NEWMAN SOUND CAMPGROUND
ACTIVITY CENTER
EXTENSION & BUILDING
MODIFICATIONS

TERRA NOVA NATIONAL PARK, NL

Proj. No.: PRO000268

SPECIFICATIONS
CIVIL/STRUCTURAL/ARCHITECTURAL

ISSUED FOR TENDER

PROVINCE OF NEWFOUNDLAND AND LABRADOR

PEGNL Newfoundland and Labrador PROFESSIONAL ENGINEERS AND GEOSCIENTISTS

PERMIT HOLDER

This Permit Allows

68925 NL CORPORATION O/A DMG CONSULTING LIMITED

To practice Professional Engineering
in Newfoundland and Labrador.
Permit No. as issued by PEGNL N0588
which is valid for the year 2015

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SIGNATURE
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DATE
PROVINCE OF NEWFOUNDLAND

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CONSULTANTS:

Prime Consultant/ Civil Engineers **DMG Consulting Limited**

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PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Title and description of Work.

.2 Contractor use of premises.

.3 Owner occupancy.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

Work of this Contract comprises general construction related to the "Extension & Building Modifications of the Newman Sound Campground Activity Center", located in the Terra Nova National Park, NL.

The work is specifically described and detailed in the specifications and drawings and generally includes but is not limited to the following:

Site Work

- Foundation excavation and backfill.
- Removal and disposal of surplus material.
- General site grading and reinstatement of disturbed areas upon completion.

Selective Demolition

- Removal and disposal of indicated sections and elements of the existing building. In-fill openings where shown. All demolished material, except that which is noted to be turned over to the owner or reused, will be removed from site and taken to an approved disposal site.

Building Construction

- Substructure: concrete foundations and concrete slab.
- Building Envelope: exterior walls finishes, windows and doors; roof construction including roof coverings.
- Interior: partitions, doors, fittings, walls, floors, and ceiling finishes.
- Exterior deck complete with railing and foundations
- Services: plumbing modifications; electrical distribution, heating and lighting.
- Any and all other miscellaneous equipment, furnishings, work or systems as indicated and required to fulfill Substantial Completion and permit Occupancy of the Building for its intended use.

1.3 CONTRACTOR USE OF PREMISES

.1 Contractor has unrestricted use of site.

.2 Coordinate use of premises under direction of Engineer and Parks Canada.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Engineer.

1.4 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.5 RELATED WORK - N/A

1.6 ON-SITE DOCUMENTS

.1 Maintain at job site documents as indicated in Section 01 31 00 – Project Management and Coordination.

1.7 CONTRACT DOCUMENTS

.1 Legends and schedules in the Issued for Tender Drawings take precedence over the Technical Specifications with respect to products and materials identified.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Connecting to existing services.

.2 Special scheduling requirements.

1.2 RELATED SECTIONS

.1 Section 01 32 00 – Construct Progress Documentation.

.2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 EXISTING SERVICES

.1 Notify Engineer and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Engineer 72 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for pedestrian and vehicular traffic.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Coordination work with other contractors and subcontractors under administration of Engineer.

.2 Scheduled project meetings.

1.2 RELATED SECTIONS

.1 Section 01 11 00 - Summary of Work.

1.3 DESCRIPTION

.1 Coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction Work, with progress of Work of other contractors and subcontractors under instructions of Engineer.

1.4 PROJECT MEETINGS

.1 Project meetings to be held at times and locations as determined by Engineer.

.2 Engineer will arrange project meetings and record and distribute minutes.

1.5 CONSTRUCTION ORGANIZATION AND START-UP

.1 Within 10 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Establish time and location of meetings and notify parties concerned minimum 5 days before meeting.

.3 Agenda to include following:

.1 Appointment of official representative of participants in Work.

.2 Schedule of Work, progress scheduling in accordance with Section 01 32 00 - Construction Progress Documentation.

.3 Schedule of submission of shop drawings, samples, colour chips in accordance with Section 01 33 00 - Submittal Procedures.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 51 00 - Temporary Utilities.

.5 Delivery schedule of specified equipment in accordance with Section 01 32 00 - Construction Progress Documentation.

.6 Site security in accordance with Section 01 52 00 - Construction Facilities.

.7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.

.8 Record drawings in accordance with Section 01 78 00 - Closeout Submittals.

.9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.10 Take-over procedures, acceptance, and warranties in accordance with Section 01 77 00 - Closeout Procedures and 01 78 00 - Closeout Submittals.

.11 Monthly progress claims, administrative procedures, photographs, and holdbacks.

.12 Appointment of inspection and testing agencies or firms in accordance with Section 01 45 00 - Quality Control.

.13 Insurances and transcript of policies.

.4 Comply with Engineer's allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.

.5 During construction coordinate use of site and facilities through Engineer's procedures for intra-project communications: Submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.

.6 Comply with instructions of Engineer for use of temporary utilities and construction facilities.

1.6 ON-SITE DOCUMENTS

.1 Maintain at job site, one copy each of the following:

.1 Contract drawings.

.2 Specifications.

.3 Addenda.

.4 Reviewed shop drawings.

.5 List of outstanding shop drawings.

.6 Change orders.

.7 Other modifications to Contract.

.8 Field test reports.

.9 Copy of approved Work schedule.

.10 Health and Safety Plan and other Safety related documents.

.11 Manufacturers' installation and application instructions.

.12 Labour conditions and wage schedules.

.13 Other documents as specified.

1.7 SCHEDULES

.1 Submit preliminary construction progress schedule in accordance with Section 01 32 00 - Construction Progress Documents to Engineer coordinated with Engineer's project

schedule. Schedule to show anticipated progress stages and final completion of work within time period required by contract documents.

.2 After review, revise and resubmit schedule to comply with project schedule requirements.

.3 During progress of Work revise and resubmit at project progress meetings or as directed by Engineer.

1.8 SUBMITTALS

.1 Make submittal to Engineer for review.

.2 Submit preliminary shop drawings, product data and samples in accordance with Section 01 33 00 – Submittal Procedures for review for compliance with Contract Documents; for field dimensions and clearances, for relation to available space, and for relation to Work of other contracts. After review, revise and resubmit for transmittal to Engineer.

.3 Submit requests for payment for review to Engineer.

.4 Submit requests for interpretation of Contract Documents, and obtain instructions through Engineer.

.5 Process change orders through Engineer.

.6 Deliver closeout submittals for review by Engineer.

1.9 COORDINATION DRAWINGS

.1 Provide information required by Engineer for preparation of coordination drawings.

.2 Review and approve revised drawings for submittal to Engineer.

.3 Engineer may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to in contract documents.

1.10 CLOSEOUT PROCEDURES

.1 Notify Engineer when Work is considered ready for Substantial Performance.

.2 Accompany Engineer on preliminary inspection to determine items listed for completion or correction.

.3 Comply with Engineer's instructions for correction of items of Work listed in executed certificate of Substantial Performance and for access to Owner-occupied areas.

.4 Notify Engineer of instructions of items of Work determined in Engineer's final inspection.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 77 00 - Closeout Procedures.

1.2 SCHEDULES REQUIRED

.1 Submit schedules as follows:

- .1 Construction Progress Schedule.
- .2 Submittal Schedule for Shop Drawings and Product Data.
- .3 Submittal Schedule for Samples.
- .4 Product Delivery Schedule.
- .5 Cash Allowance Schedule for purchasing Products.
- .6 Shutdown or closure activity.

1.3 FORMAT

.1 Prepare schedule in form of a horizontal bar chart.

.2 Provide a separate bar for each major item of work, trade or operation.

.3 Split horizontally for projected and actual performance.

.4 Provide horizontal time scale identifying first work day of each week.

.5 Format for listings: chronological order of start of each item of work.

.6 Identification of listings: By Systems description.

1.4 SUBMISSION

.1 Submit initial format of schedules within 15 working days after award of Contract.

.2 Submit schedules in electronic format, forward on disc as PDF files.

.3 Submit one opaque reproduction, plus 2 copies to be retained by Engineer.

.4 Engineer will review schedule and return review copy within 10 days after receipt.

.5 Resubmit finalized schedule within 7 days after return of review copy.

.6 Submit revised progress schedule with each application for payment.

.7 Distribute copies of revised schedule to:

- .1 Job site office.
- .2 Subcontractors.

.3 Other concerned parties.

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

1.5 CRITICAL PATH SCHEDULING

.1 Include complete sequence of construction activities.

.2 Include dates for commencement and completion of each major element of construction as follows.

.1 Site clearing.
.2 Site utilities.
.3 Foundation Work.
.4 Structural framing.
.5 Special Subcontractor Work.
.6 Equipment Installations.
.7 Finishes.

.3 Show projected percentage of completion of each item as of first day of month.

.4 Indicate progress of each activity to date of submission schedule.

.5 Show changes occurring since previous submission of schedule:

.1 Major changes in scope.
.2 Activities modified since previous submission.
.3 Revised projections of progress and completion.
.4 Other identifiable changes.

.6 Provide a narrative report to define:

.1 Problem areas, anticipated delays, and impact on schedule.
.2 Corrective action recommended and its effect.
.3 Effect of changes on schedules of other prime contractors.

1.6 SUBMITTALS SCHEDULE

.1 Include schedule for submitting shop drawings, product data, and samples.

.2 Indicate dates for submitting, review time, resubmission time, last date for meeting fabrication schedule.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTIONS INCLUDE

.1 Shop drawings and product data.

.2 Samples.

.3 Certificates and transcripts.

1.2 RELATED SECTIONS

.1 Section 01 32 00 – Construction Progress Documentation.

.2 Section 01 45 00 – Quality Control

1.3 ADMINISTRATIVE

.1 This section specifies general requirements and procedures for contractor's submissions of shop drawings, product data, samples and mock-ups to Engineer for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with work until relevant submissions are reviewed by Engineer.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Engineer. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.

.6 Notify Engineer, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are coordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Engineer review of submission, unless Engineer gives written acceptance of specific deviations.

.10 Make any changes in submissions which Engineer may require consistent with Contract Documents and resubmit as directed by Engineer. When resubmitting, notify Engineer in writing of revisions other than those requested.

.11 Notify Engineer, in writing, when resubmitting, of any revisions other than those requested by Engineer.

.12 Keep one reviewed copy of each submission on site.

1.4 SUBMITTALS

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 10 days for Engineer review of each submission.

.5 Adjustments made on shop drawings by Engineer are not intended to change contract price. If adjustments affect value of Work, state such in writing to Engineer immediately after receipt of approval of shop drawings. If value of work is to change a change order must be issued prior to proceeding with work.

.6 Accompany submissions with transmittal letter, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.7 Submissions shall include:

- .1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 Details of appropriate portions of Work as applicable:

.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.8 After Engineer review, distribute copies.

.9 Submit 3 prints plus one electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Engineer may reasonably request.

.10 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Engineer where shop drawings will not be prepared due to standardized manufacture of product.

.11 Delete information not applicable to project.

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

.13 Cross-reference product data information to applicable portions of Contract Documents.

.14 If upon review by Engineer, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of work may proceed.

.15 Samples: examples of materials, equipment, quality, finishes, workmanship. Label samples with origin and intended use.

.16 Notify Engineer in writing, at time of submission of deviations in samples from requirements of contract documents.

.17 Where colour, pattern or texture is criterion, submit full range of samples.

.18 Adjustments made on samples by Engineer are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Engineer prior to proceeding with Work.

.19 Make changes in samples, which Engineer may require, consistent with Contract Documents.

.20 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 MOCK-UPS

.1 Erect mock-ups in accordance with Section 01 45 00 - Quality Control.

1.6 PROGRESS PHOTOGRAPHS

.1 Progress photograph to be electronically formatted and labelled as to location and view.

1.7 SHOP DRAWINGS REVIEW

.1 The review of shop drawings by Engineer is for the sole purpose of ascertaining conformance with the general concept. This review shall not mean that Engineer approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all sub-trades.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA)

.1 FCC No. 301 Standard for Construction Operations.

.2 FCC No. 302 Standard for Welding and Cutting.

.3 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.4 National Building Code of Canada.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures

.2 Section 01 35 43 - Environmental Procedures

.3 Section 01 41 00 - Regulatory Requirements

1.3 SUBMITTALS

.1 At least 10 (ten) working days prior to commencing any site work: submit to Project Manager copies of:

.1 A complete Health and Safety Risk Assessment and Management Plan.

.2 Acceptance of the Project Health and Safety Risk Assessment and Management Plan and other submitted documents by the Project Manager shall only be viewed as acknowledgement that the contractor has submitted the required documentation under this specification section.

.3 Project Manager makes no representation and provides no warranty for the accuracy, completeness and legislative compliance of the Project Health and Safety Risk Management Plan and other submitted documents by this acceptance.

.4 Responsibility for errors and omissions in the Project Health and Safety risk Assessment and Management Plan and other submitted documents is not relieved by acceptance by Project Manager.

1.4 OCCUPATIONAL HEALTH AND SAFETY (PROJECT HEALTH AND SAFETY RISK ASSESSMENT AND MANAGEMENT PLANS)

.1 Conduct operations in accordance with latest edition of the Canada Occupational Health and Safety (OH&S) Act and Regulations.

.2 Prepare a detailed Project Health and Safety Risk Assessment and Management Plan for the Project Manager. Assessment shall identify, evaluate and control job specific hazards and the necessary control measures to be implemented for managing hazards.

.3 Provide a copy of the Project Health and Safety Risk Assessment and Management Plan upon request to Occupational Health and Safety Branch and the Project Manager.

.4 The written Health and Safety Risk Assessment and Management Plan shall incorporate the following:

.1 A site-specific health and safety plan, refer to clause 1.5 Site-Specific Health and Safety Risk Assessment and Management Plan of this section for requirements.

.2 An organizational structure which shall establish the specific chain of command and specify the overall responsibilities of contractors employees at the work site.

.3 A comprehensive workplan which shall:

.1 define work tasks and objectives of site activities/operations and the logistics and resources required to reach these tasks and objectives

.2 establish personnel requirements for implementing the plan, and

.3 establish site specific training and notification requirements and schedules.

.4 A personal protected equipment (PPE) Program which shall detail PPE:

.1 Selection criteria based on site hazards.

.2 Use, maintenance, inspection and storage requirements and procedures.

.3 Decontamination and disposal procedures.

.4 Inspection procedures prior to during and after use, and other appropriate medical considerations.

.5 Limitations during temperature extremes, heat stress and other appropriate medical consideration.

.5 An emergency response procedure, refer to Clause 1.6 Supervision and Emergency Response Procedure of this section for requirements.

.6 A hazard communication program for informing workers, visitors and individuals outside of the work area as required.

.7 A health and safety training program.

.8 General safety rules.

.5 Periodically review and modify as required each component of the Project Health and Safety Risk Assessment and Management Plan when a new hazard is identified during completion of work and when an error or omission is identified in any part of the Project Health and Safety Risk Assessment and Management Plan.

.6 Implement all requirements of the Project Health and Safety Risk Assessment and Management Plan.

.1 Ensure that every person entering the project site is informed of requirements under the Project Health and Safety Risk Assessment and Management Plan.

.2 Take all necessary measures to immediately implement any engineering controls, administrative contacts, personal protective equipment required or termination of work procedures to ensure compliance with the Project Health and Safety Risk Assessment and Management Plan.

1.5 SITE SPECIFIC HEALTH AND SAFETY PLAN

.1 Prepare a detailed site Specific Project Health and Safety Plan which shall:

.1 Contain certain hazard assessment results.

.2 Identify engineering and administrative demonstrative controls (work-practices and procedures) to be implemented for managing identified and potential hazards, and comply with applicable federal and provincial legislation and more stringent requirements that have been specified in these specifications.

.2 Review for completeness the hazard assessment results immediately prior to commencing work, when a new hazard is identified during completion of work and when an error or omission is identified.

.1 Be solely responsible for investigating, evaluation and managing any report of actual or potential hazards.

.2 Retain copies of all completed hazard assessments at the project site and make available to the Engineer immediately upon request.

1.6 SUPERVISION AND EMERGENCY RESCUE PROCEDURE

.1 Carry out work under the direct supervision of competent persons responsible for safety by ensuring the work complies with the appropriate section of OH&S Act and Regulations

.2 Assign a sufficient number of supervisory personnel to the work site.

.3 Provide a suitable means of communications for workers required to work alone.

.4 Develop an emergency rescue plan for the job site and ensure that supervisors and workers are trained in the emergency rescue plan.

.5 The emergency response plan shall address, as a minimum:

.1 Pre-emergency planning.

.2 Personnel roles, lines of authority and communication.

.3 Emergency recognition and prevention.

.4 Safe distances and places of refuge.

.5 Site security and control

.6 Evacuation routes and procedures

.7 Decontamination procedures which are not covered by the site specific safety and health plan.

.8 Emergency medical treatment and first aid.

.9 Emergency alarm, notification and response procedures including procedures for reporting incidents to local, provincial and federal government departments.

.10 PPE and emergency equipment.

.11 Procedures for handling emergency incidents.

.12 Site specific emergency response training requirements and schedules.

.6 The emergency response procedures shall be rehearsed regularly as part of the overall training program.

.7 Provide adequate first aid facilities for the jobsite and ensure that a minimum number of workers are trained in first aid in accordance with the First Aid Regulations.

1.7 CONTRACTORS SAFETY OFFICER

.1 The contractor shall employ a Safety Officer who will be solely responsible for the implementation and monitoring of the Project Health and Safety Risk Assessment and Management Plan, and will have the authority to implement health and safety changes as directed by the Project Manager. The Safety Officer shall have as a minimum:

.1 Completed training in hazardous occurrence management and response/protocols.

.2 Completed training in First Aid.

.3 Have working knowledge of occupational safety and health regulations.

.4 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.5 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.6 Prior to mobilization on-site, the Contractor’s Safety Officer shall hold an orientation meeting (in conjunction with Project Manager) with the construction team to review project occupational health and safety. Include a review of:

.1 Health and Safety Risk Assessment and Management Plan.

.2 Construction Safety Measures.

.3 Supervision and Emergency Rescue Procedures.

.7 Report directly to and be under direction of site supervisor.

1.8 HEALTH AND SAFETY COMMITTEE

.1 Establish an Occupational Health and Safety Committee where ten or more workers are employed on the job site as per the OH&S Act and Regulations.

.3 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.4 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 UNFORSEEN HAZARDS

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

1.11 INSTRUCTION AND TRAINING

.1 Workers shall not participate in or supervise any activity on the work site until they have been trained to a level required by this job function and responsibility. Training shall as a minimum thoroughly cover the following:

.1 Federal Health and Safety Legislation requirements including roles and responsibilities of workers and person(s) responsible for implementing, monitoring and enforcing health and safety requirements.

.2 Safety and health hazards associated with working on a contaminated site including recognition of symptoms and signs which might indicate over exposure to hazards.

.3 Limitations, use, maintenance and disinfection-decontamination of personal protective equipment associated with completing work.

.4 Limitations, use, maintenance and care of engineering controls and equipment.

.5 Limitations and use of emergency notifications and response equipment including emergency response protocol.

.6 Work practices and procedures to minimize the risk of an accident and hazardous occurrence from exposure to a hazard.

.2 Provide and maintain training of workers, as required, by Federal legislation.

.3 Provide copies of all training certificates to Project Manager for review, before a worker is to enter the work site.

.4 Authorized visitors shall not access the work site until they have been:

.1 Notified of the names of persons responsible for implementing, monitoring and enforcing the health and Safety Risk Assessment and Management Plan.

.2 Briefed on safety and health hazards present on the site.

.3 Instructed in the proper use and limitations of personal protective equipment.

.4 Briefed as the emergency response protocol including notification and evacuation process.

.5 Informed of practices and procedures to minimize risks from hazards and applicable to activities performed by visitors.

1.12 CONSTRUCTION SAFETY MEASURES

.1 Observe construction safety measures of National Building Code, latest edition, Federal Government, OH&S Act and Regulations, Workplace Health and Safety and Compensation Commission provided that in any case of conflict or discrepancy more stringent requirements shall apply.

.2 Administer the project in a manner that will ensure, at all times, full compliance with Federal Acts, regulations and applicable safety codes and the site Health and Safety Risk Assessment and Management Plan.

1.13 HEALTH AND SAFETY MONITORING

.1 Periodic inspections of the contractor's work may be carried out by the Project Manager to maintain compliance with the Health and Safety Program. Inspections will include visual inspections as well as testing and sampling as required.

.2 The contractor shall be responsible for any and all costs associated with delays as a result of contractor's failure to comply with the requirements outlined in this section.

1.14 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Project Manager.

.2 Provide Project Manager with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Project Manager may stop work if non-compliance of health and safety regulations is not corrected.

1.15 WHMIS

.1 Ensure that all controlled products are in accordance with the Workplace Hazardous Materials Information System (WHMIS) Regulations and Chemical Substances of the OH&S Act and Regulations regarding use, handling, labelling, storage, and disposal of hazardous materials.

.2 Deliver copies of relevant Material Safety Data Sheets (MSDS) to job site and the Project Manager. The MSDS must be acceptable to Labour Canada and Health and Welfare Canada for all controlled products that will be used in the performance of this work.

.3 Train workers required to use or work in close proximity to controlled products as per OH&S Act and Regulations.

.4 Label controlled products at jobsite as per OH&S and Regulations.

.5 Provide appropriate emergency facilities as specified in the MSDS where workers might be exposed to contact with chemicals, e.g. eye-wash facilities, emergency shower.

.1 Workers to be trained in use of such emergency equipment.

.6 Contractor shall provide appropriate personal protective equipment as specified in the MSDS where workers are required to use controlled products.

.1 Properly fit workers for personal protective equipment

.2 Train workers in care, use and maintenance of personal protective equipment.

.7 No controlled products are to be brought on-site without prior approved MSDS.

.8 The MSDS are to remain on site at all times.

1.16 OVERLOADING

.1 Ensure no part of work or associated equipment is subjected to loading that will endanger its safety or will cause permanent deformation.

1.17 PERSONAL PROTECTIVE EQUIPMENT

.1 Ensure workers on the jobsite use personal protective equipment appropriate to the hazards identified in the Risk Assessment and Management Plan and those workers are trained in the proper care, use, and maintenance of such equipment.

.2 PPE selections shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, task-specific conditions, duration and hazards and potential hazards identified on site.

.3 Provide workers and visitors to the site with proper respiratory protection equipment.

.1 No work shall be performed in an area where an airborne contaminant exceeds one half (½) the IDLH concentration.

.2 Respiratory protection shall be provided in accordance with the requirements of the Canada Labour Code.

.3 Establish, implement and maintain a respirator inspection and maintenance program.

.4 Copies of all respirator owners' maintenance manuals, shall be kept at all times at the contractor's site office.

.4 Provide and maintain a supply of dermal protection equipment to allow visitors and all workers proper dermal protection.

.1 Dermal protection shall be sufficient to act as a protective barrier between the skin and an airborne contaminant or hazardous material. Dermal protection shall also be provided for all physical hazards.

.2 Dermal protection equipment shall not be used after exceeding 75% of the break through time. The break through time shall be based on the contaminant which requires the least amount of time to break through the protective equipment

.3 Copies of all dermal protection user specifications, owners and maintenance manuals shall be kept at all times at the contractor's site office.

.4 Establish, implement and maintain air inspection program to ensure proper dermal protection in accordance with CSA, NIOSH, U.S. EPA and manufacturer's requirements.

