PARKS CANADA AGENCY
GREENWICH BEACH COMPLEX
REHABILITATION

SPECIFICATIONS

Consultant

Coles Associates Ltd.
Charlottetown, PEI

September 25, 2019

Project #191146

TABLE OF CONTENTS

LIST OF DRAWINGS

1 General

1.1 SCOPE OF WORK

.1 Contractor is to provide each item, & properly execute all work as specified herein, indicated by drawings, addenda or change orders issued with respect to this project.

.2 Contractor to coordinate, administer & supervise all work, material acquisition & labour.

.3 In general the scope of work includes but is not limited to:

- .1 Removing and replacing the noted exterior envelope and deck at the Greenwich Beach Complex.
- .2 Addition of new Washroom.
- .3 Treatment of Observation Tower.
- .4 Installation of new Solar Net metering system.

1.2 EXECUTION

.1 Execute work with least possible interference or disturbance to building operations, public and normal use of premises, including roads.

1.3 DOCUMENTS

.1 The Contract Documents are complementary and what is called for by anyone shall be as binding as if called for by all.

.2 Descriptions of materials or work which have well known technical or trade meanings shall be held to refer to such recognized standards.

.3 All specifications shall be interpreted in conformity with the agreement.

1.4 COMMUNICATION

.1 All submissions & inquiries shall be directed to the Departmental Representative for review.

.2 All direction will be transmitted to the Contractor by the Departmental Representative.

1.5 CODES AND REGULATIONS

.1 Perform work in accordance with National Building Code of Canada (NBC) 2015 and any other code of provincial or local application, provided that in any case of conflict or discrepancy the more stringent requirements shall apply.

.2 Meet or exceed requirements of contract documents and specified standards.

.3 References to standards, including manufacturer's direction for installation shall be the latest edition.

.4 All materials, components and equipment as well as construction methods shall comply with the latest edition of the National Building Code and all other applicable Provincial codes or regulations.

.5 The latest edition of the Canadian Electrical Code shall govern all electrical work, whether pre-wired an/or assembled remote from the site or not.

.6 All equipment supplied or installed shall be CSA approved for the intended use.

.7 The latest edition of the Canada Labour Code Part 2 and the PEI Occupational Health and Safety Act and Regulations shall govern safe construction practices.

.8 Provide a copy of all certificates of acceptance issued by Provincial or local authorities.

1.6 WORK SCHEDULE AND PROGRESS REPORTS

.1 The Contractor will prepare and maintain a consolidated schedule in weekly increments showing scheduled work versus actual work. The schedule shall indicate the contract commencement and completion date for the total project.

.2 Provide updated schedule information from time to time as the progress of the work or Departmental Representative may require.

1.7 CONTRACTOR'S USE OF SITE

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

.2 Move stored products or equipment, which interfere with operations of Departmental Representative or other Contractors.

.3 Obtain and pay for use of additional off site storage or work areas needed for operations.

.4 The work related to modifying the site roadways must be carried out so that one half of the roadway is open to vehicle traffic at all times.

.5 Provide snow clearing to allow for access to site at all times.

1.8 PROJECT MEETINGS

.1 Project meetings will be held as needed or as directed by the Departmental Representative.

.2 Notify all parties concerned of such meetings. Anticipate weekly increments.

.3 The Contractor will record minutes of meetings and distribute to all parties within three (3) days of meeting.

.4 Failure of the Contractor to accurately record minutes or distribute the minutes in a timely manner may result in the Departmental Representative taking over the duties and invoicing the Contractor and deducting costs from the progress claims as compensation.

1.9 SITE INSPECTOR

.1 No work is to be covered without having received approval from the Departmental Representative. The Departmental Representative will have the authority to cause any part of the work to cease, should, in his or her opinion, there be cause to do so.

.2 This work shall be examined by the Departmental Representative and approval granted to resume when a satisfactory solution has been found out.

1.10 EXISTING SERVICES

.1 Before commencing work, establish the location and extent of known service lines and utilities and notify Departmental Representative of findings if in conflict with information or intent shown.

.2 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.3 Contractor to be responsible for any damages caused by failure to locate, coordinate with, and preserve any and all existing underground services.

1.11 ACCESS AND SECURITY

.1 Access and security on the entire job site will be the responsibility of the Contractor.

1.12 RELICS AND ANTIQUITIES

.1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during the work, shall remain property of the Owner. Protect such articles and request directives from Departmental Representative.

.2 Give immediate notice to Departmental Representative if evidence of archaeological finds are encountered during construction, and await Departmental Representative's written instructions before proceeding with work in this area.

1.13 TENDER PRICE

.1 All work, plant and materials required to fully complete the work as noted on the drawings and specifications shall be provided in the form of a Lump Sum contract. Complete entire tender form provided and as specified.

END OF SECTION

1 General

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit ten (10) working days after award of contract in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.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 Departmental Representative. 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 considered rejected.

.6 Notify Departmental Representative, 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 co-ordinated.

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

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

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

1.2 General

.1 At Commencement of Contract (and no later than 10 days after award) submit the following:

- .1 Contract Security
- .2 Cost Breakdown
- .3 Permits as required
- .4 Construction schedule for Trade Package activity
- .5 Name of Project Superintendent
- .6 Corporate Safety Plan
- .7 Site specific safety plan
- .8 Shop drawing schedule

.2 During Construction submit the following:

- .1 Updated trade construction schedule
- .2 Shop drawings as required
- .3 Inspection and test reports
- .4 Request for Information

.3 Completion of Work submit the following:

- .1 Submission at completion of work as specified in Project Close Out, Commissioning, and Operations and Maintenance Data Sections.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.2 REFERENCES

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

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 Province of Prince Edward Island

.1 Occupational Health and Safety Act, R.S.P.E.I. 1988.

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Part 1: List of individual health risks and safety hazards identified by hazard assessments.

.2 Part 2: List specific measures to control or mitigate each hazard and risk identified in part one of Plan. State engineering controls, personal protective equipment and safe work practices to be used for work having identified hazards (s) or risk(s).

.3 Part 3: Emergency and Communications Measures as follows:

.1 Emergency Procedures: standard operating procedures, evacuation measures and emergency response implemented on site during an accident or incident. State step by step procedures, applicable to each identified hazard.

.2 Emergency Communications: list names and telephone numbers of officials, to be contacted if incident, accident or emergency situation occurs, including:

.3 General Contractor and all Subcontractors.

.4 Provincial Departments and resources from local emergency organizations, based on type of hazard, incident or accident which might occur and as stipulated in applicable laws and regulations.

.3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative.

.4 Submit copies of incident and accident reports.

.5 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 61 00 - Hazardous Facility Remediation.

.6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 2 days after receipt of comments from Departmental Representative.

.7 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.8 On-site Contingency and Emergency Response Plan:address standard operating procedures to be implemented during emergency situations.

.9 Maintain Worker's Compensation Coverage for duration of contract. Submit Letter of Good Standing to Departmental Representative.

1.4 SITE CONTROL AND ACCESS

.1 Control work site and entry points. Grant and allow entry to only workers and other persons so authorized. Immediately stop non-authorized persons from circulating within construction areas and remove from site.

.2 Prior to gaining access to the site, all contractors, subcontractors and suppliers shall file with the General Contractor their proof of Workers Compensation coverage, proof of required Insurance and proof of contract. Upon request, proof of these documents will be provided to the Owner and Departmental Representative.

.3 Delineate and isolate construction areas from other areas of site by use of appropriate means. Erect barricades, fences, hoarding and temporary lighting as required.

.4 Erect signage at entry points and at other strategic locations around site, clearly identifying construction area(s) as being "off limits" to non-authorized persons. Signage must be professionally made.

.5 Ensure persons granted access are fitted and wear appropriate personal protective equipment (PPE).

1.5 PROTECTION

.1 Provide temporary facilities for protection and safe passage of building occupants, public pedestrian and vehicular traffic around and adjacent to work site.

.2 Provide safety barricades, lights and signage on work site as required to provide a safe working environment for workers.

1.6 PERMITS

.1 Obtain permits, licenses and compliance certificates, at appropriate times and frequency as stipulated by authorities having jurisdiction.

.2 Post all permits on site. Submit copies to Departmental Representative.

1.7 FILING OF NOTICE

.1 File Notice of Project and other Notices with Provincial authorities prior to commencement of Work.

1.8 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

.2 Perform on-going hazard assessments during the progress of Work identifying new or potential health risks and safety hazards not previously known. As a minimum hazard assessments shall be carried out when:

.1 New subtrade work, new subcontractor(s) or new workers arrive at the site to commence another portion of work.

.2 The scope of work has been changed by Change Order.

.3 Potential hazard or weakness in current health and safety practices are identified by Departmental Representative or by an authorized safety representative.

.3 Each hazard assessment to be made in writing. Keep copies of all assessments on site for duration of Work. Upon request, make available to Departmental Representative for inspection.

.4 Contractor to conduct a hazard assessment in conjunction with the Owner's maintenance staff as part of the planning process including isolating existing equipment where applicable and identification of hidden services where anchoring is required. Hazard Assessments to conform with requirements of Health and Safety Section 01 35 29.

1.9 MEETINGS

.1 Prior to commencement of work hold Health and Safety meeting. Have Contractor's Site Superintendent in attendance.

.2 Provide site safety orientation session to all workers and other authorized persons prior

to granting them access to work site. Brief persons on site conditions and on the minimum site safety rules in force at site.

.3 Conduct site specific occupational health and safety meetings during the entire work as follows:

.1 Formal meetings on a minimum monthly basis.

.2 Informal tool box meetings on a regular basis from a predetermined schedule.

.4 Keep workers informed of anticipated hazards, on safety practices and procedures to be followed and of other pertinent safety information related to:

.1 Progress of Work;

.2 New sub-trades arriving on site and;

.3 Changes in site and project conditions.

.5 Record and post minutes of meetings. Make copies available to Departmental Representative upon request.

1.10 COMPLIANCE REQUIREMENTS

.1 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

.2 Comply with Occupational Health and Safety Act, Occupational Health and Safety Act Regulations, PEI.

.3 Provide Departmental Representative with Material Safety Data Sheets (MSDS).

.4 Observe and enforce construction safety measures required by National Building code, 2015 Part 8, Provincial Government, Worker's Compensation Board and municipal statutes and authorities.

1.11 WHMIS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada and Provincial Department of Labour.

.2 Submit WHMIS data sheets to Departmental Representative in accordance with Section 01 33 00 Submittal Procedures.

.3 Maintain WHMIS information station and ensure designated personnel are trained in its use.

.4 Submit copies of all Tool Box or Safety Meeting notes.

.5 Submit copies of all Worksite Safety Inspections.

1.12 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur 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 and advise Departmental Representative verbally and in writing.

1.13 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-coordinator. Health and Safety Co-coordinator must:

.1 Have minimum 2 years site-related working experience specific to activities associated with Construction.

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

.3 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.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific

Contractor's Health and Safety Plan.

1.14 CONSTRUCTION SAFETY MEASURES

.1 Observe and enforce construction safety measures required by National Building Code, 2015 Part 8, Provincial Government, Worker's Compensation Board and municipal statutes and authorities.

.2 In event of conflict between any provisions of above authorities the most stringent provision governs.

.3 PEI Occupational Health and Safety Act and regulations, guidelines and code practice, stipulate standard equipment applicable to construction sites such as protective clothing, safety hats and boots, gloves, eye protection.

.4 Provide and maintain first aid equipment, supplied and medications appropriate to the work and its location in accordance with the First Aid Regulations. Obtain and implement recommendations from Occupational Health and Safety Division specific to the project work site.

.5 Identify and mark overhead hazards.

1.15 FIRE SAFETY REQUIREMENTS

.1 Comply with requirements of latest standard for Building Construction Operations issued by the Fire Commissioner of Canada and Fire Safety Regulations of Local Authority.

1.16 OVERLOADING

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

1.17 WELDING AND CUTTING

.1 Use noncombustible shields for electric and gas welding or cutting executed within two (2) metes of combustible material or in occupied space.

.2 Place tanks supplying gases as close to work as possible. Fix in upright position, free from exposure to sun or high temperatures.

.3 Locate fire extinguishing equipment near all welding and cutting operations.

1.18 TESTING AND MONITORING

.1 Test and monitor for hazardous conditions, as required to demonstrate compliance with provincial regulations.

.2 If multiple locations are being worked simultaneously, provide monitoring at all locations where work is being carried out, including providing additional monitoring instruments.

1.19 RECORD KEEPING

.1 ALL activities associated with Health and Safety shall be recorded daily in a bound notebook. Include as a minimum; activity date, time, location of occurrence, mitigation action taken and results. Records shall be assessed by the Departmental Representative.

1.20 OPEN FLAMES, SPARKS, EXPLOSION PROTECTION

.1 Keep open flames and sparks to minimum. When flame or sparks are required, follow proper procedures to prevent fire or explosion.

1.21 FIRE SAFETY

.1 The Sub-Contractors are to participate on the Fire Safety Committee under the Joint Health and Safety Committee. The Fire Safety Committee under the direction of the Contractor is responsible for implementation and maintenance of the Construction Fire Safety Plan.

.2 Construction Fire Safety Plan:

.1 The Construction Fire Safety Plan will include the following:
  .1 Introduction of plan and purpose.
  .2 Fire Safety Committee.
  .3 Terms of reference.
.2 Committee composition.
.3 Emergency Procedures.
.4 Fire protection equipment:
  .1 Provisions for fire fighting.
  .2 Portable extinguishers.
.5 Fire safety maintenance schedule:
  .1 General.
  .2 Maintenance levels.
  .3 Skill categories.
  .4 Frequency.
  .5 Checklists.
.6 Other information:
  .1 Instruction on use of fire extinguishers.
  .2 Emergency Fire Drill procedures.

.3 Portable Fire Extinguishers:
.1 During construction, Contractor is to provide and maintain on the site at all times, ULC listed 25 lb ABC dry chemical type portable fire extinguishers.

.4 Blockage of Roadways:
.1 The Fire Department shall be advised of any work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by the Fire Department, erecting of barricades and the digging of trenches.

.5 Rubbish and Waste Materials:
.1 Rubbish and waste materials are to be kept to a minimum.
.2 The burning of rubbish is prohibited.
.3 Removal:
  .1 All rubbish shall be removed from the work site at the end of the workday or shift or as directed by Departmental Representative.
.4 Storage:
  .1 Extreme care is required where it is necessary to store oily waste in work areas to ensure maximum possible cleanliness and safety.
  .2 Greasy or oily rags or materials subject to spontaneous ignition shall be deposited and kept in an approved receptacles.

.6 Flammable Liquids:
.1 The handling, storage and use of flammable liquids are to be governed by the current National Fire Code of Canada.
.2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 liters provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable liquids exceeding 45 liters for work purposes, requires the permission of the Fire Department.
.3 Transfer of flammable liquids having a flash point below 38ºC is prohibited within buildings.
.4 Transfer of flammable liquids shall not be carried out in the vicinity of open flames or any type of heat-producing devices.
.5 Flammable liquids having a flash point below 38ºC, such as naphtha or gasoline,

shall not be used as solvents or cleaning agents.

.6 Flammable waste liquids, for disposal, shall be stored in approved containers located in a safe ventilated area. Quantities are to be kept to minimum and the Fire Department is to be notified when disposal is required.

.7 Fire Inspection:

.1 The Fire Department shall be allowed unrestricted access to the work site.

.2 The Contractor shall cooperate with the Fire Department during routine inspections of the work site.

.3 The Contractor shall immediately remedy all unsafe fire situations observed by the Fire Department.

1.22 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.

1.23 CORRECTION OF NON-COMPLIANCE

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

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

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.24 BLASTING

.1 Blasting or other use of explosives is not permitted.

1.25 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.26 WORK STOPPAGE

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

1.27 HANDLING AND TRANSPORTATION OF DANGEROUS GOODS

.1 Observe and enforce all measures required by the regulatory agencies including but not limited to Environment Canada, Prince Edward Island Department of Environment, and Transport Canada.

.2 Most current regulatory guidelines and Acts will apply to the work.

.3 In case of any conflict, the more stringent requirements will apply.

1.28 OPEN EXCAVATIONS

.1 If open trenches are to be left at the end of a work day, protective fencing must be placed around the entire perimeter to limit access by others. Fencing to be self-supporting, approved by the Department of Labour and the Construction Safety and Industrial Safety Regulations.

1.29 POTENTIAL HAZARDS

.1 Hazards include, but are not limited to, electrocution and toxic, flammable and explosion hazards associated with cleaning solvents.

.2 The Contractor shall become familiar with all potential hazards associated with the work, and shall take necessary measures to avoid injury or damage of any kind.

1.30 HEALTH AND SAFETY PLAN

.1 Prior to commencement of the work, submit to the Site Inspector a detailed Health and Safety Plan for review. The Health and Safety Plan shall comply with the provisions of this section, and shall illustrate the Contractor's knowledge and understanding of health and safety aspects of the work, the Contractor's intention to maintain a high level of safety on-site, and shall include, but not be limited to:

- .1 Description of Work
- .2 Description of Site-specific hazards:
  - .1 Physical
  - .2 Chemical
  - .3 Environmental
  - .4 Electrical
- .3 Protective Equipment:
  - .1 Respiratory
  - .2 Contact
  - .3 Electrical personal protective equipment (PPE)
- .4 Decontamination Procedures:
  - .1 Personal protective equipment (PPE)
  - .2 Equipment
- .5 Medical - Monitoring:
  - .1 Workers medical profile and suitability to work at the site.
- .6 Emergency Procedures:
  - .1 Emergency Equipment
  - .2 Contingency Plans:
- .7 General Safety:
  - .1 Designation of site-safety officer
  - .2 Safety log
  - .3 Trenching, digging, excavations
  - .4 Storage of flammables
  - .5 Safety inspections
- .8 Site Training:
  - .1 Initial hazard
  - .2 Daily safety

.2 All workers shall be trained and be familiar with the Health and Safety Plan and the use of personal protective equipment.

1.31 SITE SAFETY OFFICER

.1 Each Contractor shall appoint a responsible member of the work force as Site Safety Officer (SSO). The selection of the SSO will be subject to the approval of the Departmental Representative, and changes shall be made as requested by the Departmental Representative. The SSO shall be responsible for ensuring that all provisions of the Health and Safety Plan and relevant legislation are implemented. The SSO shall ensure that all monitoring and testing, as specified and at the direction of the Departmental Representative, are conducted. The SSO shall maintain records of all readings that are taken by the Contractor report and any abnormal or dangerous situation to the Departmental Representative and the Municipality, after having implemented emergency measures, as required, work shall not continue or proceed until the situation has been rectified.

.2 The SSO shall be authorized to act on behalf of the Contractor on all matters related to Health and Safety.

1.32 PERSONAL PROTECTIVE EQUIPMENT

.1 Use personal protection equipment as required by Occupational Health and Safety Act.

.2 Training of workers in the proper use, fitting, inspection and storage of personal protective equipment shall be done prior to use of the equipment.

1.33 WORK PRACTICES

.1 Access to work areas shall be regulated and limited to authorized persons. A daily roster shall be kept of persons entering such ares.

.2 Handling Contaminants and General Work Practices.

.1 Transportation and handling of contaminants to meet applicable local, provincial and federal regulations.

.2 Containers and systems shall be handled and opened with care.

.3 All wastes and residues containing contaminants shall be collected in appropriate containers.

.3 Confined or Enclosed Spaces

.1 Entry into confined or enclosed spaces, where there is limited egress, shall be controlled by a permit system. Permits shall be signed by an authorized representative of the employer and shall certify that appropriate measures have been taken to prevent adverse effects on the worker's health as a result of his or her entry into such space.

.2 Confined or enclosed spaces which have contained contaminants shall be thoroughly ventilated to assure an adequate supply of oxygen, tested for contaminants, and inspected for compliance with these requirements prior to each entry. Adequate ventilation shall be maintained while workers are in such spaces. Each individual entering such confined or enclosed space shall be furnished with appropriate personal protective equipment and clothing and be connected by a lifeline harness to standby worker stations outside of the space. The standby worker shall also be equipped for entry with approved personal protective equipment and clothing and have contact with a third person. The standby person shall maintain communication (visual, voice, signal line, telephone, radio, or other suitable means) with the employee inside the confined or enclosed space.

.3 Workers entering confined spaces and standby workers shall be trained at a recognized confined space training program.

1.34 SUSPENSION OF ACTIVITIES

.1 Exposure to contaminants shall be controlled so that no worker is exposed to contaminants at a concentration greater than the Time Weighted Average (TWA) concentration for the contaminant, for up to a 10 hour workday, 40 hour work week.

.2 The Contractor is to halt activities immediately during unsafe conditions. All costs relating to suspension of work for Contractor's failure to maintain Health and Safety procedures shall be borne by the Contractor.

END OF SECTION

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.

.3 Provide for removal and disposal of existing non-PCB dielectric transformer oil by an approved disposal agency.

.1 Acceptable disposal agency or approved equal:

.1 Stark International, New Glasgow, Nova Scotia.

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 and Owner requirements.

1.4 PLANT PROTECTION

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

.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 drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Restrict tree removal to areas indicated or designated by Departmental Representative.

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.

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

END OF SECTION

1 General

1.1 INSPECTION

.1 Allow Departmental Representative 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 Departmental Representative instructions, or law of Place of Work.

.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 Departmental Representative 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, Owner shall pay cost of examination and replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies are to be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Contractor.

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

.3 Employment of Inspection/Testing Agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency may request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Owner. Pay costs for retesting and re inspection.

1.3 PROCEDURES

.1 Notify appropriate agency and Departmental Representative 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.

1.4 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 Departmental Representative 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 Departmental Representative 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 Departmental Representative.

1.5 REPORTS

.1 Submit 3 copies of inspection and test reports to Departmental Representative.
.2 Provide copies to Subcontractor of work being inspected or tested.

1.6 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.
.2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Departmental Representative and may be authorized as recoverable.

1.7 MILL TESTS

.1 Submit mill test certificates as requested.

1.8 EQUIPMENT AND SYSTEMS

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

END OF SECTION

1 General

1.1 SITE ACCESS AND PARKING

.1 The Departmental Representative will designate Contractor's access to project site as well as parking facilities for equipment.

.2 Parking facilities at site are limited but within reason may be used by Contractor. Make arrangements elsewhere for Contractor's vehicles including those of subcontractors and workers, as necessary.

.3 The Contractor will maintain adjacent roads free from mud and debris tracked from construction site, on a daily basis, at no additional cost to Owner.

.4 The Contractor will provide snow removal on Wild Rose Road from PEI RTE 313 (Greenwich Road) to the worksite as well as within the site fence during period of work as required to maintain access to building, at no additional cost to the Owner.

.5 The Contractor will provide and maintain signs, barricades and other devices required to indicate construction activities or other temporary and unusual conditions resulting from project work, at no additional cost.

1.2 SITE SAFETY

.1 Contractor to post notices for both construction zone and personal protective equipment requirements.

1.3 MATERIAL STORAGE

.1 Locate site storage trailers where directed by Departmental Representative. Place in location of least interference with existing facility operations.

.2 Material storage space on site is limited. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.

1.4 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by Departmental Representative.

1.5 WASTE REMOVAL

.1 The Contractor will provide bins as required. Contractor responsible for placement and sorting of waste in the collection bins and removal of waste from site and in accordance with Final Modified Phase I Environmental Site Assessment and Hazardous Materials Survey for each individual location.

END OF SECTION

1 General

1.1 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.2 WATER SUPPLY

.1 Water supply will be provided by the Owner for construction usage at no cost. Make arrangements and pay costs for the use and transportation of such services to work area.

1.3 SANITARY FACILITIES

.1 Sanitary facilities must be located within the limits of the temporary construction fence, provided under the work of this Contract.

1.4 POWER

.1 Power supply is not available.

.2 Provide and pay all costs to supply and install temporary cabling, panel boards, switching devices and other equipment as required to connect into Contractor provided power source, provide adequate ground fault protection and extend power supply from Contractor provided source to work areas. Perform work and make all connections in accordance with the Canadian Electrical Code, in compliance with the federal and provincial Occupational Health and Safety Regulations and to lockout requirements specified in Section 01 35 29 - Health, Safety and Emergency Response Procedures.

.3 Electrical power and lighting systems installed under this Contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage.

1.5 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be 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 degrees C in areas where construction is in progress.

.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 and protection during construction.

1.6 FIRE PROTECTION

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

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 01 50 00 - Temporary Facilities

1.2 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.3 HOISTING

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

.2 Hoists and cranes shall be operated by qualified operator.

1.4 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.

1.5 SECURITY

.1 Provide and pay for any responsible security personnel to guard site and contents of site after working hours and during holidays, as directed by Departmental Representative.

1.6 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.

.3 Provide adequate weather tight, heat and ventilation appropriate for the use and storage of equipment, tools and materials.

END OF SECTION

1 General

1.1 GENERAL

.1 Use new material and equipment unless otherwise specified.

