, re-built, cleaned or otherwise "made good" as a result of the cutting and patching scope of work described in Section 01 73 03 Execution Requirements or other Sections.

3.2 Preparation

.1 Disconnect electrical, telephone/PA and data service lines in work areas without disrupting main service to building and in accordance with regulations of authorities having jurisdiction. Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.

.2 Disconnect and cap designated mechanical services in accordance with requirements of local authority having jurisdiction.

- .1 Natural gas supply lines, if applicable to be removed by gas company by qualified tradesman in accordance with gas company instructions.
- .2 Remove, cap or dispose of other underground services as indicated in drawings.
- .3 Do not disrupt active or energized utilities traversing premises designated to remain undisturbed.

.3 Floor scans to locate hidden or buried services in the work area have NOT previously been done. Prior to cutting, demolition or removal of any slabs on grade or areas where services may be concealed, engage a **private locate firm to provide magnetic and X-ray scans** of all areas involved. This is the responsibility of the General Contract and costs for such scans are to be included in the base contract price.

3.3 Disconnection and Removal of Materials and Equipment

.1 Contractor shall cooperate with the Owner to determine which materials are to be removed and retained by Owner. The Owner will decide which items or equipment they wish to retain as their property and all other materials shall be removed from the premises by this Contractor. The equipment which is to be retained by the Owner shall be stored on site where directed by the Owner.

.2 Refer to mechanical and electrical drawings and for disconnection and removal and/or relocated existing electrical, ductwork, piping and/or equipment.

3.4 Temporary Removals and Replacement

.1 All items to be removed and installed shall be completed so that replaced materials are left in a clean undamaged state. If required to be replaced due to damage, the contractor shall include in his price for the component to be replaced and installed at no additional cost to the Contract.

3.5 Selective Demolition

.1 Follow best trade practices for all demolition and alteration work. This includes but is not limited to the following items.

.1 The school will be vacant for the specified construction period until September 1, 2010. Despite this, ensure demolition work does not disrupt any ongoing aspect of the operation of the school.

.2 Confirm all demolition work (including potential noise, vibration, tools or equipment noise, etc.) in advance with the principal of the school on a daily basis. Similarly, notify all building occupants in advance at each possible interruption in services or utilities.

.3 Protect all areas from damage and intrusion by means of locking rooms under construction when not in use, use of dust tight screens and temporary partitions and hoarding. Demolish to minimize dusting. Refer to drawings for locations and other Specification Sections for requirements.

.4 Signage to be posted at all times. Take precautions to demolish only areas as necessary to complete the work, and avoid damage to adjacent areas. Make good all areas affected by demolition or renovation activities, whether specifically included in the contract documents or not.

.5 The Contractor shall be responsible for damage to all areas affected by renovation or alteration activities.

.6 Prior to demolition, the Contractor shall carefully examine the drawings in relation to the site conditions, to ensure that all intended work can be carried out without ambiguity. Incorrect demolition of any work by the Contractor, will be back-charged to him. Any discrepancies between the drawings and the site conditions, must be reported to the Consultants immediately.

.7 Demolish or remove interior and exterior elements as indicated.

.8 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.

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

.10 Demolish masonry and concrete walls in small sections. Salvage existing imperial block units in coordination with Section 04 21 13 to re-use as patching in existing imperial unit masonry. Also coordinate with Section 04 21 13 for detail of edge condition required to match new Metric Units to existing Imperial block units.

.11 Carefully remove and lower structural framing and other heavy or large objects as required. Where partial walls of exposed concrete block masonry is to remain, grind all exposed edges to a bullnose and patch as required suitable for final painting.

.12 Do not sell or burn materials on site.

.13 Remove contaminated or dangerous materials from site and dispose of in safe manner to minimize danger at site or during disposal, in accordance with all governing legislation.

.14 Saw cut and existing terrazzo floor and base as required and remove to nearest metal ‘panel’ joint to enable replacement at a full panel.

.15 Following demolition and removals of floor trenches, walls and fitments, coordinate with Section 01 73 03. As part of the work of this section, scarify or otherwise grind existing or new slabs in preparation for slab in-fills and a self leveler skim slab by Section 01 73 03. That Section is responsible for the provision of a backfill, slab on grade patching and self leveling skim coat where required in advance of new VCT finishes by Section 09 65 19.

.16 Patch and make good existing wall, ceiling and floor finish with identical original materials if affected by temporary protection or by previous Abatement contract.

3.6 Repair to all Finishes and Colours

.1 Repaint all walls in rooms or areas modified as indicated in the Finish Schedule, or as directed by the Consultant.

.2 Repair and make good all fixtures, finishes, trims and surfaces to all floor, wall and ceiling areas in rooms or areas whether or not they have been modified or affected by the work or by previous Abatement Contract.

.3 Existing paint colours are to be matched exactly using computer colour matching.

END OF SECTION

Part 1 General

1.1 ASBESTOS ABATEMENT – FOR INFORMATION ONLY

.1 Asbestos Abatement has been completed under a separate contract in advance of this contract.

Therefore, the Pre-Renovation Hazardous Building Materials Survey as prepared by OHE Consultants is enclosed following this page.

.2 The specification sections entitled "Asbestos Abatement…" contains information that is not prepared by the Architect or his sub consultants. While every effort has been made to attempt to provide comprehensive abatement testing information for the purposes of design and tendering, the Architect claims no responsibility for the accuracy of the information contained in the report.

.3 Refer also to Section 01 35 30, item 1.6 'Hazardous Materials' and item 1.23 'Asbestos' and coordinate with this section.

Part 2 Products

2.1 Not applicable

Part 3 Execution

3.1 Not Applicable

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 02 20 00 – Earthwork

.2 Section 03 20 00 - Concrete Reinforcement

.3 Section 03 30 20 - Cast-in-Place Concrete

.4 Section 07 92 10 - Joint Sealing

1.2 MEASUREMENT PROCEDURES

.1 No measurement will be made under this Section. Include costs in items of work for which concrete formwork and falsework is required.

1.3 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction.

.2 CAN/CSA-O86-01-94(R2006), Engineering Design in Wood (Limit States Design).

.3 CSA O121-M1978(R2003), Douglas Fir Plywood.

.4 CAN3-O188.0-M78, Standard Test Methods for Mat-Formed Wood Particleboards and Waferboard.

.5 CSA S269.1-1975, Falsework for Construction Purposes.

.6 CAN/CSA-S269.3-M92(R2003), Concrete Formwork.

.2 Council of Forest Industries of British Columbia (COFI)

.1 COFI Exterior Plywood for Concrete Formwork.

1.4 SHOP DRAWINGS

.1 Submit shop drawings for formwork and falsework in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3 for formwork drawings.

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

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

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Place materials defined as hazardous or toxic waste in designated containers.

.2 Ensure emptied containers are sealed and stored safely for disposal away from children.

.3 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

Part 2 Products

2.1 MATERIALS

.1 Formwork materials:

.1 For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA-O86-01.

.2 For concrete with special architectural features, use formwork materials to CAN/CSA-A23.1.

.2 Pan forms: permanent steel as indicated.

.3 Tubular column forms: round, smooth steel forms in two half sections, internally treated with release material.

.4 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 dia. in concrete surface.

.2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.

.5 Form liner:

.1 Plywood: high density overlay, Douglas Fir to CSA O121, T and G edge, 12 mm thick.

.2 Plastic laminate, vinyl, polyethylene, neoprene or approved products new and acceptable to the Consultant to provide the surface texture and forms required for the design as shown.

.6 Form release agent: chemically active release agents containing compounds that react with free lime in concrete resulting in water insoluble soaps.

.7 Form coating: Formaseal as manufactured by Master Builders for wood forms and as recommended by manufacturer for form liner.

.8 Joint tape: non-staining, water-impermeable, self-releasing, where required.

.9 Tie hole plugs: 25mm dia. tapered PVC hole plugs to be provided on all exposed walls.

.10 Falsework materials: to CSA-S269.1.

.11 Sealant: to Section 07 92 10 - Joint Sealing.

Part 3 Execution

3.1 FABRICATION AND ERECTION

.1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.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 Do not place shores and mud sills on frozen ground.

.6 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.7 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.

.8 Obtain Consultant's permission before framing openings not indicated.

.9 Align form joints and make watertight. Keep form joints to minimum.

.10 Locate horizontal form joints for exposed columns 2700 mm above finished floor elevation.

.11 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners , joints, unless specified otherwise.

.12 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.13 Line forms for following surfaces:

.1 Outer face of beams and joists.

.2 Soffit of girders, beams and slabs that are specified to be exposed.

.14 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.

.15 Obtain approval from soils testing engineer for bearing surfaces prior to erection of forms.

3.2 REMOVAL AND RESHORING

.1 Leave formwork in place for following minimum periods of time after placing concrete.

.1 3 days for walls and sides of beams.

.2 3 days for columns.

.3 7 days for beam soffits, slabs, decks and other structural members, or 3 days when replaced immediately with adequate shoring to standard specified for falsework.

.4 2 days for footings and abutments.

.2 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.

.3 Re-use formwork and falsework subject to requirements of CAN/CSA-A23.1.

.4 Be responsible for the safety of the structure, both before and after the removal of forms, until the concrete has reached its specified 28 day strength.

.5 When forms are stripped during the curing period, cure and protect the exposed concrete in accordance with Section 03300.

.6 Movement and displacement of formwork during construction, variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work performed by this Section.

.7 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 03 10 00 – Concrete Formwork & Accessories

.2 Section 03 30 20 - Cast-in-Place Concrete

.3 Section 04 21 13 - Masonry.

1.2 MEASUREMENT PROCEDURES

.1 Reinforcing steel will be measured in tonnes 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.

1.3 REFERENCES

.1 American Concrete Institute (ACI)

.1 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.

.2 American National Standards Institute/American Concrete Institute (ANSI/ACI)

.1 ANSI/ACI 315-99, Details and Detailing of Concrete Reinforcement.

.3 American Society for Testing and Materials (ASTM)

.1 ASTM A 775/A 775M-91c, 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 CSA-A23.2-14, Test Methods and Standard Practices for Concrete

.3 CAN3-A23.3-04, Design of Concrete Structures for Buildings.

.4 CSA G30.3-M1983(R1991), Cold Drawn Steel Wire for Concrete Reinforcement.

.5 CSA G30.5-M1983(R1991), Welded Steel Wire Fabric for Concrete Reinforcement.

.6 CSA G30.14-M1983(R1991), Deformed Steel Wire for Concrete Reinforcement.

.7 CSA G30.15-M1983(R1991), Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

.8 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.

.9 CAN/CSA-G40.21-04, Structural Quality Steels.

.10 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.11 CSA W186-M1990, Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.4 SHOP DRAWINGS

.1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate bar bending details, lists and quantities of reinforcement on shop drawings.

.3 On placing drawings, indicate sizes, spacings, locations and quantities of reinforcement, mesh, chairs, spacers, hangers, and mechanical splices, with identifying code marks to permit correct placement without reference to structural drawings. Prepare reinforcement drawings in accordance with ANSI/ACI 315 and ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure and Reinforcing Steel Manual of Standard Practice - Metric Supplement 2004 by Reinforcing Steel Institute of Ontario.

.4 Design and detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated. Provide Class B tension lap splices unless otherwise indicated.

1.5 SUBSTITUTES

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

Part 2 Products

2.1 MATERIALS

.1 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise. Use Grade 400R bars for all reinforcing unless noted otherwise, to sizes as shown on the drawings.

.2 Cold-drawn annealed steel wire ties: to CSA G30.3.

.3 Deformed steel wire for concrete reinforcement: to CSA G30.14.

.4 Welded wire fabrics: Where no reinforcement is shown, provide 152 x 152 MW 18.7 x MW 18.7 (6" x 6" x 6/6) welded wire fabric at 37mm (1½ ") below the finished surface of slabs on grade or walks, or toppings 62mm (2½") in thickness or greater. Lap ends and sides of fabric in accordance with requirements of CSA Standard CAN/CSA-A23.1, but in any event, not less than 300mm (12").

.5 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.

.6 Mechanical splices: subject to approval of Consultant.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, ANSI/ACI 315, and ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures 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 Upon request, provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 2 weeks prior to commencing reinforcing work.

.2 Upon request inform Consultant of proposed source of material to be supplied.

Part 3 Execution

3.1 STORAGE OF REINFORCING

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

3.2 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.

3.3 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.

.2 Prior to placing concrete, obtain Inspector's approval of reinforcing material and placement. Provide minimum 48 hours notice to both Inspector and Consultant, prior to placing concrete.

.3 Locate reinforcing bars to provide proper concrete cover. Reinforcing cover will be carefully inspected by the Consultant, and reinforcing with inadequate cover will not be acceptable.

.4 Fold all the wired behind bars, away from form faces.

.5 Modify bars on site to accommodate box-outs, inserts, etc., as directed by the Consultant.

3.4 FIELD CUTTING OF REINFORCING

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

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

.1 Related Work Specified in Other Sections

Section 02 20 00 – Earthwork
Section 02 55 00 – Site Services
Section 03 10 00 – Concrete Formwork & Accessories
Section 03 20 00 – Concrete Reinforcing
Section 04 20 00 – Unit Masonry
Section 05 10 00 – Structural Metal Framing
Section 05 50 00 – Miscellaneous Metal
Section 07 46 10 – Cementitious Surfacing System
Division 15 – Mechanical
Division 16 – Electrical

1.3 REFERENCE STANDARDS

CSA-A23.1-14 – Concrete Materials and Methods of Concrete Construction
CSA A23.2-14 – Test Methods and Standard Practices for Concrete
CAN/CSA-A3001: Portland Cement
CAN/CSA-A23.5-M86: Supplementary Cementing Materials
CAN/CSA-A362-93: Blended Hydraulic Cement
CSA G30.18-09 (R2014): Carbon steel bars for concrete reinforcement
CSA G30.3-M1983 (R1998): Cold-Drawn Steel Wire for Concrete Reinforcement
ASTM A820/A820M-16, Standard Specification for Steel Fibres for Fibre Reinforced Concrete.