.5 Provide all workers and up to five (5) visitors to the site with proper hearing protection. Workers and visitors shall not be exposed to noise levels greater than 85 dB (A) over an eight hour shift without proper hearing protection.

.6 Provide all workers and up to five (5) visitors to the site with CSA approved eye protection sufficient to act as a protective barrier between the eye and airborne contaminants, hazardous materials and physical hazard.

.7 Provide workers and up to five (5) visitors to the site with CSA approved hard hats.

1.18 WORK STOPPAGE

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

PART 2 PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 PART 3 EXECUTION (NOT APPLICABLE

END OF SECTION

PART 1 GENERAL

1.1 FIRES

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

1.2 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 DRAINAGE

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties where indicated.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by Engineer.

1.5 WORK ADJACENT TO WATERWAYS

.1 Do not operate construction equipment in waterways.

.2 Do not use waterway beds for borrow material.

.3 Do not dump excavated fill, waste material or debris in waterways.

.4 Design and construct temporary crossings to minimize erosion to waterways.

.5 Do not skid logs or construction materials across waterways.

.6 Avoid indicated spawning beds when constructing temporary crossings of waterways.

.7 Do not blast under water or within 100 m of indicated spawning beds.

1.6 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Control emissions from equipment and plant to local authorities emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 NOTIFICATION

.1 Engineer will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of environmental protection. Contractor: after receipt of such notice, inform Engineer of proposed corrective action and take such action as approved by Engineer.

.2 Engineer may issue stop order of work until satisfactory corrective action has been taken.

.3 No time extensions will be granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 02 82 00.02 – Asbestos Abatement

1.2 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.3 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: stop work immediately should materials believed to contain asbestos be encountered in during the execution of the work and notify Engineer. Do not proceed until written instructions have been received from Engineer. Perform asbestos abatement and repair in accordance with Newfoundland and Labrador Asbestos Abatement Regulations, Latest Edition.

.2 Mould: stop work immediately should material resembling mould be encountered during the execution of work and notify Engineer. Do not proceed until written instructions have been received from Engineer.

1.4 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions.

1.5 RELICS AND ANTIQUITIES

.1 Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during course of work.

.2 Give immediate notice to Engineer and await Engineer’s written instructions before proceeding with work in this area.

.3 Relics, antiquities and items of historical or scientific interest remain Her Majesty’s property.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTIONS INCLUDE

.1 Inspection and testing, administrative and enforcement requirements.

.2 Tests and mix designs.

.3 Mock-ups.

.4 Mill tests.

.5 Equipment and system adjust and balance.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures

1.3 INSPECTION

.1 Allow Engineer access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Engineer instructions.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Engineer may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Engineer shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Engineer for purpose of inspecting and/or testing portions of Work.

.2 Allocated costs: to Section 01 21 00 – Allowances and Section 01 29 83 – Payment Procedures: Testing Laboratory Services.

.3 Provide equipment required for executing inspection and testing by appointed agencies.

.4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Engineer at no cost to Engineer. Pay costs for retesting and reinspection.

1.5 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.6 PROCEDURES

.1 Notify appropriate agency and Engineer in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Engineer as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Engineer it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Engineer.

1.8 REPORTS

.1 Submit 3 copies of inspection and test reports to Engineer, plus electronic copies in PDF format.

.2 Provide copy to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

.3 Include copy of all inspection and test reports in Commissioning Manuals.

1.9 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.

.2 Construct in all locations acceptable to Engineer as specified in specific Section.

.3 Prepare mock-ups for Engineer review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 Remove mock-up at conclusion of Work or when acceptable to Engineer

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

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

.8 Mock-ups may remain as part of Work.

1.10 EQUIPMENT AND SYSTEMS

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

.2 Mechanical – coordinate with mechanical division.

.3 Electrical – Coordinate with electrical division.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 52 00 - Construction Facilities.

.2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.3 DEWATERING

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

1.4 WATER SUPPLY

.1 Arrange for connection with appropriate utility company and pay all costs for installation, maintenance and removal.

1.5 TEMPORARY HEATING AND VENTILATION

.1 Pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel operation, maintenance and removal of equipment. Use of direct, fired heaters discharging waste products into work areas will not be permitted unless prior approval is given by Engineer.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.

.2 Protect Work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 10°C and relative humidity less than 60% in areas where construction is in progress.

.1 Maintain minimum temperature of 10°C or higher where specified as soon as finished work is commenced. Maintain until acceptance of structure by Engineer.

.2 Maintain ambient temperature and humidity levels as required for comfort of office personnel.

.5 Ventilating:

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.

.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.5 Vent direct-fired combustion units to outside.

.7 Be responsible for damage to Work due to failure in providing adequate heat, humidity and protection during construction.

.8 Use of new or existing systems for temporary heating, ventilating or air conditioning will not be permitted.

1.6 TEMPORARY POWER AND LIGHT

.1 Provide and pay for temporary power during constructing for temporary lighting, heating, site construction trailers and operating of power tools in accordance with governing regulations and the Canadian Electrical Code, latest edition.

.2 Arrange for connection with Utility company. Pay all costs for installation, maintenance and removal of cables, distribution and branch panel boards, poles, lighting, heating and general power receptacles as required.

.3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.

.4 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx. Temporary lighting to consist of wiring, pig tail sockets and 75 watt shatterproof incandescent lamps to provide a minimum light level of 162 lux.

.5 Electrical power and lighting systems installed under this contract may be used for construction requirements only with prior approval of Engineer provided that guarantees are not affected. Make good damage to electrical system caused by use under this contract. Replace lamps which have been used for more than 3 months.

.6 General contractor responsible for payment of all electrical energy charges associated with temporary power up to date of substantial completion.

1.7 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

1.8 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

.3 When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval of Engineer.

1.9 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone, fax, data hook up, lines and equipment necessary for own use and use of Engineer.

1.10 SITE SIGN AND NOTICES

.1 Contractor is responsible for the construction of job sign frame and the installation of the plywood job sign. Timber frame shall be constructed as specified and detailed on “Job Sign Support Frame Detail”. Plywood job sign shall be as per layout on “Job Sign Detail”. These drawings documents are published at http://www.tw.gov.nl.ca/works

under the Project Signs Link and is to be picked up by contractor at the Sign Shop, Dept of Transportation and Works, White Hills, St. John's, Newfoundland and Labrador. Plywood job sign and timber frame shall remain the property of the Owner and shall be disposed of at the discretion of the Owner.

.2 Locate job sign as directed by Engineer so as to ensure good visibility by passing traffic.

.3 Construct timber job sign frame using two (2) 140 x 140mm timber posts set vertically in concrete to a ground depth of 1000mm or below the frost line, whichever is greater. Install three (3) 38 x 89mm horizontal timber braces, all as shown on "Job Sign Support Frame Detail" published at http://www.tw.gov.nl.ca/works under the Project Signs Link. Attach plywood sign to timber frame using galvanized nails. Paint timber frame with two (2) coats of white paint if using untreated timber. Backfill compact and level ground around job sign frame to the satisfaction of the Engineer.

1.11 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by Engineer.

.2 When project is closed down at end of construction season keep temporary facilities operational until close down or removal is approved by Engineer.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Construction aids.

.2 Office and sheds.

.3 Parking.

.4 Project identification.

1.2 RELATED SECTIONS

.1 Section 01 35 29.06 – Health and Safety Requirements

.2 Section 01 51 00 - Temporary Utilities.

.3 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 INSTALLATION AND REMOVAL

.1 Provide construction facilities in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.4 SCAFFOLDING

.1 Provide and maintain scaffolding in rigid, secure and safe manner.

.2 Erect scaffolding independent of walls. Remove promptly when no longer required. Refer to Section 01 35 29.06 – Health and Safety Requirements.

1.5 HOISTING

.1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.

.2 Hoists cranes shall be operated by certified operator.

1.6 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.7 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of work.

.2 Provide and maintain adequate access to project site.

.3 Build and maintain temporary roads where indicated or directed by Engineer and provide snow removal during period of Work.

.4 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

1.8 CONTRACTOR'S SITE OFFICES

.1 Provide office heated to 22 ^{o}C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table, fax machine, telephone, file cabinet and chair.

.2 Provide a clearly marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors may provide their own offices as necessary. Direct location of these offices.

1.9 ENGINEER SITE OFFICE (NOT REQUIRED)

1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.11 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.12 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Barriers.

.2 Environmental Controls.

.3 Traffic Controls.

.4 Fire Routes.

1.2 RELATED SECTIONS

.1 Section 01 51 00 – Temporary Utilities.

.2 Section 01 52 00 – Construction Facilities.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.4 HOARDING

.1 Erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres, installed on 89 x 89 mm wood posts at 2400 mm centres or 50 mm dia. steel posts at 2400 mm centres. Posts to be place in post holes filled with concrete to minimum 900 mm depth. Finish temporary site enclosures with 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121 or chain link fence fabric to Section 32 31 13 – Chain Link Fences and Gates.

.2 Apply plywood panels or chain link fence fabric vertically flush and butt jointed.

.3 Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.

.4 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.

.5 Paint public side of site enclosure in selected colours with one coat primer to CGSB 1.189M and one coat exterior paint to CGSB 1.59. Maintain public side of enclosure in clean condition.

.6 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.5 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.

.2 Provide as required by governing authorities.

1.6 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.

.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

.3 Erect enclosures to allow access for installation of materials and working inside enclosure.

.4 Design enclosures to withstand wind pressure and snow loading.

1.7 DUST TIGHT SCREENS

.1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

1.8 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

.2 Build and maintain temporary roads where indicated or directed and provide snow removal during period on work.

.3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor’s use of roads.

1.9 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.10 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

1.12 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Engineer locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Product quality, availability, storage, handling, protection, and transportation.

.2 Manufacturer's instructions.

.3 Quality of Work, coordination and fastenings.

1.2 RELATED SECTIONS

.1 Section 01 45 00 – Quality Control.

.2 Section 01 73 00 – Execution.

1.3 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards. Conform to these reference standards, in whole or in part as specifically requested in specifications.

.2 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.4 QUALITY

.1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Engineer based upon requirements of Contract Documents.

.4 Within 7 (seven) days of written request by Engineer, submit following information for material and equipment proposed for supply:

.1 Name and address of manufacturer.

.2 trade name, model and catalogue number,

.3 performance, descriptive and test data,

.4 manufacturer's installation or application instructions,

.5 evidence of arrangements to procure.

.5 Use products of one manufacturer for material and equipment of same type or classification unless otherwise specified.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.5 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Engineer of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.

.2 In event of failure to notify Engineer at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Engineer reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.6 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

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

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Engineer.

.9 Touch-up damaged factory finished surfaces to Engineer satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.7 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

1.8 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Engineer in writing, of conflicts between specifications and manufacturer's instructions, so that Engineer may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Engineer to require removal and re-installation at no increase in Contract Price or Contract Time.

1.9 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Engineer if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Engineer reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Engineer, whose decision is final.

1.10 CO-ORDINATION

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.11 CONCEALMENT

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform Engineer if there is interference. Install as directed by Engineer.

1.12 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

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

.3 Inform Engineer of conflicting installation. Install as directed.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Engineer.

1.14 FASTENINGS GENERAL

.1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work, unless stainless steel or other material is specifically requested in affected specification section.

.2 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood plugs are not acceptable.

.3 Conceal fasteners where indicated. Space evenly and lay out neatly.

.4 Fastenings which cause Spalding or cracking are not acceptable.

.5 Obtain Engineer's approval before using explosive actuated fastening devices. If approval is obtained comply with CSA Z166.

1.15 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.16 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Engineer.

1.17 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute work at times directed by local governing authorities, with minimum of disturbance to work.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

.3 Submit schedule to and obtain approval from Engineer for any shut-down or closure of active services or facility. Adhere to approved schedule and provide notice to affected parties.

.4 Where unknown services are encountered, immediately advise Engineer and confirm findings in writing.

.5 Remove abandoned services lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Engineer.

1.18 SELECTION OF MATERIAL AND EQUIPMENT

.1 Material and equipment will be specified in the tender documents, and selected by Contractor, by one or more of the following methods:

.1 Specification by reference to a relevant Standard, such as CSA, ASTM, ULC, etc., select any material or equipment that meets or exceeds the specified.

.2 Specification by reference to an accepted product evaluation publication, such as the CGSB “Qualified Products List”, or CCMC Registry of Product Evaluations”, - select any manufacturer’s product so listed.

.3 Specification by Prescriptive or Performance specification – select any material or equipment meeting or exceeding specification.

.4 Specification by identification of one or more Manufacturer’s specific product(s) as an “Acceptable Product”, along with a listing of other manufacturers who may offer equivalent products – select any product so named, or select from equivalent product(s) of other listed manufacturers.

.2 “Acceptable Product” is deemed to be a complete and working commodity as described by a manufacturer’s name, catalogue number, trade name, or any combination thereof, and will constitute the minimum standard of acceptance.

.3 Engineer will determine acceptability of Contractor's selection of material and equipment at time of Shop Drawing review.

.4 When material or equipment is specified by a Standard, Prescriptive or Performance specification, upon request of the Engineer, obtain from manufacturer an independent laboratory reporting, showing that material or equipment meets or exceeds the specified requirements.

1.19 SUBSTITUTION OF MATERIAL AND EQUIPMENT

.1 **Prior to Tender** closing bidders may propose addition of other manufacturer's names to those listed in the tender documents providing requests are made in writing at least 7 days prior to tender closing date or bid depository where bid depository is used. Engineer will inform all prospective bidders of decision by addendum, issued at least 5 days prior to the tender closing date.

Where no manufacturer's names are listed, the onus is on contractor to provide material and equipment to meet performance specification.

.2 **After Contract award** substitutions of material or equipment, other than as selected by Contractor from those specified, will be considered by Engineer only if:

.1 material or equipment selected from those specified are not available

.2 delivery date of material or equipment selected from those specified would unduly delay completion of the Contract; or

.3 alternative material or equipment to those specified, provided they are determined by the Engineer to be equivalent to or better that those specified, will result in a credit to the Contract amount.

.3 Requests for substitutions after Contract award must be accompanied by sufficient information in the form of shop drawings, manufacturer's literature, samples or other data to permit proper investigation of the substitutes used. Requests must also include statements of respective costs of material or equipment originally specified and the proposed substitution.

.4 Should a proposed substitution be accepted after Contract award either in part or in whole, assume full responsibility and costs when substitution affects other work on Project. Contractor to pay for design or drawing changes required as a result of the substitution.

.5 Amounts of all credits arising from approval of substitutions after Contract award will be determined by Engineer and the Contract amount will be reduced accordingly.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Requirements and limitations for cutting and patching the Work.

1.2 RELATED SECTIONS

.1 Section 01 11 00 - Summary of Work.

.2 Section 01 33 00 - Submittal Procedures.

1.3 SUBMITTALS

.1 Submit written request in advance of cutting or alteration which affects:

- .1 Structural integrity of any element of Project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.2 Include in request:

- .1 Identification of Project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.4 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

.6 Obtain Engineer approval before cutting, boring or sleeving load-bearing members.

1.5 EXECUTION

.1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.9 Restore work with new products in accordance with requirements of Contract Documents.

.10 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 - Firestopping, full thickness of the construction element.

.12 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

.13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

.14 Make cuts with clean, true, smooth edges.

.15 Where new work connects with existing, and where existing work is altered, cut, patch and make good to match existing work.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

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

.2 Store volatile waste in covered metal containers and remove from premises at end of each working day.

.3 Provide adequate ventilation during use of volatile or noxious substances. Use for building ventilation systems is not permitted for this purpose.

1.2 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.

.2 Remove waste materials and debris from site at the end of each working day. Do not burn waste materials on site.

.3 Clear snow and ice from access to building.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site containers for collection of waste materials and debris.

.6 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

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

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.3 FINAL CLEANING

.1 Refer to General Conditions.

.2 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.4 When the Work is Totally Performed, remove surplus products, tools, construction machinery and equipment. Remove waste products and debris other than that caused by the Owner or other Contractors.

.5 Remove waste materials from the site at regularly scheduled times or dispose of as directed by the Engineer. Do not burn waste materials on site.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Leave the work broom clean before the inspection process commences.

.8 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.9 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.

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

.11 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.12 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.13 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.14 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.15 Remove dirt and other disfiguration from exterior surfaces.

.16 Clean and sweep roofs.

.17 Sweep and wash clean paved areas.

.18 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

.19 Remove snow and ice from access to building.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Owner requirements.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 As-built, samples, and specifications.

.2 Equipment and systems.

.3 Product data, materials and finishes, and related information.

.4 Operation and maintenance data.

.5 Spare parts, special tools and maintenance materials.

.6 Warranties and bonds.

.7 Final site survey.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 45 00- Quality Control.

.3 Section 01 71 00 – Examination and Preparation.

.4 Section 01 77 00 - Closeout Procedures.

.5 Section 01 91 13 – General Commissioning (Cx) Requirements.

1.3 SUBMISSION

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

.2 Submit one copy of completed volumes in final form 15 days prior to final inspection.

.3 Copy will be returned after final inspection, with Engineer's comments.

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

.5 Two weeks prior to Substantial Performance of the Work, submit to the Engineer, two final copies of operating and maintenance manuals.

.6 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.7 If requested, furnish evidence as to type, source and quality of products provided.

.8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.9 Pay costs of transportation.

1.4 FORMAT

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

.2 Binders: vinyl, hard covered, 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 Text: Manufacturer's printed data, or typewritten data.

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

.9 Provide CAD files in DWG format on CD. Also provide electronic files in PDF format.

1.5 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project; names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties; schedule of products and systems, indexed to content of volume.

.2 For each product or system:

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

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

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

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

.6 Training: Refer to Section 01 91 13 – General Commissioning (Cx) Requirements.

1.6 AS-BUILTS AND SAMPLES

.1 In addition to requirements in General Conditions, maintain at the site for Engineer 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 Engineer.

1.7 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of blue line opaque drawings, provided by Engineer.

.2 Provide felt tip marking pens, maintaining red color pens for recording information.

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

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

- .1 Measured depths of elements of foundation in relation to finish first floor datum.
- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

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

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

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

.7 At completion of project provide all recorded information on print drawings or alternatively transfer to CAD files in DWG format. Submit DWG files, also with electronic files in PDF format as part of the Closeout Submittals..

1.8 FINAL SURVEY

.1 Submit final site survey certificate certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 EQUIPMENT AND SYSTEMS

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

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

.3 Include installed colour coded wiring diagrams.

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

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

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

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

.8 Include sequence of operation by controls manufacturer.

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

.10 Provide installed control diagrams by controls manufacturer.

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

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

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

.14 Include test and balancing reports

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

1.10 MATERIALS AND FINISHES

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

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

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

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

1.11 SPARE PARTS

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site location as directed; place and store.

.4 Receive and catalogue all items. Submit inventory listing to Engineer. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.12 MAINTENANCE MATERIALS

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site location as directed; place and store.

.4 Receive and catalogue all items. Submit inventory listing to Engineer. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.13 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to project site place and store.

.4 Receive and catalogue all items. Submit inventory listing to Engineer. Include approved listings in Maintenance Manual.

1.14 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 Engineer.

1.15 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan to Engineer for approval.

.3 Warranty management plan to include required actions and documents to assure that Owner receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

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

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

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

.6 Co-execute submittals when required.

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

.6 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and commissioned systems such as fire protection, alarm systems, sprinkler systems, lightning protection systems.

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.4 Procedure and status of tagging of equipment covered by extended warranties.

.5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.7 Respond in a timely manner to oral or written notification of required construction warranty repair work.

.8 Written verification will follow oral instructions. Failure to respond will be cause for the Engineer to proceed with action against Contractor.

1.16 PRE-WARRANTY CONFERENCE

.1 Meet with Engineer to develop understanding of requirements of this section. Schedule meeting prior to contract completion, and at time designated by Engineer.

.2 Engineer will establish communication procedures for:

.1 Notification of construction warranty defects.

.2 Determine priorities for type of defect.

.3 Determine reasonable time for response.

1.17 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Engineer.

.2 Leave date of acceptance until project is accepted for occupancy.

.3 Indicate following information on tag:

.1 Type of product/material.

.2 Model number.

.3 Serial number.

.4 Contract number.

.5 Warranty period.

.6 Inspector's signature.

.7 Construction Contractor.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTIONS INCLUDES

.1 Methods and procedures for demolishing, salvaging, recycling and removing sitework items designated to be removed in whole or in part, and for backfilling resulting trenches and excavations.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures

.2 Section 01 35 29.06 - Health and Safety Requirements

.3 Section 01 35 43 - Environmental Procedures

.4 Section 01 45 00 - Quality Control

.5 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.3 SUBMITTALS

.1 Shop drawings

.1 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.

.2 Submit drawings stamped and signed by qualified professional engineer licensed in Province of Newfoundland and Labrador, Canada.

.2 Hazardous Materials: provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.

.3 Submit plan indicating:

.1 Descriptions of and anticipated quantities of materials to be salvaged, reused, recycled and landfilled.

.2 Schedule of selective demolition.

.3 Number and location of dumpsters.

.4 Anticipated frequency of tippage.

.4 Submit copies of certified weigh bills, bills of landing from authorized disposal sites and reuse and recycling facilities for material removed from upon request from Engineer.

1.4 QUALITY ASSURANCE

.1 Convene pre-installation meeting one week prior to beginning work of this section to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with building subtrades.

.2 Arrange for site visit with Engineer to examine existing site conditions adjacent to demolition work, prior to start of Work.

.3 Hold project meetings every month.

.1 Ensure key personnel, site supervisor, project manager, subcontractor representatives attend.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Engineer and at no cost to Engineer.

.2 Remove and store materials to be salvaged, in manner to prevent damage.

.3 Store and protect in accordance with requirements for maximum preservation of material.

1.6 SITE CONDITIONS

.1 In all circumstances ensure that demolition work does not adversely affect adjacent water courses groundwater and wildlife, or contribute to excess air and noise pollution.

.2 Do not dispose, of waste or volatile materials such as mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.

.3 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

.5 Protect trees, plants and foliage on site and adjacent properties where indicated.

1.7 EXISTING CONDITIONS

.1 Prior to start of any demolition work remove contaminated or hazardous materials as defined by authorities having jurisdiction from site and dispose of at designated disposal facilities

1.8 SCHEDULING

.1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.

.2 Notify Engineer in writing when unforeseen delays occur.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 PREPARATION

.1 Inspect site with Engineer and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

3.2 REMOVAL OPERATIONS

.1 Remove items as indicated.

.2 Do not disturb items designated to remain in place.

.3 Removal of Pavements, Curbs and Gutters

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Engineer.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular material.

.4 When removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving, prevent contamination with base course aggregates.

.5 When removing pipes under existing or future pavement area, excavate at least 300mm below pipe invert.

.6 Decommission water wells and monitoring wells in accordance with Provincial guidelines and regulations.

.7 Removal from site

.1 Interim removal of stockpiled material will be required by Engineer, if it is deemed to interfere with operations of Engineer, Owner or other contractors.

.8 Sealing

.1 Seal pipe ends and walls of manholes or catch basins as indicated. Securely plug to form watertight seal.

.9 Backfill

.1 Backfill in areas as indicated

3.3 RESTORATION

.1 Restore areas and existing works outside areas of demolition to match conditions of adjacent, undisturbed areas.