.2 Within 7 days of written request by Departmental Representative, submit following information for materials and products proposed for supply:

- .1 Name and address of manufacturer.
- .2 Trade name, model and catalog number.
- .3 Performance, descriptive and test data.
- .4 Manufacturer's installation or application instructions.
- .5 Evidence of arrangements to procure.

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

1.2 REFERENCE STANDARDS

.1 Conform to reference standards, in whole or in part as specifically requested in specifications.

.2 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

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

1.3 CONFORMANCE

.1 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.4 SUBSTITUTION OF MATERIAL

.1 Proposals for substitution may be submitted only after award of Contract. Such requests must include statements of respective costs of items originally specified and proposed substitutions.

.2 Proposals will be considered by Departmental Representative if:

- .1 Products selected by tenderer from those specified, are not available, or
- .2 Delivery date of products selected from those specified would unduly delay completion of Contract.
- .3 Alternative products to those specified, which are brought to attention of, and considered by Departmental Representative as equivalent to those specified and will result in credit to Contract amount.
- .4 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as a result of substitution.
- .5 Amounts of all credits arising from approval of substitutions will be determined by Departmental Representative and Contract price will be reduced accordingly. No substitutions will be permitted without prior written approval of Departmental Representative.

1.5 QUALITY OF PRODUCTS

.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 Departmental Representative based upon requirements of Contract Documents.

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

.5 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.

1.6 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 Departmental Representative if required Work is such as to make it impractical to produce required results.

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

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

1.7 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 Departmental Representative 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 Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.8 TRANSPORTATION

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

.2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor to unload, handle and store such products.

1.9 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 and 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 Departmental Representative.

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

1.10 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 Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.

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

1.11 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.

1.12 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, color and finish as base metal in which they occur.

.2 Prevent electrolytic action between dissimilar metals.

.3 Use non-corrosive fasteners, anchors and spacers for securing exterior work.

.4 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood plugs not acceptable.

.5 Keep exposed fastenings to minimum, space evenly and lay out neatly.

.6 Fastenings which cause spalling or cracking are not acceptable.

.7 Obtain Departmental Representative's approval before using explosive actuated fastening devices. If approval is obtained comply with CSA Z166-1975, and observe restrictions in Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.13 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 and resilient washers with stainless steel.

1.14 LOCATION OF FIXTURES

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

.2 Inform Departmental Representative of conflicting installation. Install as directed.

1.15 CONCEALMENT

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

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

1.16 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.

1.17 CONSTRUCTION EQUIPMENT AND PLANT

.1 On request, prove to the satisfaction of Departmental Representative that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.

.2 Maintain construction equipment and plant in good operating order.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 All sections

1.2 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors. Clean work site on a daily basis.

.2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative.

.3 Clear snow and ice from access point at PEI RTE 313 (Greenwich Road) to construction, bank/pile snow in designated areas only.

.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 Provide and use clearly marked separate bins.

.7 Remove waste and debris from site and deposit in waste container at end of each working day.

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

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

1.3 FINAL CLEANING

.1 Prior to final review, remove surplus products, tools, construction machinery and equipment.

.2 Remove waste products and debris.

.3 Broom clean and wash asphalt roadways; rake clean other surfaces of grounds.

.4 Remove snow and ice from access point at PEI RTE 313 (Greenwich Road) to construction.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.2 DEFINITIONS

.1 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.

.2 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.3 Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.4 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Returning reusable items including pallets or unused products to vendors.

.5 Waste Reduction Work plan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials.

1.3 DOCUMENTS

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

.1 Waste Reduction Work plan.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Prepare and submit following prior to project start-up:

.1 Submit 2 copies of completed Waste Reduction Work plan (WRW):

1.5 WASTE AUDIT (WA)

.1 Conduct WA prior to project start-up.

.2 Prepare WA: Schedule A.

.3 Record, on WA - Schedule A, extent to which materials or products used consist of recycled or reused materials or products.

1.6 WASTE REDUCTION WORKPLAN (WRW)

.1 Prepare WRW prior to project start-up.

.2 WRW should include but not limited to:

.1 Material types, relative to Island Waste Management Protocols, including.

.1 Steel/Metals

.2 Concrete

.3 Topsoil

.4 Subsoil

.5 Mechanical/Electrical equipment

.6 Wood

.7 Destination of materials listed

.8 Deconstruction/disassembly techniques and sequencing.

.9 Clear labeling of storage areas.

.10 Details on materials handling and removal procedures.

.3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.4 Describe management of waste, during demolition and construction, including:

.1 Daily/Weekly cleaning protocol.
.2 Source separation of packaging materials/surplus materials.
.3 Trade participation in waste management.
.4 Waste containers, quantity and types (by content) on site.

.5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.

.6 Post WRW or summary where trades and workers at site are able to review content.

.7 Set realistic goals for waste reduction.

1.7 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste into waterways, storm, or sanitary sewers.

1.8 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures.

1.9 SCHEDULING

.1 Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

2 Products

2.1 NOT USED

.1 Not Used.

3 Execution

3.1 APPLICATION

.1 Do Work in compliance with WRW.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with applicable regulations and codes.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Project Record Documents as follows:
- .1 As-Built drawings;
- .2 As-Built specifications;
- .3 Reviewed shop drawings.

.2 Operations and Maintenance data as follows:
- .1 Operations and Maintenance Manual;
- .2 Maintenance Materials;
- .3 Spare Parts;
- .4 Special Tools.

1.2 PROJECT RECORD DOCUMENTS

.1 Departmental Representative will provide two white print sets of contract drawings and two copies of Specifications Manual specifically for "as-built" purposes.

.2 Maintain at site one set of the contract drawings and specifications to record actual as-built site conditions.

.3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative at any time during construction.

.4 As-Built Drawings:
- .1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of project and prior to interim inspection, neatly transfer notations to second set (also by use of red ink). Submit both sets to Departmental Representative. All drawings of both sets shall be stamped "As-Built Drawings" and be signed and dated by Contractor.
- .2 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
- .3 Record following information:
  - .1 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;
  - .2 Field changes of dimension and detail;
  - .3 Location of all capped or terminated services and utilities.
  - .4 Chases for mechanical, electrical and other services;
  - .5 Ceiling and floor elevations;
  - .6 Reflected ceiling plan condition showing finished layout of all ceiling-mounted services and devices;
  - .7 Plumbing, heating, air conditioning and ventilation, sprinkler and electrical service installation locations; all to be dimensioned and referenced to building columns or load bearing walls;
  - .8 All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;
  - .9 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings must also be marked-up and dimensioned to reflect final as-built conditions and appended to the as-built drawing document;
  - .10 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.

.5 As-built Specifications: legibly mark in red each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.

.2 Changes made by Addenda and Change Orders.

.3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above clause.

.6 Maintain As-built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Frequency of reviews will be subject to Departmental Representative's discretion. Failure to maintain as-builts current and complete to satisfaction of the Departmental .

1.3 REVIEWED SHOP DRAWINGS

.1 Compile full set of shop drawings and product data reviewed on project and incorporate into Operations and Maintenance Manual. Supply number of shop drawing sets equal to the required number of final Operations and Maintenance manuals.

.2 Submit shop drawing sets at same time and as part of the contents of the Operation and Maintenance manuals specified in this section.

1.4 OPERATIONS AND MAINTENANCE MANUALS

.1 Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.

.2 Manual Language: final manuals to be in English language.

.3 Number of copies required:

.1 Submit 2 interim copies of the manual for review and inspection by Departmental Representative. Make revisions and additions as directed and resubmit.

.2 Upon review and acceptance by Departmental Representative, submit 3 final copies. Initial copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.

.4 Submission Date: submit complete operation and maintenance manual to Departmental Representative 3 weeks prior to application for Interim Certificate of Completion of project.

.5 Binding:

.1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.

.2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.

.3 Where multiple binders are needed, correlate data into related consistent groupings.

.4 Identify contents of each binder on spine.

.5 Organize and divide data into sections same as 16 division numerical order of contract specifications and thereafter subdivided into various equipment or building systems.

.6 Material: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each separate product or system within each section and with typed description of product and major component parts of equipment.

.7 Type lists and notes. Do not hand write.

.8 Drawings, diagrams and manufacturers' literature must be legible. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.6 Manual Contents:

.1 Cover sheet containing:

.1 Date submitted.

.2 Project title, location and project number.

.3 Names and addresses of Contractor, and all Sub-contractors.

.2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.

.3 List of maintenance materials.

.4 List of spare parts.

.5 List of special tools.

.6 Original or certified copy of Warranties and Guarantees.

.7 Copies of approvals, and certificates issued by Inspection Authorities.

.8 Copies of reports and results from tests designated as Contractor's responsibilities.

.9 Product Information Data on all materials, equipment and systems as specified in individual sections of the specifications to include:

.1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.

.2 Nameplate information including equipment number, make, size, capacity, model number and serial number.

.3 Parts list.

.4 Installation details.

.5 Operating instructions.

.6 Maintenance instructions for equipment.

.7 Maintenance instructions for finishes.

.7 Shop drawings:

.1 Bind one complete set of reviewed shop drawings into each copy of operations and maintenance manual.

.2 Bind the shop drawings in a manner such that they correspond with the specification section they relate to.

.3 Where large quantity of data is supplied due to size of project, fold and bind professionally into separate correctly sized binder.

.8 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:

.1 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 color 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 Servicing and lubrication schedule, and list of lubricants required.

.7 Manufacturer's printed operation and maintenance instructions.

.8 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 color 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.

.9 Materials and Finishes Maintenance Data:

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and color and texture designations.

.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.

1.5 SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS

.1 Provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.

.2 Tag all items with associated function or equipment.

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

.4 Deliver to site in well packaged condition. Store in location as directed by Departmental Representative.

.5 Clearly mark as to contents indicating:

.1 Part number.

.2 Identification of equipment or system for which parts are applicable.

.3 Installation instructions or intended use as applicable.

.4 Name, address and telephone number of nearest supplier.

.6 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.

1.6 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 site; place and store.

.4 Receive and catalog all items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.

1.7 SUBMISSION

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

.2 Copy will be returned after final inspection, with Departmental Representative's comments.

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

.4 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, three final copies of operating and maintenance manuals in English.

.5 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.

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

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

.8 Pay costs of transportation.

.9 Failure to deliver maintenance materials, spare parts, special tools and as-builts will delay progress payments.

1.8 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 by systems, 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.

1.9 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;

.1 date of submission; names,

.2 addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties;

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

.2 For each product or system:

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

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

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

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control and Section 01 77 00 - Closeout Procedures.

.6 Training: Refer to Section 01 91 13 - General Commissioning Requirements.

1.10 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on 2 sets of blue line opaque drawings, and in copy of Project Manual.

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

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

required information is recorded.

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

.5 Specifications: legibly mark each item to record actual construction, including:
  .1 Manufacturer, trade name, and catalog number of each product actually installed, particularly optional items and substitute items.
  .2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, required by individual specifications sections.

1.11 STORAGE, HANDLING AND PROTECTION

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

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

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

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

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

1.12 WARRANTIES AND BONDS

.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 where specifically requested by individual specification sections, within ten days after completion of the applicable item of work.

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

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

.6 Co-execute submittals when required.

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

END OF SECTION

1 General

1.1 COMMISSIONING OBJECTIVE

.1 Perform commissioning activities in order to achieve the following objectives:

- .1 Collect data on equipment and systems supplied; and to document their installation;
- .2 Conduct checks and tests on fully installed building component, equipment, systems and integrated systems to:
  - .1 Verify whether they operate in accordance with requirements of Contract Documents;
  - .2 Verify performance against design criteria and user requirements and measure peak capacities;
- .3 Prepare a Building Management Manual (BMM) which contains operations and maintenance data, as-built record documents, commissioning reports, training data and other critical information for future use by Facility operational staff;
- .4 Ensure transfer of knowledge on the operations, maintenance and management of the Facility to Owner and Operational personnel by means of appropriate training.

.2 Commissioning activities conducted by Owner and/or Departmental Representative does not replace checks, tests, adjustments, balancing and other performance verification responsibilities to be performed by Trade Contractor as part of the work and as specified in other sections of the Specifications.

1.2 DEFINITIONS

.1 For the purpose of this contract, the following terms, used in this section, as they relate directly or indirectly to the commissioning process, shall be deemed to have the meaning as defined hereafter.

.2 Commissioning Process: a planned program of tasks, activities and procedures carried out systematically during the Construction and Occupancy Stages in accordance with the commissioning objectives, specified in clause 1.2 above, to:

- .1 Verify whether the fully installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and;
- .2 Ensure that appropriate documentation is compiled to effectively train Operation and Maintenance staff and prepare a comprehensive Building Management Manual (BMM).

.3 Commission (ie: to commission a building component or system): tests and checks conducted on all systems and integrated systems of Facility; carried out only after they are fully installed, functional and Contractor's Performance Verification responsibilities have been completed and approved.

- .1 Contractor provides assistance during this process by operating equipment and systems, by troubleshooting and making adjustments as may be required.
- .2 Systems are run under their full operation and under various modes to determine if they function correctly, consistently, at peak efficiency and interactively with each other as intended in accordance with Contract Documents and design criteria.
- .3 During these checks, adjustments may be made enhancing performance to meet environmental or user requirements.

.4 Contractor: means the Contractor, however it also refers to any personnel from Subcontractors, including the controls subcontractors, suppliers and manufacturer representatives with whom the Contractor contracts or obtains services for the performance of work and designated commissioning duties.

.5 Departmental Representative: persons from the civil, architectural, mechanical and

electrical design disciplines of the Departmental Representative firm(s) engaged by Owner to prepare the final design and contract documents.

.6 Design Criteria: All those factors included in the design of a Facility prescribed by the tenant needs or as determined by Departmental Representative as necessary in order to meet all Facility functional and user operational requirements.

.7 Installation/Start-up Checks:(sometimes referred to as pre-functional checks). Checks and inspections to be performed by Contractor during the pre-start-up and start-up of a particular equipment or system component.

.1 Checklist sheets are produced which include the following data:

.1 Product manufacturer's installation instructions and recommended checks and;

.2 Special procedures as specified in relevant sections of Specifications;

.3 Other items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.

.2 Standard Installation/Start-up Checklist sheets prepared by equipment manufacturer are acceptable for use. Supplement with additional data representative of specific project conditions as deemed required by Departmental Representative.

.3 Use Checklist sheets for all equipment installation. Document in writing on checklist the various checks made, deficiencies noted and corrective action taken.

.4 Installing Sub-Contractor to sign Checklist sheets upon completion, certifying that stated checks and inspections have been performed.

.8 Performance Verification: (sometimes referred to Functional Testing) checks, running dynamic tests and adjustments carried out by Contractor on equipment and systems, upon their installation, to ensure they operate correctly, efficiently and function independently and interactively with other systems as intended in accordance with contract documents and manufacturer's recommendations.

.1 Performance Verification shall not be considered part of the commissioning process. It is however considered an essential and integral part of Contractor's responsibilities in the equipment installation process which must be stringently conducted, successfully completed and approved by Owner before a piece of equipment or system is considered fully installed and functional.

.2 Facility components and systems will not be commissioned until performance verification has been completed and approved.

.9 Product Information (PI Data): a compilation of data gathered on a particular piece of equipment, typically produced by manufacturer, which includes nameplate information, installation/startup instructions, parts list, operating instructions, maintenance guidelines and other pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of such equipment. This documentation is included in the Building Management Manual (BMM) at completion of work.

1.3 CONTRACTOR'S COMMISSIONING RESPONSIBILITIES

.1 General:

.1 Coordinate the participation of the various subcontractors, their specialists and manufacturer's representatives in providing the commissioning activities described below.

.2 Ensure that workers and manufacturer's personnel are knowledgeable and qualified to interpret system functions and intended design criteria.

.3 Develop a commissioning schedule.

.4 Notify Departmental Representative in writing when Facility is ready to be commissioned. Give 14 calendar day notice.

.5 Commissioning of Facility and designated systems will only commence once that required documentation has been received and all installed equipment and systems have undergone successful performance verification.

.6 Be aware that inspection certificate will only be issued by Departmental Representative when:

.1 All commissioning documentation has been received, reviewed for suitability and approved by Departmental Representative;

.2 Designated facility components and systems have been commissioned and;

.3 Training has been completed.

.7 Non-Conformance of Performance Verification Requirements:

.1 Should incorrectly installed or malfunctioning equipment, system components or associated controls be found while Facility is being commissioned, Contractor shall be required to re-verify 100% of all equipment and components within the non functional system, including other related system as deemed required by Departmental Representative, to correct deficiencies and ensure effective performance.

.2 Costs to correct work and any additional tests or inspections, as deemed required by Departmental Representative, to determine acceptability and proper performance of such items to be paid for by Contractor.

.2 Prior to Facility being Commissioned:

.1 Submit commissioning documentation as specified in clause 1.8 for use during commissioning.

.2 Carryout pre-start-up and start-up of equipment.

.3 Conduct performance verification on all installed equipment and systems. Ensure they are fully functional.

.4 Address deficiencies in Work identified during performance verification of equipment and systems. Conduct additional performance verification checks and tests to ensure acceptability of Work.

.5 Arrange for special tools and devices, identified at commissioning meeting(s), as deemed required to assist with commissioning.

.6 Provide access ladders, two way radios and other equipment required by Team when facility will be commissioned.

.3 When Facility is being Commissioned:

.1 Provide qualified tradespersons to be present at site to assist commissioning activity.

.2 Assist in commissioning architectural and structural building component, and mechanical, electrical and civil systems specified and as follows:

.1 Operate designated building component, mechanical/electrical equipment and system under all modes of operation and conduct checks and tests as directed by Departmental Representative.

.2 Check and verify that building component, equipment, systems and integrated systems, including their controls, are functioning and responding correctly and interactively with each other.

.3 Test systems independently and then in unison with other related systems.

.4 Conduct all Commissioning checks and tests in presence of and witnessed by Departmental Representative.

.3 Specific procedures used to commission Facility may be provided by Departmental Representative which includes:

.1 Sequential order of building component and system to be tested.

.2 Running systems under various anticipated modes and demands

(example: high and low cooling or heating loads, duplicating outside temperature conditions, fire alarm and power failure conditions etc...).

.3 Running building controls through all sequences of operation to verify and confirm that equipment and systems are responding as designed and intended.

.4 Operating designated equipment at peak capacities, recording output data against design criteria.

.4 Run component or systems as long as necessary to effectively commission all items as deemed required by Departmental Representative.

.5 Monitor equipment and system responses.

.6 Record test results, measurements and other data.

.7 Assist in analyzing results. Identify system deficiencies and components not responding as intended.

.8 Correct deficiencies and system non-conformance issues. Adjust, calibrate or fine tune system components as required. Debug system software as may be required.

.9 Retest systems when directed to confirm compliance.

.4 Upon completion of Facility Commissioning:

.1 Provide training to Maintenance & Operational personnel as specified in clause 1.7 below.

.2 Turn over any filled-in checks sheets or reports resulting from commissioning.

.5 During Warranty period at Occupancy Stage:

.1 Fine tune components, systems and integrated systems and continue system debugging to optimize Facility performance.

.2 Rectify warranty issues.

.3 Submit written report to Departmental Representative.

.1 Indicate results noted and corrective action taken.

.2 Note improvements made to operating parameters and control settings.

.3 Recommend modifications deemed advisable to improve performance, environmental conditions, energy consumptions and other issues.

.4 Departmental Representative to be present during such work.

1.4 COMMISSIONING MEETINGS

.1 Convene commissioning meetings following project meetings: as required through the project to coordinate commissioning requirements.

.2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to commissioning .

.3 Continue commissioning meetings on regular basis until commissioning deliverables have been addressed.

.4 At 60% construction completion stage. Contractor to call a separate commissioning scope meeting to review progress including Departmental Representative, discuss schedule of equipment start-up activities and prepare for commissioning . Issues at meeting to include:

.1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.

.2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.

.5 Thereafter commissioning meetings to be held until project completion and as required during equipment start-up and functional testing period.

.6 Meeting will be chaired by Contractor, who will record and distribute minutes within 3 business days.

.7 Ensure Subcontractors and relevant manufacturer representatives are present at subsequent commissioning meetings and as required.

1.5 COMMISSIONING SCHEDULE

.1 Address commissioning activities within the construction work schedule. Clearly identify allocated time period for commissioning and training activities.

.2 Provide a commissioning schedule at the 60% construction stage in order that specific issues and individual details of commissioning can be reviewed, discussed and dealt with from that period onward to project completion. Submit updates thereafter.

.3 Indicate allocated time period and anticipated dates for:

.1 Submission of commissioning documentation, including O&M Manuals.

.2 Equipment and system start-up and performance verification, making them ready to be commissioned.

.3 Allocated period to commission designated building components and systems.

.4 Training period.

.5 Work during Warranty period.

.4 Submit schedule to Departmental Representative for review.

1.6 INSTRUCTORS

.1 Contractor and certified factory-trained manufacturers' personnel to provide instruction on the following:

.1 Start-Up, operation, shut-down of equipment, components and systems.

.2 Control features, reasons for, results of, implications on associated systems of, and adjustment of set points of control and safety devices.

.3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.

.2 Contractor and equipment manufacturer to provide instruction on:

.1 Start-up, operation, maintenance and shut-down of equipment they have certified installation, started up and carried out PV tests.

1.7 TRAINING OBJECTIVES

.1 Training to be detailed and duration to ensure:

.1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.

.2 Effective on-going inspection, measurements of system performance.

.3 Proper preventive maintenance, diagnosis and trouble-shooting.

.4 Ability to update documentation.

.2 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.8 TRAINING MATERIALS

.1 Contractor to be responsible for content and quality.

.2 Training materials to include:

.1 "As-Built" Contract Documents.

.2 Operating Manual.

.3 Maintenance Manual.

.4 Management Manual.

.5 Testing, Adjusting and Balancing and Performance Verification Reports.

.3 Training materials to be in a format that permits future training procedures to same degree of detail.

.4 Supplement training materials:

.1 Transparencies for overhead projectors.
.2 Multimedia presentations.
.3 Manufacturer's training videos.

.5 Equipment models.

1.9 RESPONSIBILITIES

.1 Be responsible for:
.1 Implementation of training activities,
.2 Coordination among instructors,
.3 Quality of training, training materials,

.2 Departmental Representative will evaluate training and materials.

.3 Upon completion of training, provide written report, signed by Instructors, witnessed by Departmental Representative.
.1 Report to include a list of all attendees.

1.10 TRAINING CONTENT

.1 Training to include demonstrations by Instructors using the installed equipment and systems.

.2 Content includes:
.1 Review of facility and occupancy profile.
.2 Functional requirements.
.3 System philosophy, limitations of systems and emergency procedures.
.4 Review of system layout, equipment, components and controls.
.5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
.6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.
.7 Maintenance and servicing.
.8 Trouble-shooting diagnosis.
.9 Inter-Action among systems during integrated operation.
.10 Review of O&M documentation.

.3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

1.11 VIDEO-BASED TRAINING

.1 Manufacturer's videotapes to be used as training tool with Departmental Representative's review and written approval 3 months prior to commencement of scheduled training.

.2 On-Site training videos:
.1 Videotape training sessions for use during future training.
.2 To be performed after systems are fully commissioned.
.3 Organize into several short modules to permit incorporation of changes.

.3 Production methods to be professional quality.

1.12 TRAINING

.1 Commence process of familiarizing O&M personnel in the early stages of work on purpose and operation of various equipment and systems. Continue process throughout the entire construction duration.
.1 Provide informal briefings during occasional site visits, at planned commissioning meetings and during the final commissioning site activities.

.2 Conduct formal demonstration and training sessions only after all identified systems have been commissioned and Departmental Representative has given approval to proceed with the training process.

.3 Provide training and demonstration on equipment, sub-systems, systems and integrated systems.

.4 Carryout training in accordance with requirements of Section 01 91 13 - General Commissioning Requirements.

.5 Submit written agenda of training session(s) 4 weeks before hand for review by Departmental Representative.

.6 Submit training manuals for review 2 weeks prior to actual training.

.7 Ensure required tools and O&M Manuals are on site for training and system demonstration.

.8 As a minimum, the training sessions to cover the following information:

.1 Introduction.

.2 Description of the system with factory personnel being involved at appropriate times.

.3 Instructions on start-up procedures including seasonal procedures, system check-lists and emergency procedures.

.4 Operational procedures, including occupancy considerations, seasonal change-over, manual and automatic operations and emergency modes.

.5 Instruction on system shutdowns, including checklists.

.6 Instructions on all aspects of system maintenance, including routine servicing, lubrication, overhaul and factory servicing.

.7 Information concerning the scope of warranties and their use.

.8 A description of spare parts in stock and their service.

.9 A description of normal tools required for servicing the systems/equipment.

.9 Submit typewritten record of training sessions given and list of attendees. Use forms of format approved by Departmental Representative.

1.13 DESCRIPTION

.1 Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of final inspection.

.2 Owner will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed-upon times.

1.14 QUALITY CONTROL

.1 When specified in individual Sections require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

.2 Obtain signature from attendees and provide a copy in the Building Maintenance Manual.

1.15 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Departmental Representative's approval.

.3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Record signatures of all attendees.