1.4 SAMPLES

.1 At least (3) weeks prior to commencing work, inform the Consultant of the proposed mix design and proposed source of ready mixed concrete.

.2 A sample of the finishes shall be prepared and remain as the minimum acceptable standard for the project.

1.5 CERTIFICATES

.1 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1.

.2 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA-A23.1.

1.6 QUALITY ASSURANCE

.1 The Contractor shall employ an independent inspection and testing company to carry out all testing and inspection as required. The Consultant will appoint the inspection and testing company. The cost of inspection and testing shall be paid by the Contractor, out of the Cash Allowance carried for this testing under Division 1.

.2 Samples and methods of moulding shall conform to the requirements of CSA-A23.2.

.3 Additional testing shall be made if there is a distinct change in job conditions or if required by the Consultant or the authority having jurisdiction.

.4 Compression tests shall be performed in accordance with CSA-A23.2 and good practice.

.5 Failure to meet strength requirements will result in rejection of materials, strengthening or replacement of those portions that failed to develop the specified strength.

.6 Concrete slump shall be tested at time that cylinders are cast and at such other times deemed necessary.

.7 The addition of water and admixtures on the site is hereby prohibited and unacceptable for the project.

1.7 SUBMITTALS

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

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Designate a cleaning area for tools to limit water use and runoff.

.2 Carefully coordinate the specified concrete work with weather conditions.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

.4 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.

.5 Choose least harmful, appropriate cleaning method which will perform adequately.

Part 2 Products

2.1 MATERIALS

.1 Formwork: As specified in Section 03100.

.2 Formwork Lumber:

.1 Plywood and wood formwork materials to CSA-A23.1. Formwork materials brought on site shall be new.

.2 Panels shall be fabricated for use as form panels, finished one side with form coating, with sealed edges and a minimum thickness of 17mm.

.3 Panels shall be smooth and free from defects which would show up on concrete surfaces exposed to view.

.4 Form Coating: Formaseal, as manufactured by Sternson Construction Products.

.5 Joint Tape: Non-staining, water impermeable, self-releasing.

.6 Form Ties: Removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25mm diameter in concrete surface, and not leaving metal closer than 25mm to the surface of the concrete.

.7 Tie Hole Plugs: 25mm dia. tapered P.V.C. hole plugs.

.8 Reinforcing Steel: As specified in Section 03200.

.9 Reinforcing Steel: Billet steel, grade 400R, deformed bars to CAN/CSA-G30.18 to sizes shown on structural drawings. Where none is shown, provide 15M bars at 300mm centres as minimum steel.

.10 Wire Mesh: Welded Wire Fabric to sizes and locations shown on drawings. Where none is shown, provide 152x152xMW18.7xMW18.7 W.W.F. one layer as minimum.

.11 Portland Cement: to CAN/CSA-A3001, Type GU.

.12 Water: to CSA-A23.1.

.13 Aggregates: To CSA-A23.1. Coarse aggregates to be normal density. Use blend of 10mm and 20mm for coloured patterned concrete slabs.

.14 Air Entraining Admixture: To CAN/CSA3-A23.5.

.15 Chemical Admixtures: To CAN/CSA3-A23.5 water reducing type WN. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.

.16 Colour Admixtures: Integral coloured pigments to C-979-86. Two (2) colours to be selected by Consultants from manufacturer's standard range.

.17 Non-Shrink Grout: Sternson M-Bed Superflow or approved equal.

.18 Floor Hardener: Surflex TR trap rock hardener, shake on, by Euclid Chemical Company. Application rate of 5kg/m^2 (1.0 lb/ft^2).

.19 Interior Cure and Seal Compound: Interior slabs shall be W. R. Meadows "Intex". No resin-based compounds will be accepted.

.20 Exterior Cure and Seal Compound: Exterior concrete slabs and gutters shall be W. R. Meadows "Sealtight CS-309".

.21 Expansion Joint Filler: Shall be Sealtight asphalt expansion joint filler, W. R. Meadows.

.22 Joint and Sawcut Filler: Shall be Loadflex by Sternson or Jointflex by CPD.

.23 Joint Tape: Shall be Sealtight Gusset Tape by W. R. Meadows.

.24 Premoulded Membrane: Shall be Sealtight 7100-312 (PMPC), W. R. Meadows.

2.2 CONCRETE MIXES

.1 Proportion normal density concrete in accordance with CSA A23.1, to give following properties for concrete in foundation walls, footings, composite deck toppings and any other unspecified concrete:
- .1 Cement: Type GU Portland cement, minimum 325 kg/m^3
- .2 Maximum 25% slag cement content
- .3 Minimum compressive strength at 28 days: 25 MPa.
- .4 Nominal size of coarse aggregate: 20 mm.
- .5 Slump at time and point of discharge: 50 to 100 mm.
- .6 Air content: 0 to 3%.

.2 Proportion normal density concrete in accordance with CSA-A23.1, Alternative 1 to give following properties: for concrete in slabs-on-grade, structural slabs and columns:
- .1 Cement: Type GU Portland cement, minimum 325 kg/m^3
- .2 Maximum 25% slag cement content
- .3 Minimum compressive strength at 28 days: 32 MPa.
- .4 Nominal size of coarse aggregate: 20 mm.
- .5 Slump at time and point of discharge: 60 to 100 mm.
- .6 Air content: 0 - 3% maximum.

.3 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in exterior structural slabs and sidewalks/curbs:
- .1 Cement: Type GU Portland cement, minimum 275 kg/m^3
- .2 Maximum 25% slag cement content
- .3 Minimum compressive strength at 28 days: 32 MPa.
- .4 Class of exposure: C-2.
- .5 Nominal size of coarse aggregate: 20 mm.
- .6 Slump at time and point of discharge: 60 to 100 mm.
- .7 Air content: 5 to 8%.

.4 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in grouted masonry blocks and concrete in metal pans.
- .1 Cement: Type GU Portland cement, minimum 275 kg/m^3
- .2 Maximum 25% slag cement content
- .3 Minimum compressive strength at 28 days: 20 MPa.
- .4 Nominal size of coarse aggregate: 10 mm.
- .5 Slump at time and point of discharge: 50 to 100 mm.
- .6 Air content: 0 - 3% maximum.

.5 Proportion normal density concrete in accordance with CSA-A23.1, Alternative 1 to give

following properties: for concrete fill.

.1 Cement: Type GU Portland cement, minimum 250 kg/m^3
.2 Maximum 25% slag cement content
.3 Minimum compressive strength at 28 days: 10 MPa.
.4 Nominal size of coarse aggregate: 10 mm/20 mm.
.5 Slump at time and point of discharge: 100 mm.
.6 Air content: 0 - 4% maximum.

.6 Do not change job mix formula without prior approval of the Consultant.

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

Part 3 Execution

3.1 WORKMANSHIP

.1 All concrete shall be as set forth in CSA-A23.1 and shall be composed of cement, fine and coarse aggregates and water.

.2 Concrete shall be delivered and discharged within 1½ hours after the introduction of the mixing water at the batch plant.

.3 Mixing, placing, compaction, curing, hot and cold weather protection shall conform to CSA-A23.1. Use power vibrators in sufficient number and in location and duration to the Consultant's complete satisfaction as required.

.4 Obtain the Consultant's approval before placing concrete. Provide 24 hour notice prior to placing of concrete.

.5 Pumping of concrete is permitted only after approval of equipment and mix.

.6 Ensure reinforcement and inserts are not disturbed during concrete placement in order to maintain proper coverage.

.7 Prior to placing of concrete obtain the Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

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

3.2 FORMWORK

.1 Verify lines, levels and column centres before proceeding with formwork and ensure dimensions agree with drawings.

.2 Construct forms to produce finished concrete conforming to shape, dimensions, locations and

levels indicated within tolerances required by CSA-A23.1.

.3 Align form joints and make watertight. Keep form joints to minimum.

.4 Use 25mm chamfer strips on all vertical and horizontal corners of exterior retaining walls as indicated on drawings.

.5 All surfaces of formwork which face concrete, which will be exposed to view are to be coated with protective form coating to minimize transfer of wood grain to finished concrete.

.6 Clean formwork in accordance with CSA-A23.1 before placing concrete.

.7 Re-use of formwork is subject to requirements of CSA-A23.1.

.8 When forms are stripped during the curing period, cure and protect the exposed concrete.

.9 Movement and displacement of formwork during construction, variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work performed by this Section.

.10 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

3.3 INSERTS

.1 Co-ordinate and verify that the Electrical Contractor has set all ducts, boxes and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated on structural or civil drawings must be approved by the Consultant.

.2 Co-ordinate and verify that the Mechanical Contractor has set all floor drains, cleanouts, trench drains to provide a smooth, flush appearance with the **'FINISHED FLOOR SURFACE'** and to ensure a positive and uniform slope towards the drains.

.3 Do not eliminate or displace reinforcement to accommodate inserts or hardware. If inserts cannot be located as specified, obtain approval of all modifications from the Consultant before placing of concrete.

.4 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete. With the Consultant's approval, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be at least 100 mm in diameter. Drilled holes to be minimum 25 mm larger in diameter than bolts used. Protect anchor bolt holes from water accumulations. Set bolts and fill holes with non-shrink grout or epoxy (as noted on drawings).

.5 Set hollow metal frames, plumbed, squared and braced with blocking in locations shown on drawings.

3.4 GROUTING

.1 Grout underside of steel column bearing plates with non-shrinking grout to manufacturer's instructions. Place grout to cover steel shims left in place.

3.5 FINISHING

.1 Finish all concrete surfaces in accordance with Section 03350.

3.6 EXPANSION CONTROL

.1 Expansion Joints: Install expansion joint material between slabs on grade and masonry walls, for interior slabs and at max. 6000mm spacing for exterior slabs and curbs, and between slabs on grade and concrete curbs.

.2 Control Joints: Sawcut control joints at a maximum spacing of 3000mm in each direction and where noted on drawings. Cut joints within 24 hours of placing and to a depth as detailed on drawings.

3.7 WATER/VAPOUR CONTROL

.1 Butt joints tight together and tight to foundation wall. Seal all joints with gusset tape including foundation wall junctions.

.2 Protect during placing of concrete to ensure the integrity of the barrier is maintained. Repair immediately any penetrations or areas damaged in accordance with the manufacturer's recommendations.

3.8 CURING AND PROTECTION

.1 Cure and protect newly finished slabs and steps in accordance with CSA A23.1.

.2 Coat exterior slabs, curbs with curing compound and leave for 30 days. Apply sealer after curing period has expired.

.3 Cure finished concrete surfaces in a manner which will leave the surface with a uniform appearance and with a minimum of discolouration after drying. Ensure that curing compounds are compatible with adhesives for finishes to be applied later.

.4 For all concrete slabs that are to remain exposed, curing compound is to be applied at a rate required for use as a sealer/hardener, in accordance with the manufacturer's instructions.

3.9 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Consultant in accordance with CSA-A23.1.

.2 The Consultant will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.3 Inspection or testing by Consultant will not augment or replace contractor quality control nor relieve him of his contractual responsibility.

3.10 TOLERANCES

.1 Cast-in-Place concrete shall be constructed within the dimensional tolerances specified in CSA-A23.1, as specified elsewhere in this section. Concrete floor slabs shall be constructed as moderately flat slabs and within the tolerances listed below.

.2 Conform in line, level and plumbness to the following tolerances. These are maximum values.

.3 Variation from vertical, in lines and surfaces of walls piers:

:	In height of 3m (10')	-	6mm (1/4")

.4 Variation from level or from grades shown in floors grade:

:	In any 3m (10')	-	3mm (1/8")
:	In any bay up to 6m (20')	-	6mm (1/4")
:	In any 12m (40')	-	12mm (1/2")

.5 Variation from straight or from correct position in walls:

:	In length up to 6m (20')	-	12mm (1/2")
:	In any 12m (40')	-	12mm (1/2")

.6 Variation in size and location of sleeves, floor open and the like and in location of bolts, inserts and fastenings:

:		-	6mm (1/4")

.7 Variation in location of bolts, inserts, sleeves and fastenings when in group:

:		-	3mm (1/8")

.8 Variation in cross-section of slabs, walls and piers:

:	Maximum oversize	-	12mm (1/2")
:	Maximum undersize	-	6mm (1/4")

.9 There shall be no variations from required level at junction of walls and floors.

.10 Where drains occur, floors shall be properly and uniformly sloped to allow complete drainage of the area.

3.11 DEFECTIVE CONCRETE

.1 Concrete is defective when:

.1 Containing visible honeycombing or embedded debris.

.2 Concrete damaged by freezing or which is unsatisfactory due to placement at too high a temperature.

.3 Average 28 day strength of any three consecutive strength tests is less than specified minimum 28 day strength.

.4 Any 28 day strength test result in less than 88% of specified minimum 28 day strength.

.5 Cracking occurs in locations other than at control and construction joints.

.6 Curing is not carried out strictly according to the specifications.