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.4 CLEAN UP

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

.2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Methods and procedures for demolition of structures, parts of structures, basements and foundation walls and includes abandonment and removal of septic tanks and tanks containing petroleum products.

1.2 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work

.2 Section 01 35 29.06 - Health and Safety Requirements

.3 Section 01 52 00 – Construction Facilities

.4 Section 01 56 00 - Temporary Barriers and Enclosures

1.3 REFERENCES

.1 Canadian Standards Association (CSA).

.1 CSA S350, Code of Practice for Safety in Demolition of Structures

1.4 QUALITY ASSURANCE

.1 Prior to start of Work arrange for site visit with Engineer to examine existing site conditions adjacent to demolition work

.2 Hold project meetings every month.

.3 Ensure key personnel, site supervisor, project manager, subcontractor representatives, attend.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.6 EXISTING CONDITIONS

.1 Should material resembling spray or trowel applied asbestos or any other designated substance be encountered in course of demolition, stop work, take preventative measures, and notify Engineer immediately. Do not proceed until written instructions have been received.

.2 Structures to be demolished to be based on their condition on date that tender is accepted.

.3 Salvage items as identified by Engineer. Remove, protect and store salvaged items as directed by Engineer. Deliver to Owner as directed.

1.7 DEMOLITION DRAWINGS

.1 Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.

.2 Submit drawings stamped and signed by qualified professional engineer licensed in Province of Newfoundland and Labrador, Canada.

1.8 ENVIRONMENTAL PROTECTION

.1 Ensure work is done in accordance with Section 01 35 43 – Environmental Procedures.

.2 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades parts of existing building to remain.

.3 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered cease operations and notify Engineer.

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

.5 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.6 Fires and burning of waste or materials is not permitted on site.

.7 Do not bury waste or materials on site.

.8 Do not dispose of waste or volatile materials such as mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.

.9 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.10 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities' requirements.

.11 Protect trees, plants and foliage on site and adjacent properties where indicated.

.12 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.13 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.9 SCHEDULING

.1 Ensure project time lines are met without compromising specified minimum rates of material diversion. Notify Engineer in writing of delays.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 PREPARATION

.1 Do work in accordance with 01 35 29.06 – Health and Safety Requirements.

.2 Disconnect electrical and telephone service lines entering buildings to be demolished. Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.

.3 Disconnect and cap designated mechanical services.

.1 Sewer and water lines: remove to property line.

.2 Other underground services: remove and dispose of as directed by Engineer.

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

.5 Remove rodent and vermin as required by Engineer.

3.2 SAFETY CODE

.1 Do demolition work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

.2 Blasting operations not permitted during demolition.

3.3 DEMOLITION

.1 Demolish foundation walls to minimum of 300mm below finished grade.

.2 Demolish foundation walls and footings, and concrete floors below or on grade.

.3 Break 100mm holes per 10m² area in concrete slabs which are not to be removed, to prevent accumulation of water. Keep floor drains open if permanent drainage still connected.

.4 Pieces of concrete and masonry not larger that 200 mm broken from demolition work may be used as backfill in open basements on excavations provided voids are filled. Keep demolition fill 300 mm below finished grade level. Do not backfill basement areas until inspected by Engineer.

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

.6 At end of each day's work, leave Work in safe and stable condition. Protect interiors of parts not to be demolished from exterior elements at all times.

.7 Demolish to minimize dusting. Keep materials wetted as directed by Engineer.

.8 Remove structural framing.

.9 Contain all fibrous materials (e.g. Insulation) to minimize release of airborne fiber while being transported to waste disposal site or alternative disposal location.

.10 Only dispose of material specified by selected alternative disposal option as directed by Engineer.

.11 Ensure that these materials will not be disposed of in landfill or waste stream destined for landfill.

.12 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

.13 Environmental:

- .1 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimized danger at site or during disposal.
- .2 Septic Tanks:
  - .1 Pump out buried septic tanks, left in place. Fill with sand.
  - .2 Remove tanks within area of new construction or under paved areas and slabs.

.14 Prior to the start of any demolition work remove contaminated or hazardous materials as defined by authorities having jurisdiction, from site and dispose of at designated disposal facilities.

.15 Prior to the start of any demolition work remove underground storage tanks and piping as directed.

.16 Use natural lighting to work by wherever possible. Shut off all lighting except those required for security purposes at the end of each day.

3.4 STOCKPILING

.1 Stockpile materials in a location as directed by Engineer.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Separate from general waste stream each of the following materials. Stockpile materials in neat and orderly fashion in location and as directed by Engineer for alternate disposal. Stockpile materials in accordance with applicable fire regulations.

- .1 Glass fiber ceiling tiles.
- .2 Wood fiber ceiling tiles.
- .3 Power source poles deemed unfit for reuse by Engineer.
- .4 Wiring and conduit.
- .5 Outlets/Switches
- .6 Floor receptacles.
- .7 Metal duct work, baffles, HVAC equipment.
- .8 Demountable partitions.
- .9 Drapes.
- .10 Tracks and blinds.
- .11 Insulation batts.
- .12 Miscellaneous metals.
- .13 Carpet.

.4 Supply separate, clearly-marked disposal bins for all categories of waste material. Do not remove bins from site until inspected and approved by Engineer.

.5 Provide collection areas for collection of miscellaneous metals in the area of demolition.

3.5 REMOVAL FROM SITE

.1 Notify Engineer in writing of any materials identified as not suitable for alternate disposal. Provide reasons prior to approval for disposal.

.2 Dispose of materials as directed by Engineer.

.3 Remove stockpiled material as directed by Engineer when it interferes with operations of project construction.

.4 Remove stockpiles of like materials by an alternate disposal option once collection of materials is complete.

.5 Transport material designated for alternate disposal in accordance with applicable regulations.

.6 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.6 REPORTING

.1 Record off-site removal of debris and materials and provide following information regarding removed materials to Engineer within 24 hours.

.1 Time and date of Removal

.2 Description of Material

.3 Weight and Quantity of Materials.

.4 Breakdown of reuse, recycling and landfill quantities.

.5 End Demolition of Materials.

3.7 COORDINATION

.1 Coordinate alternative disposal activities with Engineer's on site waste diversion representative.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 03 20 00 - Concrete Reinforcing.

.2 Section 03 30 00 - Cast-in-place Concrete.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-O86S1, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.

.3 CSA O121, Douglas Fir Plywood.

.4 CSA O151, Canadian Softwood Plywood.

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

.6 CAN/CSA-S269.3, Concrete Formwork.

1.3 SUBMITTALS

.1 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.

.2 Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.

.3 Indicate sequence of erection and removal of formwork/falsework as directed by Engineer.

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

PART 2 PRODUCTS

2.1 MATERIALS

.1 Formwork materials:

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

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

.2 Tubular column forms: round, spirally wound laminated fiber forms, internally treated with release material. Spiral pattern to show in hardened concrete.

.3 Form ties:

.1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.

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

.4 Form liner:

.1 Plywood: medium density overlay Douglas Fir to CSA O121, Canadian Softwood Plywood to CSA O151, T and G thickness as indicated.

.5 Form release agent: chemically active release agents containing compounds that react with free lime in concrete resulting in water insoluble soaps, non-toxic, biodegradable.

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

.7 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 Fabricate and erect falsework in accordance with CSA S269.1.

.3 Refer to architectural drawings for concrete members requiring architectural exposed finishes.

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

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

.6 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 CSA-A23.1/A23.2.

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

.8 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.

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

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

.11 Construct forms for architectural concrete, and place ties as indicated and/or as directed. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.

.12 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Ensure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.13 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

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 5 days for columns.
- .3 1 day 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 Space reshoring in each principal direction at not more than 3000 mm apart.

.4 Re-use formwork and falsework subject to requirements of CSA-A23.1A23.2.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 03 10 00 – Concrete Forming and Accessories.

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

1.2 REFERENCES

.1 American Concrete Institute (ACI)

- .1 ANSI/ACI 315, Details and Detailing of Concrete Reinforcement.
- .2 ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.

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

- .1 ASTM A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .2 ASTM A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.

.3 Canadian Standards Association (CSA)

- .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of test and Standard Practices for Concrete.
- .2 CSA-A23.3, Design of Concrete Structures.
- .3 CAN/CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement, A National Standard of Canada.
- .4 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel /Structural Quality Steel.
- .5 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .6 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 SUBMITTALS

.1 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Engineer, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada . ANSI/ACI 315 and ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.

.2 Detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by Engineer.

.2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.

.3 Cold-drawn annealed steel wire ties: to ASTM A497/A497M.

.4 Welded steel wire fabric: to ASTM A185/A185M. Provide in flat sheets only.

.5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

.6 Mechanical splices: subject to approval of Engineer.

.7 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA-A23.1A23.2, ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.2 Obtain Engineer's approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of Engineer, 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 Engineer with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.

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

PART 3 EXECUTION

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Engineer.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars which develop cracks or splits.

3.2 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA-A23.1/A23.2.

.2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.

.3 Prior to placing concrete, obtain Engineer approval of reinforcing material and placement.

.4 Ensure cover to reinforcement is maintained during concrete pour.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 03 10 00 - Concrete Forming and Accessories.

.2 Section 03 20 00 - Concrete Reinforcing.

1.2 MEASUREMENT PROCEDURES

.1 Cast-in-place concrete will not be measured but will be paid for as a fixed price item.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM C260, Standard Specification for Air-Entraining Admixtures for Concrete.
- .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
- .4 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .5 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
- .6 ASTM D1751, Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 Canadian Standards Association (CSA)

- .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CAN/CSA-A23.2, Methods of Test for Concrete.
- .3 CAN3-A266.4, Guidelines for the Use of Admixtures in concrete.
- .4 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .5 CSA-A3001, Cementitious Materials for Use in Concrete.

1.4 ACRONYMS AND TYPES

.1 Cement: hydraulic cement or blended hydraulic cement (XXb - where b denotes blended).

.1 Type GU or GUb - General use cement.

1.5 SUBMITTALS

.1 At least 4 weeks prior to commencing work, inform Engineer of proposed source of aggregates and provide access for sampling.

.2 Submit testing results and reports for review by Engineer and do not proceed without written approval when deviations from mix design or parameters are found.

.3 Certificates:

.1 Minimum 4 weeks prior to starting concrete work submit to Engineer manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:

.1 Portland cement.

.2 Blended hydraulic cement.

.3 Supplementary cementing materials.

.4 Grout.

.5 Admixtures.

.6 Aggregates.

.7 Water.

.8 Waterstops.

.9 Waterstop joints.

.10 Joint filler.

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

.3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1/A23.2.

1.6 SOURCE QUALITY CONTROL

.1 Have all concrete produced and delivered by a ready-mix plant that is a member of the Atlantic Provinces Ready Mixed Concrete Association (APRMCA) and holds a current “Certificate of Ready Mixed Concrete Production Facilities” issued by the Association. Submit a copy of this certificate to the Engineer for approval.

1.7 QUALITY ASSURANCE

.1 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures in accordance with Section 01 45 00 - Quality Control for Engineer approval for following items:

- .1 Falsework erection.
- .2 Hot weather concrete.
- .3 Cold weather concrete.
- .4 Curing.
- .5 Finishes.
- .6 Formwork removal.
- .7 Joints.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Concrete hauling time: maximum allowable time for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching.

- .1 Modifications to maximum time limit must be agreed to Engineer and concrete producer as described in CSA A23.1/A23.2.
- .2 Deviations to be submitted for review by Engineer.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

.3 Waste Management and Disposal:

- .1 Divert unused concrete materials from landfill to local facility approved by Engineer.
- .2 Provide an appropriate area on the job site where concrete trucks can be safely washed.
- .3 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by the Engineer.
- .4 Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
- .5 Prevent admixtures and additive materials from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal. Dispose of waste in accordance with applicable local, Provincial and National regulations.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Portland cement: to CAN/CSA-A3001, Type GU.

.2 Water: to CAN/CSA-A23.1.

.3 Aggregates: to CSA-A23.1.

.4 Coarse aggregates to be normal density to CSA-A23.1/A23.2.

.5 Admixtures:

- .1 Air entraining admixture: to ASTM C260.
- .2 Chemical admixtures: to ASTM C494, Engineer to approve accelerating or set retarding admixtures during cold and hot weather placing.

.6 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compressive strength of 50 MPa at 28 days.

.7 Ribbed waterstops: extruded PVC of sizes indicated shop welded corner and intersecting pieces.

- .1 Tensile strength: to ASTM D412, method A, Die "C".
- .2 Elongation: to ASTM D412, method A, Die "C", minimum 275%.
- .3 Tear resistance: to ASTM D624, method A, Die "B".

.8 Premoulded joint fillers:

- .1 Bituminous impregnated fiber board: to ASTM D1751.

.9 Polyethylene film: minimum mm thickness to ASTM C171.

.10 Bonding adhesive: as approved by Engineer.

2.2 MIXES

.1 Proportion normal density concrete in accordance with CSA-A23.1/A23.2, Alternative 1 to give following quality and yield for all concrete.

- .1 Cement:
  - .1 Type GU Portland cement.
- .2 Minimum compressive strength at 28 days:
  - .1 Foundation Walls and Footings – 20mpa
  - .2 All Interior Slabs – 20 mpa
  - .3 Exterior curbs, landings and walks – 30mpa

.3 Minimum cement content: 300 kg/m^3 of concrete.

.4 Class of exposure: N.

.1 Exterior Foundation Walls – F-2

.2 Footings and Interior Slabs – N

.3 Exterior landings and walks – C-2

.5 Nominal size of coarse aggregate: 20 mm.

.6 Slump at time and point of discharge: 75 to 100 mm.

.7 Air content: 5 to 8 %.

.8 Chemical admixtures: admixtures in accordance with ASTM C494.

PART 3 EXECUTION

3.1 PREPARATION

.1 Obtain Engineer approval before placing concrete. Provide 24 h notice prior to placing of concrete.

.2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 During concreting operations:

.1 Development of cold joints not allowed.

.2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.

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

.5 Ensure reinforcement and inserts are not disturbed during concrete placement.

.6 Prior to placing of concrete obtain Engineer approval of proposed method for protection of concrete during placing and curing in adverse weather.

.7 Protect previous Work from staining.

.8 Clean and remove stains prior to application for concrete finishes.

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

.10 Do not place load upon new concrete until authorized by Engineer.

3.2 CONSTRUCTION

.1 Do cast-in-place concrete work in accordance with CSA-A23.1/A23.2.

.2 Sleeves and inserts.

.1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where indicated or approved by Engineer.

.2 Where approved by Engineer, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated, must be approved by Engineer.

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

.4 Check locations and sizes of sleeves and openings shown on drawings.

.5 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

.3 Anchor bolts.

.1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.

.2 With approval of Engineer, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be minimum 100 mm diameter. Drilled holes to be manufacturers's recommendations.

.3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.

.4 Set bolts and fill holes with shrinkage compensating grout.

.5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.

.4 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.

.5 Finishing.

.1 Finish concrete in accordance with CSA-A23.1/A23.2.

.2 Use procedures acceptable to Engineer or those noted in CSA-A23.1/A23.2, to remove excess bleed water. Ensure surface is not damaged.

.3 Wet cure using polyethylene sheets placed over sufficiently hardened concrete to prevent damage. Overlap adjacent edges 150 mm and tightly seal with sand on wood planks. Weigh sheets down to maintain close contact with concrete during the entire curing period.

.4 Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.

.5 Finish concrete floor to meet requirements of CSA-A23.1/A23.2.

.6 Concrete floor to have finish hardness equal or greater than Mohs hardness in accordance with CSA-A23.1/A23.2.

.7 Provide swirl-trowelled finish for exterior walks, ramps, pads.

.8 Provide float finish for interior floor slabs.

.9 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.

.6 Waterstops.

.1 Install waterstops to provide continuous water seal.

.2 Do not distort or pierce waterstop in such a way as to hamper performance.

.3 Do not displace reinforcement when installing waterstops.

.4 Use equipment to manufacturer's requirements to field splice waterstops.

.5 Tie waterstops rigidly in place.

.6 Use only straight heat sealed butt joints in field.

.7 Use factory welded corners and intersections unless otherwise approved by Engineer.

.7 Joint fillers.

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Engineer.

.2 When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.3 Locate and form, isolation, construction and expansion joints as indicated. Install joint filler.

.4 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

.8 Dampproof membrane.

.1 Install dampproof membrane under concrete slabs-on-grade inside building.

.2 Lap dampproof membrane minimum 150 mm at joints and seal.

.3 Seal punctures in dampproof membrane before placing concrete. Use patching material at least 150 mm larger than puncture and seal.

3.3 SITE TOLERANCE

.1 Concrete slab tolerances in accordance with CSA-A23.1/A23.2, F-number Method, F_F =25, F_L = 20.

3.4 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Engineer in accordance with CSA-A23.1/A23.2, and Section 01 45 00 - Quality Control.

.2 Engineer will pay for costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services. Costs of retesting due to deficient work will be paid for by contractor, by credit change order.

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

.4 Non-destructive Methods for Testing Concrete shall be in accordance with CSA-A23.1/A23.2.

.5 Provide Certificate of Field Quality Inspection and Testing to Engineer for inclusion in Commissioning Manual.

.6 Inspection or testing by Engineer will not augment or replace Contractor quality control nor relieve the Contractor of his contractual responsibility.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.2 REFERENCES

.1 American Wood-Preservers' Association (AWPA)

.1 AWPA M2, Standard Inspection of Treated Wood Products.

.2 AWPA M4, Standard for the Care of Preservative-Treated Wood Products.

.2 Canadian Standards Association (CSA)

.1 CSA O80 Series, Wood Preservation.

1.3 CERTIFICATES

.1 For products treated with preservative by pressure impregnation submit following information certified by authorized signing officer of treatment plant:

.1 Information listed in AWPA M2 and revisions specified in CSA O80 Series, Supplementary Requirement to AWPA M2 applicable to specified treatment.

.2 Acceptable types of paint, stain, and clear finishes that may be used over treated materials to be finished after treatment.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Do not dispose of preservative treated wood through incineration.

.2 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.

.3 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Project Manager.

.4 Dispose of unused wood preservative material at official hazardous material collections site approved by Project Manager.

.5 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Preservative: to CAN/CSA-O80 Series standards, ACQ (Alkaline Copper Quaternary) Only.

PART 3 EXECUTION

2.1 APPLICATION: PRESERVATIVE

.1 Treat lumber to CAN/CSA- O80 Series.

.2 Following water-borne preservative treatment, dry material to maximum moisture content of 19%.

2.2 APPLICATION: FIELD TREATMENT

.1 Comply with AWPA M4 and revisions specified in CAN/CSA-O80 Series, Supplementary Requirements to AWPA Standard M2.

.2 Treat all field cuts with two (2) coats of ACQ (Alkaline Copper Quaternary)

.3 Remove chemical deposits on treated wood to receive applied finish.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 06 05 73 - Wood Treatment.

.2 Section 06 17 53 - Shop-Fabricated Wood Trusses.

.3 Section 07 92 00 - Joint Sealants.

.4 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM C36/C36M, Specification for Gypsum Wallboard.
- .2 ASTM C578, Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- .3 ASTM D5055, Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-51.32, Sheathing, Membrane, Breather Type.
- .2 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 CAN/CGSB-71.26, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.

.3 Canadian Standards Association (CSA)

- .1 CSA A123.2, Asphalt Coated Roofing Sheets.
- .2 CAN/CSA-A247, Insulating Fiberboard.
- .3 CSA B111, Wire Nails, Spikes and Staples.
- .4 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 CSA O112 Series, CSA Standards for Wood Adhesives.
- .6 CSA O121, Douglas Fir Plywood.
- .7 CAN/CSA-O141, Softwood Lumber.
- .8 CSA O151, Canadian Softwood Plywood.
- .9 CAN/CSA-O325.0, Construction Sheathing.

.4 National Lumber Grades Authority (NLGA)

- .1 Standard Grading Rules for Canadian Lumber.

1.3 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

1.4 SUBMITTALS

.1 Submit proof of compatibility between Alkaline Copper Quaternary (ACQ) pressure treated lumber and fasteners to be utilized.

PART 2 PRODUCTS

2.1 FRAMING AND LUMBER MATERIALS

.1 Lumber: unless specified otherwise, softwood, No. 1 or No. 2 grade, S4S, moisture content 19% (S-dry) or less in accordance with following standards:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Wood I-joists in accordance with Prefabricated Wood I-Joists ASTM D5055.

.3 Framing and board lumber: in accordance with NBC.

.4 Furring, blocking, nailing strips, grounds, rough bucks, fascia backing and sleepers:

.1 Board sizes: "Standard" or better grade.

.2 Dimension sizes: "Standard" light framing or better grade.

.3 Post and timbers sizes: "Standard" or better grade.

.5 Pressure treated material to be Chromated Copper Arsenate (CCA), containing a minimum of 1.5% by weight of preservative.

2.2 PANEL MATERIALS

.1 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.0.

.2 Douglas fir plywood (DFP): to CSA O121, standard construction.

.3 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.4 Insulating fiberboard sheathing: to CAN/CSA-A247.

.5 Expanded polystyrene sheathing: to Section 07 21 13 – Board Insulation.

.6 Gypsum sheathing: to 09 21 16 – Gypsum Board Assemblies.

2.3 ACCESSORIES

.1 Exterior wall sheathing paper: to CAN/CGSB-51.32 single ply, spunbonded olefin type coated impregnated as indicated.

.2 Polyethylene film: to Section 07 26 00 – Vapour Retarders.

.3 Sill Gasket Air seal: closed cell polyurethane or polyethylene.

.4 Sealants: Section 07 91 00 – Joint Sealants.

.5 General purpose adhesive: to CSA O112 Series.

.6 Nails, spikes and staples: to CSA B111.

.7 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.8 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

.9 Joist hangers: minimum 1 mm thick sheet steel, galvanized ZF001 coating designation.

.10 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, type approved by Owner's Representative.

2.4 FASTENER FINISHES

.1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work, interior highly humid areas and fire-retardant treated lumber.

2.5 WOOD PRESERVATIVE

.1 Surface-applied wood preservative: clear or copper napthenate or 5% pentachlorophenol solution, water repellent preservative.

PART 3 EXECUTION

3.1 PREPARATION

.1 Treat surfaces of material with wood preservative, before installation.

.2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.

.3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

.4 Treat all material as indicated as follows:

.1 Wood fascia, backing, curbs, nailers.

.2 Wood furring for sheeting/siding on outside surface of exterior masonry concrete walls.

.3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

.4 Exterior deck lumber and framing.

3.2 INSTALLATION

.1 Comply with requirements of NBC latest edition, Part 9 supplemented by following paragraphs.

.2 Install members true to line, levels and elevations, square and plumb.

.3 Construct continuous members from pieces of longest practical length.

.4 Install spanning members with "crown-edge" up.

.5 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

.6 Install subflooring and combined subfloor and underlay with panel end-joints located on solid bearing, staggered at least 800 mm.

.1 In addition to mechanical fasteners, apply subflooring adhesive under panels installed on wood joints. Place continuous adhesive bead in accordance with manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt.

.2 Use decking screws for mechanical fasteners when weather conditions are unsuitable for subflooring adhesive.

.7 Install wall sheathing in accordance with manufacturer's printed instructions.

.8 Install roof sheathing in accordance with requirements of NBC.

.9 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.

.10 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.

.1 Align and plumb faces of furring and blocking to tolerance of 1:600.