.5 Give time and date of each demonstration, with list of persons present.

1.16 CONDITIONS FOR DEMONSTRATIONS

.1 Equipment has been inspected and put into operation in accordance with respective applicable Sections.

.2 Testing, adjusting, and balancing has been performed and equipment and systems are fully operational.

.3 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.17 PREPARATIONS

.1 Verify that conditions for demonstration and instructions comply with requirements.

.2 Verify that designated personnel are present.

1.18 DEMONSTRATION AND INSTRUCTIONS

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, sequencing, winter/summer operating, servicing, and maintenance of each item of equipment at scheduled times, at the equipment location.

.2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.

.3 Review contents of manual in detail to explain aspects of operation and maintenance.

.4 Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.

1.19 COMMISSIONING DOCUMENTATION

.1 Submit the following documentation for use during commissioning and for incorporation thereafter into a Building Management Manual (BMM).

.2 Operations and Maintenance Manuals, Project Record Documents and other data as specified in Section 01 78 00 - Closeout Submittals. Data to include:

.1 Equipment Product Information (PI Data) complete with:

.1 Nameplate info,

.2 Installation instructions,

.3 Operating procedures and

.4 Maintenance guidelines.

.5 Reviewed shop drawings,

.6 As-built record drawings and Specifications.

.2 Completed Installation/Start-up Checklist sheets used.

.3 Copy of any static and dynamic test and reports conducted.

.4 Reports as specified in various trade sections.

.3 Documentation to include detailed information and number of copies as specified for maintenance manuals of Section 01 78 00 - Closeout Submittals.

END OF SECTION

1 General

1.1 DESCRIPTION OF WORK

.1 Perform all demolition, and restitution as indicated and required to properly complete the work of the contract, as specified in this section and indicated on the drawings.

.2 All demolition work to be coordinated with Departmental Representative.

.3 All mechanical and electrical work must be carried out by the Mechanical and Electrical Sub-Contractors identified in the Tender Form.

.4 All items indicated to be removed either for re-installation elsewhere under the Work of this Contract, or to be salvaged and turned over to the Owner are to be removed with care to avoid damage to the items. All damage to be made good at the Contractors expense.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).

.1 CSA S350-M1980(R1998), Code of Practice for Safety in Demolition of Structures.

.2 Department of Justice Canada (Jus).

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.4 Motor Vehicle Safety Act (MVSA)

.5 Workers Compensation Act

.6 National Building Code of Canada

.3 Underwriters' Laboratories of Canada (ULC).

.1 ULC/ORD-C107.19-1992, Secondary Containment of Underground Piping.

.2 ULC/ORD-C58.15-1992, Overfill Protection Devices for Underground Tanks.

.3 ULC/ORD-C58.19-1992, Spill Containment Devices for Underground Tanks.

1.3 DEMOLITION AND REMOVAL

.1 For information purposes, this generally includes but is not necessarily limited to the following work: Refer to demolition drawings for further specific information.

.1 Removal of all existing decking including ramps, steps, railings, benches sandstone pad and shower wall, as indicated on the Drawings.

.2 Removal of cedar roof shingles, cedar wall shingles, doors and trim, as indicated on the Drawings.

.3 Demolition in washroom facility as indicated on the drawings to facilitate the construction of a separate accessible washroom.

.4 Removal of water fountain, mechanical roof ventilators, rubber boots on vent pipes, and solar panels as indicated on the Drawings.

.2 Prior to demolition, the Owner may salvage loose furnishings, operational and medical equipment, stainless steel benches and wall hung equipment for their reuse.

.3 Any remaining existing furniture, fittings and equipment is to be removed and disposed of by the Contractor, subject to the Owner's final review.

1.4 MECHANICAL AND ELECTRICAL SUBCONTRACT RESPONSIBILITIES

.1 All Mechanical and Electrical work must carried out by the Mechanical and Electrical Subcontractors, except for related cutting and patching which is the responsibility this General Contractor.

1.5 REMOVED MATERIALS

.1 All removed materials become the property of the Contractor and are to be removed from the site in accordance with the requirements of Part 3.

.2 Notwithstanding this requirement the Owner reserves the right to inspect all materials following removal and retain any item that the Owner deems useful for the Owner's future use. The Owner will be responsible for the removal of these materials from the site.

1.6 PROTECTION

.1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.

.2 Take all necessary precautions and provide all bracing, shoring, and underpinning to support adjacent structures, structures undergoing demolition, adjacent services, roads and walks, landscaping and grading.

.3 If during the demolition work a situation should develop or a condition be exposed which has the potential to endanger the safety of workers or other persons in the building or structure in which demolition work is being carried out, the Contractor will cease operations, take whatever emergency action in the Contractor's opinion is required to ensure the immediate safety of workers, other persons in the building or structure, and notified the Consultant before continuing to work.

.4 Prevent debris from blocking, damaging or otherwise interfering with Mechanical and Electrical systems which must remain active and/or in place

1.7 ASBESTOS DISCOVERY

.1 Demolition of spray or trowel applied asbestos can be hazardous to health. The presence of asbestos is anticipated as identified in the hazardous material report. Should material resembling spray or trowel applied asbestos being encountered in the course of demolition work, stop work and notify the Consultant immediately. Do not proceed until written instructions have been received from the Consultant.

1.8 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Where required by Authorities Having Jurisdiction, submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.

.3 Submit drawings stamped and signed by qualified Professional Engineer registered or licensed in Province of Prince Edward Island, Canada, where complexity of work requires structural dis-assembly.

1.9 QUALITY ASSURANCE

.1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA.

.2 Meetings:

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

1.10 SAFETY CODE

.1 Carry out demolition work in accordance with the requirements of the National Building Code of Canada, Part 8, the Provincial Occupational Health and Safety Act and regulations and/or other regulations having force of law.

.2 In the case of conflict or discrepancy between regulations the more stringent requirements shall apply.

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for off site disposal waste material in accordance with Waste Management Plan.

.2 Divert excess materials from landfill.

.3 Dispose of waste at appropriate disposal facilities.

.4 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 NOT APPLICABLE

.1 Not applicable.

3 Execution

3.1 PREPARATION

.1 Ensure the following work has been properly completed before beginning demolition and removal:

- .1 Disconnect all Mechanical and Electrical services to be removed.
- .2 Tag or otherwise mark all Mechanical and Electrical services that are to remain in operation in order to avoid removal of services required to remain and/or accidental interruption of service.
- .3 Services accidentally removed shall be replaced at the contractor's expense to the satisfaction of the Owner and the Consultant.

.2 Tag or otherwise identify all items required to be salvaged to ensure that these items are removed with care to avoid damage.

.3 Move Owner's furnishings and equipment identified to remain away from work area and/ or provide protection using polyethylene sheet drop cloths. Owner to provide space for temporary storage.

3.2 DEMOLITION

.1 At the end of each day's work, leave work in a safe and secure condition so that no part is in danger of toppling or falling or unlawful entry.

.2 Demolish in a manner to minimize dusting. Keep dusty material wetted.

3.3 TEMPORARY ENCLOSURES AND COVERS

.1 Provide temporary enclosures between demolition / renovation and new construction using 10 mil poly on 38 X 89mm wood framing at maximum 610mm centers. Provide temporary anchors at perimeter secured to sides, top and bottom of opening, dust tight as required to secure existing space against dust migration.

.2 Provide a double overlapped flap where access from clean side as required.

3.4 RESTITUTION

.1 Make good all damage to the existing floors and walls where existing wall, doors and fixtures have been removed. This work includes is not limited to:

- .1 Fill and repair as necessary to provide smooth, level surface where differences in floor level or depressions exist when existing walls, floor finishes or fixtures are removed.
- .2 Clean, prime and otherwise prepare newly exposed concrete floor surfaces and all depressions with purpose made cementitious or epoxy patching compound. Finish and smooth and level with adjacent surfaces.
- .3 Patch and repair or infill as necessary to make good existing walls to remain where damage will be exposed in final finished construction and where damage will adversely affect installation of new finishes.

.4 Make good all damage to existing floors where all anchor bolts, screws, nails, and other existing anchoring devices have been removed.

3.5 DISPOSAL

.1 All demolished materials except as noted for salvage become the property of the Contractor and are to be removed from the site and this is to be in a manner and in a location acceptable to the Provincial Authority governing such disposal.

.2 Pay all fees that may be charged to dispose of materials at licensed disposal sites.

END OF SECTION

1 General

.1 Work included: Provide metal fabrications including but not limited to following:

.1 New metal railings and connections.

1.1 RELATED REQUIREMENTS

.1 Following description of work is included for reference only and shall not be presumed to be complete:

.1 Section 05 52 00 - Metal Railings

.2 Section 09 91 00 - Painting.

1.2 REFERENCES

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

.1 ASTM A53/A53M-07, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A269-10, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

.3 ASTM A307-07b, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.4 ASTM A123/A123M-09, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.5 ASTM A153/A153M-09, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

.6 ASTM A325M-07a, Specification for High-Strength Bolts for Structural Steel joints [Metric].

.7 ASTM A653M-09a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.8 ASTM B117-09, Practice for Operating Salt Spray (Fog) Apparatus.

.9 ASTM E119-09c, Test Methods for Fire Tests of Building Construction and Materials.

.10 ASTM E736-00 (2006), Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.

.11 ASTM F436M-10, Specification for Hardened Steel Washers.

.12 ASTM F738M-02 (2008), Specification for Stainless Steel Metric Bolts, Screws, and Studs.

.13 ASTM F836M-02, Specification for Style 1 Stainless Steel Metric Nuts.

.14 ASTM F844-07a, Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.40-97, Anti-corrosive Structural Steel Alkyd Primer.

.2 CAN/CGSB 1.181-99, Ready Mixed Organic Zinc-Rich Coating

.3 CAN/CGSB 85.10-99, Protective Coatings for Metals

.3 Canadian Standards Association (CSA International)

.1 CAN/CSA G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

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

.3 CAN/CSA S16-09, Design of Steel Structures.

.4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.

.5 CSA W59-03 (R2008),Welded Steel Construction (Metal Arc Welding).

.6 CSA S136-07 - North American Specification for the Design of Cold Formed

Steel Structural Members (Using Appendix B provisions applicable to Canada).

.7 CSA W47.1-09 - Certification of Companies for Fusion Welding of Steel.

.8 CSA W47.2-M1987 (R2008) - Certification of Companies for Fusion Welding of Aluminum.

.9 CSA W48.1-M1991 (R1998) - Carbon Steel Covered Electrodes for Shielded Metal Arc Welding.

.10 CSA W48-06 - Filler Metals and Allied Materials for Metal Arc Welding.

.11 CSA W59-03 (R2008) - Welded Steel Construction (Metal Arc Welding).

.12 CSA W117.2-06 - Safety in Welding, Cutting, and Allied Processes.

.13 SSPC - Steel Structures Painting Council, "Steel Structures Painting Manual, Vol. 2".

1.3 SYSTEM DESCRIPTION

.1 Design Requirements:

.1 Drawings and details are diagrammatic and are intended to show design concept, configuration, components and arrangements; they are not intended to identify nor solve completely problems of thermal and structural movements, assembly framing, fixings and anchorages.

.2 Design work to withstand within acceptable deflection limitations, variations from plumb in vertical and horizontal lines, its own weight, forces applied by movements of building structure and attached adjacent components and maximum design loads due to pressure and suction of wind, snow, ice, rain and hail.

.3 Design load bearing structures to NBC requirements and provide miscellaneous steel supports and anchors to suit design. Conform to CAN/CSA-S16.1 and CAN/CSA-S136.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's literature, data sheets for each type of material provided under this Section for Project. Data sheets shall provide all required information. Submit 3 copies of detailed instructions for maintaining, preserving and keeping materials in clean and safe conditions and give adequate warning of maintenance practices of materials detrimental to specified materials. Submit manufacturer's installation instructions.

.2 Material Safety Data Sheets:

.1 Submit MSDS for inclusion in Operation and Maintenance Manual without limitations for adhesives, sealants, patching and leveling compound, solid polymer and as designed by Consultant.

.3 Shop Drawings

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

.2 In addition to minimum requirements indicated following:

.1 Large scale details of members, materials and connections.

.2 Joint details.

.3 Methods of setting, sealing, securing, anchorage.

.4 Field connections.

.5 Submit Shop Drawings for following work bearing the stamp of a Professional Engineer registered in the Province of Prince Edward Island.

.4 Samples:

.1 Extruded and formed metals: minimum 300 mm long.

.2 Metal sheet: minimum 300 mm square and of specified thickness.

1.5 QUALITY ASSURANCE

.1 Test Reports: Submit 6 copies of certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: Submit 6 copies of product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Welding: Provide welding in accordance with CSA W59-m performed by a fabricator and mechanics fully approved by the Canadian Welding Bureau as specified herein.

.4 Structural Design and Inspection:

.1 Employ a professional structural engineer carrying a minimum $2,000,000.00 professional liability insurance and is registered in the province of Prince Edward Island to:

.1 Design components of the work of this Section requiring structural performance.

.2 Be responsible for full assemblies and connections

.3 Be responsible for determining sizes, joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.

.4 Be responsible for production and review of Shop Drawings.

.5 Inspect work of this Section during fabrication and erection.

.6 Stamp and sign each shop drawing.

.7 Provide site administration and inspection of this part of the Work.

.2 Design following:

.1 Balustrades, handrails, railings.

.3 Certification:

.1 Submit certification from registered professional structural Engineering registered in province of Prince Edward Island, who shall affix his/her seal and signature to certificate, stating structure is capable of supporting its own weight and specified live loads.

.2 Welders employed on this project may be asked by Consultant at any time for their welding certificate.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off-the-ground, undercover storage locations. Do not load areas beyond the designed limits.

.2 Handle and store metal materials at job site in such a manner to prevent damage to other materials, (to existing buildings) or property.

.3 Handle components with care, and Provide protection for surfaces against marring or other damage. Ship and store members with cardboard or other resilient spacers between surfaces. Use lifting chokers of material which will not damage surface of steel members.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Steel sections and plates: New Material Conforming to CAN/CSA-G40.20/G40.21, Grade 300W.

.2 Hollow Structural Sections: New material conforming to CSA G40.20 and CSA G40.21, Grade 350W, Class H.

.3 Steel Pipe: ASTM A53, Type S, Grade A, Standard weight, Schedule 40.

.4 Welding Materials: Conforming to CSA W48.1-M and CSA W59-M.

.5 High Strength Bolts: Supply bolts, nuts and washers conforming with ASTM A 325M. Supply each type and size of bolt and nut of same manufacture and of same lot.

- .1 Stainless Steel Bolts: To suit applications and conforms to ASTM F738M.
- .2 Stainless Steel Nuts: To suit applications and conforms to ASTM F836M.
- .3 Lock Washers: Helical spring type steel "lock" washers to suit applications and conforms to federal specification FF-W-84. Provide AISI Type 304 stainless steel lock washers at exterior locations.
- .4 Security Fasteners: Button head Torx® Plus R screw tamper resistant # 10, 25 mm long 2 per glass stop minimum stainless steel machine screws.

.6 Galvanized Primer Paint: Zinc rich conforming to CAN/CGSB-1.181 for new galvanized metal.

.7 High Performance Corrosion Protection for Perimeter Steel: 1 component, moisture cured, micaceous iron oxide/zinc filled primer, UL Classified in accordance with UL 263 (ASTM E119), corrosion protection in accordance with ASTM B117, meeting Class B Slip Certification in accordance with American Institute of Steel Construction (AISC) requirements for slip critical bolted connections, tested in accordance with ASTM E736 for its suitability for application of primer over steel to receive sprayed fireproofing "Series394, Perime Prime" by Tnemec Company Incorporated; www.tnemec.com.

.8 Steel Pipe Handrails: Conforming to ASTM A53M, Type "S", Schedule 40, Grade A steel pipe of sizes down.

.9 Galvanized: Hot dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA-G164-M.

.10 Galvanized Sheet Steel: Supply 0.91 mm (20 ga) core thickness commercial quality to ASTM A653M, CS Type A, with Z275 zinc coating designation to ASTM A653M.

.11 Aluminum Extrusions: ASTM B209M, size accurately formed as shown on Drawings, extruded aluminum alloy AA-6063-T5 or T6 for aluminum. Ensure surfaces are free from defects impairing appearance, strength and durability.

.12 Aluminum Sheet: ASTM B221M, Minimum thickness 3 mm of type and characteristics to match finished extrusions; sheet which is not exposed shall be Utility Aluminum mill finished; for intricate forming with decorative finishes use AA 1100 and for siding and exposed panels use AA-3003 with specified finish.

.13 Handrail Wall Brackets: In accordance with NBC 2015 requirements and to meet design requirements indicated on Drawings.

.14 Grout:

- .1 Cementitious, non shrinking, non expanding grout: 'Sika Grout 212' by Sika Canada Inc., or 'Non Shrink Structural Grout - Dry Pack Grout' by Euclid Chemical Company or 'Sealtight CG 86 Construction Grout' by W.R. Meadows.
- .2 Epoxy, non-shrinking, non expanding grout: 'Sika Anchor Fix.
- .3 Master Flow 100.
- .4 Master Emaco ADH 1420.

2.2 FABRICATION

.1 Fabricate each item of work of this Section in accordance with following general requirements:
  .1 Members square and straight.
  .2 Members plumb and true.
  .3 Joints accurately and tightly fitted.
  .4 Intersecting members in true, finish planes.
  .5 Fasteners concealed.
.2 Fabricate, fit and assemble work in shop where possible. Where shop fabrication is not possible, make trial assembly in shop.
.3 Provide hangers, rods, bars, bolts, anchors, brackets, rivets, bearing plate and bracing, fitting, drilling, stopping, soldering, as required for a complete assembly.
.4 Isolate dissimilar metals to prevent galvanic corrosion.
.5 Weld connections unless otherwise indicated.
.6 Shop Welding:
  .1 Execute welding to avoid damage or distortion to work. Should there be, in the opinion of Consultant or Inspection Company, doubts as to adequacy of welds, they shall be tested for efficiency and any work not meeting Standards be removed and replaced with new work satisfactory to Consultant. Carry out welding in accordance with following standards:
    .1 Fabricator shall be fully certified by Canadian Welding Bureau for fusion welding of steel structures to CSA W47.1 and for fusion welding of aluminum to CSA W47.2.
    .2 CSA W48-M - for Electrodes (if rods are used, only coated rods are allowed).
    .3 CSA W59-M - for design of connections and workmanship.
    .4 CSA W117.2 - for safety.
.7 Thoroughly clean welded joints and steel exposed for a sufficient space to properly perform welding operation. Neatly finish welds. Ensure welds exposed to view and finish painted are continuous and ground smooth.
.8 Provide exposed metal fastenings and accessories of same material, texture, color and finish as base metal to which they are applied or fastened.

2.3 FINISHES

.1 Cleaning and Shop Painting:
  .1 Clean steel to SSPC SP6 and remove loose mill scale, weld flux and splatter.
  .2 Shop prime steel with 1 coat of primer paint to dry film thickness of 0.025 mm (1 mil). Paint on dry surfaces free from rust, scale, grease. Do not paint when temperature is lower than 7 deg C. Paint items under cover and leave under cover until primer is dry. Follow paint manufacturer's recommendations regarding application methods, equipment, temperature, and humidity conditions.
  .3 Shop prime non galvanized perimeter steel members and structural steel members to receive sprayed fire resistive materials with 1 coat of high performance corrosion protection primer to dry film thickness of 0.025 mm (1 mil). Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 deg C. Paint items under cover and leave under cover until primer is dry. Follow paint manufacturer's recommendations regarding application methods, equipment, temperature, and humidity conditions.
  .4 Shop prime galvanized steel in accordance with CAN/CGSB-85.10.
  .5 Clean but do not paint surfaces being welded in the field and surfaces in contact after assembly.
.2 Hot Dip Galvanizing:
  .1 After fabrication, hot dip galvanize specific miscellaneous steel items noted on

Drawings and/or called for herein. Plug relief vents air tight. After galvanizing, remove plugs, ream holes to proper size and re-tap threads. Straighten shapes and assemblies true to line and plane after galvanizing. Repair damaged galvanized surfaces with "Galvafroid" by W.R. Meadows in accordance with manufacturer's printed directions.

.2 Galvanized members exposed to elements when in final location; members embedded in concrete; members specified in this Section or noted on Drawings.

.3 Hot-dip galvanize members, in accordance with CAN/CSA-G164-M and the requirements of following ASTM standards, with minimum coating weights or thickness as specified:

.1 Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips: ASTM A123M; average weight of zinc coating per sq/ft of actual surface, for 4.8 mm and less thickness members 2 ounces, for 6 mm and heavier members 2.3 ounces.

.2 Iron and Steel Hardware: ASTM A153M; minimum weight of zinc coating, in ounces per sq ft of surface shall be in accordance with Table 1 of ASTM A153M, for the various classes of materials used on the Project.

.3 Steel Sheet: ASTM A653M; weight of zinc coating, per sq ft on both sides of sheet. Coating designation Z275 (G90), minimized spangle and chemically treated.

.3 Color: to be selected by Consultant.

.4 Aluminum: Exposed aluminum surfaces shall have clear anodized coating (Architectural Class II). Pre-treat aluminum with caustic tech treatment prior to applying integral, clear, anodic oxide coating. Apply clear, anodic oxide coating in accordance with AAMA 611, 0.4 mils minimum coating thickness and also conforms to Aluminum Finish Designation AA-M12C22A31, Architectural Class II. Protect clear anodized coating with removable protective film.

.5 Zinc-rich primer: Ready, mixed, zinc-rich primer conforming to CAN/CGSB-1.181.

.1 Acceptable material:

.1 Sealtight Galvafroid Zinc-Rich Coating by W.R. Meadows of Canada Limited.

.2 Zinc Clad No. 7 Organic Zinc Rich Primer by Sherwin Williams Company of Canada Ltd.

.6 Isolation Coating: Bituminous paint, alkali-resistant bituminous paint or epoxy resin solution to provide dielectric separation which will dry to be tack-free and withstand high temperatures. Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers. Carboline Bitumastic 50 by Carboline Canada, or Copper Creek Top Service 760 Black by Sherwin Williams Company, 410-02 by Bakor Inc. or other Product and manufacturer acceptable to Consultant.

2.4 MISCELLANEOUS SECTIONS AND FRAMING

.1 Provide miscellaneous steel sections which are not shown or identified on Structural Drawings, or specified under another Section of Specifications.

3 Execution

3.1 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Provide components for building by other sections in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CAN/CSA-S16.1, or weld.

.7 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

.8 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 INSTALLATION

.1 Verify dimensions at the Place of the Work to ensure work of this Section fits to that of other parts of the Work.

.2 Erect the work of this Section plumb, square, true and level.

.3 Securely anchor work of this Section and rivet, weld or bolt to structural framing of the building. Where secured to concrete, Provide bolts for setting in concrete. Provide expansion bolt supports to masonry.

.4 Provide necessary fitting, setting and cutting required in connection with the fitting of work of this Section to other parts of the Work.

.5 Field Painting: Paint bolt heads, washers, nuts, field welds and previously unpainted items. Touch up with matching paint, shop primer damaged during transit and installation.

3.3 CLEANING

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

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

.3 On completion of installation, carefully clean metal work.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Hot dip galvanized steel railing systems.

1.2 RELATED REQUIREMENTS

.1 Section 05 50 00 - Metal Fabrications.

.2 Section 06 10 00 - Rough Carpentry.

.3 Section 09 91 00 - Painting.

1.3 REFERENCES

.1 American Architectural Manufacturers Association (AAMA) 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

.2 American Architectural Manufacturers Association (AAMA) 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

.3 American National Standards Institute (ANSI) - A21.I Safety Requirements for Floor and Wall Openings, Railings and Toe Boards.

.4 American National Standards Institute (ANSI) - A58.I Minimum Design Loads in Buildings and Other Structures.

.5 Americans with Disabilities Act Accessibility Guidelines (ADA).

.6 American Society for Testing and Materials (ASTM) A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

.7 American Society for Testing and Materials (ASTM) B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

.8 American Society for Testing and Materials (ASTM) B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape and Tube.

.9 American Society for Testing and Materials (ASTM) E 894 - Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings.

.10 American Society for Testing and Materials (ASTM) E 935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.

.11 American Society for Testing and Materials (ASTM) E 985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.

.12 American Welding Society (AWS) D I.2 - Structural Welding Code - Aluminum.

1.4 SYSTEM DESCRIPTION

.1 Design Requirements:

- .1 Railing shall comply with all requirements of the ADA and OSHA regulations.
- .2 Provide metals free from surface blemishes where exposed to view in finished unit.
- .3 Exposed-to-view surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable.

.2 Structural Requirements:

- .1 Handrail, wall rail and guardrail assemblies and attachments shall resist a minimum concentrated load of 91 kg applied in any direction at any point on the top rail and a vertical and horizontal thrust of 0.73 kN/m applied to the top railing without permanent set or damage. The two loads are not cumulative.
- .2 Infill area of guardrail system capable of resisting a horizontal concentrated load of 8165 g/sq.m at any point in the system. This loading shall not be applied simultaneously with other loading conditions.
- .3 Handrail assemblies and guards shall be designed to resist a load of 0.73 kN/m

applied in any direction at the top and to transfer this load through the supports to the structure.