.2 Remove and reconstruct in entirety any defective concrete footing, slabs, walls as directed by the Consultant.

3.12 COLD WEATHER PROTECTION

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

END OF SECTION

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 01 33 00 – Submittal Procedures

.2 Section 01 51 00 – Temporary Utilities

.3 Section 03 33 00 – Cast-in-Place Concrete

1.3 REFERENCES

.1 Health Canada - Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 CSA-A23.1-09: Concrete Materials and Methods of Concrete Construction

1.4 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit WHMIS MSDS - Material Safety Data Sheets.

.1 WHMIS MSDS acceptable to Human Resources Development Canada-Labour and Health Canada for concrete floor hardeners.

.2 Indicate VOC content.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard, packaging material in appropriate on-site bins for recycling.

.3 Dispose of unused chemical additive materials at an official hazardous materials collections site approved by Consultant.

.4 Unused chemical additive materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.5 Fold up metal banding, flatten and place in designated area for recycling.

.6 Dispose of unused chemical additive materials at an official hazardous materials collections site approved by Consultant.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Temporary lighting:

.1 Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 m^2 of floor being finished.

.2 Electrical power:

.1 Sufficient electrical power to operate equipment normally used during construction.

.3 Work area:

.1 Water tight protection against rain and detrimental weather conditions.

.4 Temperature:

.1 Maintain ambient temperature of not less than 10 degrees Celsius or C^o 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.

.2 Maintain substrate temperature at 10 C^o minimum.

.5 Moisture:

.1 Ensure concrete substrate is within moisture limits prescribed by flooring 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:

.1 Ventilate area of work as directed by Consultant by use of approved portable supply and exhaust fans.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.3 Provide continuous ventilation during and after coating application.

.4 Sufficient to prevent carbon monoxide or high levels of carbon dioxide and other injurious gases from affecting concrete.

1.7 SCOPE OF WORK

.1 Provide liquid hardener at all exposed concrete slab-on-grade areas, and where exposed concrete is indicated on architectural drawings or in room finish schedule.

Part 2 Products

2.1 FLOOR HARDENER

.1 Concrete floor sealer (SCONC): where concrete curing agent/sealer/hardener is required, provide Shur-Seal as manufactured by Paul M. Wolff Co. Inc. (714) 974-0630 or Sure Hard manufactured by Dayton Superior's Canada Limited.

Part 3 Execution

3.1 EXAMINATION

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

3.2 INSTALLATION

.1 On freshly poured concrete surfaces, no additional surface preparation will be required. All surfaces must be clean, sound and absorptive. Remove any concrete laitance and patch, fix all cracks and damaged areas. New concrete should be properly cured a minimum of seven (7) days, prior to placing the concrete floor hardener, in accordance with CSA A23.1 by one of the following methods: water, plastic sheeting or burlap.

.2 On areas where forms are recently removed, remove all form oil and breaking compound residue to assure penetration of the product into the surface.

.3 When applying near windows, mask the glass.

.4 Avoid contact with plant life, glass, aluminum, and other finished surfaces. Where contact occurs, immediately wipe with a damp cloth or flush with water.

.5 Avoid contact with asphaltic concrete.

.6 On previously sealed existing concrete floors, completely strip floor of sealers and contaminants prior to application. Apply as for freshly poured surfaces.

3.3 APPLICATION REQUIREMENTS

.1 Two applications are required. The first application at $5m^2$/litre followed by the second application at $10m^2$/litre as final coat in strict accordance with manufacturer's specifications.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 This Section specifies work which shall be performed by:
Section 04 22 00: Concrete Unit Masonry

1.2 QUALITY ASSURANCE

.1 Requirements of Regulatory Agencies:
Modify requirements of the Specifications only as jurisdictional authorities may direct.

1.3 REFERENCES

.1 ASTM C270-89: Standard Specification for Mortar for Unit Masonry.
.2 CSA A179-04 (R2009): Mortar and Grout for Unit Masonry.
.3 CSA A371-04 (R2009): Masonry Construction for Buildings.
.4 CSA S304.1-04: Masonry Design for Buildings (Limit States Design).

1.4 SUBMITTALS

.1 Affidavits:
Submit to Consultants affidavits of an inspection company that mortar and grout materials conform to requirements of the Specifications, if requested.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Handle and store cementitious materials protected against moisture.

.2 Handle and store all mortar materials to prevent contamination by foreign materials, and damage by freezing or excessively high temperatures.

1.6 SITE CONDITIONS

.1 Environmental Requirements:
When air temperature is less than 5^{o} C, mix mortar as specified in CSA A371.

Part 2 Products

2.1 MATERIALS

.1 Use materials only as specified in CSA Standard A179 referenced from CSA A371 and CSA S304.1 as applicable. Ensure that water and aggregate used in mortar, other than in walls buried in earth, will cause no efflorescence.

.2 Incorporate only materials from same source in mortar exposed to view.

.3 Water: Verify that water used contains no salts to cause efflorescence.

.4 Portland Cement: to CAN/CSA-A3001, Type GU; grey colour, unless indicated elsewhere.

.5 Masonry Cement: to CAN/CSA-A3002, Type S.

.6 Hydrated Lime: to ASTM C207, Type S-Special.

.7 Mortar Aggregate: natural sand, to CSA A179, standard masonry type; clean, dry, protected against dampness, freezing and foreign matter.

.8 Grout Coarse Aggregate: to CSA A179, maximum 10 mm size, 27 percent by volume.

.9 Grout Fine Aggregate: to CSA A179, clean well graded sharp sand; 54 percent by volume.

.10 Water: potable, clean and free of deleterious amounts of acids, alkalies or organic materials.

2.2 ADMIXTURES

.1 Plasticizer: water reducing type, reducing porosity and absorption to increase bond strength.

.2 Water Repellent: mixture of calcium carbonate and hydrous magnesium aluminum silicate powders.

.3 Colour: liquid manufactured or natural oxide pigment, colour and loading as selected by Consultant.

2.3 MIXES

.1 Mortar for Concrete Masonry Units: to CSA A179, Type S using the Proportion Specification Method c/w water repellent addition.

.2 Mortar for Calcium Silicate Masonry Units: to CSA 179, Proportion Specification Method, consisting of 1-1-6 mix of Portland cement, hydrated lime and aggregate, c/w integral colour.

.3 General: Ensure that water and aggregates used are all from same source and will meet required strengths. Batch mortar and grouts are acceptable provided source is approved prior to commencement of work.

.4 Mix mortars as specified in CSA A179. Use only dry aggregate. Test for bulking to determine accurate proportioning.

.5 Do not incorporate calcium chloride in mortar mix. In cold weather non-chloride accelerating admixtures may be utilised such as Accelguard 80 by Euclid Chemical Canada Inc., or equivalent meeting specified requirements of ASTM Specification C270.

.6 Dirt resistant additives: aluminum tristearate, calcium stearate or ammonium stearate.

.7 Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.

.8 Colouring Additive: A mineral-oxide pigment, harmless to mortar set and strength, shall

be provided. Colour shall be one (1) colour per masonry unit type, as selected by the Consultant.

2.4 GROUT

.1 Grout in Reinforced Masonry Cores, Bond Beams and Lintels:
: 20 MPa strength at 28 days
: 175 – 200 mm slump, mixed to CSA – A179, fine grout.

Part 3 Execution

3.1 MIXING

.1 Mix mortar to consistency required for working.

.2 Mix grout to semi-fluid consistency.

.3 Incorporate colour and admixtures into mixes in accordance with manufacturer's instructions. Use clean mixer for coloured mortar.

.4 Prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour nor more than 2 hour then remix with sufficient water to produce mortar of proper consistency for pointing.

3.2 INSTALLATION

.1 Grout fully all pockets in concrete foundation walls where structural components installed, under bearing plates at piers and elsewhere as noted on drawings.

.2 Grout solid all reinforcing installed in concrete block walls.

.3 Protect all mortar and grout installed from freezing or from excessive heat which will prevent bonding or decrease the required compressive strength.

3.3 PREPARATION

.1 Protection:
Provide waterproof protection over construction surfaces at mixing areas to prevent deposit on them of mortar and mortar materials.

3.4 MORTAR TYPES

.1 For laying concrete and brick unit masonry, use mortar type:
“S” in masonry walls in contact with earth.
“S” in masonry walls for all structural walls.
“N” in non-structural applications.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 This section to be read in conjunction with Section 04 22 00 for Execution Requirements

.2 Section 01 33 00 – Submittal Procedures

.3 Section 03 30 00 – Cast-in-Place Concrete

.4 Section 05 12 23 – Structural Steel for Buildings

.5 Section 03 41 00 – Plant- Precast Structural Concrete

.6 Section 04 22 00 – Concrete Unit Masonry

.7 Section 07 21 13 – Board Insulation

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM).

.1 ASTM C126-99, Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.

.2 Brick Industry Association (BIA).

.1 Technical Note No. 20-2000, Cleaning Brick Masonry.

.3 Canadian Standards Association (CSA International).

.1 CAN/CSA A82-06: Fired Masonry Brick Made from Clay or Shale
.2 CAN/CSA-A165 SERIES-04 (R2009): Concrete Block Masonry Units
.3 CSA-A371-04 (R2009): Masonry Construction for Buildings
.4 CAN/CSA-A3001: Portland Cement
.5 CSA-A8-M88: Masonry Cement
.6 CSA S304.1-04: Design of Masonry Structures

1.3 SUBMITTALS

.1 Product Data.

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Manufacturer's Instructions.

.1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption for units proposed for use.

1.5 PRODUCT DELIVERY STORAGE AND HANDLING

.1 Ensure that materials are delivered to job site in dry condition.

.2 Except where wetting of bricks is specified, keep materials dry until use.

.3 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

1.6 COLD WEATHER REQUIREMENTS

.1 Supplement Clause 5.15.2 of CSA A371 with the following

.1 Maintain temperature of mortar between 5°C and 50°C until used.

1.7 HOT WEATHER REQUIREMENTS

.1 As per Clause 6.7.4 of CSA A37.

1.8 PROTECTION

.1 Until completed and protected by flashings or other permanent construction, keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain. Use waterproof coverings draped 600 mm (min.) down each side of wall and securely anchored.

.2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

.3 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

1.10 JOB MOCK UP

.1 Construct mock-up panel of exterior masonry wall construction, 2000 mm x 2000 mm, showing all masonry materials and colors, fixtures, jointing, coursing, mortar and workmanship.

Part 2 Products

2.1 MANUFACTURED UNITS

.1 **Clay Brick Masonry Units**:

.1 All units: Clay Brick, Grade "SW", passing Test Methods specified in CSA-A82. Metric Modular (92 mm x 57 mm x 194 mm) as manufactured by:

.2 **Field Brick "A" (Red Colour):**

.1 Brampton Brick 'Glen-Gery (PITS) – Colour RED SMOOTH

.3 All brick to be manufactured from single continuous run to ensure minimum colour and texture variations.

.4 Acceptable Alternates by Canada Brick or Permacon matching existing brick. Alternates must be submitted to consultant for review at time of tender during addendum period and must be approved by consultant.

.2 Portland Cement:

.1 To CAN/CSA-A3001.

.3 Masonry Cement:

.1 To CAN/CSA A8.

.4 Hydrated Lime:

.1 To ASTMC207-74.

.5 Aggregate:

.1 To CSA A82.56-M1976.

.6 Water:

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

.7 Thru-wall Flashing and Air/Vapour Barrier Sheet Membrane Treatment**:** Self-adhering SBS modified bitumen membrane reinforced with non-woven fibrous glass. Acceptable materials: Blueskin TW by Bakor Inc., Mississauga or sheet air/vapour barrier membrane as specified as in Section 07 27 10 – Air Barriers.

.8 Bolts and Anchors: To CAN3-A370.

.9 Natural Mortar:

.1 Generally: Use materials only as specified in CSA A179. Ensure that weather and aggregate used in mortar, other than in walls buried in earth, will not cause efflorescence.

.2 Bonding Agent**:** Acrylic latex type by Sternson Limited, W.R. Meadows or Thoro Building Products. Use for all mortar except brick.

.3 Mixes: Mix mortars as specified in CSA A179 using the Proportion Specification. Add bonding agent in accordance with manufacturer's instructions.

.4 Mortar Types:

.1 For masonry walls in contact with earth and bedding for bearing plates and lintels: Mortar Type "S".

.2 For load-bearing walls: Mortar Type "S".

.3 For brick: Mortar Type "N" (1:1:6) premixed "Betomix 1-1-6" Type "S" portland cement hydrated lime as supplied by Daubois Inc., Jiffy Mortar Systems. Mix on site with sand and water.

.4 For all other (non-structural) masonry walls, use regular Type "N" mortar.

.5 Grout: To CSA A179 Table 3.

.10 Mortar Dropping Control Device: "Mortar Net" manufactured by Mortar Net USA (Telephone: 1-800-664-6638).

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

.12 Date Stone: Date stone to be 390 x 390 x 90 deep solid limestone. Font: Technic Lite, 100mm high. Beveled edges. Polish finish. Location to be determined by Architect.

.13 Time Capsule Stone: Time capsule stone to be 390 x 390 x 90 deep solid limestone. Font: Technic Lite, 100mm high. Beveled edges. Polish finish. Location to be under display cabinet in Entrance Foyer. Confirm final location and exact beveled wording with Architect.