.11 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.12 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners. Coordinate height of roof curbs with Section 07 52 00 – Modified Bituminous Membrane Roofing.

.13 Install sleepers as indicated.

.14 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

3.3 ERECTION

.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.2 Countersink bolts where necessary to provide clearance for other work.

.3 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

3.4 SCHEDULES

.1 Roof sheathing:

.1 Plywood, DFP or CSP sheathing grade (SHG) T&G edge, 16 mm thick, unless otherwise indicated.

.2 Exterior wall sheathing:

.1 Plywood, DFP or CSP sheathing grade or (SHG) grade, T&G edge, 13 mm thick, unless otherwise indicated.

.2 Expanded polystyrene sheathing, Type 1, RSI indicated, shiplapped edges, thickness as indicated.

.3 Gypsum sheathing, Section 09 21 16 – Gypsum Board Assemblies.

.3 Subflooring:

.1 Plywood, DFP or CSP sheathing grade (SHG) T&G edge, 19 mm thick, unless otherwise indicated.

.4 Electrical equipment mounting boards:

.1 Plywood, DFP or CSP grade, (G1S) select square edge 16 mm thick, unless otherwise indicated.

.5 Underlay:

.1 Plywood, DFP or CSP sheathing grade (Select), square edge 6 mm thick, unless otherwise indicated.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 06 05 73 - Wood Treatment.

.2 Section 06 10 00 – Rough Carpentry.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA B111, Wire Nails, Spikes and Staples.

.2 CAN/CSA O80 Series, Wood Preservation.

.3 CSA O86, Engineering Design in Wood.

.2 National Lumber Grades Authority

.1 NLGA Standard Grading Rules for Canadian Lumber.

1.3 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Wood decking: to NLGA standard Grading Rules for Canadian Lumber Select grade Spruce 38 mm. Kiln dry decking to 15% maximum moisture content.

.2 Decking lengths: 1.8 to 6 m or longer with a minimum of 90% planks exceeding 3.0 m. square end trimmed. For single spans shorter than 3 m use decking of same length as span.

.3 Nails: to CSA B111, hot dipped galvanized finish; sizes as recommended in CAN/CSA-O86. Supply 200 mm spiral spikes for lateral nailing.

.4 Splines: galvanized metal, as recommended by decking manufacturer.

.5 Wood preservative: to CAN/CSA-O80 Series standards, ACQ (Alkaline Copper Quaternary) Only.

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PART 3 EXECUTION

3.1 INSTALLATION

.1 Do wood deck work in accordance with CAN/CSA O86 except where specified otherwise.

.2 Install decking in accordance with CAN/CSA O86, simple span pattern.

.3 Provide minimum of one bearing support for each plank.

.4 Stagger end joints in adjacent planks minimum of 0.5 m. Separate joints in same area by at least two intervening courses. Avoid joints in first fifth of end spans. Minimize joints in middle third of any span.

.5 Touch up end cuts with preservative where pressure treated lumber is specified.

3.2 CLEANING

.1 Remove tool marks, bruises, and scratches.

3.3 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by wood decking installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 61 00 – Common Product Requirements.

.3 Section 06 10 00 – Rough Carpentry.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

- .1 CAN/CSA-O80 Series, Wood Preservation.
- .2 CAN/CSA-O86.1, Engineering Design in Wood.
- .3 CAN/CSA-O141, Softwood Lumber.
- .4 CSA S307-, Load Test Procedure for Wood Roof Trusses for Houses and Small Buildings.
- .5 CSA S347, Method of Test for Evaluation of Truss Plates Used in Lumber Joints.
- .6 CSA W47.1, Certification of Companies for Fusion Welding of Steel.

.2 National Lumber Grades Authority (NLGA)

- .1 NLGA, Standard Grading Rules for Canadian Lumber.

.3 Truss Plate Institute of Canada (TPIC)

- .1 TPIC, Truss Design Procedures and Specifications for Light Metal Plate Connected Trusses (Limit States Design)

1.3 DESIGN REQUIREMENTS

.1 Design trusses, bracing and bridging in accordance with CAN/CSA-O86.1 for loads indicated and minimum uniform and minimum concentrated loadings stipulated in NBC commentary.

.2 Limit live load deflection to 1/360th of span where plaster gypsum board ceilings are hung directly from trusses.

.3 Limit live load deflections to 1/240th of span unless otherwise specified or indicated.

.4 Provide camber for trusses as indicated.

1.4 SOURCE QUALITY CONTROL

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

.2 Certify preservative and fire retardant treated wood in accordance with CAN/CSA-O80 Series.

1.5 QUALIFICATION OF MANUFACTURERS

.1 Fabricator for welded steel connections to be certified in accordance with CSA W47.1.

1.6 QUALITY ASSURANCE

.1 Provide Certificate of Quality Compliance from truss manufacturer upon completion of fabrication.

.2 Provide Certificate of Quality Compliance upon satisfactory completion of installation.

1.7 SUBMITTALS

.1 Each shop drawing submission shall bear signature and stamp of professional Engineer registered or licensed in Province of Newfoundland and Labrador, Canada.

.2 Indicate TPIC Truss Design Procedure and CSA O86 Engineering Design in Wood and specific CCMC Product Registry number of the truss plates.

.3 Indicate species, sizes, and stress grades of lumber used as truss members. Show pitch, span, camber, configuration and spacing of trusses. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for members.

.4 Submit stress diagram or print-out of computer design indicating design load for truss members. Indicate allowable load and stress increase.

.5 Indicate arrangement of webs or other members to accommodate ducts and other specialties.

.6 Show lifting points for storage, handling and erection.

.7 Show location of lateral bracing for compression members.

1.8 DELIVERY AND STORAGE

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Store trusses on job site in accordance with manufacturer's instructions. Provide bearing supports and bracings. Prevent bending, warping and overturning of trusses.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Lumber: Spruce (S-P-F) species, No. 1 grade, softwood, S4S, with maximum moisture content of 19% at time of fabrication and to following standards:

.1 CAN/CSA-O141.

.2 NLGA (National Lumber Grading Association), Standard Grading Rules for Canadian Lumber.

.2 Fastenings: to CAN/CSA-O86.1.

2.2 FABRICATION

.1 Fabricate wood trusses in accordance with reviewed shop drawings.

.2 Provide for design camber and roof slopes when positioning truss members.

.3 Connect members using metal connector plates.

PART 3 EXECUTION

3.1 ERECTION

.1 Erect wood trusses in accordance with reviewed erection drawings.

.2 Indicated lifting points to be used to hoist trusses into position.

.3 Make adequate provisions for handling and erection stresses.

.4 Exercise care to prevent out-of-plane bending of trusses.

.5 Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing and decking are installed.

.6 Install permanent bracing in accordance with reviewed shop drawings, prior to application of loads to trusses.

.7 Do not cut or remove any truss material without approval of Engineer.

.8 Remove chemical and other surface deposits on treated wood, in preparation for applied finishes.

3.2 CLEANING

.1 Remove surplus materials, excess materials, rubbish, tools and equipment on completion of installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 09 91 23 - Interior Painting.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)

- .1 ANSI A208.1, Particleboard.
- .2 ANSI A208.2, Medium Density Fibreboard (MDF).

.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC)

- .1 AWMAC Quality Standards for Architectural Woodwork.

.3 American Society for Testing and Materials (ASTM)

- .1 ASTM E1333, Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.

.4 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-11.3, Hardboard.

.5 Canadian Standards Association (CSA)

- .1 CSA B111, Wire Nails, Spikes and Staples.
- .2 CSA O115, Hardwood and Decorative Plywood.
- .3 CSA O121, Douglas Fir Plywood.
- .4 CAN/CSA O141, Softwood Lumber.
- .5 CSA O151, Canadian Softwood Plywood.
- .6 CSA O153, Poplar Plywood.

.6 National Hardwood Lumber Association (NHLA)

- .1 Rules for the Measurement and Inspection of Hardwood and Cypress.

.7 National Lumber Grades Authority (NLGA)

- .1 Standard Grading Rules for Canadian Lumber.

1.3 QUALITY ASSURANCE

.1 All Fabrications shall be in accordance with the Quality Standards Manual of the Architectural Woodwork Manufacturer's Association of Canada (AWMAC).

1.4 SUBMITTALS

.1 Indicate details of construction, profiles, jointing, fastening and other related details.

.2 Indicate materials, thicknesses, finishes and hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Protect materials against dampness during and after delivery.

.3 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

PART 2 PRODUCTS

2.1 LUMBER MATERIAL

.1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:

.1 CAN/CSA-O141.
.2 NLGA Standard Grading Rules for Canadian Lumber.
.3 AWMAC custom premium grade, moisture content as specified.

.2 Machine stress-rated lumber is acceptable.

.3 Hardwood lumber: moisture content 10 % or less in accordance with following standards:

.1 National Hardwood Lumber Association (NHLA).
.2 AWMAC custom grade, moisture content as specified.

2.2 PANEL MATERIAL

.1 Douglas fir plywood (DFP): to CSA O121, standard construction.

.2 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.3 Hardwood plywood: to CSA O115.

.4 Poplar plywood (PP): to CSA O153, standard construction.

.5 Hardboard: to CAN/CGSB-11.3.

.1 Hardboard must be manufactured such that formaldehyde emissions do not exceed 0.15ppm when tested in accordance with ASTM E1333.

.6 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/m^3.

.1 Medium density fibreboard must be manufactured such that formaldehyde emissions do not exceed 0.15 ppm when tested in accordance with ASTM E1333.

.7 Decorative overlaid composite panels.

.1 Decorative overlay, heat and pressure laminated with suitable resin to 12.7 mm thick particleboard MDF core.

.2 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain (buff) balancing sheet.

.3 Edge finishing: matching melamine and polyester overlay edge strip with self-adhesive.

2.3 ACCESSORIES

.1 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.

.2 Wood screws: plain, type and size to suit application.

.3 Splines: wood

.4 Adhesive: recommended by manufacturer.

.5 Use least toxic sealants, adhesives, sealers, and finishes necessary to comply with requirements of this section.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

.2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.

.3 Form joints to conceal shrinkage.

3.2 CONSTRUCTION

.1 Fastening.

.1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.

.2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.

.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.

.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.2 Standing and running trim.

.1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.

.2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.

.3 Make joints in baseboard, where necessary using a 45° scarf type joint.

.4 Install door and window trim in single lengths without splicing.

.3 Stairs.

.1 Install stairs to location and details as indicated.

.4 Shelving.

.1 Install shelving on shelf brackets, where indicated.

.5 Hardware.

.1 Install cabinet and miscellaneous hardware as indicated.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for asphalt for use as dampproofing.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 51 00 - Temporary Utilities.

.3 Section 01 61 00 - Common Product Requirements.

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 37.2, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.

.2 CAN/CGSB 37.3, Application of Emulsified Asphalts for Dampproofing or Waterproofing.

.3 CAN/CGSB 37.5, Cutback Asphalt Plastic Cement.

.4 CGSB 37-GP-9Ma, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.

.5 CGSB 37-GP-11M, Application of Cutback Asphalt Plastic Cement.

.6 CAN/CGSB 37.16, Filled, Cutback, Asphalt for Damproofing and Waterproofing.

.7 CGSB 37-GP-36M, Application for Filled Cutback Asphalts for Damproofing and Waterproofing.

.2 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 sheets for bituminous dampproofing products. Including:

.1 Product characteristics.

.2 Performance criteria.

.3 Application methods.

.4 Limitations.

.2 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle, store and protect materials of this section in accordance with Section 01 61 00 - Common Product Requirements.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store materials on supports to prevent deformation.

.4 Remove only in quantities required for same day use.

.5 Store materials in accordance with manufacturer's written instructions.

1.6 PROJECT/SITE ENVIRONMENTAL REQUIREMENTS

.1 Temperature, relative humidity, moisture content.

.1 Apply dampproofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

.2 Do not proceed with Work when wind chill effect would tend to set bitumen before proper curing takes place.

.3 Maintain air temperature and substrate temperature at dampproofing installation area above 5°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 enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.2 Provide continuous ventilation during and after dampproofing application. Run ventilation system 24 hours per day during installation; provide continuous Ventilation for 3 days after completion of dampproofing installation.

PART 2 PRODUCTS

2.1 MATERIALS

.1 For application and curing at temperatures above 5 degrees C: waterproof emulsion, mineral colloid emulsifier type to CAN/CGSB 37.2.

.1 Package label or bill of lading for bulk hot liquid asphalt must indicate type, flash point, equiviscous temperature range and final blowing temperature.

.2 For applications and curing at temperatures above 0 degrees C but below 5 degrees C: solvent type waterproofing and dampproofing compound of selected asphalts and fibers to CAN/CGSB 37.16.

.1 Package label or bill of lading for bulk hot liquid asphalt must indicate type, flash point, equiviscous temperature range and final blowing temperature.

.3 Primer for applications at temperatures above 0 degrees C but below 5 degrees C: asphalt/solvent cutback to CAN/CGSB 37.9.

.4 Sealing compound: plastic cutback asphalt cement to CAN/CGSB-37.5. C.

PART 3 EXECUTION

3.1 WORKMANSHIP

.1 Keep hot asphalt:

.1 Below its flash point.

.2 At or below its final blowing temperature.

.3 Within its equiviscous temperature range at place of application.

3.2 PREPARATION

.1 Before applying dampproofing:

.1 Seal exterior joints between foundation walls and footings, joints between concrete floor slab and foundation and around penetrations through dampproofing with sealing compound.

3.3 APPLICATION

.1 Do dampproofing in accordance with CAN/CGSB 37.3 and CGSB 37-GP-36M except where specified otherwise.

.2 Do sealing work in accordance with CGSB 37-GP-11M except where specified otherwise.

.3 Do priming of surface in accordance with CGSB 37-GP-15M except where specified otherwise.

.4 Apply primer.

3.4 SCHEDULE

.1 Apply continuous, uniform coating to entire exterior faces of foundation walls from 50 mm below finished grade level to and including tops of foundation wall footings.

.2 Apply continuous, uniform coating to exterior side of foundation walls enclosing rooms below finished grade. Include exterior portion of interior walls where floors in adjacent rooms are at different elevations.

.3 Apply two additional coats of dampproofing to vertical corners and construction joints for a minimum width of 230 mm on each side, and all around and for 230 mm along pipes passing through walls.

END OF SECTION

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 06 10 00 – Rough Carpentry.

.4 Section 07 26 00 - Vapour Retarders.

1.2 REFERENCES

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

.1 ASTM C1289, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

.2 Canadian Gas Association (CGA)

.1 CAN/CGA-B149.1, Natural Gas and Propane Installation Code Handbook.

.2 CAN/CGA-B149.2, Propane Storage and Handling Code.

.3 Canadian General Standards Board (CGSB).

.1 CGSB 71-GP-24M, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.

.4 Underwriters Laboratories of Canada (ULC).

.1 CAN/ULC-S701, Standard for Thermal Insulation, Polystrene, Boards and Pipe Coverings.

.2 CAN/ULC-S702, Standard for Thermal Insulation, Mineral Fibre, for Buildings.

.3 CAN/ULC-S704, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's insulation products and adhesives.

.2 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Provide certificate of quality compliance from insulation manufacturer.

PART 2 PRODUCTS

2.1 INSULATION

.1 Expanded polystyrene (EPS): for use below grade and exterior walls: to CAN/ULC-S701 Type 2, shiplapped edges, RSI 0.70 per 25 mm, total thickness as indicated on drawings.

.2 Urethane (Isocyanurate): Faced, to CAN/ULC-S704 foil facing, shiplapped edges, RSI 1.05 per 25 mm, total thickness as indicated on drawings.

.3 Mineral fibre board: to CAN/ULC-S702, Type 2, semi-rigid, density 17.6 kg/m², flexible spinbonded olefin facing, RSI 0.70 per 25 mm, total thickness as indicated on drawings.

.4 Extruded polystyrene (XPS): to CAN/ULC S701 Type 3, shiplapped edges, RSI 0.88 per 25 mm, total thickness as indicated on drawings.

.5 Insulation types not indicated on drawings to be expanded polystyrene (EPS), Type 2 as a default, as per article 2.1.1.

2.2 ADHESIVE

.1 Adhesive suitable for bonding polystyrene and mineral fibre insulation to substrates as indicated.

2.3 ACCESSORIES

.1 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

.2 Joint sealing tape: air resistant pressure sensitive adhesive tape as recommended by insulation manufacturer.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 WORKMANSHIP

.1 Install insulation after building substrate materials are dry.

.2 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.

.5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

.6 Offset both vertical and horizontal joints in multiple layer applications.

.7 Do not enclose insulation until it has been inspected and approved by Engineer.

3.3 EXAMINATION

.1 Examine substrates and immediately inform Engineer in writing of defects.

.2 Prior to commencement of work ensure:

.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 RIGID INSULATION INSTALLATION

.1 Apply adhesive to insulation board in accordance with manufacturer's recommendations.

.2 Imbed insulation boards into vapour barrier type adhesive, applied as specified, prior to skinning of adhesive.

.3 In addition to adhesive install mineral fibre insulation boards with insulation clips and disk, 2 per 600 x 1200 mm board minimum, fit boards tight, cut off fastener spindle 3 mm beyond disk.

.4 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide 0.15 mm modified bituminous membrane over expansion and control joints using compatible adhesive and primer before application of insulation.

.5 Carefully inspect for continuity of air barrier prior to placement of insulation.

3.5 PERIMETER FOUNDATION INSULATION

.1 Exterior application: extend boards vertically below bottom of finish floor slab to depth as indicated on drawings. Install on exterior face of perimeter foundation wall with adhesive.

3.6 CLEANING

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

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 06 10 00 – Rough Carpentry.

.3 Section 07 26 00 - Vapour Retarders.

1.2 REFERENCES

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

.1 ASTM C553, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.

.2 ASTM C665, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

.3 ASTM C1320, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.

.4 ASTM E84, Test Method for Surface Burning Characteristics of Building Materials.

.2 Canadian Gas Association (CGA)

.1 CAN/CGA-B149.1, Natural Gas and Propane Installation Code Handbook.

.2 CAN/CGA-B149.2, Propane Storage and Handling Code.

.3 Canadian Standards Association (CSA International).

.1 CSA B111, Wire Nails, Spikes and Staples.

.4 Underwriters Laboratories of Canada (ULC).

.1 CAN/ULC-S702, Standard for Mineral Fibre Insulation.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet.

.2 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 INSULATION

.1 Thermal batt and blanket mineral fibre:

.1 Unfaced glass fiber thermal insulation to ASTM C665 Type:I, thickness and RSI value as indicated on drawings.

.2 Semi-rigid mineral wool batt insulation to CSA/ULC-S702, made from basalt rock and slag, thickness and RSI value as indicated on drawings.

.2 Acoustic batt insulation:

.1 Unfaced glass fiber acoustical insulation to ASTM C665, Type I, thickness as indicated.

.1 Flame spread: 10 to ASTM E84.

.2 Smoke development: 10 to ATSM E84.

.3 Sound transmission Class: STC 49.

.4 Dimensional stability: linear shrinkage less than 0.1%.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSULATION INSTALLATION

.1 Install insulation to maintain continuity of thermal protection to building elements and spaces and for sound attenuation as noted on drawings.

.2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

.3 Do not compress insulation to fit into spaces.

.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls and CAN/CGA-B149.1 and CAN/CGA-B149.2 Type B and L vents.

.5 Do not enclose insulation until it has been inspected and approved by Engineer.

3.3 CLEANING

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

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 51 00 - Temporary Utilities.

.4 Section 07 26 00 –Vapour Retarders

1.2 REFERENCES

.1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)

.2 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S101, Fire Endurance Tests of Building Construction and Materials.

.2 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

.3 CAN/ULC-S705.1, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Material Specification.

.4 CAN/ULC-S705.2, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Installer's Responsibilities-Specification.

1.3 TEST REPORTS

.1 Submit test reports, verifying qualities of foam sealant meet or exceed requirements of this specification.

.2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

1.4 QUALITY ASSURANCE

.1 Applicators to conform to CUFCA Quality Assurance Program.

1.5 SAFETY REQUIREMENTS

.1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:

.1 Workers must wear gloves, respirators, dust masks, eye protection, protective clothing when applying foam sealant.

.2 Workers must not eat, drink or smoke while applying foam sealant.

1.6 PROTECTION

.1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hours after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

.5 Dispose of waste foam sealant daily in location designated by Owner's Representative and decontaminate empty drums in accordance with foam sealant manufacturer's instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Apply foam sealant only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Low expanding, one-component, polyurethane foam sealant, curing to a semi-rigid, closed cell urethane foam providing a RSI of 0.9 per 25.4 mm. To meet the following physical properties:

.1	Density:	25.7 kg/m^3
.2	Compressive Strength Parallel @ 10%:	69-96 psi
.3	Tensile Strength:	103 psi
.4	Water Vapour Transmission:	5.97 perms
.5	Flame Spread:	20
.6	Smoke Development:	70

PART 3 EXECUTION

3.1 APPLICATION

.1 Apply foam sealant to clean surfaces in accordance manufacturer's printed instructions. Surfaces to be free of dust, dirt, oil and other foreign materials.

.2 Cover surfaces not intended to be foamed.

.3 Apply foam sealant to perimeter of openings indicated and to thickness as recommended by manufacturer. Trim excess cured foam from finished area.

.4 Cover exposed urethane foam sealants to protect from adverse affects from ultraviolet light (sunlight).

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 06 10 00 – Rough Carpentry.

.4 Section 07 27 00.01 – Air Barriers – Descriptive or Proprietary

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

.2 Underwriters Laboratories Canada (ULC)

.1 CAN/ULC S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

.1 Submit manufacturer's printed product literature, specifications and datasheet and include:

.1 Product characteristics.

.2 Performance criteria.

.3 Limitations.

.2 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

.3 Quality assurance submittals:

.1 Certificates: submit certificates certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions and comply with written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

1.4 MOCK-UPS

.1 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.

.2 Mock-up will be used to judge workmanship, substrate preparation, and material application.

.3 Allow 24 hours for inspection of mock-up by Owner's Representative before proceeding with vapour barrier work.

.4 When accepted, mock-up will demonstrate minimum standard of quality required for this work.

PART 2 PRODUCTS

2.1 SHEET VAPOUR RETARDER

.1 Polyethylene film: to CAN/CGSB-51.34, 0.15mm thick with a water vapour permeance of not greater than 45 ng/(P·s·m^2), flame spread rating of less than 150 to CAN/ULC S102.

2.2 ACCESSORIES

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.

.2 Sealant: compatible with vapour retarder, recommended by vapour retarder manufacturer, to Section 07 92 00 - Joint Sealants.

.3 Staples: minimum 6 mm leg.

.4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Ensure services are installed and inspected prior to installation of retarder.

.2 Install sheet vapour retarder on warm side of exterior wall and ceiling space assemblies prior to installation of gypsum board to form continuous retarder.

.3 Install Sheet Vapour retarder under stone cover in crawl space to form continuous retarder.

.4 Use sheets of largest practical size to minimize joints.

.5 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 EXTERIOR SURFACE OPENINGS

.1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.3 PERIMETER SEALS

.1 Seal perimeter of sheet vapour barrier as follows:

.1 Apply continuous bead of sealant to substrate at perimeter of sheets.

.2 Lap sheet over sealant and press into sealant bead.