1.5 SUBMITTALS

.1 Submit in accordance with provisions of Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Manufacturer's data sheets on each product to be used, including:

.1 Preparation instructions and recommendations.

.2 Storage and handling requirements and recommendations.

.3 Installation methods.

.3 Shop Drawings

.1 Plans, elevations, and detail sections.

.2 Indicate materials, methods, finishes, and types of joinery, fasteners, anchorages, and accessory items. Specify finishes.

.3 Provide setting diagrams and templates for anchorages, sleeves, and bolts installed by others.

.4 Where materials or fabricators are indicated to comply with certain design loadings, include structural computations, material properties, and other information needed for structural analysis.

.4 Certification: Submit independent testing report developed for the railing system certifying proposed railing system, including attachment method, compliance with load requirements and local codes.

.5 Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns

.1 Where normal color and texture variations are to be expected, include 2 or more units in each set of samples showing the limits of such variations.

.2 Finish shall represent color range, paint thickness, and sheen to be expected in the finished Work.

1.6 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Not less than 10 years experience in the actual production of specified products.

.2 Installer Qualifications: Firm with 3 years experience in installation of systems similar in complexity and those required for this Project, plus the following:

.1 Trained and authorized by manufacturer to engineer and install the specified railing system.

.3 Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

.1 Finish areas designated by Consultant.

.2 Do not proceed with remaining work until workmanship, color, and sheen are approved by Consultant.

.3 Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Store products in manufacturer's unopened packaging until ready for installation.

.2 Store on-site in a location and manner to avoid damage. Stacking should be done in a manner that will prevent bending. Store material in a clean, dry location away from uncured concrete and masonry. Any protection on the railings during transportation should remain until installed.

.3 Keep handling on site to a minimum, Exercise caution to avoid damage to factory applied mechanical and painted finishes.

1.8 PROJECT CONDITIONS

.1 Maintain environmental conditions including temperature, humidity, and ventilation within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

.2 Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings.

.1 Where field measurements cannot be made without delaying the railing fabrication and delivery, obtain guaranteed dimensions in writing by the Contractor and proceed with fabrication of products to not delay fabrication, delivery and installation.

.3 Coordinate fabrication and delivery schedule of handrails with construction progress and sequence to avoid delay of railing installation.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MANUFACTURERS

.1 Acceptable Material

.1 Livingston Steel Inc.

.1 Phone: 902-724-2424

.2 Website: www.livingstonsteel.com

2.2 RAILINGS

.1 Hot Dip Galvanized Railing:

.1 42.2mm (43mm maximum) diameter hot dip galvanized pipe rail, welded to bent 20 mm diameter round bar brackets with 75mm diameter x 6mm flange plates. Provide rail brackets at each post secured with 2- #10 x 100mm brown coated structural screws.

.2 Hot Dip Galvanized Pickets:

.1 16mm diameter solid hot dip galvanized rod pickets spaced at maximum 100mm gap center to center.

2.3 FABRICATION

.1 Tolerances: Verify dimensions on Site prior to shop fabrication.

.1 Fabricate items with joints neatly fitted and properly secured.

.2 Mill joints to a tight, hairline fit.

.3 Cope or miter corner joints.

.2 Design components to allow for expansion and contraction without causing buckling excessive opening of joints, or over stressing of welds and fasteners.

.3 Form metal to the required shapes and sizes with true curves, lines and angles.

.4 Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence with will expedite erection and minimize field handling of materials

.5 Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

.6 Pre-assemble items in shop or field to greatest extent possible to minimize splicing. Clearly mark units for assembly and coordinated installation.

.7 Supply components required for proper anchorage of ornamental metals. Fabricate anchorage and related components of same material and finish as metal fabrication, unless otherwise specified herein.

3 Execution

3.1 EXAMINATION

.1 Do not begin installation until substrates have been properly prepared. Fully inspect the supporting structure to verify a structurally sound base for anchoring railing system.

.2 If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

.1 Clean surfaces thoroughly prior to installation.

.2 Surface Preparation: Coordinate and furnish anchorages and setting drawings, diagrams, templates, instructions and directions for the installation of items having integral anchors which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the Project Site.

3.3 INSTALLATION

.1 Comply with manufacturer's recommendations.

.2 Provide anchorage devices and fasteners including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lab bolts, wood screws, and other connectors.

.3 Perform cutting, drilling and fitting required for installation. Set accurately in location, alignment and elevation, plumb, level and true, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry, or similar construction.

.4 Form tight joints with exposed connections accurately fitted with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding, and grinding are required for proper shop fitting and jointing, restore finishes to eliminate evidence of such corrective work.

.5 Mounting brackets shall be securely mounted to the building structure in a positive manner including sufficient reinforcements and anchors as required.

.1 Fillers: Provide fillers made from plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and over stressing of substrate.

.6 Installation shall be rigid and secure, installed by mechanics experienced in erection of architectural metal. All screws and fittings shall be drawn up tightly. Rails shall be set plumb and aligned.

.7 Close exposed ends of handrail and railing members with welded ends.

.8 Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns.

3.4 PROTECTION

.1 Protect installed products until completion of project.

.2 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 06 20 00 - Finish Carpentry
.2 Section 09 91 00 - Painting
.3 Section 10 28 13 - Toilet Accessories
.4 Division 23 - Mechanical
.5 Division 26 - Electrical

1.2 REFERENCES

.1 American National Standards Institute (ANSI)
  .1 ANSI A208.1-1999, Particleboard, Mat Formed Wood.
.2 American Society for Testing and Materials (ASTM)
  .1 ASTM D1761-00, Standard Test Methods for Mechanical Fasteners in Wood.
  .2 ASTM D5055-00, Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
  .3 ASTM D5456-01ae1, Specification for Evaluation of Structural Composite Lumber Products.
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-11.3-M87, Hardboard.
  .2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
  .3 CAN/CGSB-51.34-M86, Vapor Barrier, Polyethylene Sheet for Use in Building Construction.
  .4 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.
.4 Canadian Standards Association (CSA)
  .1 CSA A123.2-M1979(R1999), Asphalt Coated Roofing Sheets.
  .2 CAN/CSA-A247-M86, Insulating Fiberboard.
  .3 CSA B111-1974, Wire Nails, Spikes and Staples
  .4 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
  .5 CSA O112 Series-M1977, CSA Standards for Wood Adhesives.
  .6 CSA O121-M1978, Douglas Fir Plywood.
  .7 CAN/CSA-O122-M89, Structural Glued-Laminated Timber.
  .8 CAN/CSA-O141-91, Softwood Lumber.
  .9 CSA O151-M1978, Canadian Softwood Plywood.
  .10 CSA O153-M1980, Poplar Plywood.
  .11 CAN/CSA-O325.0-92(R1988), Construction Sheathing.
  .12 CAN3-O437 Series-93, Standards on OSB and Waferboard.
.5 National Lumber Grades Authority (NLGA)
  .1 Standard Grading Rules for Canadian Lumber 2010.
.6 Truss Design and Procedures for Light Metal Connected Wood Trusses, Truss Plate Institute of Canada.

1.3 QUALITY ASSURANCE

.1 Lumber 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 WASTE MANAGEMENT AND DISPOSAL

.1 Set aside damaged wood and dimensional lumber off-cuts for approved alternative uses (e.g. bracing, blocking, cripples, bridging).
.2 Collect and separate for disposal waste material generated by this Section.
.3 Place in appropriate on-site bins in accordance with Waste Management Plan.
.4 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 FRAMING AND STRUCTURAL MATERIALS

.1 Lumber:
  .1 Unless specified otherwise, softwood, 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 Glued end-jointed (finger-jointed) lumber are not acceptable.
.2 Decking, railing, tread material:
  .1 Goodfellow Terra, brown pressure treated lumber, sizes as shown.
.3 Framing and board lumber: in accordance with NBC.
.4 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
  .1 S4S is acceptable.
  .2 Board sizes: "Standard" or better grade.
  .3 Dimension sizes: "Standard" light framing or better grade.
  .4 Post and timbers sizes: "Standard" or better grade.

2.2 PANEL MATERIALS

.1 Douglas fir plywood (DFP): to CSA O121, standard construction.
.2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
.3 Poplar plywood (PP): to CSA O153, standard construction.
.4 Specifically:
  .1 Roof sheathing: Douglas Fir Plywood (DFP) exterior sheathing grade, square edge, to thickness indicated, to CSA O121.
  .2 Exterior wall sheathing: Douglas Fir Plywood (DFP) exterior sheathing grade, square edge, 12.7mm thickness, to CSA 0121.
  .3 Sub flooring: Douglas Fir Plywood (DFP), G1S grade, T & G, 19.0mm thickness, to CSA 0121.
  .4 Plywood underlay: Douglas Fir plywood (DFP), to CSA O121 - M1978, GIS with solid wood boats, (PASTE TYPE FILLERS NOT ACCEPTABLE), 8mm thickness.
  .5 Miscellaneous exterior facing: Douglas Fir Plywood (DFP) with medium density overlay (MDO) finish, square edge, 12.7mm thickness.
  .6 Mechanical & Electrical equipment backboards: Douglas fir plywood (DFP), to CSA O121, G1S, square edge to thickness indicated.

2.3 ACCESSORIES

.1 Polyethylene film: to CAN/CGSB-51.34, Type 1, 0.15 mm thick (6 mil).
.2 Sealants: Section 07 92 00 - Joint Sealants.
.3 Sub flooring adhesive: to CGSB-71.26, cartridge loaded.
.4 General purpose adhesive: to CSA O112 Series.
.5 Nails, spikes and staples: to CSA B111.

.1 Use common spiral nails and spiral spikes except where indicated otherwise.
.2 Use hot galvanized finish steel for exterior work, including sheathing.

.6 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.7 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and inorganic fiber plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

.8 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, fiber, formed to prevent dishing. Bell or cup shapes not acceptable.

.9 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy type approved by Consultant.

.10 Use surface fastenings of following type except where specific type is indicated.
.1 Roof sheathing H-clips: formed "H" shape, thickness to suit panel material, type approved by Consultant.

.11 Galvanizing: to CSA G164-M1981, use galvanized fasteners for work in exterior walls, work in high humidity areas, etc. and with pressure-preservative treated lumber.

2.4 AIR BARRIER SHEET

.1 Spun bonded olefin sheet to CAN2-51.32.
.1 Acceptable Material:
.1 Tyvek
.2 Nova Wrap

2.5 WOOD PRESERVATIVE

.1 Lumber and plywood: CCA vacuum pressure impregnated to CAN/CSA 080.1-M89 and CAN/CSA 080.9-M89, Spruce species. At all deck & railing framing and where wood comes in contact with earth, concrete or masonry.
.1 Acceptable Material:
.1 Goodfellow Terra Pressure Treated.

3 Execution

3.1 PREPARATION

.1 Store wood products in dry environment.

3.2 INSTALLATION

.1 Comply with requirements of NBC 2015 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 materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

.6 Install wall sheathing in accordance with manufacturer's printed instructions.

.7 Install roof sheathing in accordance with requirements of NBC.

.8 Install H-clips as required by spacing of roof framing.

.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 fasteners.

.13 Install sleepers as indicated.

.14 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

3.3 MISCELLANEOUS FURRING, BLOCKING AND STRAPPING

.1 Install furring and blocking as required to space out and support casework, cabinets, toilet and bath accessories, recessed panels and cabinets for work of Electrical and Mechanical Divisions, and other work as required, which includes, but is not limited to the following:

.1 At all toilet and bath accessories provide wood blocking between studs, as required.

.2 Generally both vertical and horizontal blocking will be required to secure 100 mm deep accessories recessed in 100 mm thick walls.

.3 At all wall-hung lavatories provide 37 x 285 wood blocking between double, back to back, studs to receive steel hanger.

.4 At all wall mounted doorstops.

.5 At ALL other wall-mounted items provide wood blocking between studs as required.

.2 Install furring to support any sheathing type material where there is no blocking and where sheathing is not suitable for direct nailing.

.3 Spacing of furring as required to provide adequate support for material.

.4 Install strapping as indicated or required to support panel material, except where metal strapping is specifically indicated.

.5 Align and plumb faces of furring and blocking to tolerance of 1:600.

3.4 NAILING STRIPS, FRAMING AND ROUGH BUCKS

.1 Install rough bucks, nailers and linings to rough openings as required to provide backing for window frames, door frames and other work.

.2 Install continuous pressure treated wood framing as indicated under all window stools.

.3 Install sloped sill framing and water stop as required by NBC, latest edition.

.4 Countersink bolts where necessary to provide flush surface.

3.5 FASTENERS

.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.2 Provide minimum three (3) 50 mm nails at each end to secure blocking between steel studs.

.3 Countersink bolts where necessary to provide clearance for other work.

.4 Screws for fastening pressure treated lumber to be ceramic coated.

3.6 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.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 07 92 00 - Joint Sealants
.2 Section 08 11 14 - Metal Doors and Frames
.3 Section 08 14 10 - Flush Wood Doors
.4 Section 08 71 10 - Door Hardware
.5 Section 08 80 50 - Glazing
.6 Section 09 91 10 - Painting

1.2 WORK INCLUDED

.1 Installation of finish hardware.
.2 Installation of wood and steel doors.

1.3 REFERENCES

.1 American National Standards Institute (ANSI)
  .1 ANSI A208.1, Particleboard.
  .2 ANSI A208.2, Medium Density Fibreboard (MDF).
  .3 ANSI/HPVA HP-1, American National Standard for Hardwood and Decorative Plywood
.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  .1 Architectural Woodwork Quality Standards, most recent edition.
.3 Canadian General Standards Board (CGSB)
  .1 .1 CAN/CGSB-11.3, Hardboard.
.4 Canadian Standards Association (CSA)
  .1 CSA B111, Wire Nails, Spikes and Staples.
  .2 CSA O121, Douglas Fir Plywood.
  .3 CAN/CSA O132.2 Series 90 - Wood Flush doors.
  .4 CAN/CSA O141, Softwood Lumber.
  .5 CSA O151, Canadian Softwood Plywood.
  .6 CSA O153, Poplar Plywood.
.5 National Lumber Grades Authority (NLGA)
  .1 Standard Grading Rules for Canadian Lumber, most recent edition.
.6 National Hardwood Lumber Association (NHLA)
  .1 Rules for the Measurement and Inspection of Hardwood and Cypress, most recent edition.
.7 Door and Hardware Institute (DHI)
  .1 Recommended Locations for Doors and Hardware
  .2 Installation Guide for Doors and Hardware
  .3 Installation of Commercial Steel Doors and Frames
  .4 National Fire Protection Association
  .5 NFPA No. 80 - Fire Doors and Windows
.8 ASTM International:
  .1 ASTM D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of plastics by Displacement.
  .2 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 QUALITY ASSURANCE

.1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).
.2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.
.3 Wood fire rated frames and panels: listed and labelled by an organization accredited by Standards Council of Canada to CAN4 S104 and CAN/ULC-S105.

1.5 SUBMITTALS

.1 Indicate details of construction, profiles, jointing, fastening and other related details.
.2 Indicate materials, thicknesses, finishes and hardware.
.3 Samples:
  .1 Submit samples in accordance with Section 01 33 00 - Submittals Procedures.
  .2 Submit duplicate samples: sample size 300mm x 300mm or 300mm long unless specified otherwise.
.4 Shop Drawings:
  .1 Indicate details of construction, profiles, jointing, fastening and other related details.
  .2 Indicate all materials, thicknesses, finishes and hardware.

1.6 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.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Place in appropriate on-site bins in accordance with Waste Management Plan.
.2 Set aside damaged wood and dimensional lumber off-cuts for approved alternative uses (e.g. bracing, blocking, cripples, bridging).
.3 Collect and separate for disposal waste material generated by this Section.
.4 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

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 premium grade, moisture content as specified.
.2 Machine stress rated lumber is acceptable for all purposes.
.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 Panel materials to be urea-formaldehyde free.
.2 Douglas fir plywood (DFP): to CSA O121, standard construction.

.3 Canadian softwood plywood (CSP): to CSA O151, standard construction.
.4 Hardwood plywood: to ANSI/HPVA HP-1.
.5 Poplar plywood (PP): to CSA O153, standard construction.
.6 Hardboard: to CAN/CGSB-11.3.
.7 Medium density fibreboard (MDF): to ANSI A208.2, density 769 kg/m3.
.8 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.
.6 Door silencers; Single stud rubber/neoprene type.

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.

3.3 INSTALLATION OF DOORS

.1 Unwrap and protect doors in accordance with CAN/CSA - 0.132 Series-90.

.2 Install doors to CSDMA Installation Guide.

.3 Install louvres and stops.

.4 Provide even margins between doors and jambs and finished floor and threshold, with maximum dimensions, as follows:

.1 Hinge side: 1.0 mm

.2 Latch side and head: 1.5 mm

.3 Finished floor, non-combustible still and thresholds: 13mm

.5 Adjust operable parts for correct function.

.6 Hardware

.1 Install hardware in accordance with hardware templates and manufacturer's instructions.

.7 Finish Repairs

.1 Check and make final adjustment to each operating item of hardware on each door to ensure proper operation and function.

.2 All hardware to be left cleaned and free of disfigurements.

.3 Instruct Owner's personnel in the proper operation, adjustment and maintenance of hardware.

3.4 GLAZING

.1 Installation of Glazing; Refer to Section 08 80 00 - Glazing

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 62 00 - Sheet Metal Flashing and Trim.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
- .1 ASTM D5116-97, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.

.2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .2 CAN/CGSB-51.34-M86(R1988), Vapor Barrier, Polyethylene Sheet for Use in Building Construction.

.3 Canadian Standards Association (CSA International).
- .1 CSA A123.3-98, Asphalt Saturated Organic Roofing Felt.
- .2 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .3 CSA 0118.1-97(R2002), Western Cedars Shakes and Shingles.
- .4 CSA O118.2-M1981(R2002), Eastern White Cedar Shingles.
- .5 CSA O118.3-93, Northern Pine Tapersawn Shakes.

.4 Cedar Shake and Shingle Bureau (CSSB).
- .1 CSSB-97, Cedar Shake and Shingle Grading Rules.
- .2 CSSB New Roof Construction Manual for Roof Application Details 2002.
- .3 CSSB Exterior and Interior Wall Manual for Sidewall Application Details 2002.

1.3 DEFINITIONS

.1 Shingle: tapered slice of wood sawn from block with taper in direction of grain or axial direction.

1.4 SUBMITTALS

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

.2 Shop Drawings:
- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate details of flashing installation.

.3 Samples:
- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate full size shingles, of finish and profile specified.

.4 Manufacturer's Instructions:
- .1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

.1 Qualifications:
- .1 Installer: company or person specializing in shingle and shake work installations with 5 years documented experience.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's

warranty requirements.

1.6 QUALITY ASSURANCE MOCK-UP

.1 Fabricate a mock-up that will demonstrate the various aspects of the air barrier / window connection / cladding installation and detailing.

.2 The installation is to reflect the intent to have a full tie in of the air barrier to the entire perimeter of all wall openings, including windows, doors and louvers, providing a tight air and water seal and the relationship of the cladding installation to the openings.

.3 The mock-up is to be reviewed by the Contractor, Membrane Installer, Owner and Consultant prior to the Contractor moving forward with the installation of all other windows.

.4 Allow 24 hours to convene the review on site.

.5 Mock-up to be approved prior to fabrication of additional openings.

.6 Openings installed prior to review and approval will be removed at the Contractors expense and rebuilt.

.7 The approved mock-up may remain on site as part of the work and it will form the standard of acceptance for the remainder of the work.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Remove only in quantities required for same day use.

.2 Storage and Protection:

.1 Provide and maintain dry, off-ground weatherproof storage.

1.8 MAINTENANC

.1 Extra Materials:

.1 Provide one (1) bundle of shingles in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide information on preservation and restoration of shingles.

.2 Unused shingles remain property of Owner.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

.4 Divert unused wood materials from landfill to recycling facility.

.5 Divert unused preservatives materials from landfill through disposal at special wastes depot.

2 Products

2.1 MATERIALS

.1 Eastern White Cedar Shingles, Grade A, extra re-butted and re-squared.

.1 Acceptable Material:

.1 J.D. Irving Eastern White Cedar Shingles.

.2 Sheathing paper: refer to Section 06 10 00 - Rough Carpentry, paragraph 2.4. Tape all joints.

.3 Staples: stainless steel.

.4 Rainscreen: Benjamin Obdyke Slicker Classic Rainscreen, 6mm.

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 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 Consultant to inspect roof sheathing. Take up, cut out, remove damaged portion of sheathing boards affected by fungal or insect attack as directed on site by Consultant.

.4 Replace cut out portions of sheathing boards or lath with boards of equal sectional dimensions, and specified grade. Seat each end of board on rafter, with 25 mm bearing, and secure to rafter.

3.3 APPLICATION

.1 Do wood shingle work in accordance with NBC, CAS and CCSB except where indicated otherwise.

.2 Do wood shake work in accordance with NBC, CAS and CCSB except where indicated otherwise.

.3 Install shingles over dry substrate.

.4 Space shingles per manufacturer's requirements.

.5 Stagger joints minimum of 40 mm in succeeding courses. Ensure that in any 3 courses no two joints are in alignment.

.6 Use two nails per shingle. Space nails 20 mm from edge and 40 mm above butt line of following course.

.7 Drive nails flush but do not crush shingles.

3.4 WALL SIDING SHINGLES

.1 Underlayment:

.1 Install over sheathing.

.2 Install horizontally and fasten to sheathing with nails. Lap edges 75 mm.

.2 Install shingles using single course method to ensure double thickness at any given point.

3.5 CLEANING

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

.2 Remove roofing nails that have fallen on ground using high powered, earth magnets or other collection devices. Nail pickup to Consultant's approval.

END OF SECTION

1 General

1.1 SUMMARY

.1 Work Furnished and included: all labour and materials necessary to fabricate and install the metal roof system in accordance with this performance specification including:
- .1 Underlayment.
- .2 Roof panel.
- .3 Accessories including associated flashings, closures, sealants.

1.2 RELATED REQUIREMENTS

.1 Section 07 46 19 - Steel Siding.
.2 Section 07 62 00 - Sheet Metal Flashing and Trim.
.3 Section 07 92 00 - Joint Sealants.
.4 Mechanical equipment and/or ductwork as well as their supporting framing.

1.3 REFERENCES

.1 Design of cladding system in according to the latest edition of:
- .1 CSA-S136 for the design of Cold Formed Steel Structural Members.
- .2 Canadian Sheet Steel Building Institute Standards 10M and 20M.
- .3 National Building Code of Canada.

1.4 QUALITY ASSURANCE

.1 Install two adjacent sheets c/w seaming for inspection by Consultant.
.2 Mock-up will be used to judge workmanship.
.3 Locate where directed.
.4 Allow 24 hours for inspection of mock-up by Consultant before proceeding with work.
.5 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.
.6 Manufacturer and applicator of the metal roofing system shall demonstrate at least five years experience in fabrication and installation of architectural metal roofing projects similar in scope.
.7 Manufacturer and/or approved applicator must have the single source facility to provide:
- .1 Total design of the metal roofing system.
- .2 Technical literature on tested metal roofing systems.
- .3 Engineering facilities.
- .4 Fabrication of metal roofing system and associated components.
- .5 Technical representatives.
- .6 Field installation by approved certified erectors.
- .7 Fabrication/installation drawings must bear the stamp of a professional engineer registered in the Province of Prince Edward Island.

1.5 DESIGN REQUIREMENTS

.1 Design roof system to resist:
- .1 Snow loads and snow build-up and rain load, expected in this geographical region NBC climatic data, 50 year probability.
- .2 Wind loads, positive and negative, expected in this geographical region NBC climatic data, 50 year probability.
- .3 Dead load of roof system.

.2 Deflection of the roof system is not to exceed 1/240th of the span for the specified live loading.
.3 Thermal movements: Allow for thermal movements from ambient and surface

temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to solar heat gain and night time sky heat loss.

.1 Temperature change (range): 20 Deg C, ambient; 40 deg C, material surfaces.

1.6 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures

.2 Manufacturer's Instructions:

.1 Provide to indicate special handling criteria, installation sequence and cleaning procedures.

.3 Submit product data sheets for bitumen. Include:

.1 Product characteristics.

.2 Performance criteria.

.3 Limitations.

.4 Shop drawings:

.1 Submit six (6) copies of shop drawings for approval to the Consultant.

.2 No fabrication and or installation shall commence until all shop drawings have been approved.

.3 Indicate arrangement of steel roof deck including thickness, type and welding requirements.

.4 Indicate arrangement of prefinished roof sheet, including joints, ridges, valleys, eaves, types and locations of supports, fasteners, flashing, gutters, miters, snow retention components and all metal components related to the roof installation. Include for underlayment as part of roof system.

.5 Each shop drawing shall be stamped by a professional engineer registered in the Province of Prince Edward Island.