.14 Veneer Ties: Fero slotted block tie (Type II) c/w V-Tie manufactured from 4.76 mm diameter wire conforming to CSA Standard G30.3, hot dipped galvanized to ASTM A153.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 WORKMANSHIP

.1 Build masonry plumb, level, and true to line, with joints in proper alignment.

.2 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.3 TOLERANCES

.1 Clause 5.3 of CAN/CSA-A371 applies except as follows: Walls to receive thinset ceramic tile: plumb within 1:600.

3.4 EXPOSED MASONRY

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

.2 Parging on the face of exposed masonry units will be rejected.

3.5 JOINTING

.1 Except where indicated otherwise on drawings or details or as below, make concave joints, allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, compressed, uniformly concave joints. Where joints are to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating, strike flush.

3.6 WEEPHOLES

.1 Provide 10 x 90 x 90 mm PVC weepers at regular intervals at both top and bottom of walls as indicated on Drawings. Ensure weepers are clear and not blocked by mortar or mortar droppings.

3.7 JOINING OF WORK

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

3.8 CUTTING

.1 Cut out neatly for electrical switches, outlet boxes, and other recessed or built-in objects.

.2 Make cuts straight, clean, and free from uneven edges. Use masonry saw where necessary.

3.9 BUILDING-IN

.1 Build in items required to be built into masonry by other trades.

.2 Prevent displacement of built-in items during construction. Check for plumbness, alignment, and correctness of position, as work progresses.

.3 Brace door jambs to maintain plumbness. Fill door frame with concrete.

3.10 WETTING OF BRICKS

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

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

3.11 SUPPORT OF LOADS

.1 Except where drawing requirements are more stringent, comply with Clause 6.3 of CSA S304.1.

.2 Where concrete fill is used in lieu of solid units, use minimum 25 MPa concrete to Section 03 30 00.

.3 Install building paper below voids to be filled with concrete; keep paper 25 mm back from faces of units.

3.12 PROVISION FOR MOVEMENT

.1 Leave 5 mm space below shelf angles.

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

3.13 LINTELS

.1 Install steel lintels above windows, doors and all mechanical and electrical as shown on structural drawings. Centre over opening width.

.2 Install loose steel lintels supplied by Section 05 12 23. Centre lintel over opening width. Minimum 150 mm solid bearing each end.

.3 Lintels over 2000 mm span to be complete with bearing plate and anchors each end.

.4 Bridge openings less than 450 mm wide with 6 mm thick mild steel plate lintels, bearing minimum 100 mm on each side of opening and set on dry pack grout. Width of plate to be equal to the wall thickness less 25 mm.

.5 Install precast concrete lintels supplied under Section 03 30 00.

3.14 CONTROL AND EXPANSION JOINTS

.1 Except as noted following, control joints required at maximum of 6000 mm o.c. in continuous walls having no openings, intersections or column locations. Refer to elevations for locations on exterior walls and advise Consultant of variances prior to executing the work. Control joints are not shown for clarity on the drawings for interior walls. If in doubt, request assistance from the Consultant.

.2 At doorway locations, unless indicated otherwise on elevation drawings, use one side of doorway beyond lintel. Use building paper to prevent that end of lintel to bond.

.3 Use standard block with concrete filled end core to form key. Line one side of core with building paper before filling core to prevent bonding. Complete vertical separation, full height and thickness of wall are required.

.4 Stop masonry reinforcing at each side of the joints. Caulking specified in Section 07 92 10 – Joint Sealers.

.5 At expansion joints in brick and veneer, install Rapid Expansion joint DA 2015, to leave vertical joint free of mortar to allow for horizontal expansion.

3.15 INSPECTION & TESTING

.1 Refer to Section 01 11 00 – Summary of Work, section 1.29.

3.16 CLEANING

.1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.2 On a weekly basis and at completion of work remove all debris, cut blocks and bricks, and mortar droppings.

.3 Power wash or brush exterior masonry surfaces at completion of work.

.1 Soft, clean cloths.

.4 Clean concrete brick masonry as work progresses.

.1 Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of brick and finally by brushing.

.5 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 This section to be read in conjunction with Section 04 21 13 for Execution Requirements.

.2 Work performed by other Sections and which is related to this Section is specified in:
Section 03 10 00: Concrete Formwork: for dovetail anchor slots in concrete, concrete lintels.

.3 Supply of work which shall be installed by this Section is specified in:

Section 05 12 23: Structural Steel for Buildings: to furnish bearing plates, steel lintels

Section 05 31 00: Steel Decking: to furnish weld plates. Miscellaneous inserts and attachment devices to support the installations of other Sections, frames and miscellaneous metal work

.4 This Section shall include performance of work which is specified in:
Section 04 05 12: Mortar and Grout

1.2 SYSTEM DESCRIPTION

.1 Tolerances:
Lay masonry to tolerances specified in CSA A371 and:
.1 Level within 6 mm in any bay or 6 m maximum distance, and 13 mm in 12 m or more.
.2 Opening sizes within 6 mm of designated dimension.
.3 With joints to dimensions indicated, but in no case greater than 13 mm.

1.3 QUALITY ASSURANCE

.1 Requirements of Regulatory Agencies:
.1 Construct masonry as required by jurisdictional authorities.
.2 Before commencing masonry work, verify that site conditions will allow construction of masonry within required limitations for wall heights, wall thickness, openings, bond, anchorage, lateral support, and compressive strengths of masonry units and mortars.
.3 Construct masonry fire rated assemblies, which are validated by UDI, ULC, or NRC fire tests, in complete accordance with the test design specification. Fire rated assemblies constructed otherwise will be acceptable only on presentation of authorization by jurisdictional authorities.

1.4 REFERENCES

.1 CAN/CSA-A165 SERIES-04 (R2009): Concrete Block Masonry Units
CAN/CSA-A370-04 (R2009): Connectors for Masonry

CAN/CSA-A371-04 (R2009): Masonry Construction for Buildings

CSA S304.1-04: Design of Masonry Structures (Limit States Design)

.2 Reference standards quoted in Contract Documents refer to: ASTM A924/A924M-95, Specification for General Requirements for Steel Sheet Metallic Coated by the Hot-Dip Process.
CAN/CGSB-37.2-M88, Emulsified, Asphalt, Mineral Colloid Type, Unfilled, for Dampproofing and Waterproofing, and for Roof Coatings.

1.5 SUBMITTALS

.1 Samples:
Submit samples of unit masonry for review.

.2 Affidavits:
Submit affidavits by an approved independent testing laboratory stating that materials supplied are in accordance with the Specifications, if requested.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Isolate masonry units from contact with ground and other materials until laid, to prevent staining.

.2 Ensure that moisture content of concrete masonry units is maintained within specified limits from time of shipment from plant, to time of installation.

.3 Cover masonry unit stockpiles while stored to prevent exposure to weather. Keep water out of all holes and reglets in units during freezing weather.

.4 Handle and store masonry units to prevent soiling and chipping.

.5 Deliver products to the place on site as directed, and to meet installation schedule.

Part 2 Products

2.1 MATERIALS

.1 Meet specified requirements of CSA A370 and CSA A371 for materials unless specified otherwise.

.2 Asphalt Emulsion:
To meet specified requirements of CAN/CGSB-37.2.

.3 Joint Packing at Walls:

.1 Fire Separation Packing: at tops of fire rated walls and partitions: Thermafiber 200 degree glass fibre insulation by Canadian Gypsum Company, Limited, or Firebarrier fibre firestopping by AD Distributors Ltd.

.2 Expansion Joint Packing: Glass fibre insulation, rigid board, density of 48 kg/cu.m.; or Rodofoam by Sternson Limited, or closed cell neoprene DA2015 by Dur-O-Wal Ltd.

.4 Joint Reinforcement:

.1 Provide joint reinforcement in width to ensure that longitudinal rods at faces of wall have minimum mortar cover of 16 mm and that they are centred on shells of hollow core units.

.2 Horizontal joint reinforcing shall include longitudinal and cross rods, welded steel rod, Truss type extra heavy duty Blok-Lok BL-30 or 120 Truss-Mesh by Hohmann & Barnard Inc. Galvanizing as per Section 2.1.9.

.3 For Exterior single-wythe block wall horizontal joint reinforcement shall include cross ties hot dipped galvanized Truss type (Extra Heavy Duty). Spacing to be minimum everty 3rd course, U.N.O.

.4 For Interior Single Wythe Load-bearing Walls shall include 4.8mm cross ties mill galvanized Truss type (Extra Heavy Duty). Spacing to be as per drawings.

.5 For Interior Single Wythe Non-Load-bearing Walls provide 3.76 mm dia. longitudinal and cross rods, welded steel rod, galvanized, ladder design (Standard). Spacing shall be every second block course.

.6 All joint reinforcing to be galvanized as per 2.19 of this Section.

.5 Masonry Veneer Wall Tie (Steel Stud Back-up):

Adjustable, dual component slotted design; e.g. Fero Slotted Stud Tie (Type 1), comprised of:

.1 Slotted Stud Plate: 1.61 mm thick hot dipped galvanized steel plate to ASTM A153; length to suit air space dimension and stud width.

.2 V-Tie: 4.76 mm diameter hot dipped galvanized steel wire to ASTM A153; length to provide placement of tie legs at centerline of veneer.

.3 Fasteners: self-tapping sheet metal screws, hex washer head, suitable length to penetrate stud no less than 13 mm; minimum 2 screws per tie.

.4 Insulation Retaining Clip: purpose-made plastic, as recommended by tie manufacturer.

.6 Masonry Veneer Wall Tie (CMU Back-up):

Adjustable, dual component slotted design; e.g. Fero Slotted Block Tie (Type 1), comprised of:

.1 Slotted Block Plate: 1.61 mm thick hot dipped galvanized steel plate, to ASTM A153; length to suit air space and CMU width dimension, less 6 mm.

.2 V-Tie: 4.76 mm diameter hot dipped galvanized steel wire, to ASTM A153,; length to provide placement of tie legs at centerline of veneer.

.3 Insulation Retaining Clip: purpose-made plastic, as recommended by tie manufacturer.

.7 Wall Tie (Structural Steel Back-up):

Adjustable, dual component design; suitable for welded attachment; e.g. Blok Lok Flex o-lok ties BLT-9, hot dipped galvanized c/w V-Tie, 4.8 mm size; hot dipped galvanized, suitable length to provide placement of tie legs at central line of veneer.

.8 Strap Anchors: 6.35 mm thick steel plate, hot dipped galvanized; U-shaped and Z-shaped to suit application; e.g. BLT 11Z BY Blok-Lok.

.9 Galvanizing:

.1 For Joint Reinforcement, Bond Ties, Anchors, and Accessories in Exterior Walls: To meet specified requirements of ASTM Specification A153 , Class B, hot dip.

.2 For Joint Reinforcement, Anchors, and Accessories in Interior Walls: above

grade Manufacturer's standard mill galvanising.

.3 For Joint Reinforcement, Bond Ties, Anchors, and Accessories in interior walls below grade: To meet specified requirements of ASTM Specification A153, Class B, Hot Dip Gavanized.

.10 Reinforcing Steel:
For reinforced block lintels: to meet specified requirement of CSA Standard G30.18.

.11 Dovetail Anchor:
25 mm x 2mm formed sheet steel dovetail brick anchor galvanised, with end bent to form hook, to suit dovetail anchor slot specified for installation by formwork constructor.

.12 Weep Holes:
Plastic tube, 10mm OD x 100 mm long, or 10 mm x 38 mm x 90 mm long rectangular; or DA1069 Cell Vent by Dur-O-Wall Limited.

.13 Concrete Masonry Units:

.1 To meet specified requirements of CAN3-A165 Series – 04.

.2 Include all special shapes, such as end, bond, sash groove and lintel units, required for complete masonry installation indicated on Drawings. Use bullnose corner block at all door jambs, vertical external corners and where otherwise indicated on Drawings.

.3 Modular size units.

.4 Provide 100% solid units where required by jurisdictional authorities.

.5 Moisture controlled ("M") units acceptable to Consultant.

.6

.1 Normal Weight Units: For use in walls below ground floor elevation:
Hollow Units: H/15/A/O.
75% Solid Units: S/15/A/M.
Solid Units: Sc/15/A/O:

.2 Light Weight Units: For use in walls above ground floor elevation:
Hollow Units: H/15/C/M
75% Sold Units S/15/C/M
Solid Units: Sc/15/C/M

.7 Supply lintel blocks for fabrication of lintels by Section 03 30 00.

Part 3 Execution

3.1 PROTECTION

.1 Cover exposed tops of masonry walls when laying is not in progress and until protected by completed construction. Cover with non-staining waterproof material to overhang top edges of wall by 600 mm minimum and secured to prevent dislodgement.

.2 Protect exposed external corners of masonry with materials which will not damage or soil finished surfaces.

.3 Protect all finished surfaces from mortar droppings.

.4 Take particular care to protect faces of concrete unit masonry from mortar droppings and

smears as laying proceeds.

.5 Turn over or cover scaffolds and mortar boards at completion of each day's work to avoid staining of finished surfaces by splashed rain.

3.2 LAYING MASONRY

.1 Lay masonry to meet specified requirements of CSA A370 and CSA A371, unless otherwise specified.

.2 Lay masonry to course as shown on Drawings and to minimise cutting of units.

.3 Coordinate coursing of dissimilar sized units only as approved by Consultant.

.4 Use only dry and unfrozen materials.

.5 Remove sections of masonry which have been frozen before laying of masonry continues.

.6 Lay masonry in running bond with vertical joints of alternate courses in line.

.7 Lay concrete unit masonry with thick ends of webs on top.