.3 Install staples through lapped sheets at sealant bead into wood substrate.

.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 LAP JOINT SEALS

.1 Seal lap joints of sheet vapour barrier as follows:

.1 Attach first sheet to substrate.

.2 Apply continuous bead of sealant over solid backing at joint.

.3 Lap adjoining sheet minimum 150 mm and press into sealant bead.

.4 Install staples through lapped sheets at sealant bead into wood substrate.

.5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 ELECTRICAL BOXES

.1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:

.1 Install moulded box vapour barrier or wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.

.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.6 CLEANING

.1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation methods providing primary air/vapour barrier materials and assemblies.

.2 Air/vapour barrier materials to provide continuous seal between components of building envelope and building penetrations.

1.2 RELATED SECTIONS

.1 Section 01 45 00 - Quality Control.

.2 Section 01 51 00 - Temporary Utilities.

.3 Section 01 61 00 - Common Product Requirements.

.4 Section 07 92 00 - Joint Sealants.

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.13M, Sealing Compound, One Component, Elastomeric Chemical Curing.

.2 CAN/CGSB-19.18M, Sealing Compound, One Component, Silicone Base Solvent Curing.

.3 CAN/CGSB-19.24M, Multi-Component, Chemical Curing Sealing Compound.

.4 CGSB 19-GP-14M, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

.2 National Building Code of Canada (NBCC)

.1 NBCC, Part 5 - Environmental Separation

.3 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

.1 Submit manufacturer’s product data sheets.

.2 Submit manufacturer’s installation instructions.

1.5 QUALITY ASSURANCE

.1 Perform Work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification requirements for materials and installation.

.2 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.

.3 Manufacturer's Representative:

.1 Inspect substrate prior to commencement of work, twice during application of membrane and at commissioning to ascertain that air/vapour barrier system is installed according to membrane manufacturer's most current published specifications and details.

.2 Provide technical assistance to applicator and assist where required in correct installation of membrane.

.3 Provide certificate of quality compliance upon satisfactory completion of installation.

.4 Maintain one copy of documents on site.

1.6 QUALIFICATIONS

.1 Applicator: Company specializing in performing work of this section with minimum 5 years documented experience with installation of air/vapour barrier systems. Complete installation must be approved by the material manufacturer.

.2 Applicator: Company who is currently licensed by certifying organization must maintain their license throughout the duration of the project.

1.7 MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct typical panel, 10 m² minimum, incorporating wall openings, insulation, building corner condition, illustrating materials interface and seals.

.3 Locate where directed.

.4 Mock-up may remain as part of the Work.

.5 Allow 48 h for inspection of mock-up by Owner's Representative before proceeding with air/vapour barrier Work.

1.8 PRE- INSTALLATION MEETINGS

.1 Convene one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions. Deliver membrane materials in factory wrapped packaging indicating name of manufacturer and product.

.3 Avoid spillage. Immediately notify Owner's Representative if spillage occurs and start clean up procedures.

.4 Clean spills and leave area as it was prior to spill.

.5 Store roll materials on end in original packaging.

.6 Store primers at temperatures of 5°C and above to facilitate handling. Keep solvent away from open flame and excessive heat.

1.10 PROJECT ENVIRONMENTAL REQUIREMENTS

.1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation.

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

.3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.11 WARRANTY

.1 Provide a written warranty for work of this section from Manufacturer for failure due to defective materials and from contractor for failure due to defective installation workmanship for ten (10) years respectively from the date of Substantial Completion.

.2 Include coverage of installed sealant and sheet materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion or do not cure.

PART 2 PRODUCTS

2.1 SHEET MEMBRANE AIR BARRIER (TYPE 1)

.1 Sheet Seal: Self-Adhesive bitumen laminated to high-density polyethylene film, nominal total thickness of 1.0 mm.

.1 Membrane Physical Properties

.1 Application min 5°C

.2	Service Temperature	-40°C to 70°
.3	Elongation	min 200%
.4	Tensile strength	min 2.4 Mpa
.5	Puncture Resistance	min 178 N
.6	Water vapour transmission	2.8mg/Pa.s.m² (0.05 perms)
.7	Moisture Absorption	0.1%
.8	Air Leakage at 75 Pa	0.02L/Sm²
.9	Air Leakage of the 3000 Pa test	No change

2.2 LIQUID MEMBRANE AIR/VAPOUR BARRIER (TYPE 2)

.1 Single component, liquid applied, water-based, polymer-modified air barrier providing a seamless, elastomeric membrane when cured, wet film thickness 1.53 mm, cured film thickness 1.15 mm.

.2 Liquid membrane Air/Vapour physical properties:

.1	Application Temperature:	min. 4° C
.2	Service Temperature:	-29° C to 49° C
.3	Elongation:	1500%
.4	Tensile Strength:	0.10 MPa
.5	Water Vapour Permeance:	0.03 perms
.6	Air Leakage at 75 Pa:	< 0.02 L/s/m^2

2.3 LIQUID MEMBRANE VAPOUR PERMEABLE AIR BARRIER (TYPE 3)

.1 Water-based air-barrier providing a tough, seamless, elastomeric membrane when cured, allowing moisture vapour to pass through it, wet film thickness 2.3 mm, cured film thickness 1.15 mm.

.2 Liquid membrane vapour permeable air barrier physical properties:

.1	Application Temperature:	min. 4° C
.2	Service Temperature:	-29° C to 49° C
.3	Elongation:	1500%
.4	Water Vapour Permeance:	12 perms
.5	Air Leakage at 75 Pa:	< 0.02 L/s/m^2

2.4 SHEET MEMBRANE VAPOUR PERMEABLE AIR BARRIER (TYPE 4)

.1 Self-adhering reinforced modified polyolefin tri-laminate water resistive, vapour permeable, air barrier membrane to the following properties:

.1	Weight:	160 g/m^2
.2	Water Vapour Transmission:	202 g/m^2

.3	Tensile Strength:	182N MD and 129N CD
.4	Water Vapour Permeance:	1658 ng/Pa.m2.s
.5	Air Leakage:	<0.02 L/s/m2
.6	Average Dry Breaking Force:	565N MD and 405N CD

2.5 EXTERIOR WALL SHEATHING PAPER

.1 spunbonded olefin type coated impregnated sheathing paper to CAN/CGSB-51.32 single ply, as indicated.

2.6 SEALANTS

.1 Sealants in accordance with Section 07 92 00 - Joint Sealants.

.2 Primer: recommended by sealant manufacturer.

.3 Primer for type 4 Air Barrier: quick setting, synthetic rubber based adhesive aerosol.

2.7 SCHEDULE

.1 Type 1 Air Barrier: for installation on any solid surface.

.2 Type 2 Air Barrier: for installation on masonry or concrete surfaces.

.3 Type 3 Air Barrier: for installation on wood/gypsum board surfaces.

.4 Type 4 Air Barrier: for installation on any solid surface approved by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept the Work of this section.

.2 Ensure all surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.

.3 Report any unsatisfactory conditions to the Owner's Representative in writing.

.4 Do not start work until deficiencies have been corrected.

3.2 PREPARATION

.1 Remove loose or foreign matter which might impair adhesion of materials.

.2 Ensure all substrates are clean of oil or excess dust; all masonry joints struck flush, and open joints filled; and all concrete surfaces free of large voids, spalled areas or sharp protrusions.

.3 Ensure all substrates are free of surface moisture prior to application of membrane and primer.

.4 Ensure metal closures are free of sharp edges and burrs.

.5 Prime substrate surfaces to receive adhesive and sealants in accordance with manufacturer's instructions.

3.3 INSTALLATION (SHEET MEMBRANE)

.1 Install materials in accordance with manufacturer's instructions.

.2 Over the properly prepared substrate surface apply primer with a roller and allow drying to a tacky surface. Prime only area to be covered in a working day. Reprime area not covered with membrane within 24 hours.

.3 After primer has dried, using a hand roller firmly press the entire membrane onto the primed surface, in strict accordance with membrane manufacturer’s written instructions.

.4 Ensure complete coverage of and adhesion of all substrates to receive membrane, including wall penetrations. Co-operate with other trades to ensure continuity of membrane.

.5 Overlap membrane 50mm and carefully smooth out with a roller to ensure full continuous bond throughout overlaps without fissures or fishmouthing.

.6 It is important that a complete air seal be achieved. Be responsible for the completeness of membrane wherever it is not specifically detailed. Consult with Owner’s Representative if there is any doubt as to the integrity of membrane, whether detailed or not.

.7 In order to ensure a complete seal, seal membrane to all penetrations in an approved manner.

.8 Apply a trowelled bead of mastic to all terminations of the membrane at the end of a day’s work.

.9 Do not enclose membrane until it has been inspected and approved by Owner’s Representative. Inform Owner’s Representative 48 hours prior to required inspection.

3.4 INSTALLATION (LIQUID MEMBRANE AIR/VAPOUR BARRIER)

.1 Install materials in accordance with manufacturer's instructions.

.2 Prepare surfaces ensuring they are clean, structurally sound and smooth. Patch all cracks, small voids, irregularities and small deformities with manufacturer approved patch material.

.3 Apply minimum 150 mm wide self-adhering air barrier strip between joints of dissimilar building materials.

.4 Apply liquid membrane to substrate by spraying or nap roller as per manufacturer's instructions.

.5 Ensure complete coverage of and adhesion of all substrates to receive liquid membrane, including wall penetrations. Co-operate with other trades to ensure continuity of membrane.

.6 It is important that a complete air seal be achieved. Be responsible for the completeness of liquid membrane wherever it is not specifically detailed. Consult with Owner's Representative if there is any doubt as to the integrity of the liquid membrane, whether detailed or not.

.7 In order to ensure a complete seal, seal liquid membrane to all penetrations in an approved manner.

.8 Do not enclose membrane until it has been inspected and approved by Owner's Representative. Inform Owner's Representative 48 hours prior to required inspection.

3.5 INSTALLATION (LIQUID MEMBRANE VAPOUR PERMEABLE AIR BARRIER)

.1 Install materials in accordance with manufacturer's instructions.

.2 Prepare surfaces ensuring they are clean, structurally sound and smooth. Patch all cracks, small voids, irregularities and small deformities with manufacturer approved patch material.

.3 Joints in exterior sheeting of 6.4 mm or greater to be covered with tape or filled with mastic caulking compound prior to application of liquid membrane as per manufacturer's recommendations.

.4 Apply minimum 150 mm wide self-adhering air barrier strip between joints of dissimilar building materials.

.5 Apply liquid membrane to substrate by spraying or roller as per manufacturer's instructions.

.6 Ensure complete coverage of and adhesion of all substrates to receive liquid membrane, including wall penetrations. Co-operate with other trades to ensure continuity of membrane.

.7 It is important that a complete air seal be achieved. Be responsible for the completeness of liquid membrane wherever it is not specifically detailed. Consult with Owner's Representative if there is any doubt as to the integrity of the liquid membrane, whether detailed or not.

.8 In order to ensure a complete seal, seal liquid membrane to all penetrations in an approved manner.

.9 Do not enclose membrane until it has been inspected and approved by Owner's Representative. Inform Owner's Representative 48 hours prior to required inspection.

3.6 PROTECTION OF WORK

.1 Protect finished Work in accordance with Section 01 61 00 - Common Product Requirements.

.2 Do not permit adjacent work to damage work of this section.

.3 Ensure finished Work is protected from climatic conditions.

3.7 INSPECTION

.1 Carefully inspect for continuity of air barrier prior to placement of insulation.

.2 Repair all deficient membrane areas.

.3 Misaligned or inadequately lapped seams, punctures or other damage must be repaired with a patch of air barrier membrane extending 50mm in all directions from edge of damaged areas.

.4 Cover membrane immediately after Owner's Representative's inspection to protect from damage by other trades.

3.8 TESTING

.1 Air leakage testing as directed by Owner's Representative and paid for by contractor will be performed by professional testing agency for the locations selected at random for penetrations, laps, corners, etc.

.2 Testing will be witnessed by Owner's Representative and test reports will be signed by tester, site representative and contractor.

.3 Inform Owner's Representative 48 hours prior to required testing.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials, removal and installation of fiberglass-reinforced asphalt shingles and roll roofing.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 61 00 - Common Product Requirements.

.4 Section 01 78 00 - Closeout Submittals.

.5 Section 07 62 00 – Sheet Metal Flashing and Trim.

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB).

- .1 CAN/CGSB-37.4, Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing.
- .2 CAN/CGSB-37.5, Cutback Asphalt Plastic Cement.
- .3 CAN/CGSB-51.32, Sheathing, Membrane, Breather Type.
- .4 CAN/CGSB-51.34, Vapour Barrier Polyethylene Sheet, for Use in Building Construction.

.2 Canadian Roofing Contractors' Association (CRCA).

- .1 CRCA Roofing Specification Manual.

.3 Canadian Standards Association (CSA).

- .1 CAN/CSA-A123.1/A123.5, Asphalt Shingles Made From Organic Felt and Surfaced With Mineral Granules/Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules.
- .2 CSA A123.2, Asphalt-Coated Roofing Sheets.
- .3 CAN/CSA-A123.3, Asphalt Saturated Organic Roofing Felt.
- .4 CAN3-A123.51, Asphalt Shingle Application on Roof Slopes 1:3 and Steeper.
- .5 CAN3-A123.52, Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3.
- .6 CSA B111, Wire Nails, Spikes and Staples.

.4 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC).

.1 CCMC, Registry of Product Evaluations.

1.4 EXTRA MATERIALS

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 All unused shingles remain property of owner.

1.5 SUBMITTALS

.1 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

.2 Submit product data sheets for asphalt shingles. Include:

.1 Product characteristics.
.2 Performance criteria.
.3 Installation instructions.
.4 Limitations.
.5 Colour and finish.

.3 Submit duplicate samples of full size specified shingles.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Remove only in quantities required for same day use.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

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

.3 Use the least toxic sealants, and adhesives necessary to comply with requirements of this section.

.4 Close and seal tightly. Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.5 Place used hazardous sealant tubes and adhesive containers in areas designated for hazardous materials.

1.8 WARRANTY

.1 Provide a written guarantee, signed and issued in the name of the owner, stating the fiberglass-reinforced asphalt shingles shall remain free from defects in materials and workmanship for a period of twenty five (25) years from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Fiberglass-reinforced asphalt shingles: to CSA A123.1/A123.5.

- .1 Type: self-seal, standard, pattern rectangular
- .2 Mass: minimum 33 kg/3m²
- .3 Colours: as selected by Engineer

.2 Roofing underlayment: self-adhesive, non-woven glass fibre matt coated with SBS modified bitumen, minimum thickness 1.8 mm, bottom surface release film, top surface sanded.

.3 Continuous Ridge Vent: minimum 285 mm wide durable, copolymer plastic ridge vent, providing minimum 357 cm^2/m net free vent area, capable of accepting fiberglass-reinforced asphalt shingle cap over for shingle finish.

.4 Cement: Plastic cement: to CAN/CGSB-37.5.

.5 Nails: to CSA B111, of galvanized steel, sufficient length to penetrate 19 mm into deck.

PART 3 EXECUTION

3.1 REMOVAL OF EXISTING ROOFING

.1 Remove existing roofing, flashings and underlay, and expose sheathing or shingle lath of roof.

.2 Withdraw existing shingle and flashing nails, set those which break off. Leave surfaces free from dirt and loose material.

.3 Engineer to inspect roof sheathing. Take up, cut out, portion of sheathing boards affected by fungal or insect attack as directed on site by Engineer.

.4 Replace cut out portions of sheathing or lath with sheathing of equal sectional dimensions, and specified grade. Seat each end of board on rafter/truss, with 25mm bearing, and secure to rafter/truss.

3.2 APPLICATION

.1 Do fiberglass-reinforced asphalt shingle work in accordance with CAN3-A123.51/CAN3-A123.52, NBC/CRCA Specification, except where specified otherwise.

.2 Install layer of self-adhesive roof underlayment over the entire roof area.

.3 Install drip edge along eaves, overhanging 12 mm, with minimum 50 mm flange extending onto roof decking. Nail to deck at 400 mm oc.

.4 Install bottom step flashing (soaker base flashing) interleafed between shingles at vertical junctions.

.5 Install fiberglass-reinforced asphalt shingles on roof slopes 1:3 and steeper in accordance with CAN3-A123.51.

.6 Install fiberglass-reinforced asphalt shingles on roof slopes 1:6 to less than 1:3 in accordance with CAN3-A123.52.

3.3 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by asphalt shingles installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 06 10 00 – Rough Carpentry.

.2 Section 07 62 00 – Sheet Metal Flashing and Trim.

.3 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-11.3, Hardboard.
- .2 CAN/CGSB-11.5, Hardboard, Precoated, Factory Finished, for Exterior Cladding.
- .3 CAN/CGSB-11.6, Installation of Exterior Hardboard Cladding.
- .4 CAN/CGSB-51.32, Sheathing, Membrane, Breather Type.

.2 Canadian Standards Association (CSA)

- .1 CSA B111, Wire Nails, Spikes and Staples.
- .2 CSA O121, Douglas Fir Plywood.
- .3 CSA O151, Canadian Softwood Plywood.

.3 NLGA Standard Grading Rules for Canadian Lumber.

1.3 SUBMITTALS

.1 Product Data:

- .1 Submit manufacturer's printed product literature, specifications and data sheet.
- .2 Submit copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's for caulking materials during application and curing.

.2 Submit duplicate 300 x 300 mm size profile specified.

.3 Submit manufacturer’s installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Deliver siding suitable packaged to avoid damage to finished surface.

.3 Store in an unheated structure or under cover until application. Siding may be temporarily stored outside if at least 4 inches off the ground and on a flat, well drained surface protected from moisture with a shed pack or waterproof cover.

1.5 QUALITY ASSURANCE

.1 Provide Certificate of Quality Compliance from siding manufacturer upon completion of fabrication.

.2 Provide Certificate of Quality Compliance upon satisfactory completion of installation.

1.6 WARRANTY

.1 Warranty Period: 15 years against cracking, peeling, blistering, chalking, loss of coating adhesion, yellowing with age, and no damage caused by rinse cleaning surface dirt. Warranty to commence at date of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Clapboard Siding: Western Lodgepole Pine or Eastern Spruce, NO. 1 select or better grade, factory finished, saw texture, bevel profile, cove or V-joint pattern, free of large knots, knot holes, or loose knots: maximum moisture content of 12 percent. Size: 16 mm thickness, 150 mm width, 114 mm actual coverage.

.2 Moldings and trim: Western Lodgepole Pine or Eastern Spruce, No. 1 select or better grade, factory finished same as siding.

.3 Strapping: Softwood Lumber, kiln dried treated with brush applied wood preservative.

.4 Nails: Mechanically galvanized, to securely and rigidly retain the work permanently in position, pre-finished baked on coating to match siding finish. Nails 64 mm long for siding and 83 mm for trims.

.5 Exterior Sheathing Membrane: CAN/CGSB 51.32M, Spun bonded olefin sheeting, conforming to ASTM D3575, single ply laminated and coated.

.6 Sealant: Thermoplastic type, color to exactly match siding.

.7 Concealed Flashings: 0.4 mm thick galvanized steel.

2.2 FINISH

.1 Pre-finish color: Thermoplastic acrylic latex emulsion, factory coated under controlled environment conditions by a modified vacuum coat method, one prime coat and one finish coat, applied to all board surfaces, minimum 0.15 mm dry film thickness.

.1 Standard color or custom color from manufacturers range of colors.

.2 Touch-Up Paint: Thermoplastic acrylic latex emulsion, same type and color as siding.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verify that substrate surfaces and wall openings are ready to receive work.

3.2 PREPARATION

.1 Install metal flashing continuous over window and other openings. Secure in position tight to wall sheathing.

.2 Install one layer of sheathing membrane horizontally on sheathed walls, weather lap edges and ends minimum 150 mm. Stagger vertical laps. Tape all edges.

.3 Install strapping at 460 mm o.c.

.4 Install siding kitchen starter strips, behind first row of siding.

.5 Apply sealant around window, door and other opening frames.

3.3 INSTALLATION

.1 Install siding and accessories to manufacturer’s instructions.

.2 Install screen at bottom of base trim.

.3 Install siding for natural watershed.

.4 Install siding in straight aligned lengths, set level with plumb ends and corners.

.5 Install hardboard to CGSB11-GP-6M and manufacturers' instructions.

.6 Achieve siding joints no less that 800 mm apart in adjoining boards and distribute evenly over wall surface.

.7 Miter external and internal corners: Install corner strips, closures, frieze boards skirt boards and trim.

.8 Fasten siding securely to wood batten substrate.

.9 Face nail 25 mm from bottom of siding board directly into wood strapping, drive nail head just flush with siding surface; do not indent or penetrate painted coating.

3.4 INCIDENTAL SITE FINISHING

.1 Carefully set exposed nails flush with siding coating.

.2 Touch-up blemished siding materials to match siding color.

3.5 CLEANING

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

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 06 10 00 – Rough Carpentry.

.3 Section 07 92 00 – Joint Sealants.

1.2 REFERENCES

.1 The Aluminum Association Inc. (AA)

.1 Aluminum Sheet Metal Work in Building Construction.

.2 AA DAF45, Designation System for Aluminum Finishes.

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

.1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.3 ASTM D523, Standard Test Method for Specular Gloss.

.4 ASTM D822, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGBS)

.1 CAN/CGSB-37.5, Cutback Asphalt Plastic Cement.

.4 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual.

.5 Canadian Standards Association (CSA International)

.1 CSA A123.3, Asphalt Saturated Organic Roofing Felt.

.2 CSA B111, Wire Nails, Spikes and Staples.

1.3 SAMPLES

.1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.

PART 2 PRODUCTS

2.1 SHEET METAL MATERIALS

.1 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ150 coating, regular spangle surface, 0.70 mm base metal thickness. Pre-painted to CGSB –GP-71.

2.2 PREFINISHED STEEL SHEET

.1 Prefinished sheet with factory applied polyvinylidene fluoride.

.1 Class F1S

.2 Colour as selected by Engineer from manufacturer's standard range.

.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.

.4 Coating thickness: not less than 22 micrometres.

.5 Resistance to accelerated weathering for caulk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:

.1 Outdoor exposure period 2500 hours.

.2 Humidity resistance exposure period 5000 hours.

2.3 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CAN/CGSB 37.5.

.3 Underlay for metal flashing: No. 15 perforated asphalt felt to CSA A123.3.

.4 Sealants: Section 07 92 00 – Joint Sealants.

.5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.

.7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.8 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.

.2 Fabricate aluminum flashings and other sheet aluminum work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.

.3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.

.4 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.

.5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

.1 Form flashings, copings and fascias to profiles indicated of 0.60 mm thick prefinished steel.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details and as detailed.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.

.4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips, as detailed.

.5 Lock end joints and caulk with sealant.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 06 10 00 - Rough Carpentry.

.3 Section 07 62 10 - Sheet Metal Flashing and Trim.

.4 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

.1 The Aluminum Association Inc. (AA)

.1 Aluminum Sheet Metal Work in Building Construction.

.2 AA DAF45, Designation System for Aluminum Finishes.

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

.1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.3 ASTM D523, Standard Test Method for Specular Gloss.

.4 ASTM D822, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGBS)

.1 CAN/CGSB-37.5, Cutback Asphalt Plastic Cement.

.4 Canadian Standards Association (CSA International)

.1 CSA B111, Wire Nails, Spikes and Staples.