.5 Samples:

.1 Submit color samples for full range of manufacturer's standard colors.

.2 Submit samples of colored metal roof sheet for review by the consultant, prior to fabrication.

.6 Maintenance Data:

.1 Provide maintenance data for cleaning and maintenance of panel finishes for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.7 PRODUCT DELIVERY, HANDLING & STORAGE

.1 Store roofing products in accordance with manufacturer's recommendations.

.2 Protect prefinished steel during fabrication, transportation, site storage and erection, in accordance with CSSBI Standards.

1.8 GUARANTEE

.1 For work in this section, warranty by installer against defects or deficiencies in materials or workmanship shall be for a period of one (1) year from date of Substantial Completion.

1.9 WARRANTY

.1 Provide a manufacturer's written warranty: Furnish panel manufacturer's written warranty covering failure of factory applied exterior finish within the warranty period. Warranty period for finish: Forty (40) years after the date of Substantial Completion. The values below are based on normal environments and exclude any aggressive atmospheric conditions.

.1 Barrier Series (Polyvinyl Chloride - PVC) will not change color more than ten (10.0) Hunter Delta E units as determined by ASTM method D-2244-02 at any

time for twenty (20) years from the date of installation (20.5 years from application).

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 ROOF SYSTEM COMPONENTS:

.1 Roof System:

.1 Underlayment:

.1 Titanium PSU 30 Synthetic Roofing Underlayment.

.2 Prefinished Roof Sheet, exposed to exterior.

.1 Profile: Vicwest SuperVic

.2 Panel: 30" wide sheets, 28 gauge.

.3 Color: Regent Grey - 56082.

.2 Acceptable Material:

.1 SuperVic by VicWest.

2.2 PANEL FINISHES:

.1 Coating: Prepainted with WeatherX on exterior face.

2.3 COLOUR

.1 Barrier coating thickness shall be 6 mils on exterior exposed surface of the finished profile and 4 mils on the reverse, selected from the manufacturer's standard color range.

2.4 ACCESSORIES

.1 Flashing: In accordance with Section 07 62 00 - Sheet Metal Flashing and Trim. Formed from same materials as the roof sheet. Custom fabricated to suit architectural detail, as required.

.2 Closures: Foam and metal closures to suit profiles selected, to manufacturer's recommendations.

.3 Sealants: In accordance with manufacturer's recommendation and Section 07 92 00 - Joint Sealants.

.4 Soil Stack Boots: Replace soil stack rubber boot flashings with new to match existing in accordance with manufacturer's recommendations.

2.5 FABRICATION

.1 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including fascia and soffit panels and all companion flashing.

.2 Fabricate all components of the system in the factory, ready for field installation.

.3 Provide roof sheet and all accessories in longest practical length to minimize field lapping of joints.

3 Execution

3.1 EXAMINATION

.1 Prior to proceeding with any metal roofing system installation, the completed installations of preceding trades shall be inspected and any remedial work required shall be reported in writing to the Consultant. The installation of the metal roofing system shall not begin until all remedial work has been completed and accepted by this trade.

3.2 INSTALLATION

.1 Roof Materials:

.1 Underlayment: Install underlayment fully adhered to solid substrate according to manufacturer's recommendations. Ensure all joints are properly lapped and sealed. Tie in barriers on adjacent surfaces to ensure airtight construction. Provide a continuous seal around all openings in the insulated metal roof system.

.2 Roof Panel Installation:

.1 Install exterior prefinished roof panels using manufacturer's proper construction procedure. Ensure metal roofing sheet side-lap is positively retained, and proper sheet coverage is maintained.

.2 Where indicated on approved shop drawings, secure the end-lap of metal roofing sheets in accordance with the manufacturers specifications and detail to provide a weather-tight seal. Exposed fasteners to match color of the roof sheet.

.3 Provide notched and formed closures, sealed against weather penetration, at changes in pitch, and at ridges and eaves, where required.

.4 Install all companion flashing (gutters, ventilators) as shown on the shop drawings. Use concealed fasteners when possible. Exposed fasteners to match color of roof sheet.

3.3 CLEAN-UP

.1 Clean exposed panel surfaces in accordance with manufacturer's instructions.

.2 Repair and touch-up with color matching high grade enamel minor surface damage, only where permitted by the Consultant and only where appearance after touch-up is acceptable to Consultant.

.3 Replace damaged panels and components that, in opinion of the Consultant, cannot be satisfactorily repaired.

.4 Clean excessive foreign materials from the roof by dry wiping.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 31 29 - Wood Shingles and Shakes

1.2 REFERENCES

.1 The Aluminum Association Inc. (AA)
- .1 Aluminum Sheet Metal Work in Building Construction-2000.
- .2 AA DAF45-97, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials (ASTM International)
- .1 ASTM A591/A591M-98, Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
- .2 ASTM A606-01, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
- .3 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM A792/A792M-02, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .5 ASTM B32-00, Standard Specification for Solder Metal.
- .6 ASTM D523-89(1999), Standard Test Method for Specular Gloss.
- .7 ASTM D822-01, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.4 Canadian Standards Association (CSA International)
- .1 CSA B111-1974(R1998), Wire Nails, Spikes and Staples.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 SHEET METAL MATERIALS

.1 Prepainted Zinc coated steel sheet: 20ga and 24 ga. thickness, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

2.2 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied polyvinylidene fluoride.
- .1 Class F1S.
- .2 One (1) color selected by Consultant from manufacturer's standard range.
- .3 Specular gloss: 30 units +/- in accordance with ASTM D523.
- .4 Coating thickness: not less than 22 micrometers.
- .5 Resistance to accelerated weathering for chalk rating of 8, color 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 Sealants: to CAN/;CGSB 19.13, one component.
Acceptable Material: Tremco A Spectrum 2", Pecora 895 NST.

.4 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.5 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.

.6 Washers: of same material as sheet metal, 1 mm thick with rubber or neoprene packings.

.7 Prefabricated flashing at pipes penetrating roofs: purpose-made, neoprene or spun aluminum to CRCA Specification FL/532, minimum 300mm above top of roof membrane.

.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.

.1 Brake form to profiles indicated and required to suit parapet configurations.

.2 Form pieces in 2400 mm max. lengths. Make allowance for expansion at joints.

.3 Hem exposed edges on underside 12 mm. Miter and seal corners with sealant.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 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 26 ga thick galvanized steel.

2.6 EAVES TROUGHS AND DOWNPIPES

.1 All existing to remain, remove and reinstall.

3 Execution

3.1 INSTALLATION

.1 Install sheet metal work 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 Counter flash 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.

.6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.

.7 Insert metal flashing into reglets to form weather tight junction.

.8 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.

.9 Caulk flashing at reglet with sealant.

.10 Install pans, where shown and around items projecting through roof membrane.

END OF SECTION

1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 30 00 - Cast-In-Place Concrete.
.2 Section 07 60 00 - Flashing and Sheet Metal.
.3 Section 08 11 13 - Hollow Metal Doors & Frames.
.4 Section 08 80 00 - Glazing.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
  .1 ASTM C 321 - Standard Test Method for Bond Strength of Chemical - Resistant Mortars.
  .2 ASTM C 834 - Standard Specification for Latex Sealants.
  .3 ASTM C 882 - Standard Test Method for Bond Strength of Epoxy-R Systems used with Concrete by Slant Shear.
  .4 ASTM C 919 - Standard Specification for use of Sealants in Acoustical Applications.
  .5 ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
  .6 ASTM C 1330 - Standard Specification for Cylindrical Sealant Backing for use with Cold Liquid Applied Sealants.
  .7 Sealants and associated materials must conform with the latest version of standards and specifications referenced.
.2 Transport Canada (TC)
  .1 Transportation of Dangerous Goods Act (TDGA).
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-19.21, Sealing and Bedding Compound Acoustical.
.4 Department of Justice Canada (Jus)
  .1 Canadian Environmental Protection Act, 1999 (CEPA).
.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
  .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 Manufacturer's Technical Data Guides and application procedures.
.3 Submit cured samples illustrating colors selected.
.4 Submit laboratory tests or data validating product compliance with performance criteria specified. Include SWRI validation certificate where required.
.5 Upon completion of the project the sealant applicator must submit copies of the Manufacturer's Weatherseal and the Warranty Applicator's Workmanship Warranty.
.6 Before proceeding with work or ordering of material submit the following to the Consultant for review and acceptance:
  .1 Manufacturer's product data for sealants to be used.
  .2 Manufacturer's recommended installation procedures.
.7 Material Safety Data Sheets:
    .1 Submit MSDS for inclusion in Operation and Maintenance Manual.

1.4 QUALITY ASSURANCE/MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Manufacturer Qualifications: Company regularly engaged in manufacturing and marketing of products specified in this section.

.3 Installer Qualifications: Qualified to perform work specified by reason of experience or training provided by the product manufacturer.

.4 Installer must submit a reference list including a minimum of three projects of similar size and scope.

.5 Mock-ups: Include a minimum of 3m of sealant to show compatibility with substrate, proper adhesion to substrate and chosen color.

.1 Apply mock-up with specified joint filler types and with other components noted. Installer must provide both primed and un-primed mock up to assess whether a primer is required for the project.

.2 Locate where directed by Consultant.

.3 Mock-up may remain as part of the work if acceptable to Consultant.

.4 Allow 24 hours for inspection of mock-up by Consultant before proceeding with sealant work.

.5 When accepted, mock-up will demonstrate minimum standard of quality required for this Work.

.6 Adhesion pull tests: the number of adhesion pull tests is to be determined by the manufacturer's weatherseal warranty. Adhesion pull tests are to be conducted by or in the presence of the manufacturer's representative. The manufacturer is to supply the Consultant / Owner with the results of the adhesion pull tests. The sealant installer is responsible for repairing areas where adhesion pull tests are conducted.

1.5 FIELD ADHESION / COHESION TESTS

.1 Test Frequency:

.1 Perform a field test for each type of sealant and substrate combination, for all interior and exterior sealants associated with the building envelope.

.2 Perform three (3) additional tests for each failed test.

.2 Locate test joints as directed by Owner's Representative. Tests to be performed in the presence of the Owner's Representative and/or manufacturer's representative.

.3 Notify Owner's Representative seven (7) days prior to dates tests are to be performed.

.4 Test joint sealants by hand-pull methods #1 and #2. Record results in Field Adhesion / Cohesion Test Form.

.1 Test Method #1:

.1 Make a knife cut horizontally from one side of the joint to the other.

.2 Make two (2) vertical cuts (from the horizontal cut) approximately 75mm long on each side of the joint.

.3 Pry out flap created from cuts.

.4 Firmly grasp flap and slowing pull at 90 degrees from sealant plane.

.5 Pull flap until adhesive or cohesive failure occurs.

.1 Adhesive failure will be evidenced by the sealant pulling off clean from the substrate.

.2 Cohesion failure will be evidenced by the sealant ripping or failing within itself, leaving well-adhered sealant to the substrate, (cohesive failure is considered a positive result).

.2 Test Method #2:

.1 Follow steps #1 to #4 (inclusive) of Test Method #1 above.

.2 Mark a benchmark on the sealant, 25mm from the plane of the installed sealant.

.3 Firmly grasp the flap and pull slowly, while holding a ruler parallel to the sealant flap. Note the position of the benchmark on the ruler.

.4 Refer to manufacturer's printed literature for each sealant tested for the required extension factor pass criteria; (i.e. if the 25mm benchmark on the sealant can be pulled to 100mm and held with no failure of sealant, 400% elongation is achieved).

.5 If no failure occurs prior to the manufacturer's stated extension factor, the test is successful. Extension factor should be three (3) times the movement capability of the sealant.

.5 Inspect joints for:

.1 Complete fill.

.2 Absence of voids.

.3 Primer.

.4 Proper width / depth ratio.

.5 Backup material.

.6 Repair sealants pulled in test area by applying new sealants following same procedures used to original seal joints.

.7 Contactor shall repair test areas at no additional cost to the Owner.

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 products in original factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets (MSDS) for each product.

.3 Store products in location protected from freezing, damage, construction activity, precipitation and direct sunlight in strict accordance with manufacturer's recommendations.

.4 Condition products to approximately 16 to 21 degrees C, for use in accordance with manufacturer's recommendations.

.5 Handle all product with appropriate precautions and care as stated on Material Safety Data Sheet (MSDS).

1.7 PROJECT CONDITIONS

.1 Do not use products under conditions of precipitation or freezing weather. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.

.2 Ensure substrate is dry.

.3 Protect adjacent work from contamination due to mixing, handling and application.

.4 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.

.5 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

1.9 WARRANTY

.1 Provide manufacturer's five (5) year standard material warranty.

.2 Include coverage for replacement of sealant materials which fail to achieve water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

.3 Warranty Exclusions: Failure resulting from concrete shrinkage, structural cracks or defects, faulty construction, faulty design, faulty materials (other than sealant), misuse of structure, settlement or accident, fire or other casualty, or physical damage.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

.4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Provincial and Municipal regulations.

2 Products

2.1 MANUFACTURERS

.1 Acceptable material:

- .1 BASF Building Systems.
- .2 Pecora Corporation.
- .3 Tremco Sealant and Waterproofing.
- .4 Sika Canada Inc.
- .5 Dow Corning.

.2 Provide all joint materials of the same type form a single manufacturer.

2.2 MATERIALS

.1 Single Component, Non-Sag Polyurethane Sealant with plus or minus 25 percent movement capability for vertical joints; ASTM C 920, Type S, Grade NS, Class 35, uses NT, M, A, O & I.

- .1 Acceptable Materials:
  - .1 MasterSeal NP1 by BASF Building Systems.
  - .2 Pecora DynaTrol 1-XL by Pecora Corporation.
  - .3 Sikaflex 1a by Sika Canada Inc.
- .2 Substrates: concrete, masonry, aluminum, wood, copper, stainless steel, galvanized steel and some stone.
  Expected service life: 7 - 12 years.
  Possible uses: Wall joints, window frames, precast joints, parapets etc.

.2 Single component neutral cure silicone sealant for non-structural glazing applications with plus / minus 50 percent joint movement capability; ASTM C 920, Type S, Grade NS, Class 50, Use NT, M, G and A.

- .1 Acceptable Materials:
  - .1 Pecora 864NST or 895NST by Pecora Corporation.
  - .2 Dow Corning 795 by Dow Corning.
  - .3 Spectrum 2 by Tremco Sealant & Waterproofing.
- .2 Substrates: concrete, masonry, aluminum, glass & plastics.
  Expected service life: 20 years +.
  Possible uses: conventional glazing, window & door frames, window perimeters, curtain walls, expansion & control joints etc.

.3 Single component mildew resistant silicone sealant plus/minus 25% movement capability; ASTM C 920, Type S, Grade NS, Class 25, Use NT, G and A.

.1 Acceptable Materials:

.1 Pecora 898 by Pecora Corporation.

.2 Tremsil 200 by Tremco Sealant & Waterproofing.

.3 Dow Corning 786.

.2 Substrates: glass, aluminum, tile and fiberglass.
Possible uses: countertops, kitchen & bath areas, non-structural glazing, etc.

.4 Gunned 100% solids epoxy joint filler. Two component gun-grade pick proof epoxy joint filler for sloped, vertical areas and security applications.

.1 Tensile Strength: 13.8 MPa

.2 Slant Shear Strength: 34.5 MPa.

.3 Bond Strength: 10.3 MPa.

.4 Acceptable Materials:

.1 Dynapoxy EP-1200 by Pecora Corporation.

.2 MasterEmaco ADH 327 by BASF Building Systems.

2.3 ACCESSORIES

.1 Primer: Type recommended by the sealant manufacturer and compatible with joint forming materials.

.2 Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer and compatible with joint forming materials.

.3 Soft Backer Rod: non-gassing, reticulated closed-cell polyethylene rod designed for use with cold-applied joint sealants.

.1 Comply with ASTM C 1330.

.2 Size required for joint design.

.4 Closed-Cell Backer Rod: closed-cell polyethylene rod designed for use with cold-applied joint sealants for on-grade or below-grade applications.

.1 Comply with ASTM C 1330.

.2 Size required for joint design.

.5 Joint Filler: closed-cell polyethylene joint filler, designed for use in cold joints, construction joints or isolation joints wider than 1/4 inch (6mm).

.1 Size required for joint design.

.6 Bond Breaker: Pressure-sensitive tape recommended by sealant manufacturer to suit application.

2.4 COLOR

.1 Sealant Colors: Selected by Consultant.

.1 Manufacturer's standard color range.

.2 Custom color matching submittal of job site substrate samples.

3 Execution

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.2 EXAMINATION

.1 Inspect all areas involved in work to establish extent of work, access and need for protection of surrounding construction.

.2 Conduct pre-application inspection of site verification with an authorized manufacturer's representative.

.3 Occupied areas: where high VOC materials are utilized, investigate occupants to determine the measures to be taken to accommodate them.

3.3 PREPARATION

.1 Remove loose materials and foreign matter which could impair adhesion of the sealant.

.2 Clean joint and saw cuts by grinding, sandblasting or wire brushing to expose a sound surface free of contamination and laitance.

.3 Ensure structurally sound surfaces are dry, clean, free of dirt, moisture, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing, curing and parting compounds, membrane materials and other foreign matter.

.4 Where the possibility of sealants staining adjacent areas or materials exist, mask joints prior to application.

.1 Do not remove masking tape before joints have been tooled and initial cure of joint filler has taken place.

.2 Work stained due to failure of proper masking precautions will not be accepted.

3.4 INSTALLATION:

.1 Priming:

.1 Prime all surfaces to receive sealant with recommended primer unless the mockup proves otherwise.

.2 Back-Up Material:

.1 Install appropriate size backer rod, larger than joint where necessary according to manufacturer's recommendations.

.2 Install polyethylene joint filler in joints wider than 1/4 inch (6mm) to back-up material per manufacturer's recommendations.

.3 Bond Breaker:

.1 Install bond-breaker strip in joint to be sealed on top of back-up material to prevent adhesion of sealant to back-up material; install per manufacturer's recommendations.

.4 Sealant:

.1 Prepare sealants that require mixing; follow manufacturer's recommended procedures, mixing thoroughly.

.2 Mix only as much material as can be applied within manufacturer's recommended procedures, mixing thoroughly.

.3 Apply materials in accordance with manufacturer's recommendations; take care to produce beads of proper width and depth, tool as recommended by manufacturer and immediately remove surplus sealant.

.4 Apply materials only within manufacturer's specified application life period. Discard sealant after application life is expired or if prescribed application period has elapsed.

3.5 CLEANING

.1 Remove uncured sealant with Reducer 990, xylene, toluene or MEK. Remove cured sealant by razor, scraping or mechanically.

.2 Remove all debris related to application of sealants from job site in accordance with all applicable regulations for hazardous waste disposal.

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

1 General

1.1 WORK INCLUDED

.1 All hollow metal (HM) steel frames, and screens as per Door Schedules, and as detailed on Drawings.

.2 Provide steel doors and frames including but not limited to following:

- .1 Insulated exterior metal doors.
- .2 Hollow metal transom panels.
- .3 Hollow metal door frames.
- .4 Glazing stops.

1.2 RELATED REQUIREMENTS

.1 Section 07 92 00 - Joint Sealants.

.2 Section 09 91 00 - Painting.

1.3 REFERENCES

.1 Canadian Standards Association (CSA).

- .1 CSA A101-M1983, Thermal Insulation, Mineral Fibre, for Buildings.
- .2 CSA W59-M1989, Welded Steel Construction (Metal Arc Welding).
- .3 CSA-A440.S1, Canadian Supplement.
- .4 AAMA/WDMA/CSA 101/I.S.2/A-440.

.2 Canadian General Standards Board (CGSB).

- .1 CAN/CGSB-1.181-92, Ready-Mixed Organic Zinc-Rich Coating.
- .2 CGSB 51-GP-21M-78, Thermal Insulation, Urethane and Isocyanurate, Unfaced.
- .3 CAN/CGSB-82.5-M88, Insulated Steel Doors.
- .4 CSA W59-03, Welded Steel Construction (Metal Arc Welding).
- .5 CAN4-S104-M80, Standard Method for Fire Tests of Door Assemblies.
- .6 CAN4-S105-M85, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.
- .7 CAN/ULC-S702-97, Standard for Mineral Fibre Thermal Insulation for Buildings.

.3 American Society for Testing and Materials (ASTM).

- .1 ASTM A 525M-91b, General Requirements for Steel Sheet Zinc-Coated (Galvanized) by the Hot-Dip Process Metric.
- .2 ASTM A 526M-90, Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
- .3 ASTM A 527M-90, Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality.
- .4 ASTM B 29-92, Pig Lead.
- .5 ASTM A924M-07, Specification for General Requirements for Steel Sheet, Metallic- Coated by Hot-Dip Process.
- .6 ASTM C518-04, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- .7 ASTM C578-07, Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- .8 ASTM C665-06, Specification for Mineral Fiber Insulation.
- .9 ASTM C1289-07, Specification for faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

.4 CAN/ULC-S702-97 - Standard for Mineral Fibre Thermal Insulation for Buildings.

- .1 CSDMA, Commercial Steel Doors and Frames, 2006.
- .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors, 1990.

.5 ANSI:
- .1 ANSI A115-05, Hardware Preparations for Steel Doors and Frames.
- .2 ANSI A115-IG 94, Installation Guide for Doors and Hardware.
- .3 ANSI A224.1-94, Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- .4 ANSI A250.4-01, Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.

1.4 DESIGN REQUIREMENTS

.1 Design exterior frame assembly to accommodate expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.

.2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

.3 Product quality shall meet standards set by (CSDMA) Canadian Steel Door and Frame Manufacturers Association.

1.5 SUBMITTALS

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

.2 Product Data:
- .1 Submit manufacturer's product specification, construction details, material, finish descriptions and dimensions of individual components.
- .2 Submit manufacturer's literature, data sheets for each type of material provided under this Section for project.
- .3 Data sheets shall provide all required information.
- .4 Submit required copies of detailed instructions for inclusion in maintenance manual.
- .5 Submit manufacturer's installation instructions.

.3 Material Safety Data Sheets:
- .1 Submit MSDS for inclusion in Operation and Maintenance Manual.

.4 Shop Drawings:
- .1 Show each type of frame, door, core, metal thicknesses and finishes, openings (glazed and/or louvred), fire ratings, location of exposed fasteners, cutouts, hardware blanking, reinforcing, tapping and drilling arrangements.
- .2 Show large scale frame sections and anchoring details.
- .3 Submit door and frame schedule identifying each unit.
- .4 Ensure each unit bears legible identifying mark corresponding to that listed in Door and Frame Schedule.
- .5 Fabrication shall not proceed without receipt of reviewed submittal drawings and reviewed hardware schedule.

.5 Test Reports:
- .1 Submit following test reports:
  - .1 Steel door and frame assemblies supplied under this Section meet acceptance criteria of ANSI A224.1 and ANSI A250.4, Level "A".

1.6 DELIVERY, STORAGE AND HANDLING

.1 Be responsible for supply of products under this Section to site in timely manner, so as not to delay progress of other trades.

.2 Protect doors and frames during shipping and storage.

.3 Inspect all materials thoroughly upon receipt and report all discrepancies, deficiencies and/or damages immediately in writing to the Supplier. Note all damage on carrier's Bill of Lading.

.4 Make good immediately any damage done. Clean scratches and touch up with rust-

inhibitive primer. Replace damaged work which cannot be repaired, restored or cleaned.

.5 Store in a dry, secure location, on planks or dunnage. Doors and frame shall be stored in a vertical position, spaced with blocking. Materials shall be covered to protect them from damage but is such a manner as to permit air circulation. Site storage and protection of materials shall be in accordance with NAAMM-HMMA 840.

1.7 OPENING SIZES

.1 Method of measuring sizes:

.1 Width - Width of openings shall be measured from inside to inside of frame jamb rabbets.

.2 Height - Heights of openings shall be measured from the level finished floor (exclusive of floor coverings to the head rabbet of the frame.

.3 Door sizes - Doors shall be sized so as to fit the above openings and allow 3 mm maximum clearance at jambs and head of frame. A clearance of 6 mm maximum shall be allowed between the bottom of the door and the finished floor (exclusive of floor coverings). These are considered to be nominal clearances, subject to ordinary commercial variations.

1.8 WARRANTY

.1 Warrant work of this Section for period of 1 year against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to; buckling, opening of seams, bond failure and extensive colour fading.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 ACCEPTABLE MATERIALS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Ambico Limited; www.ambico.com

.2 Apex Machine Works Limited; www.apexmw.com

.3 Daybar Industries Limited; www.daybar.com

.4 Fleming Door Products Limited; www.flemingdoor.com

2.2 MATERIALS

.1 Hot dipped galvanized steel sheet: to ASTM A 526M or ASTM A 527M coating designation to ASTM A 525M, ZF75, minimum base steel thickness in accordance with CSDFMA Table 1 - Thickness for Component Parts.

.2 Reinforcement channel: to CAN/CSA-G40.21, Type 44W, coating designation to ASTM A 525M, ZF75.