.8 Joints:

.1 Make joints of uniform thickness with vertical joints from course to course maintained plumb.

.2 Provide full bed and head joints for shear walls.

.3 When laying is resumed on walls previously laid with mortar either partially or totally set, remove loose units and mortar from top and adjoining surfaces. Remove mortar completely when masonry is removed and replaced with new.

.4 Form tooled concave joints wherever exposed to view, whether behind cabinets, fitments, and wall accessories, or not. When mortar has become "thumb-print" hard, tool joints and clean off burrs with trowel or burlap. Use a tool with a bearing surface of 550 mm minimum length on horizontal joints to avoid uneven depressions.

.5 Rake out joints to masonry exposed to view to provide for caulking
: at junction of interior and exterior walls with columns.
: at junction of interior with exterior walls.
: intersections of walls and partitions where joint reinforcement is installed.
: at caulked joints where indicated typically.

.9 Stop off horizontal runs of walls by racking back a half unit in each horizontal course: do not touch.

.10 Do not wet concrete units.

.11 Distribute masonry units of varying colours and textures to avoid spotty appearance over wall surfaces exposed to view. Do not use units which contrast too greatly with overall range.

.12 Use chipped and blemished units only where concealed. Do not use defective or broken

units. Do not lay concrete units with markedly smooth face that will appear slick where exposed to view, whether painted or not.

.13 Maintain bracing of walls and piers continuously during construction until structure provides support.

.14 Lintels:

.1 Build in Lintels supplied by Section 03 30 00 and 05 50 00. Set and level lintels on a bed of mortar.

.2 Build in precast concrete block lintels fabricated under work of Section 03 30 00.

.3 Provide means to prevent damage due to differential movement resulting form expansion or contraction and from deflection of lintel.

.4 Bridge openings not exceeding 450 mm in width with 6 mm mild steel plate lintels bearing 100 mm on each side of opening. Width of plate shall be wall thickness less 25 mm. Joint at lintel to be dry packed. Provide weep joints in mortar at 800 mm above lintels.

.15 Built-In Items:

.1 Verify that built-in items specified in other Sections are available for building in before laying of masonry commences. Co-operate in the setting and aligning of built-in items and provide for later installation of items which are installed by other Sections, to avoid cutting, fitting, and patching.

.2 Build masonry around pressed steel door frames supplied and set as specified in other sections. Ensure that anchors are well secured and that frames are true and plumb. Completely fill frames with mortar as each course is laid. Maintain protective frame covering and ensure that no mortar is left on frame faces.

.16 Cope, cut and split concrete masonry units with power-driven abrasive discs. Cut units wherever electrical outlets, grilles, and pipes occur. Allow 3.2 mm clearance around items which are incorporated in walls.

.17 Do not expose open cells, cores or frogs of masonry units to view.

.18 Coat faces of concrete covered with less than 200 mm of masonry veneer at exterior walls and parapets with prime coat and one dampproof coat of asphalt emulsion.

.19 Locate bearings and piers as indicated on Drawings; provide solid masonry units at bearings.

.20 Extend walls and partitions at top to deck, slab or structural members, as applicable, except where otherwise noted on Drawings. Incorporate both lateral support and deflection space at termination of walls as required by this Section. Where walls terminate at bottoms of steel joists, close space at joists to deck or slab with metal lath and plaster on one side of joist or with 16 mm thick fire rated, Type X. gypsum board secured to each side of joists, if infilling with masonry is impractical; and to meet specified requirements of Section 09 21 16. Ensure that construction at joists completely closes and seals space.

.21 Masonry Solid Wall Anchorage:

.1 Use dovetail anchors for slots at concrete construction.

.2 Keep masonry a minimum of 12.7 mm clear of faces of structural members or as indicated on Drawings, and fill space with glass fibre board, leaving space for caulking at joints exposed to view or the weather.

.3 Bed anchors solidly in mortar joints.

.4 Fill cores of hollow units solidly with mortar where anchors are embedded.

.5 Co-ordinate with Section 031 0 00 to ensure that dovetail anchor slots in concrete are located correctly. Assist in their installation if requested.

.6 Coodinate with Section 11 52 00 locations of all wall mounted Gymnasium equipment and fill blocks solid above, below, and within mounting locations.

.22 Joint Reinforcement:

1. Install joint reinforcement in single wythe masonry walls and partitions. Place reinforcement continuously in horizontal joints spaced as noted on structural drawings, beginning with course 400 mm above bearing, unless otherwise specified or indicated.
2. Place reinforcement additionally in courses 200 mm, 400 mm and 800 mm above and below openings, and extending 600 mm beyond jambs of openings.
3. Where changes in wall thickness occur, extend reinforcement of lesser width 450 mm beyond changes of width.
4. Lap reinforcement a minimum of 150 mm at splices.
5. Do not run reinforcement through control joints.
6. Wherever walls and partitions intersect one another, or each other, continue reinforcement through. Do not carry reinforcement through intersections where lateral support anchors are installed or at intersections of walls and partitions with solid piers.
7. Bond cavity walls together with cavity-wall ties staggered in alternate course and spaced not to exceed 800 mm horizontally and 600 mm vertically. Provide additional ties spaced not more than 400 mm apart within 200 mm of openings and on each side of control and expansion joints, except where wythes are bonded together with masonry returns or otherwise.
8. Install vertical reinforcing to size and spacing as shown on Drawings. Fill voids with minimum 10 MPa grout.
9. Properly position vertical bar reinforcement in concrete masonry pilasters, columns, and walls and secure against displacement.
10. Provide two 15M size reinforcing bars grouted vertically into masonry unit cores on both sides of masonry openings. One bar per cell.
11. Solidly fill block cores containing vertical reinforcement or anchor bolts with grout.
12. Lap splices 30-bar diameters minimum. Clear distance between vertical bars and masonry units shall be 15 mm.
13. Provide 20M size reinforcing bars full height, each cell, complete with 25MPa concrete as shown on drawings.

.23 Deflection Space:

.1 Incorporate a deflection space between tops of non-load-bearing walls and partitions and structure to prevent transference of structural loads to masonry.

.2 Fill deflection space with glass fibre board compressed to 50% of original thickness to completely seal space.

.3 Co-ordinate laying of masonry with installation of lateral support specified in this Section and as provided by Section 05 50 00.

.24 Penetrations of Masonry:

.1 Fill voids of masonry to within 19 mm of structural members, pipes, ducts and conduit that penetrate masonry walls and partitions, unless otherwise indicated.

.2 Keep masonry units similarly clear of such penetrations.

.3 Finish mortar smooth at face of masonry.

.4 Pack remainder of annular void surrounding penetrating item with fire separation packing to within 12.7 mm of face of masonry to allow for sealant.

.25 Shrinkage Control Joints:

.1 Incorporate vertical shrinkage control joints in walls of which concrete masonry units are a part.

.2 Install control joints at junctions of walls and columns, at intersections of unit concrete masonry load-bearing walls, and wherever indicated on Drawings, and otherwise in wall with no openings, at a maximum spacing of 6000 mm o/c. Carry joints full height of walls.

.3 Ensure complete vertical separation through walls incorporating control joints. Make control joints 9.5 mm wide, rake back 19 mm at junctures with concrete, and leave joints free and clear for caulking, as specified in Section 07 92 10.

.4 Construct control joints of standard block and fill void between block with 20 MPa concrete grout to form a continuous key full height of joint by installation of continuous building paper between concrete key and block on one side of joint.

.26 Expansion Joints:

.1 Incorporate expansion joints in walls where indicated on Drawings.

.2 Maintain expansion joints free of mortar with temporary filler when laying masonry. Pack joints full height with glass fibre board compressed to 50% of original thickness.

.3 Leave clean space in joints for caulking as specified in Section 07 92 10.

.27 Fire Separations:

.1 Construct fire separation walls tightly to construction at perimeter, and without openings or voids.

.2 Do not reduce the thickness of masonry fire separations to less than the thickness indicated for the required fire separation rating.

.3 All load bearing and non-load bearing partitions shall carry to the underside of structure above.

.4 All openings in partitions, even above ceilings shall be patched to maintain sound and fire separation.

.5 In partitions and walls not required to be fire separations, fill space between partitions and structural elements with rock wool compressible filler to maintain complete sound separation.

.6 In fire separations, spaces to be firestopped in accordance with Section 07 84 00 – Firestopping.

.7 Use U.L.C. labeled mortar for all patching in fire separations.

.28 Lateral Support Anchors:

.1 Vertical:

.1 At intersecting and abutting load bearing walls, use prefabricated corners and tees to match horizontal reinforcing.

.2 At intersection of non-load bearing walls with load bearing or non-load bearing walls, use corrugated galvanized ties.

.3 At wood parapet and similar conditions, use model BL404 with BLT9 ties, all by BlokLok. Ensure ties extend a minimum of 50 mm into the brick or block outer wythe.

.29 Bonding

.1 Walls of two or more widths: bond using metal ties in accordance with subsection 5.6 of CAN3-A371.

.2 Submit procedure and obtain approval by Architect.

.3 In cavity walls, keep all cavity spaces free of mortar and debris by placing a wood strip on the ties. Retain strip on a wire line and pull up level and clean off droppings prior to placing next course of ties. Install mortar control device at 300 mm o.c. horizontally, in a staggered pattern so as to overlap each other on each side. Install in every 2nd course above foundation and shelf angles.

.30 Thru-wall flashing and Thru-wall Building Paper at Control Joints

.1 Install thru-wall flashing at ground floor elevation in all walls on foundations.

.2 Leave 2” (50 mm) of thru-wall flashing or building paper hanging, projecting off all lintels and all required locations. Architect will review prior to cutting.

.3 Cutting protruding flashing: This procedure is to ensure that thru-wall flashing is installed where intended.

.31 Base Course Detail

.1 Provide square base block in areas of porcelain tile installation for porcelain cove base and fitted corners. Contractor to grind upper 50mm of block corner to match upper courses of bullnose block walls Refer to Details

.32 Cold Weather Protection

.1 Refer to the Ontario Masonry Contractor's Association's provision and publications. Include for tarped heated enclosures, heated mortar mixing pans - no non-freeze additives such as calcium will be tolerated on this project.

3.3 ADJUSTMENT AND CLEANING

.1 Patch damaged masonry in walls which have been rejected as unacceptable.

.2 Point all holes in mortar joints except weepholes.

.3 Point all voids in concrete unit masonry faces.

.4 Cut out defective mortar joints to a minimum depth of 13 mm and repoint.

.5 Clean concrete masonry units with dry brushes and as otherwise recommended by the supplier to remove mortar and stains.

.6 Do not use wire brushes for cleaning.

.7 Should specified cleaning methods be insufficient, proceed with other methods only with approval.

.8 Protect adjacent materials, construction and finished surfaces from damage while cleaning.

.9 Ensure that all efflorescence and mortar deposits are removed from surfaces to receive coating.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

.1 Related Work Specified in Other Sections

Section 03 30 20 – Cast-in-Place Concrete
Section 04 20 00 – Unit Masonry
Section 05 30 00 – Metal Decking
Section 05 50 00 – Miscellaneous Metal
Section 07 41 00 – Preformed Metal Panels & Siding
Section 07 51 00 – Insulated Built-up Bituminous Roofing
Section 08 10 00 – Metal Doors and Frames
Section 08 40 00 – Aluminium Doors, Frames & Windows
Section 09 90 00 – Painting
Division 15 – Mechanical
Division 16 – Electrical

.2 Products Supplied Under Work of this Section and Installed Under Work of Other Sections

Section 03300	:	To install anchor bolts and loose bearings plates
Section 04200	:	To install anchor bolts, loose bearing plates & anchors
Section 04200	:	To install loose lintels

1.3 REFERENCE STANDARDS

CSA S16-14: Design of Steel Structures
CSA W59-13: Welded Steel Construction (Metal Arc Welding)
CSA G40.20-13: General Requirements for Rolled or Welded Structural Quality Steel
CSA G40.21-13: Structural Quality Steel
CSA W48-14: Filler Metals and Allied Materials for Metal Arc Welding
CAN/CSA G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles
ASTM F3125/F3125M-15a: Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength
The Ontario Building Code, (O. Reg. 332/12)

1.4 SOURCE QUALITY CONTROL

.1 Submit 2 certified copies of mill reports covering chemical and physical properties of steel used in this work.

.2 Submit affidavits from the manufacturer or fabricator that materials supplied comply

with this Specification.

.3 All double chord trusses, open web steel joists and long span steel joists are to be inspected by an independent inspection company in accordance with Division 1. Inspection is to be conducted at the premises of the fabricator, prior to delivery, and is to include verification of materials used, sizes and dimensions of members, welding, alignment, camber, paint coverage and general workmanship. All joists are to be designed for the loads and spans indicated on the Drawings. Submit copies of design shop drawing complete with the Engineer's stamp, dated and signed.

.4 At least one-third of the joists are to be fabricated and ready for delivery prior to calling the inspection company, thus limiting the number of visits required to three (3). All deficiencies are to be corrected prior to delivery.

.5 The Owner will appoint an independent inspection and testing company to ensure that the Work of this Section is performed in accordance with the Specifications. The cost of all inspections/testing shall be paid for from the cash allowance allocated for this in Section 01050 - Allowances.

1.5 DESIGN OF DETAILS AND CONNECTIONS

.1 Design details and connections in accordance with requirements of CAN/CSA-S16, latest edition, to resist forces, moments and shears indicated.

.2 For non-standard connections, submit sketches and design calculations stamped and signed by qualified professional Engineer registered in the Province of Ontario.