1.3 SUBMITTALS

.1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.

.2 Clearly indicate bending, folding, jointing, fastening installation details.

1.4 DELIVERY AND STORAGE

.1 Store products off ground and under cover in a dry, well ventilated enclosure.

.2 Stack pre-formed material in manner to prevent twisting, bending and rubbing.

.3 Provide protection for galvanized and pre-coated surfaces.

.4 Prevent contact of dissimilar metals during storage. Protect from acids, flux, and other corrosive materials and elements.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Sheet Steel: Commercial or Forming Steel to ASTM A653/A653M with Z275 hot dip galvanized zinc coating, in thickness and finish specified in this Section.

.2 Sheet Steel Finish: factory painted, baked-on enamel of proven durability for exterior exposure, to CSSBI Technical Bulletin No. 7, 5000 series. Finish colour as selected by Owner's Representative from paint manufacturer's standard range.

.3 Eavestrough Brackets: 3 mm x 38 mm hot dip galvanized steel strap.

.4 Eavestrough Spacers: 2 mm x 38 mm hot dip galvanized steel strap.

2.2 ACCESSORIES

.1 Sheet Metal Screws: cadmium plated, self tapping, pan head.

.2 Eavestrough Fasteners: 10 mm diameter. x 150 mm long, hot dip galvanized lag screws and ferrules.

.3 Downspout Straps: 0.55 mm thick sheet steel.

.4 Isolation coating: alkali resistant bituminous paint.

.5 Plastic cement: to CAN/CGSB 37.5.

.6 Sealants: Section 07 92 00 – Joint Sealants.

.7 Touch-up paint: as recommended by prefinished material manufacturer.

2.3 FABRICATION

.1 Fabricate sheet aluminum work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.

.2 Form eavesthrough and downspouts from sheet steel as specified, true and accurate to size, free from distortion and other defects detrimental to appearance and performance.

.3 Form eavestrough of 100 mm widths using continuous rolling process. Downspouts shall be corrugated. Form eavestroughs from thickness in accordance with the following table:

Profile	Nominal Width	Girth	Sheet Thickness
Ogee	100 mm 150 mm	255 mm 380 mm	0.48 mm 0.55 mm
Rectangular		510 mm 530 mm to 635 mm	0.55 mm 0.70 mm

.4 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Join sheet steel components with silicon sealant and cadmium plated screws.

.2 Secure 100 mm wide eavestroughs to building with lag screws through ferrules spaced @ 800 mm o.c. maximum.

.3 Secure eavestroughs over 100 mm wide with staggered brackets and spacer bars spaced @ 800 mm o.c. maximum.

.4 Install eavestroughs in maximum 15 m lengths, sloped to downspouts. Close ends of each length and allow 15 mm between lengths. Provide at least one downspout per eavestrough length.

.5 Install elbows and tees as required, and secure downspouts with straps at 1.8 m centres, minimum 2 straps per downspout.

3.2 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Leave works areas clean, free from grease, finger marks and stains.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials, preparation and application for caulking and sealants.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 61 00 - Common Product Requirements.

1.3 REFERENCES

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

.1 ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act (CEPA).

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.5 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act (TDGA).

1.4 SUBMITTALS

.1 Manufacturer's product to describe.

.1 Caulking compound.

.2 Primers.

.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.4 Installation instructions, surface preparation and product limitations.

.2 Submit duplicate samples of each type of material and colour.

.3 Cured samples of exposed sealants for each color where required to match adjacent material.

.4 Manufacturers' instructions to include installation instructions for each product used.

1.5 QUALITY ASSURANCE/MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant. Mock-up may be part of finished work.

.3 Allow 24 hours for inspection of mock-up by Engineer before proceeding with sealant work.

.4 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.5 When accepted, mock-up will demonstrate minimum standard of quality required for this Work.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.7 PROJECT CONDITIONS

.1 Environmental Limitations:

.1 Do not proceed with installation of joint sealants under following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4˚C.

.2 When joint substrates are wet.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

PART 2 PRODUCTS

2.1 SEALANT MATERIALS

.1 Sealants and Caulking compounds must:

.1 Meet or exceed all applicable governmental and industrial safety and performance standards; and

.2 Be manufactured and transported in such a manner that all steps fo the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection Act (CEPA).

.2 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mecury, lead, cadium, hexavalent chromium, barium or their compounds, except barium sulphate.

.3 Sealant and caulking compounds must no contain a total of volatile organic compound (VOC's) in excess of 5% by height as calculated from records of the amounts of constituents used to make the product.

.4 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.

.5 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.6 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.

.7 Where sealants are qualified with primers use only these primers.

.8 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Urethanes One Part.

.1 Non-Sag to CAN/CGSB-19.13, Type 2.

.2 Silicones One Part.

.1 To CAN/CGSB-19.13, mildew resistant.

.3 Acoustical Sealant.

.1 To ASTM C919.

.4 Preformed Compressible and Non-Compressible back-up materials.

.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.

.1 Extruded closed cell foam backer rod.

.2 Size: oversize 30 to 50 %.

.2 Neoprene or Butyl Rubber.

.1 Round solid rod, Shore A hardness 70.

.3 High Density Foam.

.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.

.4 Bond Breaker Tape.

.1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

.1 Perimeters of exterior openings where frames meet exterior facade of building, Sealant type CAN/CGSB- 19.13.

.2 Expansion and control joints in exterior surfaces of poured-in-place concrete walls: Sealant type CAN/CGSB – 19.13.

.3 Control and expansion joints in exterior surfaces of unit masonry walls: Sealant type: CAN/CGSB – 19.13.

.4 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: CAN/CGSB – 19.13.

.5 Control and expansion joints on the interior of exterior surfaces of unit masonry walls. Sealant Type CAN/CGSB -19.13.

.6 Interior control and expansion joints in floor surfaces: Sealant type CAN/CGSB - 19.13.

.7 Perimeters of interior frames, as detailed and itemized: Sealant type CAN/CGSB - 19.13.

.8 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant type CAN/CGSB -19.13.

.9 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities, counters, plastic laminate and adjacent wall finish, etc.): Sealant type CAN/CGSB – 19.13, mildew resistant.

.10 Exposed interior control joints in drywall: Sealant type: CAN/CGSB -19.13.

.11 Acoustical Sealant ASTM C919.

2.4 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Primer: as recommended by manufacturer.

PART 3 EXECUTION

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing.

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.3 Cleanup.

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 07 21 20 – Low Expanding Foam Sealant.

.3 Section 07 26 00 –Vapour Retarders.

.4 Section 07 92 00 - Joint Sealants.

.5 Section 08 80 50 - Glazing

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-79.1, Insect Screens.

.2 Canadian Standards Association (CSA)

.1 CSA-A440-00/A440.1, A440, Windows / Special Publication A440.1, User Selection Guide to CSA Standard A440, Windows.

.2 CAN/CSA-Z91, Safety Code for Window Cleaning Operations.

1.3 SUBMITTALS

.1 Indicate materials and details in scale full size for head, jamb and sill, profiles of components, interior and exterior trim. Junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes fasteners, and caulking. Indicate location of manufacturer’s nameplates.

.2 Shop drawings to include continuation of air barrier and vapour barrier between wall assembly and vinyl window.

.3 Submit one complete full size window sample of each type window.

.4 Include frame, sash, sill, glazing and weatherproofing method, insect screens, surface finish and hardware. Show location of manufacturer's nameplates.

.5 Include 150 mm long samples of head, jamb, sill, meeting rail, mullions to indicate profile.

1.4 TEST REPORTS

.1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications, for:

.1 Windows classifications
.2 Air tightness
.3 Water tightness
.4 Wind load resistance
.5 Condensation resistance
.6 Forced entry resistance
.7 Insect screens
.8 Glazing
.9 Safety drop - vertical sliding windows only
.10 Ease of operation - windows with operable lights
.11 Sash pull-off - vinyl windows

1.5 WARRANTY

.1 Provide a written warranty for work under this Section from Manufacturer for failure due to defective materials and from Contractor for failure due to defective installation, workmanship for ten (10) years respectively from the date of Substantial Completion.

1.6 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for windows for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Materials: to CSA-A440/A440.1 supplemented as follows:

.2 All vinyl windows by same manufacturer.

.3 Sash: vinyl.

.4 Main frame: vinyl, thermally broken.

.5 Glass: in accordance with Section 08 80 50 - Glazing.

.6 Screens: to CAN/CGSB-79.1.

.1 Insect screening mesh: count 18 x 14

.2 Fasteners: tamper proof

.3 Screen frames: aluminum, colour to match window frames

.4 Mount screen frames for exterior replacement.

.5 Provide full insect screens to cover entire window

2.2 WINDOW TYPE AND CLASSIFICATION

.1 Types:

.1 Single hung, top vented, bottom position fixed, insulating glass.

.2 Single hung, bottom vented, top position fixed, insulating glass.

.3 Fixed: with insulating glass.

.4 Screens: screens as indicated.

.2 Classification rating: to CSA-A440/A440.1 for various regions of Newfoundland and Labrador as follows:

.1	Argentia	A3, B5, C4, I40, F1, S1
.2	Bonavista	A3, B6, C3, I40, F1, S1
.3	Cape Harrison	A3, B5, C3, I40, F1, S1
.4	Cape Race	A3, B6, C3, I40, F1, S1
.5	Churchill Falls	A3, B2, C2, I43, F1, S1
.6	Buchans	A3, B3, C3, I40, F1, S1
.7	Corner Brook	A3, B5, C4, I40, F1, S1
.8	Gander	A3, B4, C3, I40, F1, S1
.9	Goose Bay	A3, B3, C3, I40, F1, S1
.10	Grand Bank	A3, B6, C4, I40, F1, S1
.11	Grand Falls	A3, B4, C3, I40, F1, S1
.12	Labrador City	A3, B2, C2, I43, F1, S1
.13	Port aux Basques	A3, B6, C4, I40, F1, S1
.14	St. Anthony	A3, B6, C4, I40, F1, S1
.15	St. John’s	A3, B6, C4, I40, F1, S1
.16	Stephenville	A3, B5, C4, I40, F1, S1
.17	Wabana	A3, B6, C4, I40, F1, S1
.18	Wabush	A3, B2, C2, I43, F1, S1

.3 Energy ratings: windows to be Energy Star certified to Canadian Standards Association for various regions of Newfoundland and Labrador as follows:

.1 Island Region (excluding Northern Peninsula).

.1 Zone B.

.2 Northern Peninsula of Island Region and Labrador Region (excluding Northern Labrador – Natuashish and North).

.1 Zone C.

.3 Northern Labrador – Natuashish and North.

.1 Zone D.

2.3 FABRICATION

.1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:

.2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3.0 mm for units with a diagonal measurement over 1800 mm.

.3 Face dimensions detailed are maximum permissible sizes.

.4 Brace frames to maintain squareness and rigidity during shipment and installation.

2.4 VINYL FINISHES

.1 Vinyl finishes: in accordance with CSA-A440/A440.1, including appendices.

2.5 GLAZING

.1 Glaze windows in accordance with CSA-A440/A440.1 and Section 08 80 50 - Glazing.

2.6 HARDWARE

.1 Hardware:

.1 stainless steel or white bronze trimline camlocks to provide security and permit easy operation of units.

.2 Counter balance: stainless steel coil balance hardware.

.2 Where windows latching devices are located in excess of 1600 mm above finished floor level:

.1 Equip vertical sliding units with ring pull at top sash. Provide operating pole of length required, complete with appropriate tip to suit ring pull. Provide one (1) pole for each room where vent sash occurs.

.3 Vertical slider windows are not required to have inward tilt action. All vertical slider windows provided for this project are to have the inward tilt action mechanism disabled prior to delivery to the project site.

2.7 AIR BARRIER AND VAPOUR RETARDER

.1 Provide low expanding, single component polyurethane foam sealant installed at head, jamb and sill perimeter of window for sealing to building air barrier, vapour retarder and window frame. Foam sealant width to be adequate to provide required air tightness and

vapour diffusion control to building air barrier and vapour retarder foam interior. Refer to Section 07 21 20 – Low Expanding Foam Sealant.

PART 3 EXECUTION

3.1 WINDOW INSTALLATION

.1 Install in accordance with CSA-A440.

.2 Arrange components to prevent abrupt variation in colour.

.3 Install shims between windows and building frame at each installation screw location. Shim and fasten windows in accordance with manufacturer's recommendations and CAN/CSA A440.4.

3.2 CAULKING

.1 Seal joints between windows and window sills with sealant. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.

.2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within window units except where exposed use is permitted by Engineer.

3.3 TESTING

Note (size of project shown determines the extent of testing) Applied to projects with over 100 windows.

.1 Air leakage testing as directed by Engineer and paid for by Contractor, will be performed by professional testing agency for three locations selected at random for window/wall assembly.

.2 Window/wall assembly will include foundations, steel stud structure, gypsum sheathing and air barrier with on 1500 x 1500 window installed and sealed in place. (Omit spandrel panel for this exercise). Construct a test chamber on the exterior, from approximately 3100 high x approximately 3000 wide, sealed to foundation wall and face of air barrier on gypsum board. Provide mechanical anchorage to resist air pressure. Use a fan mounted in a door to achieve negative and positive pressures of 75 Pa. Use a smoke pencil to test for leaks. Total air leakage shall be less than 0.25 L/sec. for the tested assembly after accounting for leakage in the test chamber.

.3 Testing will be witnessed by Engineer and test reports will be signed by Tester, Site Representative and Contractor.

.4 Inform Engineer 48 hours prior to required testing.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 07 92 00 – Joint Sealants.

.4 Section 08 53 13 – Vinyl Windows.

1.2 REFERENCES

.1 American National Standards Institute (ANSI).

.1 ANSI/ASTM E330, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM C542, Specification for Lock-Strip Gaskets.

.2 ASTM D2240, Test Method for Rubber Property – Durometer Hardness.

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-12.1, Tempered or Laminated Safety Glass.

.2 CAN/CGSB-12.3, Clear Float Glass

.3 CAN/CGSB-12.5, Mirrors, Silvered.

.4 CAN/CGSB-12.8, Insulating Glass Units.

.5 CAN/CGSB-12.11, Wired Safety Glass.

.4 Canadian Standards Association (CSA).

.1 CSA A440.2, Energy Performance Evaluation of Windows and Sliding Glass Doors.

.2 CSA Certification Program for Windows and Doors.

.5 Flat Glass Manufacturers Association (FGMA).

.1 FGMA Glazing Manual.

.6 Laminators Safety Glass Association (LSGA).

.1 LSGA Laminated Glass Design Guide.

1.3 SYSTEM DESCRIPTION

.1 Performance Requirements:

.1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads as measured in accordance with ANSI/ASTM E330n and NBC latest edition.

.3 Limit glass deflection to 1/200 with full recovery of glazing materials.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet.

.2 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.3 Closeout Submittals:

.1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals

1.5 QUALITY ASSURANCE

.1 Perform work in accordance with FGMA Glazing Manual IGMAC and Laminators Safety Glass Association – Standards Manual for glazing installation methods. Provide shop inspection and testing for glass.

.3 Provide certificate of quality compliance from manufacturer.

1.6 MOCK-UPS

.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up to including glass glazing, and perimeter air barrier and vapour retarder seal.

.3 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application.

.4 Construct mock-up where directed.

.5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

.6 Allow 24 hours for inspection of mock-up by Owner's Representative before proceeding with work.

1.7 WARRANTY

.1 Provide ten (10) year warranty for glazing units.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Install glazing when ambient temperature is 10°C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

PART 2 PRODUCTS

2.1 MATERIALS: FLAT GLASS

.1 Float glass: to CAN/CGSB-12.3, Glazing quality, 5 mm minimum thickness.

.2 Safety glass: to CAN/CGSB-12.5, transparent, 6 mm thick.

.1 Type 1, Laminated, Type 2 - tempered

.2 Class B - float

.3 Category 11

.3 Silvered mirror glass: to CAN/CGSB-12.5, 4 mm thick.

.1 Type 1A - Float glass for normal use

.4 Wired glass: to CAN/CGSB-12.11, 6 mm thick.

.1 Type 1- Polished both sides (transparent)

.2 Wire mesh style 3 – square.

.5 Glass for cabinet and millwork: to CAN/CGSB-12.5, transparent, minimum 4.0 mm thick, unless otherwise indicated.

.1 Type 1 - Clear Laminated or Type 2 - Tempered.

2.2 MATERIALS: SEALED INSULATING GLASS

.1 Insulating glass units: to CAN/CGSB-12.8, double unit, minimum 23mm overall thickness (as per NBCC for window area and climatic conditions.)

.1 Glass: to CAN/CGSB-12.3

.2 Glass thickness: minimum 6 mm each light (as per NBCC calculations for window area and climatic conditions.)

.3 Inter-cavity space thickness: 13 mm.

.4 Glass coating: surface number 2 (inside surface of outer light), low “E”.

.5 Inert gas: argon.

.6 Light transmittance: minimum 0.70.

.2 Insulating glass units for exterior steel doors: to CAN/CGSB-12.8, double unit, minimum 25 mm overall thickness (as per NBCC for window area and climatic conditions.)

.1 Glass: to CAN/CGSB-12.1, tempered.

.2 Glass thickness: minimum 6 mm each light (as per NBCC for window area and climatic conditions.)

.3 Inner-cavity space thickness: 13 mm.

.4 Glass coating: surface number 2 (inside face of outer light), low “E”.

.5 Inert gas: argon.

2.3 MATERIALS

.1 Sealant: 07 92 00 – Joint Sealants.

2.4 ACCESSORIES

.1 Setting blocks: Neoprene, 80-90 Shore A durometer hardness to ASTM D2240, minimum 100 mm x width of glazing rabbet space minus 1.5 mm x height.

.2 Spacer shims: Neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.

.3 Glazing tape:

.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper; black colour.

.4 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot, colour as selected.

.5 Glazing clips: manufacturer's standard type.

.6 Lock-strip gaskets: to ASTM C542.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXAMINATION

.1 Verify that openings for glazing are correctly sized and within tolerance.

.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.4 INSTALLATION: EXTERIOR – WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

.1 Perform work in accordance with FGMA Glazing Manual and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.

.3 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.

.4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.5 Rest glazing on setting blocks and push against tape and heel of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.

.6 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line.

.7 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.

.8 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5 INSTALLATION: INTERIOR DRY METHOD (TAPE AND TAPE)

.1 Perform work in accordance with FGMA Glazing Manual and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.

.3 Place setting blocks at 1/4 with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against tape with sufficient pressure to attain full contact at perimeter of light or glass unit.

.5 Place glazing tape on free perimeter of glazing in same manner described in 3.4.3. Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.

.6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

.7 Knife trim protruding tape.

3.6 INSTALLATION: MIRRORS

.1 Set mirrors with clips. Anchor rigidly to wall construction.

.2 Set in frame.

.3 Place plumb and level.

3.7 CLEANING

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

.2 Remove traces of primer, caulking.

.3 Remove glazing materials from finish surfaces.

.4 Remove labels after work is complete.

.5 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacture's instructions.

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

3.8 PROTECTION OF FINISHED WORK

.1 After installation, mark light with an "X" by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures

.2 Section 06 10 00 - Rough Carpentry

.3 Section 07 21 16 - Blanket Insulation

1.2 REFERENCES

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

- .1 ASTM C36/C36M, Specification for Gypsum Wallboard.
- .2 ASTM C475, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .3 ASTM C514, Specification for Nails for the Application of Gypsum Board.
- .4 ASTM C630/C630M, Specification for Water-Resistant Gypsum Backing Board.
- .5 ASTM C840, Specification for Application and Finishing of Gypsum Board.
- .6 ASTM C931/C931M, Specification for Exterior Gypsum Soffit Board.
- .7 ASTM C954, Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
- .8 ASTM C1002, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .9 ASTM C1047, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.2 Association of the Wall and Ceilings Industries International (AWEI)

.3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.4 Underwriters' Laboratories of Canada (ULC)

- .1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

.1 Submit 300 mm size samples of corner and casing beads insulating strip.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.

.2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.

.3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.5 SITE ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature minimum 10° C, maximum 21° C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.6 QUALIFICATIONS

.1 Dry wall installers: minimum 5 years proven experience.

1.7 MOCKUPS

.1 Submit Mock-Ups in accordance with Section 01 45 00 – Quality Control.

.2 Construct mock up gypsum board wall installation including one inside corner and one outside corner. Mock-up may be part of finished work.

.3 Allow 24 hours for inspection of mock-up by Engineer before proceeding with rest of the work.

.4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Standard board: to ASTM C36/C36M regular and Type X, thicknesses as indicated on drawings, 1200 mm wide x maximum practical length, ends square cut, edges bevelled.

.2 Moisture and mold resistant board: to ASTM C36/C36M and ASTM C1177/C1177M with glass mat facings, both sides, regular and Type X, thicknesses as indicated on

drawings, 1200 mm wide x maximum practical length, ends square cut, long edges tapered.

.3 Glass mat exterior gypsum board sheathing: to ASTM C1177/C1177M regular and Type X, thicknesses as indicated on drawings, 1200 mm wide x maximum practical length, ends and long edges square cut.

.4 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30 galvanized.

.5 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.

.6 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

.7 Nails: to ASTM C514.

.8 Steel drill screws: to ASTM C1002.

.9 Stud adhesive: to CAN/CGSB-71.25.

.10 Laminating compound: as recommended by manufacturer, asbestos-free.

.11 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, metal, zinc-coated by hot-dip process 0.5 mm base thickness, perforated flanges, one piece length per location.

.12 Sealants: in accordance with Section 07 92 10 - Joint Sealing.

.13 Acoustic sealant: to CGSB 19-GP-21M.

.14 Polyethylene: to CAN/CGSB-51.34, Type 1.

.15 Insulating strip: rubberized, moisture resistant, 3 mm thick cork strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.

.16 Joint compound: to ASTM C475, asbestos-free.

2.2 FINISHES

.1 Texture finish: asbestos-free standard white texture coating and primer-sealer, recommended by gypsum board manufacturer.

PART 3 EXECUTION

3.1 ERECTION

.1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.

.2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.

.3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.4 Install work level to tolerance of 1:1200.

.5 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, and other protrusions.

.6 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

.7 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.

.8 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

.9 Install wall furring for gypsum board wall finishes in accordance with ASTM C840, except where specified otherwise.

.10 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.11 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.2 APPLICATION

.1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.

.2 Apply single, double layer gypsum board to wood or metal furring or framing using screw fasteners. Maximum spacing of screws 300 mm oc.

.1 Single-Layer Application:

.1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.

.2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.

.2 Double-Layer Application:

.1 Install gypsum board for base layer and exposed gypsum board for face layer.

.2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.

.3 Apply base layers at right angles to supports unless otherwise indicated.

.4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.

.3 Apply single layer gypsum board to concrete or concrete block surfaces, where indicated, using laminating adhesive.

.1 Comply with gypsum board manufacturer's recommendations.

.2 Brace or fasten gypsum board until fastening adhesive has set.

.3 Mechanically fasten gypsum board at top and bottom of each sheet.

.4 Apply water-resistant gypsum board where wall tiles are to be applied and adjacent to slop sinks janitors closets. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

.5 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, in partitions where perimeter sealed with acoustic sealant.

.6 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.

.7 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.

.8 Install gypsum board with face side out.

.9 Do not install damaged or damp boards.