.3 Composites: balance of core materials used in conjunction with lead: in accordance with manufacturers' proprietary design.

2.3 DOORS: CORE MATERIALS

.1 Exterior doors to have styrene core.

.2 Stiffened: face sheets welded, honey comb, insulated core.

2.4 DOORS: CONSTRUCTION

.1 Form each face sheet for exterior doors from 18 ga sheet steel.

.2 Reinforce doors with vertical stiffeners, securely welded to each face sheet at 150 mm on centre maximum.

.3 Fill voids between stiffeners of doors with fibreglass core.

2.5 DOORS: FABRICATION GENERAL

.1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.

.2 Exterior doors: hollow steel styrene insulated construction. Interior doors: honeycomb construction.

.3 Fabricate doors with longitudinal edges tack welded. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.

.4 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.

.5 Reinforce doors where required, for surface mounted hardware. Provide flush vinyl top caps to exterior doors.

.6 Manufacturer's nameplates on doors are not permitted.

.7 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.

.8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

2.6 PRIMERS

.1 Touch-up prime CAN/CGSB-1.181.

2.7 ACCESSORIES

.1 Door silencers: single stud rubber/neoprene type.

.2 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

.3 Metallic paste filler: to manufacturer's standard.

.4 Sealant: Refer to Section 07 92 00 - Joint Sealants.

2.8 FRAMES: WELDED TYPE

.1 Welding in accordance with CSA W59.

.2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.

.3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.

.4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.

.5 Securely attach floor anchors to inside of each jamb profile.

.6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

.7 When required due to site access or due to shipping limitations, frame products for large openings shall be fabricated in sections, with splice joints for field assembly by others.

.8 Securely attach lead to inside of frame profile from return to jamb soffit (inclusive) on door side of frame only, where lead lined doors required.

2.9 FRAME ANCHORAGE

.1 Frame Anchors:
  .1 Frame anchor Products shall be provided with anchorage appropriate to floor, wall and frame construction.
.2 Floor Anchors:
  .1 Where frame Product is installed prior to construction of adjacent wall, each jamb shall be provided with 1.52 mm (16 ga) steel floor anchors.
  .2 Each anchor shall be provided with 2 (two) holes for mounting to floor and shall be securely welded to inside of jamb profile.
.3 Wall Anchors:
  .1 Each wall anchor shall be located immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
  .2 Provide 2 anchors for rebate opening heights up to and including 1500 mm and one (1) additional anchor for each additional 760 mm of height or fraction thereof, except as indicated below.
  .3 Frame installed in stud and drywall partitions shall be provided with 20 gauge steel snap-in or "Z" stud type anchors.
  .4 Supply frame anchors to gypsum board installers with directions for installing steel door frames in solid gypsum board partitions.
  .5 Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcing and directly opposite on the strike jamb.
  .6 Extensions shall be fabricated from 2.66 mm (12 ga) steel formed channels, mounting angles and adjusting brackets, with mounting angles welded to the inside of frame head.
  .7 Formed adjusting brackets and fasteners shall be shipped loose.
  .8 Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on site, by Subcontractor responsible for installation.

2.10 HARDWARE PREPARATION

.1 Doors and frames shall be prepared to receive hardware.
.2 Unless otherwise shown on the drawings, locate hardware in accordance with the Recommended Locations For Architectural Hardware as published by the Door and Hardware Institute.
.3 Prepare doors and frames to receive electrified hardware.
.4 Frame preparation shall include the application of shallow back boxes suitable for EMT termination at all device locations.
.5 Back boxes shall be of sufficient size allowing for wiring, connectors, and the device to be properly installed in the mortise.
.6 Door preparation shall include the installation of conduit or suitable wire raceway within door assemblies during fabrication.

2.11 FABRICATION

.1 Permit access by an approved inspection and testing company for purpose of inspecting at random doors under fabrication.
.2 Welding: CSA W59-M.
.3 Grind exposed welds smooth and flush. Fill open joints, seams and depressions with filler or by continuous brazing or welding. Grind smooth to true sharp arises and profiles and sand down to smooth, true, uniform finish.
.4 Hardware Requirements and Preparations:
  .1 Door and frame shall be blanked, reinforced, drilled and tapped at factory for fully templated hardware only in accordance with approved hardware schedule

and templates provided by hardware Supplier.

.2 Check hardware list for requirements.

.3 Door and frame shall be blanked and reinforced only for mortised hardware that is not fully templated.

.4 Where surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges or non templated hardware apply, frame shall be reinforced only, with drilling and tapping done by others in field.

.5 Templated holes 12.7mm diameter and larger shall be factory prepared except mounting and through bolts holes which shall by Subcontractor responsible for installation on site, at time of application.

.6 Templated holes less than 12.7mm diameter shall be factory prepared only when required for function of device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.

.7 Hinge reinforcing shall be 3.42 mm (10 ga) steel minimum, high frequency type be provided.

.8 Reinforcing for continuous hinges shall be 2.66 mm (12 ga) minimum.

.9 Cylindrical lock, ASA strike and flush bolt reinforcing shall be 2.66 mm (12 ga) steel minimum.

.10 Mortise lock and surface mounted hardware reinforcing shall be 1.52 mm (16 ga) steel minimum.

.11 Provide all hardware mortises on perimeter frame members shall be grouted.

.12 In masonry or concrete partitions with 0.76 mm (22 ga) steel grout guards. Where electrified hardware is specified on approved Hardware Schedule, steel door and frame shall have CSA approved system consisting of CSA approved conduit and junction boxes.

.13 Refer to Section 08 71 00 -Door Hardware for openings that require electrified hardware unless indicated otherwise.

.5 Frames - General:

.1 Fabricate frames for doors, screens and borrowed lights to profiles indicated.

.2 Reinforce frame as required for surface mounted hardware.

.3 For door frames wider than 1500 mm, reinforce door frame head and jamb and mullions at junction of head.

.4 Prepare each door opening for single stud door silencers: 3 for single door openings placed opposite hinges: 2 for double door openings approximately 150 mm each side of centreline of head stop.

2.12 SEALANT

.1 As recommended by installer in accordance with Section 07 92 00 - JointSealants.

3 Execution

3.1 INSTALLATION GENERAL

.1 Install doors and frames to CSDMA Installation Guide.

3.2 FRAME INSTALLATION - GENERAL

.1 Set frames plumb, square, level and at correct elevation.

.2 Secure anchorages and connections to adjacent construction.

.3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width.

.4 Provide vertical support at center of head for openings over 1200 mm wide.

.5 Provide vertical support at center of head for openings over 1200 mm wide.

.6 Remove temporary spreaders after frames are built-in.

.7 Caulk perimeter of frames between frame and adjacent material.

.8 Maintain continuity of vapor barrier and air barrier.

3.3 DOOR INSTALLATION - GENERAL

.1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.

.2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.

.1 Hinge side: 1.0 mm.

.2 Latch side and head: 1.5 mm.

.3 Finished floor, top of carpet: 13 mm.

.3 Adjust operable parts for correct function.

.4 Install louvers.

3.4 HOLLOW METAL DOORS

.1 Install hollow metal doors in accordance with manufacturer's instructions.

.2 Install in accordance with following edge clearances unless otherwise indicated:

.1 Between doors and frames at head and jambs: 3 mm.

.2 At door bottom: 19 mm maximum to unfinished floor, 6 mm maximum to finished floor unless indicated to be undercut.

.3 Between meeting edges of pairs of doors: 3 mm.

3.5 HOLLOW METAL FRAMES

.1 Install hollow metal frames in accordance with manufacturer's instructions.

.2 Set frames plumb, square, level and at correct elevation, maintaining uniform door width and height.

.3 Secure anchorages and connections to adjacent construction.

.4 Brace frames rigidly in position while being built in.

.5 Provide vertical supports and horizontal spreaders to prevent deflection and warping.

.6 Allow for deflection to prevent structural loads from being transmitted to frame.

.7 Provide batt insulation to completely fill pressed steel frames of exterior doors and adjacent cavities.

.8 Door Jamb Extensions:

.1 Provide solid blocking and securement between all door frame extensions, metal stud and door frames at a minimum four locations per door jamb.

3.6 FINISH REPAIRS

.1 Touch up with primer finishes damaged during installation with zinc primer to CGSB 1-GP-181.

.2 Fill exposed frame anchors and with metallic paste filler and sand to a uniform smooth finish.

END OF SECTION

1 General

1.1 SUMMARY

.1 Supply and deliver all finish hardware as specified in hardware sets for doors listed on door schedule. Hardware shall include all fasteners and devices necessary for the proper installation of hardware.

1.2 RELATED REQUIREMENTS

.1 Section 08 11 13 - Hollow Metal Doors and Frames.

1.3 REFERENCES

.1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).

- .1 CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frames Manufacturer's Association.

.2 Canadian General Standards Board (CGSB).

- .1 CAN/CGSB 69.17 M86(R1993), Bored and reassembled Locks and Latches.
- .2 CAN/CGSB 69.18 M90/ANSI/BHMA A156.1 1981, Butts and Hinges.
- .3 CAN/CGSB 69.19 93/ANSI/BHMA A156.3 1984, Exit Devices.
- .4 CAN/CGSB 69.20 M90/ANSI/BHMA A156.4 1986, Door Controls (Closers).
- .5 CAN/CGSB 69.21 M90/ANSI/BHMA A156.5 1984, Auxiliary Locks and Associated Products.
- .6 CAN/CGSB 69.22 M90/ANSI/BHMA A156.6 1986, Architectural Door Trim.
- .7 CAN/CGSB 69.24 M90/ANSI/BHMA A156.8 1982, Door Controls Overhead Holders.
- .8 CAN/CGSB 69.26 96/ANSI/BHMA A156.10 1991, Power operated Pedestrian Doors.
- .9 CAN/CGSB 69.28 M90/ANSI/BHMA A156.12 1986, Interconnected Locks and Latches.
- .10 CAN/CGSB 69.29 93/ANSI/BHMA A156.13 1987, Mortise Locks and Latches.
- .11 CAN/CGSB 69.30 93/ANSI/BHMA A156.14 1991, Sliding and Folding Door Hardware.
- .12 CAN/CGSB 69.31 M89/ANSI/BHMA A156.15 1981, Closer/Holder Release Device.
- .13 CAN/CGSB 69.32 M90/ANSI/BHMA A156.16 1981, Auxiliary Hardware.
- .14 CAN/CGSB 69.33 M90/ANSI/BHMA A156.17 1987, Self closing Hinges and Pivots.
- .15 CAN/CGSB 69.34 93/ANSI/BHMA A156.18 1987, Materials and Finishes.
- .16 CAN/CGSB 69.35 M89/ANSI/BHMA A156.19 1984, Power Assist and Low Energy Power Operated Doors.
- .17 CAN/CGSB 69.36 M90/ANSI/BHMA A156.20 1984, Strap and Tee Hinges and Hasps.

.3 All hardware shall comply with requirements of the National Building Code (2015).

1.4 REQUIREMENTS OF REGULATORY AGENCIES

.1 Use ULC listed and labeled hardware for doors in fire separations and where noted on Door Schedule (located at the end of this document in the Schedules section).

1.5 SUBMITTALS

.1 Product Data:

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

.2 Hardware List:

.1 Submit Finish Hardware Schedule electronically for approval.

.2 Schedule shall be written in accordance with DHI Sequence and Format for vertical hardware schedule publication.

.3 Schedule shall reference item and door number to hardware set specified.

.4 Door index to be included referencing the door number to scheduled item number.

.5 Submit electronic copies of keying schedules for approval.

.6 Schedule shall be written in accordance with DHI Handbook Keying Schedule Systems and Nomenclature. Coordinate all keying in writing.

.3 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.2 Provide template drawings as requested.

.4 Closeout Submittals

.1 Provide operation and maintenance data for door closers, lockets, door holders electrified hardware and fire exit hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.6 QUALITY ASSURANCE

.1 Hardware supplier must have on staff an Architectural Hardware Consultant or person of equivalent qualification and experience. Hardware supplier must have been in hardware supply for a minimum of two (2) years, have supplied similar type projects, and have adequate facilities to service project.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Trade Contractor to provide clean, dry locked room for storage of hardware on shelving.

.2 Each hardware item shall be delivered to site in manufacturers original packaging. Each item shall be labeled with door and item number to correspond with hardware schedule.

.3 All hardware will be delivered to one receiving are on site.

1.8 WARRANTY

.1 Furnish a one-year written warranty for all products with exceptions of door closers, Mortise locksets and latchsets which shall be warranted for ten (10) years, and exit devices and trim, overhead holders and stops which shall be warranted for five (5) years.

1.9 WASTE DISPOSAL AND MANAGEMENT

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MANUFACTURERS

.1 Acceptable Material:

.1 As specified below in Hardware Group No. 01.

2.2 FINISH

.1 As noted in hardware packages.

2.3 KEYING

.1 All cylinders construction, master keyed.

.2 Provide three (3) master keys for each MK or GMK group.

.3 Stamp keying code numbers on keys and cores.

2.4 FASTENINGS

.1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.3 Exposed fastening devices to match finish of hardware.

.4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.

.5 Use fasteners compatible with material through which they pass.

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.

.2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.3 Recommend mounting heights shall be in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturer's Association.

.4 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 INSTALLATION

.1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.

.2 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.3 Install key control cabinet.

.4 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.

.5 Remove construction cores when directed by Consultant; install permanent cores and check operation of locks.

3.3 ADJUSTING

.1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety, weather tight closure and to provide tight fit at contact points with frames.

3.4 CLEANING

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

.2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.

.3 Remove protective material from hardware items where present.

3.5 PROTECTION

.1 Provide proper protection of all hardware items until Owner accepts project as complete.

3.6 HARDWARE GROUPS

.1 Hardware Group No. 01

For use on mark/door #(s): 103.1

3 EA	Hinge	5BB1 NRP 4.5x5	630	IVE
1 EA	Deadbolt & Thumbturn	D121	630	FAL
1 EA	Surface Closer	4040 XP	689	LCN
1 EA	OH Stop	1005	630	GLY
1 EA	Lockset	ND405 ATH	626	SCH
2 EA	Kickplate	8400 12" x 30"	630	IVE
1 SET	Weatherstrip	W-20N x Door Width x (2) Door Height	628	KNL
1 EA	Door Sweep	W-245 x Door Width	628	KNL
1 EA	Threshold	CT-10 x Door Width	627	KNL

END OF SECTION

1 General

1.1 DESCRIPTION OF WORK

.1 The work of this Section comprises the provision of all equipment, labour and materials necessary for the supply and installation of all interior and exterior glass and glazing as follows:

.1 Glazing for exterior windows.

1.2 RELATED REQUIREMENTS

.1 Section 08 11 13 - Hollow Metal Doors and Frames

1.3 REFERENCES

.1 American National Standards Institute (ANSI).

.1 ANSI/ASTM E330-02, 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 International, (ASTM).

.1 ASTM C542-94(1999), Specification for Lock-Strip Gaskets.

.2 ASTM D1003-00, Test Method for Haze and Luminous Transmittance of Plastics.

.3 ASTM D2240-02b, Test Method for Rubber Property - Durometer Hardness.

.4 ASTM E84-01, Test Method for Surface Burning Characteristics of Building Materials.

.5 ASTM F1233-98, Test Method for Security Glazing Materials and Systems.

.6 ASTM C509-06, Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.

.7 ASTM C510-05a, Standard Test Method for Staining and Colour Change of Single or Multicomponents Joint Sealants.

.8 ASTM C794-06, Standard Test Method for Adhesion in Peel of Elastomeric Joint Sealants.

.9 ASTM C864-05, Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

.10 ASTM C920-05, Standard Specification for Elastomeric Joint Sealants.

.11 ASTM C1036-06, Standard Specification for Flat Glass.

.12 ASTM C1048-04, Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.

.13 ASTM C1115-06, Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.

.14 ASTM C1376-03, Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.

.15 ASTM E1300-07e1, Practice of Determining Load Resistance of Glass in Buildings.

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

.2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.

.3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.

.4 CAN/CGSB-12.8-97, Insulating Glass Units.

.5 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting.

.6 CAN/CGSB-19.13-M87, Sealing Compound, One-Component, Elastomeric, Chemical Curing.

.7 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.

.8 CAN4-S104-M80, Fire Test of Door Assemblies.

.9 CAN4-S106-M80, Fire Test of Windows and Glass Assembles.

1.4 SYSTEM DESCRIPTION

.1 Design Requirements:

.1 Design glass and glazing to CAN/CGSB-12.20-M complying to OBC design and regulations of authorities having jurisdiction, which shall be minimum, except where more stringent requirements are specified herein. In case of conflict of requirements comply with most stringent requirements.

.2 Provide accessories, closures and trims required and necessary to complete work.

.2 Performance Requirements:

.1 Ensure solvents and/or other volatile elements in glazing system do not affect properties and performance of materials used for edge seal and sealant glass bond.

.2 Ensure materials used for edge seals are compatible with other materials they come in contact within glazing system. If required, perform compatibility tests to ASTM C510, ASTM C794 and ASTM C1087, or others as applicable.

.3 Use sealants and other materials in glazing system which are unaffected by long term UV light exposure.

1.5 SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheets.

.3 Material Safety Data Sheets:

.1 Submit MSDS for inclusion in Operation and Maintenance Manual.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.5 Closeout Submittals:

.1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.6 QUALITY ASSURANCE

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

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

.3 Pre-installation Meetings: attend pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.4 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals

.5 Perform work in accordance with FGMA Glazing Manual, IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver glass and associated materials to site in original crates and containers with manufacturer's name and brand distinctly marked thereon and with glass labelled as to types. Do not remove labels on glass until after work is accepted by Consultant.

.2 Store materials within the building, in a clean, dry location, acceptable or as designated by Consultant. Fully protect materials from damage of any kind until ready for use.

1.8 PROJECT CONDITIONS

.1 Environmental Requirements: No glazing done when temperature is less than 7 deg C or sash or frames are wet, damp or frosted.

.2 Protect work of other trades from damage resulting from work of this Section.

.3 Identify glazed openings immediately following glass installation. Use coloured tapes or flags suspended near, but not in contact with glass. Attach to frames or surround with suitable non-staining strippable adhesives or tapes.

1.9 WARRANTY

.1 Warrant factory sealed insulating units for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract.

.2 Warrant that factory sealed insulating units be free from material obstruction of vision as result of dust or film formation on internal glass surfaces by any cause, under normal conditions anticipated under this Project, other extrinsic glass breakage, but including breakage due to thermal shock and temperature differential due to inherent glass or glazing fault.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 ACCEPTABLE MATERIALS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

- .1 AGC Flat Glass North America, Ltd.; www.na.agc-flatglass.com.
- .2 Ace Security Laminates; www.acesecuritylaminates.com.
- .3 Barber Glass Industries; www.barberglass.com.
- .4 GE Silicones; www.gesilicones.com.
- .5 Guardian Industries Corp.; www.guardian.com.
- .6 PPG Canada Inc.; www.ppgglass.com.
- .7 Pilkington Special Glass Limited; www.pilkington.com.
- .8 Prelco Inc.; www.prelco.com.
- .9 Schott North America Inc.; www.us.schott.com.
- .10 Viracon Inc.; www.viracon.com.
- .11 Tremco Canada; www.tremcosealants.com.
- .12 Trulite Industries Limited; www.trulite.com.

2.2 MATERIALS: FLAT GLASS

.1 Glass: Free from bubbles, waves, discolouration and other defects and of following types for locations indicated on Drawings or noted on Door Schedule. Ensure glass bears manufacturer's label indicating quality. Leave labels in place until final cleaning.

.2 Single Glazed Glass Types:

- .1 Tempered Glass (TGL):
  - .1 Minimum 6 mm.
  - .2 Conforming to ASTM C1048, CAN/CGSB-12.1-M, Type 2 tempered, Class B float glass, Category II.

.3 Perform heat strengthening using horizontal tong free method; surface compression not less than 7500 psi.

.3 Glazing, Sealing Compounds and Accessories:

.1 Ensure glazing, sealing compounds and accessories are compatible with all contact surfaces of frames, other accessories used in glazing system and contact surfaces of compounds used on insulated glass units.

.2 Wood or other organic materials are not acceptable for use in glazing systems including spacer blocks.

.3 Glazing Compound:

.1 Non-hardening modified oil type.

.2 Colour to match adjacent surfaces unless indicated otherwise.

.4 Sealant Compound: One component type, elastomeric chemical curing, CAN/CGSB- 19.13-M, Class G-2-25-A-N. Colour to match adjacent surfaces unless indicated otherwise.

.5 Sealant Compound:

.1 CAN/CGSB-19.24-M, multi-component chemical curing, Type 2, Class A.

.2 Colour to match adjacent surfaces.

.6 Sealant Compound:

.1 One component, silicone base solvent curing.

.2 Colour to match adjacent surfaces.

.7 Elastomeric Joint Sealants: ASTM C920.

.8 Sealant for Interior Glass-to-Glass Butt Glazing Installation:

.1 Translucent 1 part silicone sealant conforming to U.S. Federal Specification TT-S-001543 (Silicone Building Sealant) and TT-S-0230, CAN/CGSB-19.13-M and ASTM C920, (One Component Building Sealant).

.2 "Tremsil 200" by Tremco Canada;

.3 "DC 999" by Dow Corning Canada.

.4 Cellular Gaskets for Compression Glazing:

.1 ASTM C509 cellular, elastomeric, preformed, black.

.2 Closed cell neoprene or EPDM extrusions including molded corners where applicable by Cellular Rubber Extrusions Tremco Canada.

.5 Dense Gaskets for Compression Glazing:

.1 ASTM C864, Option II or ASTM C1115, Type C, dense neoprene or EPDM extrusions, 60 and 70 Durometer density including molded corners where applicable.

.2 Poly-Wej Gaskets Tremco Canada.

.6 Glazing Splines:

.1 Neoprene or EPDM manufacturer's standard dry glazing splines to suit aluminum extrusions.

.2 Colour to match adjacent surfaces unless indicated otherwise

.7 Glazing Points and Wire Spring Clips:

.1 Corrosion resistant, manufacturer's standards.

.8 Edge Blocking, Setting Blocks, Later Shims, Gaskets and Tapes:

.1 Edge Blocking for Glass:

.1 60 - 70 Durometer neoprene, silicone or EPDM, channel shaped, 100 mm - 150 mm long.

.2 Setting Blocks:

.1 7 mm x 100 mm EPDM or extruded 80-90 Durometer neoprene; at insulating glass, use EPDM only. At fire-rated glazed doors and

partitions, use similar sized fire-rated silicone GE "Gel 516" or asbestos cement blocks.

.2 Width; 1.6 mm to 3 mm less than design glazing pocket width.

.3 For 4 sided structural glazing, use silicone compatible rubber or silicone.

.3 Lateral Shims:

.1 Neoprene, silicone or EPDM, 40 - 60 Durometer, 100 mm long or as required.

.4 Non-Compression Glazing Tape for Interior Aluminum Screen Glazing:

.1 Preformed, 100% solids, cross linked butyl rubber, polyisobutylene, hardness 65 Durometer, unaffected by UV through glass.

.2 Tape shall be sufficiently wide and thick as to completely cover bite area of glazing unit when the unit is pushed into place.

.3 Acceptable Material shall be "Tremco 440 Tape" by Tremco Canada.

.5 Compression Glazing Gaskets for Interior Aluminum Screen Glazing:

.1 EPDM, neoprene, thermoplastic or other acceptable material with Shore A Durometer of 35, ± 5.

.2 Dual Durometer gaskets of a specific acceptable type are also acceptable.

.3 Ensure material has sufficient thickness or be of a configuration to allow 25% compression when installed, have a minimum 2000 psi (1500 psi for silicone) tensile strength, resistance to permanent set of 30% maximum, minimum elongation at break of 300% (700% for silicone) and resistance to ozone showing no cracks. "VISIONstrip®" by Tremco Canada.

.4 Acceptable material: Armet, Dow Corning and PTI.

.6 Compression Glazing Tape:

.1 Preformed, ribbon-shaped, non-skinning, 100% solids, non-oxidizing polyisobutylene: butyl, paper release, EPDM shim with continuous synthetic rubber spacer rod of 60 Durometer hardness.

.2 Ensure tape is sufficiently wide and thick to completely cover bite area of glazing unit when unit is pushed into place.

.3 Acceptable material: Polyshim II Tape" by Tremco Canada.

.9 Primer Sealers and Cleaners: To glass and plastic glazing manufacturer's standards.

2.3 ACCESSORIES

.1 Qualified products: only compounds listed on the CGSB Qualified Products list are acceptable for use on this project.

.2 Glazing compound: oil base, to CAN/CGSB-19.6, Type 1, color to match adjacent metal.

.3 Sealant compound: one component acrylic base, to CGSB 19-GP-5M, gun grade, color to match adjacent material.

.4 Sealant compound: two-component polysulphide base, to CAN2-19.24, gun grade, color to match adjacent metal.

.5 Glazing splines: E.P.D.M. or neoprene. Manufacturer's standard dry glazing splines to suit aluminum extrusions, black color.