.3 For standard connections, select details from CISC Handbook of Steel Construction to ensure structural adequacy.

.4 Submit shop fabrication details stamped and signed by a qualified professional licensed in the Province of Ontario.

1.6 SHOP DRAWINGS

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

.2 Indicate shop and erection details including cuts, copes, connections, holes, bolts and welds. Indicate welds by welding symbols defined in CSA-W59-13.

.3 Submit copy of erection drawings to the Consultant for review and reference.

.4 Submit all weld procedures pertinent to the work prior to or along with the first submission of shop drawings, for subsequent review and acceptance by the Consultant.

1.7 STORAGE AND HANDLING

.1 Handle all materials with the necessary care to prevent damage to fittings, finishes and alignments.

.2 Materials damaged due to faulty storage or handling shall be repaired or replaced, without additional expense to the Owner, all to the satisfaction of the Consultant.

.3 Replace promptly all items verified as received in a damaged condition.

1.8 EXAMINATION

.1 Examine surfaces with which Work is to be anchored or connected.

.2 Report to the Consultant, all unsatisfactory conditions likely to prevent or prejudice the proper installation of the work.

.3 Commencement of Work implies unconditional acceptance of substrate and surface and condition to which all members are to be anchored and secured.

1.9 QUANTITY OF ITEMS

.1 Where a component, device, item or part of material is referred to in the singular number, such reference shall mean as many as are required to complete the work.

Part 2 Products

2.1 MATERIALS

.1 Structural steel: to CAN/CSA-G40.21 Grade 350W for rolled sections and plates, Grade 350W for Hollow Structural sections.

.2 Anchor bolts: to CAN/CSA-G40.21, Grade 300W.

.3 Bolts, nuts and washers: to ASTM A325M.

.4 Welding materials: to CSA W48 Series.

.5 Shop paint primer: to CGSB 1-GP-40M. Refer to Formulas in Section 09900.

.6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA G164, minimum zinc coating of 600 g/m^2.

Part 3 Execution

3.1 INSPECTION AND COORDINATION

.1 The Contractor shall field check all dimensions and elevations affecting his trade at the site. All discrepancies shall be reported to the Consultant before proceeding with the work.

.2 The Contractor shall report in writing all defects in the work prepared under other sections of the Specifications which will affect the work of this Section. Commencement of the work will

imply acceptance of previously prepared work.

.3 Verify all requirements and dimensions of existing, proceeding and following Work before commencing fabrication.

3.2 FABRICATION

.1 Fabricate structural steel, as indicated, in accordance with CAN/CSA-S16 and in accordance only with reviewed and stamped shop drawings.

.2 Supply fastenings, anchors and accessories required for fabrication and erection of Work. Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to absolute minimum and inconspicuous, spacing them evenly and setting them out neatly. Make fastenings of permanent type.

.3 Beams shall be rolled sections, combined as noted. Beam connections shall be standard double angle clip type, developing full strength of all the members.

.4 Clean all steel members by scraping, wire brushing or other effective means to remove loose mill scale, rust, oil or other foreign matter. Surfaces shall be thoroughly dry before painting.

.5 Apply one (1) shop coat of paint, conforming to CGSB 1-GP-40D primer, to all surfaces except surfaces to be in contact with or encased in concrete and surfaces and edges to be field welded or high tension bolted.

.6 Apply two (2) shop coats of paint, conforming to CGSB 1-GP-40D primer to all surfaces which will be inaccessible after assembling. Touch up all bolts, welds and surfaces of connecting members damaged during construction.

.7 All steel exposed to weather including steel lintels in exterior walls shall be hot dip galvanized.

.8 All members shall be assembled true and without twists or open joints. Shop connections shall be welded.

.9 High tensile bolted connections, where used, shall be in accordance with CAN/CSA-S16 latest edition. Holes shall be accurately spaced and of size to allow insertion of bolts of 1.5 mm (1/16") diameter less than hole diameter.

.10 Welding shall be executed so as to avoid damage or distortion to the work. Welds on exterior work shall be continuous to provide proper weathering; all welds on exposed finished work shall be ground smooth.

.11 There shall be no burning of holes in members in the shop or field without the permission of the Consultant. If consent is given, burned members shall be finished to an acceptable appearance.

.12 Mark materials in accordance with CAN/CSA-G40. Do not use die stamping. If steel is to be

left in unpainted condition, place marking at locations not visible from exterior after erection. Shop mark bearing assemblies and splices for fit and match.

3.3 ERECTION

.1 Erect structural steel as indicated in accordance with CAN/CSA-S16 latest edition and in accordance with shop drawings.

.2 Continuously seal members by continuous welds where indicated. Grind smooth.

.3 Obtain written permission of the Consultant prior to field cutting or altering of structural members.

.4 Touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.

.5 Erection of structural steel on site shall be properly co-ordinated by the Contractor with the work of all other trades. Co-ordinate the work to incorporate all electrical appurtenances, and protect same from damage during erection.

.6 Bolted assemblies for base connections shall not be tightened until at least 72 hours after the grout pad has been placed.

.7 All bolts shall be tightened by using a suitable torque wrench, torquing as required in CAN/CSA-S16 latest edition.

.8 Damaged work will not be accepted on site. Damaged work arriving on site will be returned to the shop for repair and/or refinishing.

.9 All temporary supports shall be attached to the work in such a manner so as not to mar the surface on the finished section.

.10 All steel shall be set accurately to the lines and elevations shown on the Drawings.

.11 Assume full responsibility for the correct plumbing, alignment and setting of all members; set all guys, braces, etc., necessary to maintain the structure during erection, and until such time as the work of other trades is in place.

3.4 OPEN WEB STEEL JOISTS

.1 Minimum bearing, unless otherwise detailed, shall be 63.5mm (2½") on steel and 100mm (4") on concrete or masonry. Where joists span from one side only they shall bear directly over centre of beam unless otherwise shown. Open web steel joists and their design shall conform to CAN/CSA-S16 latest edition.

.2 Shoes are to be designed so that the allowable bearing pressure on the supporting material is not exceeded.

.3 Provide bridging in accordance with CAN/CSA S16 latest edition.

.4 Extend and if necessary deepen top chords of joists with cantilevered ends to carry the specified

loading indicated or implied.

3.5 LONG SPAN STEEL JOISTS

.1 Design, supply and erect long span steel joists in accordance with the manufacturer's published standards and this Specification. Design joists to safely withstand the total dead and live load per linear foot indicated on the Drawings. Provide cross bridging, bottom chord extensions, framing for openings, anchors, welded anchorage, bolts at bearings, and all other accessories indicated or required.

3.6 DOUBLE CHORD TRUSSES

.1 Fabrication, welding and splicing of double chord trusses is to be strictly to the details shown on the drawings. Dimensions, weld sizes and details shown are critical and excessive deviations will not be accepted.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 The Contractor shall ensure that no asbestos containing materials are used in connection with the work of this section.

1.2 RELATED SECTIONS

.1 Section 04 22 00 - Concrete Unit Masonry

.2 Section 05 10 00 - Structural Steel and OWSJ Framing

1.3 REFERENCE STANDARDS

CSA S136-12: North American Specification for the Design of Cold-Formed Steel Structural Members.
CSA W59-13: Welded Steel Construction (Metal Arc Welding)
CSA W47.1-09 (R2014): Certification of Companies for Fusion Welding of Steel
CSA W48-14: Filler Metals and Allied Materials for Metal Arc Welding

.1 Work of this section shall conform to CSA-S136-16 and to meet the specified requirements of the Canadian Sheet Steel Building Institute "Standard for Steel Roof Deck" and "Standard for Steel Floor Deck".

.2 Welding shall meet requirements of CSA-W59-13 and undertaken to meet requirements of CSA-W47.1-09 (R2014) and CSA-W55.3-08 (R2013)

1.4 DESIGN REQUIREMENTS

.1 Metal deck shall be of suitable design and thickness to safely support the indicated live and dead loading over the spans shown without exceeding the maximum working stress of 143.8 MPa.

.2 Wherever structural framing permits, steel deck shall be designed and fabricated to span continuously over at least 4 supports (3 spans).

.3 Provide an adequate increase in thickness of metal to compensate for continuity wherever fewer supports may occur.

.4 Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action, and uplift as indicated.

.5 Deflection under specified live load not to exceed 1/240 of span for roofs and 1/360 for floors.

.6 Metal roof deck and composite concrete slab sections shall have a depth not less than 38mm.

1.5 SHOP DRAWINGS

.1 Submit erection drawings in accordance with directions.

.2 Fabrication shall not commence until drawings are reviewed.

.3 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.

.4 When requested shop drawings are to bear the Seal and Signature of the Licensed Professional Engineer responsible for the design.

.5 When requested submit design calculations complete with Stamp and Signature of the responsible Professional Engineer.

.6 Allow ten (10) working days for the review of shop drawings and supply as many copies for review and distribution as directed. Shop drawings shall be checked in detail by the General Contractor before submission. Drawings which fail to meet this requirement shall be returned marked NOT REVIEWED.

.7 The review of such drawings shall not relieve the Contractor of the responsibility of seeing that this work is complete, accurate and in conformity with the drawings and the specification.

Part 2 Products

2.1 MATERIALS

.1 STEEL SHEET to ASTM A653/A653M (Structural quality) grade 230 with a base nominal thickness (BNT) as noted on the drawings.

.2 ZINC COATING

.1 Unless otherwise noted, provide a ZF 275 coating as designated by ASTM A653/A653M.

.2 Deck surfaces which are designated for finish painting (Refer to Architectural Drawings & Finish Schedules) shall not receive chemical treatment that will adversely affect paint application.

.3 TYPES OF DECKING:

.1 Roof deck: Shall be single fluted element with ribs of depth as shown on the drawings.

.2 Acoustic Deck: shall be single fluted elementary with ribs of depths as shown on drawings and with perforations on the vertical faces of the flutes complete with a sound absorbing strip [fibreglass density 17.6 kg/m^3 (1.1 lb/ft^3)] supplied by the deck fabricator for installation by the roofing contractor.

.3 Deck shall have interlocking side joints between panels.

.4 CLOSURES:

.1 Provide cover plates, edge stiffeners, cell closures and flashings from sheet steel similar to decking with a base nominal thickness of 0.76 mm. (Refer to Architectural Drawings).

.2 Provide and install closures at the top of all walls. Type to match the profile and finish of selected decking.

.5 PRIMER: to conform to CAN/CGSB-1.181

.1 Acceptable Product - GALVAFROID by Meadows

.6 PRE-FINISH: to conform to CAN/CGSB-1.181

.1 Acoustic deck for Library to be factory applied finish. Colour to be selected by Architect.

.7 METAL UPSTANDS/CURBS:

.1 Where required by the Architectural Drawings provide and install 1.6 mm (16 gauge) galvanized metal upstands.

Part 3 Execution

3.1 PREPARATION

.1 Verify the location and condition of all bearing surfaces placed by others. All such surfaces shall be at the elevation called for on the drawings.

.2 Commencement of erection implies acceptance of the work of other sections, which affect the work of this section.

.3 No claim for relief from contractual responsibility or for extras to the contract will be allowed unless such claim is made in writing prior to commencement of the work.

.4 Protect steel deck during shipping and handling in accordance with CSSBI standards.

.5 The steel deck welder must be certified to CSA W47.1 for fusion welding of steel deck.

3.2 FABRICATION & ERECTION

.1 Conform to CSA S136, CSA W59, CCSBI 10 M.

.2 Erect Steel Decking as indicated to manufacturer's direction and to reviewed shop drawings.

.3 Accurately align the deck and lap at supports. 50 mm (2") minimum.

.4 Supply and place steel packing as required to produce an even bearing pressure at supports.

.5 Any material which has been damaged shall be replaced at no expense to the owner.

.6 Provide for ribs to bear on beams parallel to flutes when tops of such beams are at same elevation as deck bearing.

.7 Provide reinforcing stiffeners for unsupported edges of metal deck.

.8 Install 50 x 50 x 6 mm steel angles or formed channels perpendicular to flutes, welded to 2 flutes each side of opening for deck openings from 150 mm 450 mm in size.

.9 For deck openings over 450 mm and for areas of concentrated load, reinforce in accordance with structural framing details.

.10 Install closures and upstands as shown on drawings and reviewed shop drawings.

.11 After alignment and levelling and unless otherwise noted on drawings, the minimum attachment for steel deck to the bearing surfaces shall be:

- .1 The first, third and fifth low corrugations, 300 mm (12") maximum centers and each side of each sheet, are spot welded with 20 mm (3/4") nominal top diameter.
- .2 Side laps of adjacent units shall be crimped together at 450 mm (18") centres.
- .3 Side (edge) conditions shall be welded with 20 cm (3/4") welds at 600 mm (24") maximum spacings.

.12 Immediately after decking is permanently secured in place, where top and/or bottom surfaces have been burned by welding or where surface coating has been damaged during transit or in erection.

- .1 Touch-up galvannealed surfaces with specified coating.

.13 Where pre-finished acoustic deck is specified, provide mechanical fasteners equivalent to spot welding specified at other roof areas. Submit mechanical fastener type and methods to Engineer for approval prior to start of construction.

3.3 FIELD QUALITY CONTROL

.1 General

.1 Routine inspection and testing of materials and erection shall be carried out by an independent Inspection and Testing Company appointed by the Owner, and be paid for out of Cash Allowances.

.2 Any testing or inspection required by the Consultant because of an error or due to a departure from the contract documents by the Contractor shall be paid for by the Contractor.