.10 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.3 INSTALLATION

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm oc using contact adhesive for full length.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.

.4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.

.5 Construct control joints of two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.

.6 Provide continuous polyethylene dust barrier behind and across control joints.

.7 Locate control joints at changes in substrate construction.

.8 Install control joints straight and true.

.9 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.

.10 Install expansion joint straight and true.

.11 Install access doors to electrical and mechanical fixtures specified in respective sections.

.1 Rigidly secure frames to furring or framing systems.

.12 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.13 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:

.1 Levels of finish:

.1 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.(For use where water resistant gypsum backing board is used as a substrate for tile.)

.2 Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

.14 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.15 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.16 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.17 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

.18 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.

.19 Mix joint compound slightly thinner than for joint taping.

.20 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.

.21 Allow skim coat to dry completely.

.22 Remove ridges by light sanding or wiping with damp cloth.

.23 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

3.4 SCHEDULES

.1 Construct fire rated assemblies where indicated, seal penetrations, as per Section 07 84 00 – Firestopping.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM F1066, Specification for Vinyl Composition Floor Tile.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-25.20, Surface Sealer for Floors.

.2 CAN/CGSB-25.21, Detergent-Resistant Floor Polish.

1.3 SUBMITTALS

.1 Submit duplicate tile in size specified, 300 mm long base.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for resilient flooring for incorporation into manual.

1.5 ENVIRONMENTAL REQUIREMENTS

.1 Maintain air temperature and structural base temperature at flooring installation area at 18º C to 30º C for 48 hours before, during and for 48 hours after installation, and at relative humidity not greater than 60%.

1.6 EXTRA MATERIALS

.1 Provide maintenance materials of resilient tile flooring, base and adhesive.

.2 Provide 3m² of each colour, pattern and type flooring material required for this project for maintenance use.

.3 Extra materials to be from same production run as installed materials.

.4 Clearly identify each container of floor tile and each container of adhesive.

.5 Deliver to Owner’s Representative, upon completion of the work of this section.

.6 Store where directed by Owner’s Representative.

1.7 WARRANTY

.1 Flooring materials shall be warranted by the manufacturer against defects in materials and workmanship for a period of five (5) years from the date of Substantial Completion.

.2 Contractor shall provide a two (2) year warranty from the date of substantial completion against defects in workmanship.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Resilient flooring must:

.1 Meet or exceed all applicable governmental and industrial safety and performance standards; and

.2 Be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection ct (CEPA)

.2 Vinyl composition tile (VCT): to ASTM F1066, Composition 1 - non asbestos Class 2 - through pattern tile, plain surface, minimum 3.0 mm thick, minimum 305 mm x 305 mm unless otherwise indicated, in colour selected by Owner's Representative.

.3 Linoleum Tile: renewable, polymer based floor tile having a nominal total thickness of minimum 2.0 mm, minimum 305 mm x 305 mm unless otherwise indicated, composed of polyester resin and fillers. Pigment with colours and textures to be dispersed uniformly throughout total thickness.

.4 Vinyl flooring must:

.1 Floor tile to confirm to ASTM F1066, Class 2 – through pattern, for size, squareness, thickness, indentation, impact, deflection, resistance to chemicals and resistance to heat.

.2 Not be manufactured or formulated with cadium (Cd), chromium (Cr), lead (Pb,), mercury (Gg), and nickel (Ni);

.3 Not contain >0.01% by weight of arsenic (As);

.4 Not contain >1% by weight of tin (Sn), or zinc (Zn);

.5 Not be manufactured or formulated with short-chained chlorinated paraffin waxes (CS≤13), or nonyl phenol;

.6 Not contain or be manufactured with materials derived from species listed on the Convention on International Trade in Endangered Species (CITES).

.5 Feature strip: of same material and thickness as adjacent work, width as indicated on drawings, colour as selected by Owner's Representative.

.6 Resilient base: rubber, coved, minimum 1200 mm length and 101.6 mm high x 2.0 mm thick, including external corners for coved base only, of colour selected by Owner's Representative.

.7 Primers and adhesives: waterproof, solvent-free, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.

.8 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.

.9 Metal edge strips: aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.

.10 Sealer: to CAN/CGSB 25.20M, type recommended by flooring manufacturer.

.11 Wax: to CAN/CGSB-25.21 type recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 INSPECTION

.1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer.

3.2 SUB-FLOOR TREATMENT

.1 Remove all tile adhesive from existing floor areas to receive new tile.

.2 Remove floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with floor filler.

.3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

.4 Old vinyl flooring to be removed by trained personnel (may contain asbestos).

.5 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.

3.3 TILE APPLICATION

.1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to the outside. Do not let contaminated air recirculate through a district or whole building air distribution system.

Upon completion of work, maintain ventilation at maximum capacity until building occupation.

.2 To minimize emissions from adhesives, use water-based, solvent-free styrene-butadiene-rubber adhesive for linoleum. Butadiene exposure may cause eye and nose irritations, headaches, dizziness, and vomiting.

.3 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.

.4 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.

.5 Install flooring to square grid pattern with all joints aligned, with pattern grain alternating to produce basket weave pattern.

.6 As installation progresses, and after installation, roll flooring in 2 directions including resilient tile with 45 kg minimum roller to ensure full adhesion.

.7 Cut tile and fit neatly around fixed objects.

.8 Install feature strips and floor markings where indicated. Fit joints tightly.

.9 Install flooring in pan type floor access covers. Maintain floor pattern.

.10 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

.11 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

.12 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.4 BASE APPLICATION

.1 Lay out base to keep number of joints at minimum. Base joints at maximum length available or at internal or premoulded corners.

.2 Clean substrate and prime with one coat of adhesive.

.3 Apply adhesive to back of base.

.4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.

.5 Install straight and level to variation of 1:1000.

.6 Scribe and fit to door frames and other obstructions.

.7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles, minimum 300 mm each leg. Wrap around toeless base at external corners.

3.5 INITIAL CLEANING AND WAXING

.1 Remove excess adhesive from floor, base and wall surfaces without damage.

.2 Clean, seal and wax floor and base surface to flooring manufacturer's instructions. In carpeted areas clean, seal and wax base surface before carpet installation.

3.6 PROTECTION OF FINISHED WORK

.1 Protect new floors after initial waxing until final inspection.

.2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 61 00 - Common Product Requirements.

.4 Section 01 78 00 – Closeout Submittals.

1.2 REFERENCES

.1 Environmental Protection Agency (EPA)

.1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).

.2 Master Painters Institute (MPI)

.1 MPI Architectural Painting Specifications Manual

.3 Society for Protective Coatings (SSPC).

.1 SSPC Painting Manual, Systems and Specifications Manual.

.4 National Fire Code of Canada.

1.3 QUALITY ASSURANCE

.1 Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Qualified journeyperson shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyperson in accordance with trade regulations.

.3 Conform to latest MPI requirements for exterior painting work including preparation and priming.

.4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with MPI Painting Specification Manual "Approved Products" listing and shall be from a single manufacturer for each system used.

.5 Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.

.6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Engineer.

.7 Standard of Acceptance:

.1 Walls: No defects visible from a distance of 1000 mm at 90° to surface.

.2 Ceilings: No defects visible from floor at 45° to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

.1 Provide paint products meeting MPI "Environmentally Friendly" E2 or E3 ratings based on VOC (EPA Method 24) content levels.

1.5 SCHEDULING OF WORK

.1 Submit work schedule for various stages of painting to Engineer for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Engineer for changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.6 SUBMITTALS

.1 Submit product data and manufacturer's installation/application instructions for paints and coating products to be used.

.2 Submit WHMIS - MSDS - Material Safety Data Sheets.

.3 Upon completion, submit records of products used, records to be included in Operation and Maintenance Manuals. List products in relation to finish system and include the following:

.1 Product name, type and use.

.2 Manufacturer's product number.

.3 Colour numbers.

.4 Manufacturer's Material Safety Data Sheets (MSDS).

.5 MPI Environmentally Friendly classification system rating.

.4 Submit manufacturer's application instructions for each product specified.

.5 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating, with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:

.1 3 mm plate steel for finishes over metal surfaces.

.2 13 mm birch plywood for finishes over wood surfaces.

.3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.

.4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.

.6 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

.7 Submit full range of available colours where colour availability is restricted.

1.7 QUALITY CONTROL

.1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.

.2 When requested by the Engineer or Paint Inspection Agency, prepare and paint designated surface, area, room or item (in each colour scheme) to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.8 EXTRA MATERIALS

.1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Submit 1 - 4 litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish formula.

.3 Deliver to Engineer and store where directed.

1.9 DELIVERY, HANDLING AND STORAGE

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver and store materials in original containers, sealed, with labels intact.

.3 Labels shall clearly indicate:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.4 Remove damaged, opened and rejected materials from site.

.5 Provide and maintain dry, temperature controlled, secure storage.

.6 Observe manufacturer's recommendations for storage and handling.

.7 Store materials and supplies away from heat generating devices.

.8 Store materials and equipment in a well ventilated area with temperature range 7ºC to 30ºC.

.9 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.10 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.

.11 Remove paint materials from storage only in quantities required for same day use.

.12 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.13 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

.14 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

1.10 SITE REQUIREMENTS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces.

.2 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate

temperatures above 10ºC for 24 hours before, during and after paint application until paint has cured sufficiently.

.3 Where required, provide continuous ventilation for seven days after completion of application of paint.

.4 Provide temporary ventilating and heating equipment where permanent facilities are not available.

.5 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless specifically pre-approved by Engineer and, applied product manufacturer, perform no painting work when:

.1 ambient air and substrate temperatures are below 10ºC.

.2 substrate temperature is over 32ºC unless paint is specifically formulated for application at high temperatures.

.3 substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.

.4 the relative humidity is above 85% or when dew point is less than 3ºC variance between air/surface temperature.

.5 rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.

.2 Perform no painting work when maximum moisture content of substrate exceeds:

.1 12% for concrete and masonry (clay and concrete brick/block).

.2 15% for wood.

.3 12% for plaster and gypsum board.

.3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".

.4 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:

.1 Apply paint finish only in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint only to adequately prepared surfaces and to surfaces within moisture limits noted herein.

.3 Apply paint only when previous coat of paint is dry or adequately cured.

.4 Apply paint finishes only when conditions forecast for entire period of application fall within manufacturer's recommendations.

.5 Do not apply paint when:

.1 Temperature is expected to drop below 10ºC before paint has thoroughly cured.

.2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.

.3 Surface to be painted is wet, damp or frosted.

.6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

.7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

.9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of the Engineer such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Ensure emptied containers are sealed and stored safely.

.5 Unused paint, coating materials must be disposed of at official hazardous material collections site as approved by Engineer.

.6 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal.

.7 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.8 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.9 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.

.10 Empty paint cans are to be dry prior to disposal or recycling (where available).

PART 2 PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in the latest edition of the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Paint materials for each coating formula to be products of a single manufacturer.

.3 Low odour products: whenever possible, select products exhibiting low odour characteristics. If two products are otherwise equivalent, select the product with the lowest odour. Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.

.4 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, shall:

.1 be water-based, water soluble, water clean-up.

.2 be non-flammable

.3 be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.

.4 be manufactured without compounds which contribute to smog in the lower atmosphere.

.5 do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.

.5 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).

.6 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavelant chromium or their compounds.

.7 Water-borne surface coatings must have a flash point of 61.0ºC or greater.

.8 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:

.1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

.2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

.9 Water-borne paints and stains, and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.

2.2 COLOURS

.1 Engineer will provide Colour Schedule after Contract award.

.2 Selection of colours will be from manufacturer’s full range of colours.

.3 Where specific products are available in a restricted range of colours, selection will be based on the limited range.

.4 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Engineer written permission.

.2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

.3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.

.4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Engineer.

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:

Gloss Level /Category	Units @ 60°/	Units @ 85°
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 - high gloss finish	> 85	

.2 Gloss level ratings of painted surfaces shall be as specified herein.

2.5 EXTERIOR PAINTING SYSTEMS

.1 The following paint formulas requires a three coat finish as indicated in the MPI Architectural Painting Specifications Manual.

.2 Asphalt Surfaces: zone/traffic marking for drive and parking areas, etc.

.1 EXT 2.1B Alkyd zone/traffic marking finish.

.3 Concrete Vertical Surfaces: (including horizontal soffits)

.1 EXT 3.1A – Latex G4 finish

.4 Concrete Horizontal Surfaces: decks

.1 EXT 3.2D - Alkyd floor enamel G4 finish.

.5 Clay Masonry Units: (pressed and extruded brick)

.1 EXT 4.1A - Latex G4 finish.

.6 Concrete Masonry Units: smooth and split face block and brick

.1 EXT 4.2A - Latex G4 finish.

.7 Structural Steel and Metal Fabrications:

.1 EXT 5.1J - Pigmented polyurethane finish (over high build epoxy).

.8 Galvanized Metal: not chromate passivated

.1 EXT 5.3D - Pigmented polyurethane finish for use in high contact/high traffic areas.

.9 Dimension Lumber: columns, beams, exposed joists, underside of decking, siding, fencing, etc.

.1 EXT 6.2L - Semi-transparent stain finish.

.2 EXT 6.2M - Latex G4 finish (over latex primer).

.10 Dressed Lumber: doors, door and window frames, casings, battens, smooth facias, etc.

.1 EXT 6.3L - Latex G4 finish (over latex primer)

.11 Wood Panelling: plywood siding, fascias, soffits, etc.

.1 EXT 6.4K - Latex G4 finish (over latex primer).

.12 Wood Decks and Stairs/Steps: using spaced lumber

.1 EXT 6.5A - Latex porch and floor G4 finish (over primer).

.2 EXT 6.5F - Deck stain finish.

PART 3 EXECUTION

3.1 GENERAL

.1 Perform preparation and operations for exterior painting in accordance with MPI Painting Specifications Manual except where specified otherwise.

.2 Apply all paint materials in accordance with paint manufacturer's written application instructions.

3.2 EXISTING CONDITIONS

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Engineer damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Engineer. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:

.1 Concrete: 12%.

.2 Clay and Concrete Block/Brick: 12%.

.3 Wood: 15%.

3.3 PROTECTION

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Engineer.

.2 Cover or mask windows and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.

.3 Protect items that are permanently attached such as Fire Labels on doors and frames.

.4 Protect factory finished products and equipment.

.5 Protect passing pedestrians, building occupants and general public in and about the building.

.6 Remove electrical cover plates, light fixtures, surface hardware on doors, and all other surface mounted fittings, equipment and fastenings prior to undertaking any painting operations. Store for re-installation after painting is completed.

.7 Cover or move exterior furniture and portable equipment around building as necessary to carry out painting operations. Replace as painting operations progress.

.8 As painting operations progress, place "WET PAINT" signs in areas of work to approval of Engineer.

3.4 CLEANING AND PREPARATION

.1 Clean and prepare exterior surfaces in accordance with MPI Painting Specification Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and other surface debris by wiping with dry, clean cloths or compressed air.

.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and allow to dry thoroughly.

.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.

.6 Use trigger operated spray nozzles for water hoses.

.7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.

.2 Prevent contamination of cleaned surfaces before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.3 Where possible, prime surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.2 Apply wood filler to nail holes and cracks.

.3 Tint filler to match stains for stained woodwork.

.4 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.5 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes or blowing with clean dry compressed air.

.6 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.

.7 Do not apply paint until prepared surfaces have been accepted by Engineer.

3.5 APPLICATION

.1 Method of application to be as approved by Engineer. Apply paint by brush roller, air sprayer, airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.

.2 Brush and Roller Application:

.1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.

.2 Work paint into cracks, crevices and corners.

.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.

.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple.

.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray Application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.

.4 Brush out immediately runs and sags.

.5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.

.4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Engineer.

.5 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.7 Sand and dust between coats to remove visible defects.

.8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

.9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Unless otherwise specified, paint exterior exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.

.2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.3 Paint fire protection piping red.

.4 Do not paint over nameplates.

.5 Paint steel electrical light standards. Do not paint outdoor transformers and substation equipment.

3.7 FIELD QUALITY CONTROL

.1 Field inspection of exterior painting operations to be carried out by Engineer.

.2 Advise Engineer when each applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Co-operate with Engineer and provide access to areas of work.

3.8 RESTORATION

.1 Clean and re-install all hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect surfaces from paint droppings and dust to approval of Engineer. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Engineer.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 61 00 - Common Product Requirements.

.4 Section 01 78 00 - Closeout Submittals.

1.2 REFERENCES

.1 Environmental Protection Agency (EPA)

.1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).

.2 Master Painters Institute (MPI)

.1 MPI Architectural Painting Specifications Manual.

.3 Society for Protective Coatings (SSPC)

.1 SSPC Painting Manual, Volume Two, Systems and Specifications Manual.

.4 National Fire Code of Canada.

1.3 QUALITY ASSURANCE

.1 Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Qualified journeymen shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.

.3 Conform to latest MPI requirements for interior painting work including preparation and priming.

1.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

.1 Provide paint products meeting MPI "Environmentally Friendly" E2 or E3 ratings based on VOC (EPA Method 24) content levels.

.2 Where indoor air quality (odour) is a problem, use only MPI listed materials having a minimum E2 or E3 rating.

1.5 SCHEDULING

.1 Submit work schedule for various stages of painting to Engineer for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Engineer for any changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.6 SUBMITTALS

.1 Submit product data and manufacturer's installation/application instructions for each paint and coating product to be

.2 Submit product data for the use and application of paint thinner.

.3 Submit WHMIS MSDS - Material Safety Data Sheets. Indicate VOCs during application and curing.

.4 Upon completion, submit records of products used, records to be included in Operating and Maintenance Manuals. List products in relation to finish system and include the following:

- .1 Product name, type and use
- .2 Manufacturer's product number
- .3 Colour numbers
- .4 MPI Environmentally Friendly Classification System Rating
- .5 Manufacturer's Material Safety Data Sheets (MSDS)

.5 Submit full range colour sample chips to indicate where colour availability is restricted.

.6 Submit duplicate 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:

- .1 3 mm steel plate for finishes over metal surfaces.
- .2 13 mm birch plywood for finishes over wood surfaces.
- .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
- .4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.

.7 When approved, sample panels shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

1.7 QUALITY CONTROL

.1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.

.2 When requested by Engineer, prepare and paint designated surface, area, room or item (in each colour scheme) to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.8 EXTRA MATERIALS

.1 Submit maintenance materials from same product run as products installed in accordance with Section 01 78 00 - Closeout Submittals. Package products with protective covering and identify with descriptive labels.

.2 Submit one - four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish formula.

.3 Deliver to Engineer and store where directed.

.4 Provide certificate signed by staff that extra materials have been received in order.

1.9 DELIVERY, HANDLING AND STORAGE

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver and store materials in original containers, sealed, with labels intact.

.3 Labels shall clearly indicate:

.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.4 Remove damaged, opened and rejected materials from site.

.5 Provide and maintain dry, temperature controlled, secure storage.

.6 Observe manufacturer's recommendations for storage and handling.

.7 Store materials and supplies away from heat generating devices.

.8 Store materials and equipment in a well ventilated area with temperature range 7º C to 30º C.

.9 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.10 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Engineer. After completion of operations, return areas to clean condition to approval of Consultant.

.11 Remove paint materials from storage only in quantities required for same day use.

.12 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.13 Fire Safety Requirements:

.1 Provide minimum one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Ensure emptied containers are sealed and stored safely.

.5 Unused paint, coating materials must be disposed of at official hazardous material collections site as approved by Engineer.

.6 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal.

.7 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.8 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.9 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

1.11 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces.

.2 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application until paint has cured sufficiently.

.3 Where required, provide continuous ventilation for seven days after completion of application of paint.

.4 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless specifically pre-approved by the specifying body, Paint Inspection Agency and the applied product manufacturer, perform no painting work when:

.1 Ambient air and substrate temperatures are below 10°C.

.2 Substrate temperature is over 32°C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer’s prescribed limits.

.4 The relative humidity is above 60% or when the dew point is less than 3°C variance between the air/surface temperature.

.2 Perform no painting work when the maximum moisture content of the substrate exceeds:

.1 12% for concrete and masonry (clay and concrete brick/block).

.2 15% for wood.

.3 12% for plaster and gypsum board.

.3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".

.4 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:

.1 Apply paint finish only in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint only to adequately prepared surfaces and to surfaces within moisture limits noted herein.

.3 Apply paint only when previous coat of paint is dry or adequately cured.

.4 Additional Interior Application Requirements:

.1 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

.2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Engineer such that painted surfaces will have dried and cured sufficiently before occupants are affected.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Paint materials for paint systems shall be products of a single manufacturer.

.3 Low odor products. Whenever possible, select products exhibiting low odor characteristics. If two products are otherwise equivalent, select the product with the lowest odor. Only qualified products with E2 or E3 ”Environmentally Friendly”rating are acceptable for use on this project.

.4 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, shall:

.1 be water-based, water soluble, water clean-up.

.2 be non-flammable.

.3 be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.

.4 be manufactured without compounds which contribute to smog in the lower atmosphere.

.5 do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.

.5 Water-borne surface coatings must be manufactured and transported in a manner that steps of process, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for

facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).

.6 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavelant chromium or their compounds.

.7 Water-borne surface coatings must have a flash point of 61.0°C or greater.

.8 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:

.1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

.2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

.9 Water-borne paints and stains, and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.

2.2 COLOURS

.1 Engineer will provide Colour Schedule after contract award.

.2 Selection of colours will be from manufacturers full range of colours.

.3 Where specific products are available in a restricted range of colours, selection will be based on the limited range.

.4 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Engineer written permission.

.2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

.3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.

.4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Engineer.

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:

Gloss Level Category	Units @ 60°	Units @ 85°
G1 - matte finish	max. 5	max. 10
G2 - velvet finish	max. 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

.2 Gloss level ratings of painted surfaces shall be as specified herein.

2.5 INTERIOR PAINTING SYSTEMS

.1 The following paint formulas requires a three coat finish as indicated in the MPI Architectural Painting Specifications Manual.

.2 Concrete Vertical Surfaces: including horizontal soffits

.1 INT 3.1A Latex G5 finish (over sealer).

.3 Concrete Horizontal Surfaces: floors and stairs

.1 INT 3.2B Alkyd floor enamel low gloss finish.

.4 Clay Masonry Units: pressed and extruded brick

.1 INT 4.1A Latex G5 finish.

.5 Concrete Masonry Units: smooth and split face block and brick.

.1 INT 4.2A Latex G5 finish.

.6 Structural Steel and Metal Fabrications: columns, beams, joists, etc.

.1 INT 5.1E Alkyd G5 finish.

.7 Galvanized Metal: doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etc.

.1 INT 5.3A Latex G5 finish.

.8 Dimension Lumber: columns, beams, exposed joists, underside of decking, etc.

.1 INT 6.2D Latex G5 finish (over latex primer).

.9 Dressed Lumber: including doors, door and window frames casings, mouldings, etc.

.1 INT 6.3T Latex G5 finish (over latex primer).

.10 Wood Paneling and Casework: partitions, panels, shelving, millwork, etc.

.1 INT 6.4C Semi-transparent stain finish.

.11 Wood Floors and Stairs: including hardwood flooring, etc.

.1 INT 6.5B Polyurethane varnish gloss finish (over stain).

.2 INT 6.5C Polyurethane varnish gloss finish.