.6 Glazing points and wire spring clips: corrosion resistant, manufacturer's standard.

.7 Cap bead: one component silicone, neutral cure, CGSB 19-GP-23, gun grade, color white.

.1 Acceptable material:

.1 Tremco "Spectrum 2" .

.2 Sonneborn "Omniseal".

.8 Setting blocks: Neoprene, 80-90 Shore A durometer hardness to ASTM D2240, length of 25 mm for each square meter of glazing.

.9 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.

.10 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; size as required; black/ bronze color.

.11 Glazing clips: manufacturer's standard type.

.12 Glazing points and wire spring clips: corrosion resistant, manufacturer's standard.

.13 Lock-strip gaskets: to ASTM C542.

.14 Cap bead: one component silicone, neutral cure, to CGSB 19-GP-23, gun grade, color white.

Acceptable material:

.1 Trecmo "Spectrum 2"

.2 Sonneborn "Omniseal"

.15 Primer-sealers and cleaners: to glass manufacturer's standard.

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 FABRICATION

.1 Label each light of glass and/or plastic glazing with registered name of Product and weight and quality of glass and/or plastic glazing.

.2 Check dimensions on job site before cutting materials.

.3 Ensure minimum bite or lap of glass and/or plastic glazing on stops and rabbets as recommended by glass and/or plastic glazing manufacturer.

.4 Provide "CLO Clearshield Coating" by CLO Glass Limited to all surfaces having been etched.

3.3 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.

3.4 PREPARATION

.1 Thoroughly clean glass rebates and glass of dust, dirt, mortar and other foreign materials prior to glazing. Remove oils and grease with non-staining solvents such as Xycol or Methyl Ethyl Ketone solutions.

3.5 WORKMANSHIP

.1 Remove protective coatings and clean contact surfaces with solvent and wipe dry.

.2 Apply primer-sealer to contact surfaces.

.3 Place setting blocks as per manufacturer's instructions

.4 Install glass, rest on setting blocks, ensure full contact and adhesion at perimeter.

.5 Install removable stops, without displacing tape or sealant.

.6 Provide edge clearance of 3 mm minimum.

.7 Insert spacer shims to center glass in space. Place shims at 600 mm oc and keep 6 mm below sight line.

.8 Apply cap bead of sealant at full perimeter of exterior, at all aluminum window glazing.

.9 Apply sealant to uniform and level line, flush with sight line and tooled or wiped with, solvent to smooth appearance.

.10 Do not cut or abrade tempered, heat treated, or coated glass.

3.6 DOOR TRANSOMS

.1 All doors transoms to be glazed with 6mm tempered units, in accordance with the requirements of this Section, to door manufacturer's standard glazing installation practice unless noted other wise on drawings.

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 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 Provide and maintain necessary protection of completed work against damage.

.2 Do not mark or attach anything directly to exposed glass and framing surfaces.

.3 If welding is to take place above or near completed glazing work, protect glass with plywood or other suitable means to reduce likelihood of weld spatter damaging glass surfaces.

.4 Protect glass from other trades, workers, tools and other similar materials.

.5 Replace cracked, broken, or defective glass at no additional cost to the Owner and to Consultant's satisfaction.

.6 Identification of Glazing: Mark glass lites with temporary, easily removable, large safety markings, immediately after glass installation. Maintain safety markings until final clean-up.

END OF SECTION

1 General

1.1 DESCRIPTION OF WORK

.1 The work of this Section comprises the furnishings of all labour, equipment and materials necessary for the supply and installation of the Ceramic Tile as indicated on the Drawings. which includes but is NOT necessarily limited to:

.1 Floor Ceramic Tile

.2 Work Included: Provide ceramic tile including but not limited to following:

.1 Grouting control joints in floor slab under tile.

.2 Waterproof membrane.

.3 Anti-fracture membrane.

.4 Leveling bed.

.5 Thin set mortar bed.

.6 Ceramic floor tile, base, trims and fittings.

.7 Ceramic wall tile and trims.

.8 Porcelain tile.

.9 Installation systems, mortars and grouts.

.10 Sealing tile control joints and other accessories.

.11 Sealing penetrations through wall and floor tile.

1.2 RELATED REQUIREMENTS

.1 Section 07 92 00 - Joint Sealants.

1.3 REFERENCES

.1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)

.1 ANSI A108.1-99, Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).

.2 CTI A118.3-92, Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).

.3 CTI A118.4-92, Specification for Latex Portland Cement Mortar (included in ANSI A108.1).

.4 CTI A118.5-92, Specification for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation (included in ANSI A108.1).

.5 CTI A118.6-92, Specification for Ceramic Tile Grouts (included in ANSI A108.1).

.6 ANSI A108.1-05, Installation of ceramic tile with Portland cement mortar.

.7 ANSI A108.4-99(R2005), Installation of ceramic tile with organic adhesives.

.8 ANSI A108.5, Installation of ceramic tile with dry-set Portland cement/latex Portland cement mortar.

.9 ANSI A108.6-99(R2005), Installation of ceramic tile with chemical resistant, water cleanable tile setting/grouting epoxy.

.10 ANSI A108.9-99(R2005), Installation of ceramic tile with modified epoxy emulsion mortar/ grout.

.11 ANSI A108.10-99(R2005), Installation of grout in tile work

.12 ANSI A108.11-99(R2005), Installation of cementitious backer unit.

.13 ANSI A108.12-99(R2005), Installation of ceramic tile with EGP (Exterior Glue Plywood) Latex Portland Cement Mortar.

.14 ANSI A108.13-05, Installation of load bearing, bonded, waterproofing membranes for thin set ceramic tile and dimension stone.

.15 ANSI A118.3-99(R2005), Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy

Adhesive.

.16 ANSI A118.4-99(R2005), Specification for Latex-Portland Cement Mortar.

.17 ANSI A118.5-99(R2005), Specification for Furan Mortars and Grout.

.18 ANSI A118.6-99(R2005), Specification for Ceramic Tile Grouts.

.19 ANSI A118.7-99(R2005), Polymer modified cement grouts for tile Installation.

.20 ANSI A108.9-99(R2005), Cementitious backer unit.

.21 ANSI A118.10-99(R2005), Specification for Load Bearing, Bonded Waterproof Membrane for Thin-set Ceramic Tile and Dimension Stone Installation.

.22 ANSI A118.11-99(R2005), Standard for EGP (Exterior Glue Plywood) Latex Portland Cement Mortar.

.23 ANSI A136.1-99(R2005), Specification for Organic Adhesives for the Installation of Ceramic Tile.

.24 ANSI A137.1, Recommended Standard Specification for Ceramic Tile.

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

.1 ASTM C144-99, Specification for Aggregate for Masonry Mortar.

.2 ASTM C 207-91(1997), Specification for Hydrated Lime for Masonry Purposes.

.3 ASTM C979-99, Specification for Pigments for Integrally Colored Concrete.

.4 ASTM A185M-07, Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.

.5 ASTM C144-04, Specification for Aggregate for Masonry Mortar.

.6 ASTM C207-06, Specification for Hydrated Lime for Masonry Purposes.

.7 ASTM C373-88(06), Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products.

.8 ASTM C503-08, Specification for Marble Dimension Stone (Exterior)

.9 ASTM C627-93(99), Evaluating ceramic tile installation systems.

.10 ASTM C648-04, Specification for Standard Test Method for Breaking Strength of Ceramic Tile.

.11 ASTM C650-04, Test Method for Resistance of Ceramic Tile to Chemical Substances.

.12 ASTM C847-06, Specification for Metal Lath.

.13 ASTM C1027-99(04), Determining visible abrasion resistance of glazed ceramic tile.

.14 ASTM C1028-07, Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34-M86(R1988), Vapor Barrier, Polyethylene Sheet for Use in Building Construction.

.2 CGSB 71-GP-22M-78, Adhesive, Organic, for Installation of Ceramic Wall Tile.

.3 CAN/CGSB-75.1-M88, Tile, Ceramic.

.4 CAN/CGSB-25.20-95, Surface Sealer for Floors.

.5 CGSB 71-GP-22M, Adhesive, Organic, for Installation of Ceramic Wall Tile.

.6 CGSB 71-GP-29M, Adhesive, Elastomeric, for Installation of Quarry Tiles.

.7 CGSB 71-GP-30M, Adhesive, Epoxy and Modified Mortar Systems for Installation of Quarry Tiles.

.8 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.9 CAN/CGSB-75.1-M88, Tile, Ceramic.

.4 Canadian Standards Association (CSA International)

.1 TTMAC - Terrazzo Tile & Marble Association of Canada - Specification Guide 09

30 00; Tile Installation Manual 2006 - 2007

1.4 DEFINITIONS

.1 Ceramic Tile: Ceramic surfacing unit relatively thin in relation to facial area, made from clay or mixture of clay and ceramic materials, fired at temperature sufficiently high enough to produce specific physical properties and characteristics conforming to Standards specified herein above

.2 Porcelain Tile: Porcelain tile manufactured in various thickness and sizes having matt or unglazed or high polish finish is ceramic tile that is generally made by dust pressed method from a composition which results in tile that is dense, impervious, fine grained, smooth and textured with sharply formed face. Water absorption conforming to ASTM C373.

1.5 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Manufacturer's Instructions:

.1 Provide to indicate special handling criteria, installation sequence, cleaning procedures.

.3 Material Safety Data Sheets:

.1 Submit MSDS for inclusion in Operation and Maintenance Manual.

.4 Shop Drawings:

.1 In addition to minimum requirements indicate following:

.1 Details of construction.

.2 Joint layouts.

.3 Dimensions.

.4 Patterns and makings where applicable.

.5 Samples:

.1 Floor tile: submit duplicate sample of each color, texture, size, and pattern of tile.

.2 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, color, and size.

.3 Submit individual sample panels of each colour of ceramic tile, set with adhesive, grouting and bonding method as specified, showing quality, colour and finish of material, grout and pattern of tiles. Each panel shall be minimum 600 mm x 600 mm.

.6 Maintenance Instructions:

.1 Submit maintenance instructions in accordance with Section 01 78 00 - Closeout Submittals. Provide Owner with required copies of TTMAC Maintenance Guide.

.2 Include specific warnings of any maintenance practice or materials which may damage or disfigure tile work.

.3 Include cleaning methods, cleaning solutions recommended, stain removal methods, polishes and waxes recommended.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Provide Product of company specializing in manufacture of ceramic tile, porcelain tile, mosaics, pavers, trim units and thresholds with minimum experience of 5 years. Provide test reports if requested to substantiate that Products supplied on this Project will be of consistent quality in appearance and physical properties.

.2 Execute work of this Section using a company who is a member in good standing with TTMAC and has minimum five (5) years successful experience in application of Products, systems and assemblies specified. Perform tile work

using skilled mechanics trained and experienced in work of this complexity. Install waterproofing system using an applicator approved by system manufacturer.

.3 Use proprietary Products in full compliance with manufacturer's recommendations. As far as possible obtain Product from single manufacturer ensuring single source responsibility for consistent quality in appearance and physical properties, compatibility with adjacent components while maintaining quality. If requested, manufacturer of installation system shall provide laboratory confirmation to identify proper usage of specified materials. Have manufacturer's representative visit site at commencement of tile work to give proper direction and thereafter at regular interval to ensure proper workmanship.

.2 Mock-Ups:

.1 Where designated or requested, Provide Mock-Ups on site, of each type, style, finish, size, colour of ceramic tile, trims and threshold along with respective installation system.

.2 All pertinent remarks, observations and recommendations shall be discussed in presence of all participants shall be recorded.

.3 Sample flooring area, once accepted, including recorded remarks and recommendations shall become a permanent part of Project and shall be the standard of workmanship against which balance of ceramic tile work will be judged.

.3 Pre-Installation Meetings:

.1 Arrange pre-installation meeting one (1) week prior to commencing work with all parties associated with trade as requested by Consultant. Presided over by Contractor, include Consultant, Subcontractor performing work of this trade and Owner's representative.

.2 Review Contract Documents for work included under this trade and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of work of this Section.

.3 In particular ensure Division 3 requirements for concrete are compatible with requirements of this Section; floor flatness and floor levelness requirements for various floor finishes and their acceptability by ceramic tile manufacturer; surface texture of finished floor required; acceptable approaches to remediation of high moisture and high pH floors; adhesive application and ceramic tile installation.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Comply with material manufacturer’s ordering instructions and lead time requirements to avoid delays.

.2 Coordinate deliveries to comply with construction progress schedule and arrange for above ground, under cover storage before materials are delivered to site.

.3 Store packaged materials in original containers with seals unbroken complete with labels in accordance with manufacturer’s instructions.

.1 Prevent damage to materials and Products during handling and storage.

.2 Keep delivered material dry and free from stains inside weatherproof structure or otherwise protected from freezing and elements.

.3 Store cementitious material off damp surfaces.

.4 Protect organic and epoxy adhesives, additives, mortar mixes and grouts from freezing, moisture and excessive heat during transportation and storage. Maintain temperatures in storage area between 15°C and 20°C.

1.8 EXTRA MATERIAL

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide minimum 2% of each type and color of tile required for project for maintenance use.

.3 Deliver extra stock to Owner as soon as permanent, locking storage facilities are available. Place extra stock in designated storage area where directed.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Safety:

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.

.2 Ventilation:

.1 Provided continuously during and after installation. Run system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of installation.

.3 Temperature:

.1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12°C for 48 hours before, during, and 48 hours after, installation.

.2 Do not install tiles at temperatures less than 12°C or above 38°C.

.4 Do not apply epoxy mortar and grouts at temperatures below 15°C or above 25°C.

1.10 WARRANTY

.1 Warrant work of this Section for a period of three (3) years against defects, excessive wear, and loss of adhesion including replacement of defective tile work, materials, labour costs for demolition of defective work, accessories, and installation systems at Owner's convenience.

.2 Defective work includes without limitation, tiles broken in normal use due to deficiencies in setting bed, loose tiles or grout and similar defects which can be attributed to poor performance of work or defective materials.

.3 Warrant waterproofing work of this Section against defects of workmanship and materials, and against any actual leakage, for a period of five (5) years.

.4 Leakage due to structural failure of concrete shall be excepted.

.5 Cracks arising from normal shrinkage and/or expansion of concrete shall not be considered as structural failure.

.6 Hairline cracks which result from these causes shall be considered normal and warranty shall not be voided as a result of these minor defects.

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 CERAMIC TILE - GENERAL

.1 Ceramic Tile:

.1 Conforming to ANSI A137.1, CAN/CGSB-75.1-M.

.2 Provide tile trims and accessories such as bullnoses, copings, caps, cove base,

nosings, corner pieces, and other special units as specified, indicated, and required.

.3 Without limitations and unless noted otherwise, Provide tile trim and accessories for each type of tile including:

.1 Rounded and squared finished edges.

.2 Inside and outside corners.

.3 Cove bases, outer and inner.

.4 Sanitary caps and corners.

.4 Colour as selected by Consultant from manufacturer's full ranges.

.5 Provide tile with minimum following characteristics:

.1 Water Absorption: ASTM C373 -

.2 Breaking Strength: ASTM C648 - > 250 lbs.

.3 Abrasion Resistance: ISO 10545-7 - Class Four Heavy Traffic.

.4 Scratch Hardness: MOH's - 7.

.5 Chemical Resistance: ASTM C650 - Resistant.

.6 Coefficient of Friction: ASTM C1028 - Wet: 0.60; Dry: 0.80.

.7 Ceramic Floor Tile: CAN/CGSB-75.1-M, Type 2, Class MR1, Mosaic Unglazed, slip resistant.

.8 Ceramic Floor Tile: CAN/CGSB-75.1-M, Type 7, Class MR1, Glazed Floor Tile, slip resistant.

.9 Ceramic Wall Tile: Glazed, Interior, CAN/CGSB-75.1-M, Type 5, Class MR4.

.10 Ceramic Wall Tile: Glazed, Interior, Mosaic, CAN/CGSB-75.1-M, Type 1, Class MR1.

.11 Glazed Ceramic Facing Veneer: CAN/CGSB-75.1-M, Type 3, Class MR1.

2.2 CERAMIC FLOOR TILE

.1 Type CT-1:

.1 Supply 300 mm x 300 mm size unglazed porcelain tiles.

.1 Cemento Series supplied by Centura Tile.

.2 Colour: Light Grey.

.3 Finish: Matte.

2.3 TRIM SHAPES

.1 Conform to applicable requirements of adjoining floor and wall tile.

.2 Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.

.3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.

.4 Internal and External Corners: Provide trim shapes as follows where indicated.

.1 Bullnose shapes for external corners including edges.

.2 Coved shapes for internal corners.

.3 Special shapes for:

.1 Base to floor internal corners to provide integral coved vertical and horizontal joint.

.2 Base to floor external corners to provide bullnose vertical edge with integral coved horizontal joint. Use as stop at bottom of openings having bullnose return to wall.

.3 Wall top edge internal corners to provide integral coved vertical joint with bullnose top edge.

.4 Wall top edge external corners to provide bullnose vertical and horizontal

joint edge.

.5 Provide cove and bullnose shapes for countertops, and where indicated and required to complete tile work.

2.4 GROUT

.1 Epoxy Grout: Conforming to ANSI A118.3; Flextile Flex-Epoxy 100 - 100% Solids, two component water based washable epoxy grout, consisting of two components; a hardening resin and premixed portion of epoxy resin, colour pigments, and graded aggregate.

.2 Color selected by Consultant from Manufacturers standard range.

.3 Acceptable Material:

.1 Epoxy Grout by Flextile Ltd.

.2 SPECTRALock Pro Gout by Laticrete International, Inc.

.3 Kerapoxy K400 by Mapei Inc.

.4 Grout Sealer: colorless, low viscosity, penetrating silicone sealer.

.1 Acceptable Material

.1 Flextile 49 silicone sealer.

.2 Mapei "Ultracolor"

2.5 THIN-SET MORTARS AND ADHESIVE:

.1 Mortar and Adhesive

.1 Polymer modified dryset mortar to ASTM C627-10.

.2 Mix to manufacturers requirements.

.3 Acceptable Material:

.1 Flextile 52 "Versatile" Thinset Mortar.

.2 Mapei "Ultraflex II".

.3 Flextile "Polymer Modified Wall Grout".

.4 Mapei "Ultracolor"

.5 TEC Sturdi-flex.

.2 Pre-mixed - Leveling Bed, Scratch Coat and Underlayment:

.1 Acceptable Material:

.1 Flextile # 53 Thin-Set Mortar and Flextile #44 Acrylic Latex Mortar Additive by Flextile Ltd.

.2 Latacrete 3701 Mortar Admixture with Laticrete 226 thick bed mortar mix by Laticrete International Inc.

.3 Planicrete 50 with Ketabond Mapei Inc.

.4 Mixed with water for underlayment mix at rates as recommended by manufacturer.

.5 Primer: Undiluted latex.

2.6 WATERPROOFING, CRACK SUPPRESSION AND ANTI-FRACTURE MEMBRANE SYSTEM

.1 Extra heavy duty, cold applied, seamless, load bearing, non-toxic, non-flammable, non-hazardous during storage, mixing, application and when cured, conforming to ANSI A118.10, for installation of ceramic tile and quarry tile for areas such as bathrooms, plazas, showers, kitchens, fountains, swimming pools and balconies.

.2 Reinforcing fabric shall be non-woven, rot-proof fabric specially for use with waterproofing membrane.

.3 All system materials shall be non-toxic, non-flammable and non- hazardous during storage, mixing, application and when cured.

.4 Waterproofing, crack suppression and anti fracture membrane shall meet following physical requirements:

.1 Water Permeability at 91.2 kPa (30 ft hydro/0.9 atoms): Nil.
.2 Elongation at break in accordance with ASTM D-751: 40%.
.3 Service Temperature: -28 deg C to +137 deg C.
.4 Tensile breaking strength: 20.4 Mpa.
.5 Thickness: 0.5 mm (20 mils).
.6 Bonding strength to concrete: 2.4 Mpa.
.7 Acceptable Material:
.1 Flextile WP-980 Waterproof & Crack Isolation Membrane with Reinforcing Fabric by Flextile Ltd.
.2 Laticrete 9235 waterproof membrane system with Laticrete's fiberglass cloth reinforcement.
.3 Mapelastic PRP 315 by Mapei Inc.
.4 Uncoupling membrane, Ditra by Schluter.

.5 Surface Preparation:
.1 Self leveling and smoothing underlayment for rapid leveling of concrete, portland cement mortar bed, plywood, terrazzo and existing ceramic tile floors.
.2 Acceptable Material:
.1 Flex-Flo up to 12 mm, by Flextile Ltd.
.2 Laticrete 86 up to 12 mm, by Laticrete International, Inc.
.3 Ultra lan/Ultra Plan MB up to 5 mm.
.4 Planicrete M20 up to 50 mm by Mapei Inc.

2.7 ACCESSORIES

.1 Extruded Aluminum components:
.1 With height of profile and type to suit design requirements and installation requirements.
.2 Acceptable Material:
.1 Schlüter - SCHIENE (sized for tile)

2.8 CLEANING COMPOUNDS

.1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
.2 Materials containing acid or caustic material are not acceptable.

3 Execution

3.1 EXAMINATION

.1 Verify existing conditions and finishes are ready to receive specified tile work.
.2 Ensure backings are structurally sound, level, and plumb within required tolerances.
.3 Ensure concrete is cured, has no structural cracks, openings and projects not required to meet design requirements.
.4 Concrete shall be cured for a minimum of twenty-eight (28) Days and shall have steel trowel finish if installation to include load bearing waterproof membrane over concrete and thin set application; fine broom or wood float finish for thin set application; shall have screed finish for mortar bed applications.
.5 Notify Consultant in writing of unacceptable substrate conditions.
.6 Beginning of installation implies acceptance of existing conditions.
.7 Ensure compatibility of adhesives, waterproofing, reinforcing and fillers with adjacent substrate and component coming in contact with these Products.
.8 Ensure waterproofing and adhesive manufacturers; examine substrate conditions, verify

conditions are suitable for installation prior to commencement, and review application procedures. If requested submit written report.

3.2 PREPARATION

.1 Clean substrate surfaces to receive ceramic tile. Surface shall be dimensionally stable, cured free of contaminants such as oil, sealants, and curing compound.

.2 Mortar bed application substrate surface variation shall not exceed 6 mm in 3000 mm.

.3 Thin set application substrate surface variation shall not exceed 3 mm in 3000 mm.

.4 Apply latex cementitious leveling coat to correct substrate irregularity up to 8 mm thickness. Above 8 mm correct irregularity by mortar bed method.

.5 Review setting out point with Consultant for each location, verify patterns and edge condition.

.6 Verify expansion joints have been installed properly.

.7 Verify service fittings, floor drains, rough-ins and similar requirements are completed and are at proper levels to receive ceramic work.

3.3 MIXES - GENERAL

.1 Mix mortars and grouts to comply with requirements of referenced Standards and manufacturer's recommendations for accurate proportioning of materials, water or additive content, mixing equipment and mixer speeds, mixing containers, mixing time, pot life and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics.

.2 Prepare and mix latex cement leveling bed/scratch coat mortar using recommended mixing proportions to achieve proper consistency in accordance with manufacturer's instructions.

.3 Prepare and mix dry-set cement mortar, latex cement mortar using recommended mixing proportions to obtain proper consistency in accordance with manufacturer's instructions and requirements of ANSI A108.5.

.4 Prepare and mix ceramic tile grout using recommended mixing proportions to obtain proper consistency in accordance with manufacturer's instructions and requirements of ANSI A108.10.

.5 Prepare and mix modified epoxy emulsion mortar using factory proportioned adhesive units to obtain proper consistency in accordance with manufacturer's instructions and requirements of ANSI A108.9.

.6 Prepare and mix chemical resistance, water cleanable, tile setting epoxy adhesive using factory proportioned adhesive units to obtain proper consistency in accordance with manufacturer's instructions and requirements of ANSI A108.6.

.7 Prepare and mix chemical resistance, water cleanable, grouting epoxy using factory proportioned epoxy grout units to obtain proper consistency in accordance with manufacturer's instructions and requirements of ANSI A108.6.

3.4 INSTALLATION

.1 Provide tile in accordance with Terrazzo Tile & Marble Association of Canada - Specification Guide 09 30 00; Tile Installation Manual 2006 - 2007 unless specified otherwise.

.2 Lay out tile so field or patterns are centered on wall and floor areas, or conform architectural details so no tile less than 1/2 size occurs.

.3 No cut tiles are allowed at finished ceiling level.

.4 Align joints in walls, bases and floors, where tile sizes accommodate.

.5 Provide uniform joint widths throughout.

.6 Prior to installation ensure back of each tile is free of contaminants.

.7 Distribute production run variations evenly, maintaining continuity of appearance.

.8 Arrange accessories in tile work so they are spaced evenly, centered with joints and set true with proper and adequate projection conforming to manufacturer's recommendations.

.9 Make sure tile has adequate solid backing.

.10 Ensure corner and edges are fully supported by bonding material. Avoid slippage.

.11 Tile installation shall have a minimum of 95% bond coverage by backbuttering or other approved technique.