.2 Routine Inspection

.1 Field Inspection of welded and/or screwed joints.

.2 General inspection of field cutting and alterations required by other trades.

.3 General inspection of shop priming and field painting as to quality of materials and workmanship.

.3 Specific Inspection

.1 Profile of section, gauge of deck and steel grade.

.2 Thickness of zinc coating.

.3 Fusion welds, side connections.

.4 Bearing of steel deck.

.4 Reports

.1 Distribute copies of all reports for shop and field work as directed.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

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

1.2 WORK IN OTHER SECTIONS

.1 Related Work Specified in Other Sections
Section 03 30 00 – Cast-in-Place Concrete
Section 04 20 00 – Unit Masonry
Section 05 12 00 – Structural Metal Framing
Section 05 50 00 – Miscellaneous Metal

1.3 DESCRIPTION OF WORK

.1 Provide labor, material, equipment and services required to furnish and install metal floor deck and accessories shown on drawings or specified.

1.4 SUBMITTALS

.1 Shop Drawings
- .1 Submit completely detailed shop drawings to the Consultant for review prior to fabrication and shipment. Drawings shall indicate material thickness (not gauge), finish, fastening methods for deck units, accessories, closure pieces, fittings, size and location of framing supports and type of sequence of connections.
- .2 Location, lengths and markings of deck units shall correspond with sequence of installation. Accessories shall be fully detailed.

.2 Mill Certificates
- .1 Mill Certificates from the sheet steel coil and producer's testing and inspection report shall be submitted for review.

1.5 QUALITY ASSURANCE

.1 Deck units shall be designed and manufactured according to CSA Standard CAN3-S136-M84 and Canadian Sheet Steel Building Institute Standard 12M-84.

Part 2 Products

2.1 COMPOSITE FORM DECK

.1 Fabricate from metallic coated sheet steel conforming to CSSBI 101M-84 with minimum yield strength of 230 MPa, 38 mm deep.

.2 Galvanizing of sheet steel shall be by hot-dip process and shall conform to ASTM designation A525, coating class G90.

2.2 FABRICATION

.1 Deck unit shall be cut to lengths required so end joints occur on supporting structural members with minimum lap of 50 mm.

2.3 ACCESSORIES

.1 Cover plates shall be of the same material gauge as decking or of greater thickness, if required. Closures shall be tight to prevent leakage of concrete. Form to match deck contour, minimum 150 mm wide.

.2 Column flashing shall be provided to close spaces between floor units and columns, weld in place.

.3 End closures shall be provided to close open ends of cells at columns, walls, and openings in floor.

.4 Closures shall be provided for closing voids between cells over partitions that are perpendicular to direction of cells. Closures may be rubber or steel metal. Closures above fire-resistant partitions shall be sheet metal at both sides of partition. Fibrous glass insulation shall fill spaces between pair of closures.

.5 Provide angles and other steel members not designated as structural steel or miscellaneous metal work but which are required for a complete and rigid deck installation.

.6 Provide flat cover plate of same material gauge as decking or of greater thickness to cover transition areas of roof deck with opposing slope (valleys) warrant cutting of deck. Minimum width shall be 300 each side of joint.

2.4 SHEAR CONNECTIONS

.1 Headed stud type, ASTM A108, Grade 1015 or 1020, cold finished carbon steel, with dimensions conforming CAN3-S16.1-M84.

Part 3 Execution

3.1 INSTALLATION OF COMPOSITE METAL DECK

.1 Do not start placing of floor deck units until supporting members are in place and secured. Adjust to final position with ends bearing on supporting members, ends of adjacent units staggered, and accurately aligned end to end, before fastening permanently. Lap side joints by interlocking rib edges of adjacent units. Place and align floor deck units so as to maintain required number of units indicated on reviewed shop drawings.

.2 Install deck units in strict accordance with manufacturer's recommendations, as indicated on reviewed shop drawings, and as follows:-

.1 Lay units to span three or more support spacings, shingle fashion, with ends telescoping and lapped a minimum of 50 mm directly over bearings, with side ribs

lapped.

.2 Ends of adjacent form units shall be staggered on supporting members so that butt ends are not terminated on one member, except at slab edges or at openings.

.3 Form units shall start and terminate at the center of supporting members at ends of runs, at openings, or elsewhere as shown on the reviewed shop drawings.

.3 Provide metal closures at open, uncovered ends and edges of floor deck, weld in place, to provide rigid installation. In addition, provide metal closures in voids between metal floor deck units and top of walls and partitions, where so indicated on drawings.

.4 Fastening

.1 Steel units shall be placed on supporting steel framework and adjusted to final position before being permanently fastened. Panels shall be welded to steel framework at ends and intermediate supports by 20 mm diameter puddle welds at 300 mm centers. Where two sections are combined to form a cellular panel, the panels shall be structurally resistance welded to develop their full section properties. Side closures of panels shall be tack welded at minimum of 900 mm centers. End closures shall be tack welded at minimum 1200 mm centers. Cut and place column closures.

.2 Comply with aws requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.

.5 Accessories

.1 Provide sheet metal cover plates as required to close panel end conditions, where panels change direction or abut. Provide material for column closures to close openings between panels and columns.

.2 In areas of suspended ceiling, hanger lip tabs shall be provided at 1200 mm centers along entire length of panel joint. Hanger tabs shall be for the use of ceiling suspension. Tabs shall be hooked over male leg before female leg of the next panel is placed over it. Tabs shall be designed so that they can be moved along panel joint after erection and until concrete is poured.

3.2 CUTTING AND REINFORCING OPENINGS

.1 Provide holes in the floor deck as required for the passage of pipes, duct and structural supports, equipment and other openings, and similar construction. Furnish and install steel angle framing at two sides of such openings where the structural capacity of the deck is impaired by cutting of one full rib or more, where building framing is not provided. Use angles 450 mm longer than the opening width, placed at right angles to the deck ribs, welded to the bottom of each rib.

.2 Install floor deck to provide an even top surface, ready to receive concrete fill. Trim deck to fit closely to adjacent construction, and force lap joints into tight contact. Installation shall prevent flow of concrete cement through floor deck joints.

3.3 CLEANING AND TOUCH-UP PAINTING

.1 Upon completion of floor deck installation, clean top and bottom surfaces of mud, dirt, weld spatters and other contaminants. Wire brush, clean, and touchup paint all scarred areas on top and bottom surfaces of deck to leave deck in good condition ready for subsequent construction. Scarred areas include welds, welds scars, abraded surfaces, bruises and rust spots. Use rust-inhibitive prime paint, on painted surfaces, of same kind as used in the shop. At phosphatized finished surfaces, wire brush and leave ready for concrete placement, as provided in section 03010 of specification.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures

.2 Section 03 30 00 – Cast-in-Place Concrete

.3 Section 04 21 13 – Masonry

.4 Section 05 12 23 – Structural Steel

.5 Section 05 21 00 – Steel Joist Framing

.6 Section 05 31 00 – Steel Deck

.7 Section 09 91 22 – Painting

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

- .1 ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
- .2 ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
- .3 ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer
- .2 CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating
- .3 CISC/CPMA 1 – 73B, Quick Drying, One-Coat Paint for Use on Structural Steel
- .4 CISC/CPMA 2 – 75, Quick Drying, Primer for use on Structural Steel

.3 Canadian Standards Association (CSA International)

- .1 G40.20-04: General Requirements for Rolled or Welded Structural Quality Steel
- .2 G40.21-04 (R2009): Structural Quality Steel
- .3 CAN/CSA G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles
- .4 CSA S16.1-09: Limit States Design of Steel Structures
- .5 CAN/CSA – S136-07: North American Specification of the Design of Cold-formed Steel Structural Members
- .6 CSA W47.1-09: Certification of Companies for Fusion Welding of Steel
- .7 CSA W59-03 (R2008): Welded Steel Construction (Metal Arc Welding)
- .8 CSA NSS.3-1965 (r2003): Resistance Welding Qualification Code for Fabricators of Structural Members in Buildings

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.4 The Environmental Choice Program

.1 CCD-047a-98, Paints, Surface Coatings

.2 CCD-048-98, Surface Coatings - Recycled Water-borne

1.3 SUBMITTALS

.1 Shop Drawings

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

.1 Deliver, store, handle and protect materials in accordance with manufacturer recommendations.

.2 Storage and Protection:

.1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.

.2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

Part 2 Products

2.1 MATERIALS

.1 Steel sections and plates: to CSA-G40.20/G40.21, Grade 350W for hollow structural sections Class H and Grade 300W for Plates and Flat Shapes.

.2 Welding materials: to CSA W59.

.3 Bolts and anchor bolts: to ASTM A307.

.4 Stainless steel tubing: to ASTM A269, Type 316 alloy, Seamless welded with AISI No. 4 finish.

.5 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 PRIMERS, COATINGS AND SHOP PAINTING

.1 Interior Steel in Dry Areas: Quick drying oil alkyd conforming to CISC/CPMA 2.75.

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.2 Exterior Steel, Interior Steel in Unheated Areas, Steel Embedded in Concrete: Hot dip galvanized conforming to CSA G164, minimum Z275 coating. Galvanizing of structural steel components and loose lintels: refer to Section 05 12 23.

.3 Galvanized Coating Touch-Up: W.R. Meadows "Galvafroid" or Kerry Industries "Z.R.C." zinc rich coating or similar manufacturer containing minimum 90% zinc by weight.

.4 Apply two (2) shop coat(s) of primer or coating as indicated above and according to manufacturers recommendations. Do not prime aluminum, stainless steel or those components to be galvanized or encased in concrete.

.5 Use primer unadulterated, as provided by manufacturer. Paint on dry surfaces free from rust scale and grease. Do not paint when temperature is lower than 10 deg. Celsius and rising.

.6 Clean surfaces to be field welded; do not paint.

2.3 FASTENINGS

.1 Use nuts and bolts conforming to ASTM A307, A325, and A563 as applicable.

.1 For interior work, use cadmium-plated fastenings where other protection is not specified.

.2 For exterior work, use Type 300 or 400 stainless steel.

2.4 ANCHORS AND SHIMS

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

2.5 PIPE

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

2.6 BITUMINOUS PAINT

.1 Alkali-resisting to meet specified requirements of CAN/CGSB-1.108, Type 2. Use to insulate contact between dissimilar metals.

2.7 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

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.5 Weld all connections where possible, and bolt where not possible unless indicated otherwise on drawings.

.6 Weld all stainless steel by the Argon Arc Process. Grind smooth and polish joints, crence-free, and flush without seams.

2.8 LIST OF MISCELLANEOUS METAL FABRICATIONS

.1 This Section includes, but is not limited to the following list. Note: Galvanize all exterior items and other items noted. Prime paint all interior items.

.1 Anchors, Bolts, Inserts, Sleeves for work in this Section.
.2 Miscellaneous angles at edges of exposed ceilings to cover insulation in deck flutes.
.3 Bench Supports and Shelf Brackets (see ADs).
.4 Steel Stairs, railings, handrails.
.5 Fire route gate (see ADs).
.6 Elevator pit ladder.
.7 Bollards (see ADs).
.8 Hangers and Supports (for work in this Section).
.9 Lintels (if not by Structural Steel).

Part 3 Execution

3.1 GENERAL

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

3.2 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Provide components for building by other sections in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CSA-S16.1, or weld.

.7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

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.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

.9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding. Spray or brush apply a minimum of three (3) coats of zinc-rich paint to achieve a dry film thickness of 8 mils. Apply a finish coat of aluminum paint to provide a colour blend with the surround galvanizing.

3.3 WALL BENCHES AND UPPER SHELF

.1 Steel Angles, Steel Channel, Flat Bar Steel, Steel Rod as indicated on details.

.2 Use secure round head fasteners or countersink holes for flat head screws.

.3 Prime paint: Galvafroid.

.4 Chamfer cut ends of Rod 2 mm.

.5 Refer to AD drawings.

3.4 STEEL STAIRS

.1 Refer to Structural Drawing for Stair Construction Components. The sizes shown on structural drawings are minimum sizes. The stairs and its components shall be designed and certified by Fabricator's design Engineer licenced in the Province of Ontario.

.2 Refer to Drawing A20 for dimensions, location, and guardrail details.

.3 Note: install stairs, handrails, plumb, level, rigid and secure, as per details shown on Drawings.

.4 Provide shop drawings indicating profiles, sizes, connections, anchorage, etc. stamped and certified by a Professional Engineer (P. Eng.). The Engineer shall visit the site on periodic basis during construction, report in writing for each visit and upon completion of work, and provide a certificate stating that the work was performed in general conformance with the drawings and specifications.

3.5 GATE

.1 Welded steel pipe construction, as shown on AD 218 drawing. Galvanize after fabrication.

.2 Provide post & wheel to vehicle gate to prevent sagging.

3.6 ACCESS STAIR & LADDER

.1 Fabricate interior and exterior roof access ladders as described on drawings AD 515 & AD 517. Typical Construction is detailed on Structural Drawings.

3.7 WALL BRACKETS AND HOOKS

.1 As shown on Drawings - prime paint.

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3.8 BOLLARDS

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

.2 Refer to drawing AD 209.

3.9 SOCCER GOAL POSTS

.1 Refer to drawing AD 211 in Specification Binder C for information. Provide 1 moveable goalpost at each end of play field (2 in total).

.2 Goalposts can also be supplied by a gymnasium equipment supplier listed in Section 11 52 00. Moveable goalposts must meet the required size as described in AD 211.