.12 Plaster and Gypsum Board: gypsum wallboard, drywall, "sheet rock type material", etc and textured finishes:

.1 INT 9.2A Latex G5 finish (over latex sealer) for walls.

.2 INT 9.2A Latex G1 finish (over latex sealer) for ceilings.

.13 Canvas and Cotton coverings:

.1 INT 10.1B Alkyd G5 finish.

.14 Painting of interior game line layouts with colours as noted on approved game line layout drawing on interior resilient (gymnasium) flooring to be by others in accordance with MPI Architectural Painting Specification.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 GENERAL

.1 Perform preparation and operations for interior painting in accordance with MPI Painting Specifications Manual except where specified otherwise.

.2 Apply all paint materials in accordance with paint manufacturer's written application instructions.

3.3 PROTECTION

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage. If damaged, clean and restore such surfaces as directed by Engineer.

.2 Cover or mask floors, windows and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.

.3 Protect items that are permanently attached such as Fire Labels on doors and frames.

.4 Protect factory finished products and equipment.

.5 Protect passing pedestrians, building occupants and general public in and about the building.

.6 Remove electrical cover plates, light fixtures, surface hardware on doors, door stops, bath accessories and other surface mounted fittings and fastenings prior to undertaking any painting operations. Store for re-installation after painting is completed.

.7 As painting operations progress place "WET PAINT" signs in occupied areas to approval of Engineer.

3.4 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Engineer all damage, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Engineer. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:

.1 Plaster and wallboard: 12%

.2 Masonry/Concrete: 12%

.3 Concrete Block/Brick: 12%

.4 Wood: 15%

3.5 CLEANING AND PREPARATION

.1 Clean and prepare surfaces in accordance with MPI Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.

.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and allow to dry thoroughly.

.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.

.6 Use trigger operated spray nozzles for water hoses.

.7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.

.2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.3 Sand existing surfaces with intact, smooth, high gloss coatings to provide adequate adhesion for new finishes.

.4 Where possible, prime surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.2 Apply wood filler to nail holes and cracks.

.3 Tint filler to match stains for stained woodwork.

.5 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air, or vacuum cleaning.

.7 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.

.8 Do not apply paint until prepared surfaces have been accepted by Engineer.

3.6 APPLICATION

.1 Method of application to be as approved by Engineer. Apply paint by brush, roller, air sprayer, airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.

.2 Brush and Roller Application:

.1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.

.2 Work paint into cracks, crevices and corners.

.3 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple.

.4 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.

.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.

.4 Brush out immediately all runs and sags.

.5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.

.4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Engineer.

.5 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.7 Sand and dust between coats to remove visible defects.

.8 Finish tops of cupboards, cabinets and projecting ledges, both above and below sight lines as specified for surrounding surfaces.

.9 Finish closets and alcoves as specified for adjoining rooms.

.10 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.7 MECHANICAL/ELECTRICAL EQUIPMENT

.1 In finished areas: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.

.2 In boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 In other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.5 Do not paint over nameplates.

.6 Keep sprinkler heads free of paint.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.8 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.9 Paint all fire protection piping red.

.10 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

.11 Do not paint interior transformers and substation equipment.

3.8 FIELD QUALITY CONTROL

.1 Field inspection of interior painting operations to be carried out by Engineer.

.2 Advise Engineer when each applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Co-operate with Engineer and provide access to all areas of the work.

.4 Standard of Acceptance:

.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.

.2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.9 RESTORATION

.1 Clean and re-install all hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Engineer. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Engineer.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

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

.1 ASTM D 698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).

.2 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.3 CSA-A3001, Cementitious Materials for Use in Concrete.

1.2 QUALITY ASSURANCE/REGULATORY REQUIREMENTS

.1 Shore and brace excavations, protect slopes and banks and perform all work in accordance with Provincial and Municipal regulations whichever is more stringent.

.2 Comply with Explosives Act of Canada.

.3 Perform blasting in accordance with Provincial and Municipal regulations. Repair damage to approval of Engineer.

.4 No blasting will be permitted within 3 m of any building and where damage would result.

1.3 TESTS AND INSPECTIONS

.1 Testing of materials and compaction of backfill and fill will be carried out by testing laboratory designated by Engineer.

.2 Not later than one week before backfilling or filling, provide to designated testing agency, 23 kg sample of backfill for fill material proposed for use.

.3 Do not begin backfilling or filling operations until material has been approved for use by Engineer.

.4 Not later than 48 hours before backfilling or filling with approved material, notify Engineer so that compaction tests can be carried out by designated testing agency.

.5 Before commencing work, conduct, with Engineer, condition survey of existing structures, trees and other plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.

1.4 EXISTING CONDITIONS

.1 Examine soil report available from Engineer.

.2 Before commencing work verify the location of all buried services on and adjacent to the site.

.3 Arrange with appropriate authority for relocation of buried services that interfere with execution of work. Pay costs of relocating services.

.4 Remove obsolete buried services within 2 m of foundations. Cap cut-offs.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Granular B-Type I, B-Type II, Select Subgrade to OPSS1010. Sand to OPSS1004.

.2 Crushed Granular to CCDG14.02.

.3 Unshrinkable fill: proportioned and mixed to provide:

.1 Maximum compressive strength of 0.4 MPa at 28 days.
.2 Maximum Portland cement content of 25 kg/m^3.
.3 Minimum strength of 0.07 MPa at 24 h.
.4 Concrete aggregates: to CSA-A23.1/A23.2,
.5 Cement: to CAN/CSA-A3001, Type GU.
.6 Slump: 160 to 200 mm.

PART 3 EXECUTION

3.1 PROTECTION/PROTECTION

.1 Protect excavations from freezing.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Engineer's Consultants approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

3.2 CLEARING AND GRUBBING

.1 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.

.2 Remove stumps and tree roots below footings, slabs, and paving, and to 600 mm below finished grade elsewhere.

.3 Dispose of cleared and grubbed material off site daily to disposal areas acceptable to authority having jurisdiction.

3.3 EXCAVATION

.1 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.

.1 Stockpile topsoil on site for later use.

.2 Excavate as required to carry out work, in all materials met.

.1 Do not disturb soil or rock below bearing surfaces.

.2 Notify Engineer when excavations are complete.

.3 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work. Excavation taken below depths shown without Engineer written authorization to be filled with concrete of same strength as for footings at Contractor's expense.

.3 Excavate trenches to provide uniform continuous bearing and support for 150 mm thickness of pipe bedding material on solid and undisturbed ground.

.1 Trench widths below point 150 mm above pipe not to exceed diameter of pipe plus 600 mm.

.4 Excavate for slabs and paving to subgrade levels.

.1 In addition, remove all topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.

3.4 BACKFILLING

.1 Inspection: do not commence backfilling until fill material and spaces to be filled have been inspected and approved by Engineer.

.2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.

.3 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.

.4 Compaction of subgrade: compact existing subgrade under walks, paving, and slabs on grade, to same compaction as specified for fill.

.1 Fill excavated areas with selected subgrade material or gravel and sand compacted as specified for fill.

.5 Placing:

.1 Place backfill, fill and basecourse material in 150 mm lifts. Add water as required to achieve specified density.

.6 Compaction: compact each layer of material to following densities for material to ASTM D698,

.1 To underside of basecourses: 95%.

.2 Basecourses: 100%.

.3 Elsewhere: 90%.

.7 In trenches:

.1 Up to 300 mm above pipe or conduit: sand placed by hand.

.2 Over 300 mm above pipe or conduit: native material approved by Engineer.

.8 Under seeded and sodded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.

.9 Blown rock material, not capable of fine grading, is not acceptable, imported material must be placed on this type of material.

.10 Against foundations (except as applicable to trenches and under slabs and paving): excavated material or imported material with no stones larger than 200 mm diameter within 600 mm of structures.

.11 Underground tanks: use sand to bottom of granular basecourses or to bottom of topsoil, as applicable.

3.5 GRADING

.1 Grade so that water will drain away from buildings, walls and paved areas, to catch basins and other disposal areas approved by the Engineer.

.1 Grade to be gradual between finished spot elevations shown on drawings.

3.6 SHORTAGE AND SURPLUS

.1 Supply all necessary fill to meet backfilling and grading requirements and with minimum and maximum rough grade variance.

.2 Dispose of surplus material off site.

3.7 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 This Section defines correction to maximum dry density to take into account aggregate particles larger than 4.75 mm.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C127-88, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.

.2 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600kN-m/m³).

.3 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).

.4 ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.3 DEFINITIONS

.1 Corrected maximum dry density is defined as:

.1 D =(D1xD2)(F1 x D2) + (F2 x D1)

.2 Where: D = corrected maximum dry density kg/m^3.

.1 F1 = fraction (decimal) of total field sample passing 4.75 mm sieve.

.2 F2 = fraction (decimal) of total field sample retained on 4.75 mm sieve (equal to 1.00 - F1)

.3 D1 = maximum dry density, kg/m3of material passing 4.75 mm sieve determined in accordance with Method A C of ASTM D698.

.4 D2 = bulk density, kg/m3, of material retained on 4.75 mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.

.3 For free draining aggregates, determine D1 (maximum dry density) to ASTM D4253, dry method when directed by Engineer.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

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 31 23 33.01 – Excavating, Trenching and Backfilling.

.4 Section 32 11 16.01 – Granular Sub Base.

.5 Section 32 11 23 – Aggregate Base Courses.

.6 Section 32 12 16.02 – Asphalt Paving for Building Sites.

1.2 REFERENCES

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

.1 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.3 SOURCE QUALITY CONTROL

.1 Source of materials to be incorporated into work or stockpiles requires approval.

.2 Inform Engineer of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.

.3 If, in opinion of Engineer, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.

.4 Should a change of material source be proposed, advise Engineer 4 weeks in advance of proposed change to allow sampling and testing.

.5 Acceptance of material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if its field performance is found to be satisfactory.

1.4 SAMPLES

.1 Aggregate will be subject to continual sampling by Engineer during production.

.2 Provide Engineer with access to source and processed material for sampling and testing.

.3 Bear the cost of sampling and testing of aggregates which fail to meet specified requirements.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.

.2 Flat and elongated particles of coarse aggregate: to ASTM D4791.

.1 Greatest dimension to exceed five times least dimension.

.3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:

.1 Natural sand.

.2 Manufactured sand.

.3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.

.4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:

.1 Crushed rock or slag.

.2 Gravel and crushed gravel composed of naturally formed particles of stone.

PART 3 EXECUTION

3.1 TOPSOIL STRIPPING

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.

.2 Commence topsoil stripping of areas as indicated after area has been cleared and removed from site.

.3 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.

.4 Stockpile in locations as directed by Engineer. Stockpile height not to exceed 2.0 m.

3.2 DEVELOPMENT OF AGGREGATE SOURCE

.1 Contractor to produce aggregates off site.

.2 Contractor to develop aggregate source to prevent contamination of aggregates stockpiled.

3.3 PROCESSING

.1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

.2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Engineer.

.3 Wash aggregates, if required to meet specifications. Use only equipment approved by Engineer /Architect.

.4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

3.4 HANDLING

.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.5 STOCKPILING

.1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Engineer. Do not stockpile on completed pavement surfaces.

.2 Stockpile aggregates in sufficient quantities to meet Project schedules.

.3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into work.

.5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Engineer within 48 h of rejection.

.7 Stockpile materials in uniform layers of thickness as follows:

.1 Max 1.0 m for coarse aggregate and base course materials.

.2 Max 2.0 m for fine aggregate and sub-base materials.

.3 Max 1.5 m for other materials.

.8 Complete each layer over entire stockpile area before beginning next layer.

.9 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

.10 Do not cone piles or spill material over edges of piles.

.11 Do not use conveying stackers.

.12 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.6 CLEANING

.1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

.2 Leave any unused aggregates in neat compact stockpiles as directed by Engineer.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 31 11 00 - Clearing and Grubbing.

.2 Section 31 23 16.26 - Rock Removal.

.3 Section 31 23 33.01 - Excavation, Trenching and Backfilling.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/m³),

1.3 EXISTING CONDITIONS

.1 Examine subsurface investigation report which is available for inspection from Engineer.

.2 Known underground and surface utility lines and buried objects are as indicated on site plan.

.3 Refer to dewatering in Section 31 23 33.01 - Excavating Trenching and Backfilling.

1.4 PROTECTION

.1 Protect and/or transplant existing fencing trees, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by Engineer. If damaged, restore to original or better condition unless directed otherwise.

.2 Maintain access roads to prevent accumulation of construction related debris on roads.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Fill material: Type 3 in accordance with of Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Engineer.

PART 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by Engineer.

.2 Commence topsoil stripping of areas as indicated after area has been cleared of brush, weeds and grasses and removed from site.

.3 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.

.4 Stockpile in locations as directed by Engineer. Stockpile height not to exceed 2 m.

.5 Dispose of unused topsoil as directed by Engineer.

3.2 GRADING

.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

.2 Rough grade to following depths below finish grades:

.1 250mm for concrete slabs and walks precast paving units.

.3 Slope rough grade away from building 1:50 minimum.

.4 Grade ditches to depth as indicated.

.5 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

.6 Compact filled and disturbed areas to corrected maximum dry density to ASTM D698, as follows:

.1 85% under landscaped areas.

.2 95% under paved and walk areas.

.7 Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 TESTING

.1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by Engineer. Refer to Sections 01 29 83 - Payment Procedures for Testing Laboratory Services and 01 45 00 – Quality Control.

.2 Submit testing procedure, frequency of tests, to Engineer for approval.

3.4 SURPLUS MATERIAL

.1 Remove surplus material and material unsuitable for fill, grading or landscaping as directed by Engineer.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 56 00 - Temporary Barriers and Enclosures.

.3 Section 02 41 16 – Structure Demolition

.4 Section 31 05 16 – Aggregate Materials.

.5 Section 31 22 13 – Rough Grading.

1.2 REFERENCES

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

.1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3).

.5 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3) (2,700 kN-m/m^3).

.6 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.

.2 CA/CGSB-8.2, Sieves, Testing, Woven Wire, Metric

.3 Canadian Standards Association (CSA)

.1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.1 CSA-A3001, Cementitious Materials for Use in Concrete.

.2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/ Methods of Test and Standard Practices for Concrete.

1.3 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock excavation: excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1 m^3. Frozen material not classified as rock.

.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in work.

.3 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.4 Waste material: excavated material unsuitable for use in work or surplus to requirements.

.5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of work.

.6 Unsuitable materials:

.1 Weak and compressible materials under excavated areas.

.2 Frost susceptible materials under excavated areas.

.3 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1.

Sieve Designation	%Passing
2.00 mm	100
0.10 mm	45-100
0.02 mm	10-80
0.005 mm	0-45

.2 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

1.4 SUBMITTALS

.1 Inform Engineer at least 4 weeks prior to commencing work, of proposed source of fill materials and provide access for sampling.

.2 Submit 70 kg samples of type of fill specified including representative samples of excavated material.

.3 Ship samples as directed by Engineer in tightly closed containers to prevent contamination.

1.5 QUALITY ASSURANCE

.1 Submit design and supporting data at least 2 weeks prior to commencing work.

.2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in the province of Newfoundland and Labrador.

.3 Keep design and supporting data on site.

.4 Engage services of qualified professional engineer who is registered or licensed in Province of Newfoundland and Labrador to design and inspect cofferdams, shoring, bracing and underpinning required for work.

.5 Do not use soil material until written report of soil test results are reviewed and approved by Engineer.

1.6 EXISTING CONDITIONS

.1 Buried services:

.1 Before commencing work verify location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Prior to commencing excavation work, notify applicable Owner or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Owners or authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.

.6 Confirm locations of buried utilities by careful test excavations.

.7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.8 Where utility lines or structures exist in area of excavation, obtain direction of Engineer before removing or re-routing.

.9 Record location of maintained, re-routed and abandoned underground lines.

.10 Confirm locations of recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:

.1 Conduct, with Engineer condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by work.

.2 Protect existing buildings and surface features from damage while work is in progress. In event of damage, immediately make repair to approval of Engineer.

.3 Where required for excavation, cut roots or branches as approved by Engineer.

PART 2 PRODUCTS

2.1 MATERIALS

.1 .1 Backfill Type 1 and Type 2 fill: properties to Section 31 05 16 - Aggregate Materials and the following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

Sieve Designation	%Passing	
	Type1	Type2
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

.2 Type 3 fill: selected material from excavation or other sources, approved by Engineer for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

PART 3 EXECUTION

3.1 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.2 PREPARATION/PROTECTION

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Engineer's approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage. Protect buried services that are required to remain undisturbed.

3.3 STRIPPING OF TOPSOIL

.1 Commence topsoil stripping of areas as indicated by Engineer after area has been cleared of brush, weeds and grasses and removed from site.

.2 Strip topsoil to depths as indicated by Engineer. Do not mix topsoil with subsoil.

.3 Stockpile in locations as directed by Engineer. Stockpile height not to exceed 2 m.

.4 Dispose of unused topsoil as directed by Engineer.

3.4 STOCKPILING

.1 Stockpile fill materials in areas designated by Engineer. Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

3.5 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 30 - Health and Safety Requirements and Occupational Health and Safety Act for the Province of Newfoundland and Labrador.

.2 Obtain permit from authority having jurisdiction for temporary diversion of water course.

.3 Construct temporary works to depths, heights and locations as indicated or approved by Engineer.

.4 During backfill operation:

.1 Unless otherwise as indicated or as directed by Engineer remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

.3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.

.5 When sheeting is required to remain in place, cut off tops at elevations as indicated.

.6 Upon completion of substructure construction:

.1 Remove cofferdams, shoring and bracing.

.2 Remove excess materials from site and restore water courses as indicated and as directed by Engineer.

3.6 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while work is in progress.

.2 Submit for Engineer's review details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

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

.5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in manner not detrimental to public and private property, or any portion of work completed or under construction.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

3.7 EXCAVATION

.1 Excavate to lines, grades, elevations and dimensions as indicated by Engineer.

.2 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.

.3 Excavation must not interfere with bearing capacity of adjacent foundations.

.4 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.5 For trench excavation, unless otherwise authorized by Engineer in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

.6 Keep excavated and stockpiled materials a safe distance away from edge of trench as directed by Engineer.

.7 Restrict vehicle operations directly adjacent to open trenches.

.8 Dispose of surplus and unsuitable excavated material off site.

.9 Do not obstruct flow of surface drainage or natural watercourses.

.10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.11 Notify Engineer when bottom of excavation is reached.

.12 Obtain Engineer approval of completed excavation.

.13 Remove unsuitable material from trench bottom to extent and depth as directed by Engineer.

.14 Correct unauthorized over-excavation as follows:

- .1 Fill under bearing surfaces and footings with concrete specified for footings.
- .2 Fill under other areas with Type 2 fill compacted to not less than 95% of corrected maximum dry density.

.15 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Engineer.

3.8 FILL TYPES AND COMPACTION

.1 Use fill of types as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 corrected maximum dry density.

- .1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95%.
- .2 Within building area: use Type 2 to underside of base course for floor slabs. Compact to 98%.
- .3 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 100%.

.4 Retaining walls: use Type 2 fill to subgrade level on high side for minimum 500 mm from wall and compact to 95%. For remaining portion, use Type 3 fill compacted to 95%.

.5 To correct over excavation in trenches: use Type 2 fill to underside of sand bedding compacted to 95%.

3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services as indicated.

.2 Place bedding and surround material in unfrozen condition.

3.10 BACKFILLING

.1 Vibratory compaction equipment: approved by Engineer.

.2 Do not proceed with backfilling operations until Engineer has inspected and approved installations.

.3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.4 Do not use backfill material which is frozen or contains ice, snow or debris.

.5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.6 Backfill around installations.

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 600 mm.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures.

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure, and approval obtained from Engineer, or

.2 If approved by Engineer, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Engineer.

3.11 RESTORATION

.1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by Engineer.

.2 Replace topsoil as indicated by Engineer.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Reinstate pavement and sidewalks distributed by excavation to thickness, structure, and elevation which existed before excavation.

.5 Clean and reinstate areas affected by work as directed by Engineer.

.6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 h.

END OF SECTION

PART 1 GENERAL

1.1 SECTIONS INCLUDES

.1 Materials and installation of polymeric geotextiles used in revetments, breakwaters, retaining wall structures, filtration, drainage structures, roadbeds and railroad beds purpose of which is to:

.1 Separate and prevent mixing of granular materials of different grading.

.2 Act as hydraulic filters permitting passage of water while retaining soil strength of granular structure.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D4491 - [99a], Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

.2 ASTM D 4595-[86(2001)], Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

.3 ASTM D 4716-[01], Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

.4 ASTM D 4751-[99a], Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-4.2 No. 11.2-[M89(April 1997)], Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).

.2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.

.1 No.2-[M85], Methods of Testing Geosynthetics - Mass per Unit Area.

.2 No.3-[M85], Methods of Testing Geosynthetics - Thickness of Geotextiles.

.3 No.6.1-[93], Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.

.4 No.7.3-[92], Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.

.5 No. 10-[94], Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

1.4 SUBMITTALS

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

.2 Submit to Project Manager following samples prior to beginning Work.

1.5 DELIVERY, STORAGE AND HANDLING

.1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris, and rodents.

.2 Geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended ultra-violet exposure prior to placement. If stored outdoors, they shall be elevated and protected with a waterproof cover.

1.6 WASTE MANAGEMENTS AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

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

PART 2 PRODUCTS

2.1 MATERIAL

.1 Geotextile: Non woven synthetic fibre fabric, supplied in rolls.

.1 Composed of: minimum 85% by mass of polypropylene.

.2 Each geotextile roll shall be labelled or tagged to provide product identification sufficient for quality control purposes.

.3 Physical Properties:

.1 Thickness: to CAN/CGSB-148.1, Method No. 3.

.2 Mass per unit area: to CAN/CGSB - 148.1, Method No. 2.

.3 Tensile Strength and elongation (in any principal direction): to CAN/CGSB-148.1, Method 7.3.

.1 Tensile strength: minimum 330N.

.2 Elongation at break: greater than 50%

.3 Tear strength: Minimum 180 N

.4 Seam strength: Equal to or greater than tensile strength of fabric.

.5 Puncture strength: Minimum 990 N

.4 Permeability: Greater than or equal to 1 x 10^{-3} cm/s

.5 Permittivity: Minimum 0.05 s^{-1}

.6 Filtration opening size (F.O.S.): Not less than 40 µm

.4 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, Non galvanized.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

.1 Prepare the surface, in advance of placing the geotextile, to achieve a smooth, even surface, clear of any aggregates or debris, and constructed to the cross section and profile indicated on the plans.

3.2 GEOTEXTILE PLACEMENT

.1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with pins.

.2 Place geotextile material smooth and free of tension stress, folds, wrinkles, and creases.

.3 Place geotextile on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.

.4 Overlap each successive strip of geotextile 600 mm over previously laid strip.

.5 Join successive strips of geotextile by sewing or by securing with pins.

.6 Pin successive strips of geotextile material from displacement, damage, or deterioration before, during and after placement of material layers.

.7 After installation, cover with overlying layer within 4 hours of placement.

.8 Replace damaged or deteriorated geotextile to approval of Project Manager.

.9 Place and compact granular aggregate on top of geotextile in accordance with Section 32 11 11 23.

3.3 CLEANING

.1 Remove construction debris from project site and dispose of debris in an environmentally responsible and legal manner.

END OF SECTION