.12 Fit tile units around corners, fitments, fixtures, drains and other built-in-objects to maintain uniform joint appearance.

.13 Cut, drill and set anchors, bolts for fastening fixtures and fittings in tile work.

.14 Make cut edges smooth, even and free from chipping. Do not split tile.

.15 Grout to match colour of tile unless indicated otherwise. Fill joints.

.16 Control Joints: Provide control joints in accordance with following layout guidelines and as indicated:

- .1 Slabs-on-Grade:
  - .1 Over saw cut control joints.
  - .2 Around columns.
  - .3 Over perimeter joints.
  - .4 Every 4500 mm to 6000 mm in a grid.
- .2 Suspended Slabs:
  - .1 Over beam locations.
  - .2 Around columns.
  - .3 Every 4500 mm to 6000 mm in a grid.

.17 Anti-Fracture Membrane:

- .1 Install in strict accordance with manufacturer's instructions.

.18 Waterproof Membrane:

- .1 Pre cut reinforcing fabric allowing 50 mm for overlap at ends and sides. Extend fabric 150 mm through door openings.
- .2 Roll up fabric so that each piece can be placed when ready. Reinforce joints.
- .3 Spread layer of waterproofing liquid at joints and cracks.
- .4 Embed 150 mm wide strip of reinforcing fabric into liquid. Spread coat of liquid over fabric to seal it.
- .5 At flash cove spread layer of waterproofing liquid in coves.
- .6 Embed 150 mm wide strip of reinforcing fabric and allow 100 mm of fabric to be flashed up walls.
- .7 Spread coat of liquid over fabric to seal it.
- .8 Flash fabric and waterproofing liquid into any drain and around all projections.
- .9 Use roller or brush to apply a liberal coat of waterproofing liquid to floor and/or wall slightly wider than reinforcing fabric width.
- .10 Include joints and covers which have been previously reinforced. While surface is still wet, unroll pre cut piece of fabric into it.
- .11 Embed fabric and smooth out any wrinkles.
- .12 Ensure liquid shall bleed through fabric.
- .13 Seal fabric.
- .14 Immediately apply liberal coat of liquid to completely cover fabric. Lap fabric 50 mm at seams.
- .15 Allow to dry until dry to touch.
- .16 Apply final application of liquid to entire surface.
- .17 If requested, flood test installation in designated locations after allowing membrane to cure fully for 7 Days at 21 deg C. Allow more cure time during cold

weather.

.18 Flood test installation for 24 to 48 hours before setting of tile to ensure no water penetration.

.19 Repair and retest if required.

.20 Do not allow traffic on exposed waterproof membrane.

.21 Provide waterproof membrane to following decks, floors, walls, steps and ramps:

.1 Swimming pools.

.2 Wading and whirl pools.

.3 Showers.

.19 Leveling Bed:

.1 Provide minimum 1.6 mm leveling bed to surfaces to receive waterproof membrane, in accordance with manufacturer's instructions.

.2 Provide ramped leveling bed beneath finish flooring adjacent to ceramic tile, for minimum 600 mm strip, to achieve flush finished surfaces at finished flooring transition.

.20 Ceramic Tile:

.1 Provide setting bed in accordance with manufacturer's printed instructions and as specified herein.

.2 Prepare gypsum board and cement board surfaces, by applying a scratch coat of setting bed material.

.3 Provide setting compound in 1 layer with notched trowel to provide a continuous 3 mm to 6 mm bed, in accordance with tile manufacturer's written instructions.

.4 Place tiles to achieve uniform:

.1 Shading.

.2 Colouring.

.3 Jointing.

.5 Lay tiles in true lines, conforming to lines of building and arrange symmetrically in accordance with Drawing layouts.

.6 Review layout and slopes with Consultant prior to setting of tiles.

.7 When tiles are laid by thin-set method on exterior surfaces, in wet areas or laying large size tiles, achieve minimum of 95% coverage.

.8 Bonding shall be notched in horizontal straight lines.

.9 Lay tile on freshly notched thin-set mortar, slide tile back and forth at 90 degree to notches.

.10 Ensure tiles are set while bond coat is wet and in tacky stage without skin.

.11 Provide back buttering by applying thin troweled coat to back side of tile using flat side of trowel immediately before laying to achieve minimum 95% adhesion for exterior work, or large tile area or wet areas.

.12 Lay ceramic tile with 1.6 mm joints, with joints running through in both directions.

.13 Lay out work to produce a symmetrical pattern with minimum amount of cutting. Cut tile at room perimeter shall be not less than 1/2 full size.

.14 Install divider strips and/or trims to suit design requirements at junction of flooring and dissimilar materials.

.15 Provide space or control or expansion joints in widths and depth as located and detailed on Drawings

.16 Existing joints in concrete sub floors shall be carried through to surface of tile work in accordance with details shown on Drawings.

.17 Install expansion joints where tile work abuts restraining surfaces such as perimeter walls, curbs, columns, wall corners and similar components, directly over joints in structural surfaces to details indicated.

.18 Provide slopes to floor drains using leveling bed material.

.19 Set wall tile in a true vertical plane with edges of tiles flush with each other.

.20 Provide uniform slopes to floor drains.

.21 Neatly and closely fit tiles around pipes, accessories and other items occurring in floor and walls.

.22 Provide necessary cutting without marring tile.

.23 Provide ceramic tile bases to work of Architectural Woodwork and Modular Casework Sections as indicated.

.24 Replace cracked, discoloured, chipped, and damaged tile.

.25 Align joints of floor, wall and base tiles.

.21 Grouting:

.1 Apply grout in accordance with manufacturer's printed instructions.

.2 Minimum of 2/3 of joint depth shall be kept open for grouting and grout shall penetrate joint to bond coat.

.3 When tiles have set, fill joints full with grout.

.4 Wipe clean surplus grout from face of tile, down to sharp edge of cushion edge of tile.

.5 After grout has attained slight initial set, completely clean-up and polish surfaces of tile.

3.5 CLEANING

.1 Upon completion remove protective coverings and clean down finished work of this Section leaving it in perfect condition, satisfactory to Consultant. Correct defective pointing and other unsatisfactory conditions.

.2 Clean adjacent surfaces which have been soiled or otherwise marred, to completely remove evidence of material causing same.

3.6 PROTECTION

.1 Protect other parts of Work from spatters.

.2 Remove and replace with perfect materials, sections of work which have become stained, soiled, broken, chipped or otherwise damaged.

.3 Prohibit traffic during installation and for 96 hours after completion.

3.7 SCHEDULES

.1 Install ceramic tiles according to TTMAC, Specification Guide 09 30 00 - Tile Installation Manual 2006/2007.

.2 Expansion and Control Joints for Tile Installation: TTMAC Detail 301MJ-2006 Movement Joints.

.3 Wall Tile:

.1 Tile Installed on Cement Mortar Over Masonry or Concrete Walls TTMAC Detail 302W- 2006.

.2 Tile Installed Over Masonry or Concrete walls - Thin Set Method TTMAC Detail 303W-2006.

.3 Tile Installed Over Gypsum Board - Thin Set Method, Dry Areas Only TTMAC Detail 304W-2006.

.4 Tile Installed on Cementitious Backer Unit (CBU), Thin Set Method, Walls, for Interior Wet/Dry Areas and Exterior Use; TTMAC Detail 305W-2006.

.5 Tile Installed on Cementitious Backer Unit (CBU)/ Coated Glass Mat Backer Board, on Bath Tub/Walls, Thin Set Method, TTMAC Detail 306W-2006.

.6 Tile Installed Over Cementitious Backer Unit (CBU) and Tile Installed on Coated Glass Mat Backer Board, on Bath Tub/Walls, Thin Set Method Detail A and Detail B respectively, TTMAC Detail 306W-2006.

.7 Tile installed on cement mortar over solid backing on interior/exterior walls,

TTMAC Detail 307W-2006.

.8 Tile installed on interior/exterior walls on cement mortar over wood or metal studs, TTMAC Detail 308W-2006.

.4 Floor Tile:

.1 Tile Installed on Interior/Exterior Cement Mortar Bed on Concrete Slab. TTMAC Detail 310F-2002; Detail A and Detail B Chemical Resistance as applicable.

.2 Tile Bonded to Concrete Slab - Thin Set Method, TTMAC Detail 311F-2002; Detail A and Detail B Epoxy Method as applicable.

.3 Tile installed on cement mortar bed on concrete slab, TTMAC Detail 310F-2006.

.4 Tile bonded to concrete slab - Thin-set method, TTMAC Detail 311F-2006.

.5 Ceiling:

.1 Tile installed on ceilings or soffits, TTMAC Detail 315F-2006.

.6 Miscellaneous Locations:

.1 Tile installed on stairs, TTMAC Detail 318S-2006.

.2 Tile on shower receptors, TTMAC Detail 319SR-2006.

.3 Tile installed over existing tile interior walls only, TTMAC Detail 323RW-2006.

.4 Tile installed over existing tile interior floors only,TTMAC Detail 324RF-2006.

3.8 SEALER AND PROTECTIVE COATING

.1 Apply in accordance with manufacturer's instructions.

3.9 JOINT PATTERN

.1 Straight

.2 Staggered

.3 45 degree

END OF SECTION

1 General

1.1 SUMMARY

.1 Work Included: Provide painting including but not limited to following:

- .1 Interior:
  - .1 Exposed building surfaces .
  - .2 Hollow metal doors and frames, both interior and exterior surfaces.
  - .3 Exposed miscellaneous metal and steel items for the work of all trades, including hangers, etc., for mechanical and electrical works.
  - .4 Mechanical and electrical backboards.
  - .5 Access panels and doors.
  - .6 Wood fitments unless plastic laminated as noted.
  - .7 Conduit, piping, ductwork, light panels, etc. exposed to view in areas.

1.2 RELATED REQUIREMENTS

.1 Section 06 10 00 - Rough Carpentry.

.2 Section 08 11 13 - Hollow Metal Doors and Frames.

.3 Electrical Sections.

1.3 REFERENCES

.1 Department of Justice Canada (Jus)

- .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33
- .2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .3 Master Painters Institute (MPI)
  - .1 MPI Architectural Painting Specifications Manual, 2004.
- .4 National Fire Code of Canada - 1995
- .5 Society for Protective Coatings (SSPC)
  - .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

1.4 QUALITY ASSURANCE

.1 Qualifications:

- .1 Contractor: minimum of five years proven satisfactory experience.
- .2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
- .3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.

.2 Pre-Installation Meeting:

- .1 Attend pre-installation meeting one week prior to beginning work of this Section.
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Coordination with other building subtrades.
  - .4 Review quality expectations.
- .2 Standard of Acceptance:
  - .1 Walls: No defects visible from a distance of 1000 mm at 900 to surface.
  - .2 Soffits: No defects visible from floor at 450 to surface when viewed using final lighting source.
  - .3 Final coat to exhibit uniformity of color and uniformity of sheen across full surface area.

1.5 HEALTH AND SAFETY

.1 Occupational Health and Safety in accordance with Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

1.6 QUALITY CONTROL

.1 Provide mock up in accordance with Section 01 45 00 - Quality Control.

.2 Prepare and paint one (1) designated wall of one (1) room to requirements specified herein, with specified paint with selected colors, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval.

.3 On completion have paint thickness tested for proper film thickness. Do not proceed with balance of project until test results are in compliance with MPI Painting Specification Manual standards.

.4 When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on site work.

1.7 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's literature, data sheets for each type of material provided under this Section for Project. Data sheets shall provide all required information. Submit manufacturer's installation instructions.

.2 Material Safety Data Sheets: Submit MSDS for inclusion in Operation and Maintenance Manual without limitations for adhesives, sealants, patching and leveling compound, solid polymer and as designated later by Consultant.

.3 Samples:

.1 Submit full range color sample chips to indicate where color availability is restricted.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation and instructions.

.5 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:

.1 Product name, type and use.

.2 Manufacturer's product number.

.1 Color numbers and associated locations.

1.8 DELIVERY, STORAGE AND HANDLING

.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 Color number in accordance with established color 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 & equipment in a well ventilated area with temp. range 7°C to 25°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 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.

1.9 FIRE SAFETY REQUIREMENTS

.1 Provide one - 3kg Type ABC 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 SITE CONDITIONS

.1 Environmental Requirements: Paint and finish in clean, dust-free, properly ventilated and adequately lit areas (minimum 100 lx (9.3 ft candles).

.2 Maintain minimum interior temperature of 18°C during application and drying of paint and maintain until building occupancy occurs.

.3 Do not undertake exterior painting if air and surface temperature are expected to fall below 10°C before coating has dried. Avoid painting during winds, weather conditions which may affect paint application or following rain. Wait until frost, dew or condensation has evaporated. Avoid painting surfaces exposed directly to hot summer sun.

.4 Do not undertake interior painting on surfaces where condensation has or will form due to presence of high humidity and lack of proper ventilation.

.5 Ventilate enclosed spaces.

.6 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".

.7 Perform no painting work when maximum moisture content of substrate exceeds:

.1 15% for wood.

.8 Test concrete, masonry and plaster surfaces for alkalinity as required.

.9 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 10°C 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.

.7 Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer.

.8 Protect until paint is dry or until weather conditions are suitable.

.9 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.10 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of the Consultant such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.11 EXTRA MATERIAL

.1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Submit one - one liter can of each type and color of primer, identified color and paint type in relation to established color schedule and finish system.

.3 Deliver and store where directed.

1.12 SCHEDULING OF THE WORK

.1 Submit work schedule for various stages of painting to Consultant for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Consultant for changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.13 WARRANTY

.1 Warrant work of this Section for period of 2 years against defects and/or deficiencies in accordance with General Conditions of the Contract.

.2 Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner.

.3 Defects include but are not limited to; material shrinkage, cracking, splitting and defective workmanship including but are not limited to failure in bubbling, blistering and delamination.

1.14 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

.4 Separate for reuse and place in designated containers steel waste in accordance with Waste Management Plan.

.5 Handle and dispose of hazardous materials in accordance with CEPA, regulations.

.6 Unused paint materials must be disposed of at official hazardous material collections site.

2 Products

2.1 MATERIALS

.1 Provide paint materials for paint systems from single manufacturer.

.2 Conform to latest MPI requirements for painting work including preparation and priming.

.3 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.

.4 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.

.5 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or

their compounds.

.6 Water-borne surface coatings and recycled water-borne surface coatings must have a flash point of 61.00C or greater.

.7 Recycled water-borne surface coatings must not contain:

.1 Lead in excess of 600.0 ppm weight/weight total solids.

.2 Mercury in excess of 50.0 ppm weight/weight total product.

.3 Cadmium in excess of 1.0 ppm weight/weight total product.

.4 Hexavelant chromium in excess of 3.0 ppm weight/weight total product.

.5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

.8 Painting products: except where specifically specified otherwise all paint to be latex base with the following manufacturer's product lines as Acceptable Material for use on this project.

.1 PPG - Pure Performance - 0 VOC.

.2 Benjamin Moore - Genex - 0 VOC.

.3 Glidden Lifemaster 2000 - 0 VOC.

.4 Exterior:

.1 Colour Your World - 5600 Series.

.2 CIL/Glidden - 9420 Series.

.3 PPG - 1 Series

.5 Primers

.1 Latex or alkyd as recommended by paint manufacturer except where specifically indicated otherwise.

2.2 COLORS

.1 Consultant will provide Color Schedule after Contract award.

.2 Color schedule will be based upon selection two (2) base colors.

.3 Selection of colors from manufacturers full range of colors.

.4 Second coat in three coat system to be tinted slightly lighter color than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform color tinting operations prior to delivery of paint to site in strict accordance with manufacturer's written instructions.

.2 Paste, powder or catalyzed paint mixes shall be mixed

.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 Consultant.

.5 Re-mix paint prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees	
Gloss Level 1	Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2	Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3	Eggshell Finish	10 to 25	10 to 35

Gloss Level 4	10 to 25 10 to 35	20 to 35 min. 35
Gloss Level 5	20 to 35 min. 35	35 to 70
Gloss Level 6	Traditional Gloss	70 to 85
Gloss Level 7	High Gloss Finish	More than 85

.2 Gloss level ratings of painted surfaces as indicated.

2.5 INTERIOR PAINTING SYSTEMS

.1 Galvanized metal: doors & frames.
- .1 INT 5.3A - Latex gloss level 5-semi-gloss finish.

.2 Dressed lumber: including doors, door and window frames, casings, mouldings:
- .1 INT 6.3K - Polyurethane varnish gloss level 5-semi-gloss finish.
- .2 INT 6.3T - Latex semi-gloss finish (over latex primer).

.3 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock type material", and textured finishes:
- .1 INT 9.2A - Latex gloss level 3-eggshell finish (over latex sealer).

2.6 EXTERIOR PAINTING SYSTEMS

.1 Dressed Lumber: doors, door and window frames, casings, battens, smooth fascias, etc.
- .1 EXT 6.3L - Latex gloss level 3 finish (over latex primer) do not use flat finish on doors.

.2 Existing Steel Observation Tower:
- .1 Primer, zinc rich, epoxy, MPI #20.
  - .1 Acceptable Material: PPG Architectural Aquapan Zinc Rich Epoxy.
- .2 Finish coats, epoxy, high build, low gloss, MPI #108.
  - .1 Acceptable Material: PPG Architectural Aquapan High Build Epoxy.

.3 Galvanized Metal for Doors & Frames:
- .1 INT 5.3A - Latex gloss level 5-semi-gloss finish.

3 Execution

3.1 TOPCOAT AND INTERMEDIATE COAT THICKNESSES

.1 Latex & Acrylics (Interior): 0.03 mm (1.2 mils) DFT/coat.

.2 Latex & Acrylics (Exterior): 0.038 mm (1.5 mils) DFT/coat.

.3 Epoxys (Interior): 0.076 mm (3 mils) DFT/coat.

.4 Urethanes (Interior and Exterior): 0.076 mm (3 mils) DFT/coat.

3.2 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.

3.3 GENERAL

.1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.4 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation

of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavorable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

3.5 PREPARATION

.1 Protection:

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.2 Surface Preparation:

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

.2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.3 Place "WET PAINT" signs in occupied areas as painting operations progress.

.3 Clean and prepare surfaces in accordance with MPI Architectural 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.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalies, 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.

.5 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.6 Apply wood filler to nail holes and cracks.

.7 Tint filler to match stains for stained woodwork.

.8 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.

.9 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 (SSPC SP-6 Commericial Blast).

3.6 APPLICATION

.1 Method of application to be as approved by Consultant.

.2 Brush and Roller Application:

.1 Apply paint in uniform layer using brush and/or roller type 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.

.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces 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

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 uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.

.4 Brush out immediately all runs and sags.

.5 Use brushes and rollers 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.

.5 Apply coats of paint 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 tops of interior cupboards and cabinets and projecting ledges.

.9 Finish inside of cupboards and cabinets as specified for outside surfaces.

.10 Finish closets and alcoves as specified for adjoining rooms.

.11 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.7 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with color and finish to match adjacent surfaces, except as indicated.

.2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 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 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.

.7 Do not paint interior transformers and substation equipment.

3.8 RESTORATION

.1 Clean and re-install 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 Consultant. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

END OF SECTION

1 General

1.1 SUMMARY

.1 Provide washroom accessories including but not limited to following:

- .1 Baby Change Station - BCS
- .2 Clothing Hook - CH
- .3 Grab Bar - GB
- .4 Napkin/Tampon Disposal - ND
- .5 Paper Towel Dispenser - PTD
- .6 Soap Dispenser - SD
- .7 Toilet Paper Dispenser - TPD
- .8 Concealed sheet steel reinforcing by Section 05 50 00 - Metal Fabrications.

1.2 RELATED REQUIREMENTS

.1 Section 05 50 00 - Metal Fabrications

.2 Section 06 10 00 - Rough Carpentry.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM A167-99, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM B456-95, Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- .3 ASTM A653/A653M-99, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM A924/A924M-99, Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .5 ASTM A666-03 - Specification for Annealed or Cold-Worked Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar.
- .6 ASTM B456-03 - Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.81-M90 - Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
- .2 CAN/CGSB-1.88-92 - Gloss Alkyd Enamel, Air Drying and Baking
- .3 CGSB 31-GP-107Ma - Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .4 CAN/CSA-G164-M92 (R2003) - Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 CSA W59-03 - Welded Steel Construction (Metal Arc Welding)
- .6 CAN/CGSB-12.5-M86, Mirrors, Silvered.

.3 Canadian Standards Association (CSA)

- .1 CSA Standards\CSA-B561-04, Barrier-Free Design.

1.4 SHOP DRAWINGS

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

.2 Product Data:

- .1 Submit manufacturer's literature, data sheets for each type of material provided under this Section.
- .2 Data sheets shall provide all required information.
- .3 Submit required copies of detailed instructions for maintaining, preserving and

keeping materials in clean and safe conditions and give adequate warning of maintenance practices or materials detrimental to specified materials.

.4 Submit manufacturer's installation instructions.

.3 Material Safety Data Sheets:

.1 Submit MSDS for inclusion in Operation and Maintenance Manual.

.4 Shop Drawings:

.1 Shop drawings shall be in the form of catalogue cuts and fully illustrate specified materials with description of components, surface finishes, hardware and securement devices.

.2 Submit a full schedule of accessories and identify Contractor Supplied / Contractor Installed and Owner Supplied / Contractor Installed accessories.

.5 Samples:

.1 Submit complete samples of each accessory and modular unit to Consultant for review of construction quality, materials and finish prior to delivery of required quantities of items.

.2 Submit sample of each colour where applicable.

.3 No trademark and/or labels shall be accepted on exposed finishes.

.6 Maintenance Instructions:

.1 Submit an accessories schedule, keys and parts manual as part of project closeout documents.

.2 Submit 2 sets of following items of manufacturer's literature:

.1 Technical Data Sheets of each item used for the project.

.2 Service and Parts Manuals.

.3 Name of local representative to be contacted in the event of need of field service of consultation.

.4 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.

1.5 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Provide special tools required for accessing, assembly/disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 - Closeout Submittals.

.3 Deliver special tools to Owner.

1.6 EXTRA MATERIALS

.1 Provide special tools required for accessing, assembly/disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 - Closeout Submittals.

.2 Deliver special tools to Consultant.

1.7 WARRANTY

.1 Warrant work of this Section for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract.

.2 Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner.

.3 Defects include but are not limited to; deterioration of mirror's silvering.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate for disposal waste material generated by this Section.

.2 Place in appropriate on-site bins in accordance with Waste Management Plan.

.3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Owner initiating a clean-up and related costs being deducted from progress claims.

2 Products

2.1 MATERIALS

.1 Sheet steel: commercial quality to ASTM A653/A653M with ZF001 designation zinc coating.

.2 Stainless steel sheet metal type 302 or 304: to ASTM A167, with #4 finish. minimum 0.8mm thick except where noted otherwise.

.3 Stainless steel tubing type 304: commercial grade, seamless welded, 1.2 mm wall thickness.

.4 Fasteners: concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fiber, lead or rubber as recommended by accessory manufacturer for component and its intended use.

2.2 BLOCKING

.1 Provide blocking for all accessories regardless of supply or installation responsibilities.

2.3 FINISHES

.1 Chrome and nickel plating: to ASTM B456 79 satin polished finish.

.2 Baked enamel: condition metal by applying one coat of metal conditioner to CGSB 31 GP 107M, apply one coat Type 2 primer to CGSB 1 GP 81M and bake, apply two coats Type 2 enamel to CGSB 1 GP 88M and bake to hard, durable finish. Sand between final coats. Color selected from standard range by Consultant.

.3 Manufacturer's or brand names on face of units not acceptable.

2.4 SCHEDULE OF ACCESSORIES

.1 Supply and install each item in quantities shown on Accessories Schedule on Drawings.

.2 Confirm Owner Supplied / Contractor Installed (OS/CI) or Contractor Supplied / Contractor Installed (CS/CI) accessories prior to preparing shop drawings and ordering.

2.5 FABRICATION

.1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.

.2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.

.3 Brake form sheet metal work with 1.5 mm radius bends.

.4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

.5 Back paint components where contact is made with building finishes to prevent electrolysis.

.6 Hot dip galvanize concealed ferrous metal anchors and fastening devices to CSA G164.

.7 Shop assemble components and package complete with anchors and fittings.

.8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.

.9 Provide steel anchor plates and components for installation on studding and building framing.

3 Execution

3.1 INSTALLATION

.1 Install and secure accessories rigidly in place as follows:
  .1 Stud walls: install wood blocking in stud space prior to plaster or drywall finish.
  .2 Hollow masonry units or existing plaster/drywall: use toggle bolts drilled into cell/ wall cavity.
  .3 Solid masonry, marble, stone or concrete: use bolt with lead expansion sleeve set into drilled hole.
.2 Install grab bars on built-in anchors provided by bar manufacturer.
.3 Use tamper proof screws/bolts for fasteners.
.4 Fill contractor supplied units with necessary supplies shortly before final acceptance of building.
.5 Install Owner supplied washroom accessories.
.6 Install mirrors in accordance with Section 08 80 00 - Glazing.

END OF SECTION