3.10 STAGE RIGGING & SUPPORT ANGLES

.1 Refer to ADs for details.

3.11 GARBAGE BIN ENCLOSURE

.1 Refer to drawings AD 221 & AD 222 for details.

3.12 GYM STORAGE FENCE AND GATE

.1 Wire Storage System:

.1 Welded wire mesh partition and swing doors as manufactured by Spinnaker.

.2 Provide a complete assembly, complete with hinges and locking hasps; for Gym Storage compartment.

3.13 DUST COLLECTOR GATE

.1 Provide a complete assembly as shown on drawings, complete with acoustic louvre (refer to specification Section 08 92 00 Louvres) hinges and locking hasps.

3.14 GALVANIZED STEEL

.1 Galvanize steel members, fabrications, and assemblies after fabrication by the hot dip process in accordance with CSA G164, minimum Z275 coating.

.2 Galvanize bolts, nuts and washers and iron and steel hardware components in accordance with CSA G164.

.3 Safeguard products against steel embrittlement in conformance with ASTM A143.

.4 Design features which may lead to difficulties during galvanizing shall be pointed out prior to dipping.

.5 The composition of metal in the galvanizing bath shall be not less than 98.0% zinc.

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3.15 ERECTION

.1 Erect work in accordance with shop drawings and in coordination with trades whose work relates to this Section

.2 Erect work plumb, straight, square and accurately fitted with tight joints at intersections.

.3 Where possible install work in one continuous piece.

.4 Anchor all components to structure, walls, and floors as required with weld or other methods of anchorage approved by the Consultant.

3.16 TOUCH-UP AND REPLACEMENT

.1 Touch-up adjacent primed surfaces burned, scratched or otherwise damaged during erection with prime paint, to match shopcoat, or galvafroid for galvanized when erection is completed.

.2 Paint over bare areas on galvanized surfaces and welds with zinc rich paint.

.3 Replace damaged or unacceptable materials indicated by the Consultants.

3.17 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

.1 Section 03 10 00 – Concrete Forms and Accessories.

.2 Section 08 11 14- Steel Doors and Frames.

.3 Section 07 50 13 – Common Work Results for Roofing

.4 Section 07 50 16 – Rough Carpentry for Roofing.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

- .1 CSA B111-[1974(R1998)], Wire Nails, Spikes and Staples.
- .2 CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA O121-[M1978(R1998)], Douglas Fir Plywood.
- .4 CAN/CSA-O141-[91(R1999)], Softwood Lumber.
- .5 CSA O151-[M1978(R1998)], Canadian Softwood Plywood.
- .6 CAN/CSA-O325.0-[92(R1998)], Construction Sheathing.
- .7 CAN/CSA-086M-01(R2006), Engineering Design in Wood.

.2 National Lumber Grades Authority (NLGA)

- .1 Standard Grading Rules for Canadian Lumber [2000].

1.3 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

.3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Divert unused wood materials from landfill to recycling, reuse, composting facility approved by Consultant.

.3 Do not dispose of preservative treated wood through incineration.

.4 Do not dispose of preservative treated wood with materials destined for recycling or reuse.

.5 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Consultant.

.6 Dispose of unused wood preservative material at official hazardous material collections site approved by Consultant.

.7 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other locations where they will pose health or environmental hazard.

Part 2 Products

2.1 LUMBER MATERIAL

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:

.1 Douglas fir Graded 122-C, construction or No. 2 Pine, pressure treated in accordance with CSA 080M.

.2 Board sizes: "Standard" or better grade.

.3 Dimension sizes: "Standard" light framing or better grade.

.4 Post and timbers sizes: "Standard" or better grade.

.5 Fasteners: Proprietary fasteners toggle bolts, expansion shields and lag bolts, crews and lead or inorganic fire plugs, explosive actuated fastening devices, recommended for purpose by manufacture. Use stainless steel or galvanized to CSA G164-M1981 fasteners for all exterior fastening and for any damp or moist areas.

.6 Wood Preservatives: Surface-applied wood preservative: clear copper napthenate or 5% pentachlorophenol solution, water repellent preservative.

.7 Material shall be straight, sawn square, true, dressed four sides properly sized, shaped to correct dimensions from nominal sizes noted on Drawings.

2.2 PANEL MATERIALS

.1 Douglas fir plywood (DFP): to CSA O121, standard construction, good one side with waterproof adhesive.

2.3 ACCESSORIES

.1 Nails, spikes, staples, screws, bolts anchors lag screws, special fastening devices and supports required for erection of all carpentry components: to CSA B111. Use galvanized components where exposed to exterior atmosphere.

2.4 FINISHES

.1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work and interior highly humid areas.

Part 3 Execution

3.1 GENERAL

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

3.2 PREPARATION

.1 Do all wood framing in accordance with the Ontario Building Code and Can3 086M 01 (2006).

.2 Machine dressed work shall be slow fed using sharp cutters and finished members shall be free from drag, feathers, slivers or roughness of any kind.

.3 Frame materials with tight joints rigidly held in place.

.4 Design construction methods for expansion and contraction of the materials.

.5 Erect work plumb, level, square and to required lines.

.6 Be responsible for methods of construction for ensuring that materials are rigidly and securely attached and will not be loosened by the work of other trades.

3.3 FURRING AND BLOCKING

.1 Supply and install furring and blocking, required.

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

3.4 ROUGH BUCKS AND NAILERS

.1 Install wood bucks and nailers, as indicated, including wood bucks and linings around frames for doors and windows.

.2 Except where indicated, otherwise, use material at least 38 mm thick secured with 9 mm bolts located within 300 mm from ends of members and uniformly spaced at 1200 mm between.

.3 Countersink bolts where necessary to provide clearance for other work.

3.5 ROOF FASCIAS, CANTS, NAILERS CURBS

.1 Install wood cants, fascia backing, nailers, curbs and other wood supports for roofing, sheet metal fork, roof mounted equipment.

.2 Secure with galvanized 9 mm bolts, where indicated, galvanized nails elsewhere. Locate fastenings within 300 mm from ends and uniformly spaced between. Space bolts at 1200 mm and nails at 600 mm centres, except where indicated otherwise.

.3 Staple vapour retardant sheet strip to underside of nailers before installation. Apply strip continuous with 200 mm overlap at joints, free of wrinkles and tears, with at least 200 mm exposed for overlap on roof deck.

.4 Install wood nailers for roof hoppers, dressed, tapered and recessed slightly below top surface of roof insulation.

3.6 SUPPORTS FOR MECHANICAL UNITS

.1 Performed by Section 07 50 16. Refer to Section 07 50 13 for work division.

3.7 PRESSURE TREATED WOOD

.1 Use wood pressure treated in accordance with CSA 080M for all wood members in contact with exterior walls and roofs.

.2 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.8 GARBAGE ENCLOSURE DOORS

.1 Supply and install 38 mm x 140 mm pressure treated wood slats to front of garbage enclosure doors.

.2 Fasten each slat to steel frames with 2 screws at top, bottom and at diagonal bracing.

3.9 INSTALLATION OF HOLLOW METAL FRAMES

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

.2 Where pressed steel frames are installed in concrete walls, secure frames to concrete using lead expansion shields and anchor bolts through pipe sleeves. Perform drilling of concrete as required. Fill recessed bolt heads flush to frame face with approved metal filler and sand smooth.

.3 Install fire rated door frames in accordance with requirements of National Fire Code Volume 4, produced by The National Fire Protection Association (NFPA 80).

3.10 GENERAL

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

3.11 ERECTION

.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.2 Countersink bolts where necessary to provide clearance for other work.

3.12 INSTALLATION

.1 Lay out work carefully and to accommodate work of others. Cut and fit accurately. Erect in position indicated by drawings. Align, level, square, plumb, and secure work permanently in place. Brace work temporarily as required. Join work only over solid bracing.

.2 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolthead and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of work.

.3 Co-operate with work of other Sections to ensure that unity of actions will ensure orderly progress to meet construction schedule.

.4 Provide anchors, bolts and inserts, required for attachment of the work of this Section, to those performing the work of other Sections and who are responsible for their installation.

.5 Work shall include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, and strap iron required for installation of work and all operating hardware required on work of this Section for temporary use.

.6 Do no attach work by wood plugs or blocking in concrete or masonry. Use lead shields, expansion shields, concrete nails, or similar methods only as approved by the Architect.

.7 Do not regard grounds, blocking, furring, and such other fastening provisions as shown on Drawings as exact or complete. Provide required provisions for fastening, located and secured to suit site conditions, and adequate for intended support.

.8 Cut fastening work into lengths as long as practicable and with square ends. Erect work plumb, in true planes, and fastened rigidly in place.

.9 Grounds around openings in cavity wall systems, under sills and thresholds to provide continuous support shall be 50mm (2") minimum thickness, preservative treated.

.10 Install supports and furring members as required to receive components of cabinetwork.

.11 Install blocking at roofs, as indicated on Drawings, secured permanently to structure, trimmed and levelled to accommodate roofing components, and to receive flashings.

.12 All members shall be accurately cut to length, angle and be true to line to assure tight joints.

.13 Correct alignment and plumb must be maintained until specified lateral bracing is installed. Cutting and altering of trusses is not permitted except by approval by the Engineer. Heavy concentrated loads must not be placed on top of trusses until permanent bracing and decking have been installed. In any event, these temporary loads must not exceed the truss design loads.

3.13 SCHEDULES

.1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use 19mm thick plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 300 mm intermediate

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for asphalt for use as waterproofing.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 51 00 - Temporary Utilities.

.3 Section 312310- Excavating, Trenching and Backfilling

.4 Section 033000- Cast- in-Place Concrete

.5 Section 042113- Masonry

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-37.2-[M88], Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.

.2 CAN/CGSB 37.3-[M89], Application of Emulsified Asphalts for Dampproofing or Waterproofing.

.3 CAN/CGSB 37.5-[M89], Cutback Asphalt Plastic Cement.

.4 CGSB 37-GP-6Ma-[83], Asphalt, Cutback, Unfilled, for Dampproofing.

.5 CGSB 37-GP-9Ma-[83], Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.

.6 CGSB 37-GP-11M-[76(R1984)], Application of Cutback Asphalt Plastic Cement.

.7 CGSB 37-GP-12Ma-[84], Application of Unfilled Cutback Asphalt for Dampproofing.

.8 CGSB 37-GP-15M-[76(R1984)], Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.

.9 CAN/CGSB 37.16-[M89], Filled, Cutback, Asphalt for Dampproofing and Waterproofing.

.10 CAN/CGSB 37.28-[M89], Reinforced Mineral Colloid Type, Emulsified Asphalt for Roof Coatings and for Waterproofing.

.11 CGSB 37-GP-36M-[76], Application of Filled Cutback Asphalts for Dampproofing and Waterproofing.

.12 CGSB 37-GP-37M-[77], Application of Hot Asphalt for Dampproofing or Waterproofing.

.2 Canadian Standards Association (CSA International)

.1 CSA A123.4-[98], Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.

.3 Health Canada

.1 Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 National Research Council Canada (NRC)/Institute for Research in Construction (IRC)

.1 Canadian Construction Materials Centre (CCMC)

1.4 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures .

.2 Submit product data sheets for bituminous dampproofing products. Including:

.1 Product characteristics.

.2 Performance criteria.

.3 Application methods.

.4 Limitations.

.3 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, and cleaning procedures.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Provide and maintain dry, off-ground weatherproof storage.

.2 Store materials on supports to prevent deformation.

.3 Remove only in quantities required for same day use.

.4 Store materials in accordance with manufacturer's written instructions.

.5 Store solvent base liquids away from excessive heat and open flame.

.6 Store emulsion liquids at above freezing temperatures, free from contact with cold or frozen surfaces.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Ensure emptied containers are sealed and stored safely.

.3 Fold up metal banding, flatten and place in designated area for recycling.

.4 Divert unused bituminous waterproofing, sealing compounds and asphalt primer materials from landfill to recycling facility approved by Consultant.

1.7 PROJECT/SITE ENVIRONMENTAL REQUIREMENTS

.1 Temperature, relative humidity, moisture content.

.1 Apply waterproofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

.2 Do not proceed with Work when wind chill effect would tend to set bitumen before proper curing takes place.

.3 Maintain air temperature and substrate temperature at dampproofing installation area above 5 degrees C for 24 hours before, during and 24 hours after installation.

.4 Do not apply dampproofing in wet weather.

.2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

.3 Ventilation:

.1 Ventilate area of Work as directed by Consultant by use of approved portable supply and exhaust fans.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.3 Provide continuous ventilation during and after waterproofing application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of waterproofing installation.

1.8 QUALIFICATIONS AND QUALITY ASSURANCE

.1 Waterproofing shall be carried out by applicators skilled and with previous similar experience in this work in strict accordance with manufacturer's printed instructions. Submit proof of experience upon Consultant’s request.

.2 Manufacturer’s representative shall be called by the applicator to inspect the substrate prior to commencement of work.

.3 Manufacturer’s representative shall be retained by installer to provide technical assistance on a as-needed basis during course of installation of membrane.

1.9 EXTENDED WARRANTY

.1 Contractor performing the work of this Section, shall provide a full materials and labour warranty for 5 years from the date of Substantial Performance of the Contract.

.2 Contractor hereby warrants that the waterproofing membrane will stay in place and remain leakproof in accordance with the Contract, but for 5 years.

.3 Waterproofing membrane manufacturer shall provide a written warranty that the waterproofing membrane will remain in a watertight condition and will not leak as a result of faulty materials for a period of ten years.