SPECIFICATIONS FOR

REPAIR SHOWERS IN LIVING UNITS F-32S COLLINS BAY INSTITUTION FRONTENAC INSTITUTION

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Prepared for:

PUBLIC WORKS GOVERNMENT SERVICES CANADA
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JLR 26880

COVERS AND DRAWING LISTS

ARCHITECTURAL

MECHANICAL

ELECTRICAL

END OF SECTION

1 WORK COVERED BY CONTRACT REQUIREMENTS

.1 Work of this Contract comprises remedial renovations to four shower areas in four separate washroom/shower facilities in Living Units F-32S, Collins Bay Institution, Frontenac Institution, 1455 Bath Road, Kingston, Ontario.

.2 Phased Construction:
.1 Provide a detailed schedule outlining which areas will be renovated at which time.
.2 Construction is to be implemented in phases with one washroom/shower room being renovated at a time. The building will remain occupied throughout renovations and the other washrooms/shower rooms will remain in use. Each washroom is to be isolated as the construction occurs. For a limited amount of time, access to the washroom/shower room stacked below the room being renovated will be permitted so that through floor work can be accomplished.
.3 On the phasing schedule, clearly identify when more than one washroom/shower room will need to be isolated at the same time.
.4 Each phase includes construction, testing, commissioning, and certification of building systems serving the spaces included in the phase.
.5 PWGSC Representative to review and approve phasing schedule prior to commencing work.

2 MINIMUM STANDARDS

.1 Materials shall be new and work shall conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2010 (NBC) and all applicable Provincial and Municipal codes. In the case of conflict or discrepancy the most stringent requirement shall apply.

3 TAXES

.1 Pay all taxes properly levied by law (including Federal, Provincial and Municipal).

4 FEES, PERMITS, AND CERTIFICATES

.1 Pay all fees and obtain all permits. Provide authorities with plans and information for acceptance certificates. Provide inspection certificates as evidence that work conforms to requirements of Authority having jurisdiction.

5 FIRE SAFETY REQUIREMENTS

.1 Comply with the National Building Code of Canada 2010 (NBC) for fire safety in construction and the National Fire Code of Canada 2010 (NFC) for fire prevention, firefighting and life safety in building in use.

.2 Comply with Human Resources and Social Development Canada (HRSDC) - Labour Canada, Fire Protection Engineering Services standards:
.1 No. 301: Standard for Construction Operations
.2 No. 302: Standard for Welding and Cutting
.3 No. 374: Fire Protection Standard for General Storage (Indoor and Outdoor)
.4 Retain all fire safety documents and standards on site.

.3 Welding and cutting:
.1 At least 48 hours prior to commencing cutting, welding or soldering procedure, provide to PWGSC Representative:
.1 Notice of intent, indicating devices affected, time and duration of isolation or bypass.
.2 Completed welding permit as defined in FC 302.
.3 Return welding permit to PWGSC Representative immediately upon completion of procedures for which permit was issued.
.2 A fire watcher as described in FC 302 shall be assigned when welding or cutting operations are carried out in areas where combustible materials within 10m may be ignited by conduction or radiation.

6 FIELD QUALITY CONTROL

.1 Carry out Work using qualified licenced workers or apprentices in accordance with Provincial Act respecting manpower vocational training and qualification.

.2 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licenced workers.

.3 Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.

7 HAZARDOUS MATERIALS

.1 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of Material Safety Data Sheets (MSDS) acceptable to Human Resources Development Canada, Labour Program.

.2 For ALL work, give the PWGSC Representative 48 hours' notice for work involving designated substances (Ontario Bill 208), hazardous substances (Canada Labour Code Part II Section 10), and before painting, caulking, or using adhesives.

8 REMOVED MATERIALS

.1 Unless otherwise specified, materials for removal become the Contractor's property and shall be taken from site.

9 PROTECTION

.1 Protect finished work against damage until take-over.

.2 Protect adjacent work against the spread of dust and dirt beyond the work areas.

.3 Protect workers and other users of site from all hazards.

10 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to the normal use of premises. Make arrangements with PWGSC Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Provide temporary means to maintain security in construction areas.

.4 Where elevators, dumbwaiters, conveyors, or escalators exist, Contractor may use these at Frontenac Institution Management's discretion. Protect from damage, safety hazards, and overloading of existing equipment.

.5 Sanitary facilities will be assigned for Contractor's personnel. Others shall not be used. Keep facilities clean.

11 CUT, PATCH, AND MAKE GOOD

.1 Cut existing surfaces as required to accommodate new work.

.2 Remove all items so shown or specified.

.3 Patch and make good surfaces cut, damaged or disturbed, to PWGSC Representative's approval. Match existing material, colour, finish, and texture.

12 SLEEVES, HANGERS, AND INSERTS

.1 Co-ordinate setting and packing of sleeves and supply and installation of hangers and inserts. Obtain PWGSC Representative's approval before cutting into structure.

13 EXAMINATION

.1 Examine site and conditions likely to affect work and be familiar and conversant with existing conditions.

.2 Arrange for photographs with the PWGSC Representative of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.

14 SIGNS

.1 Provide common-use signs related to traffic control, information, instruction, use of equipment, public safety devices, etc., in both official languages or by the use of commonly-understood graphic symbols to the PWGSC Representative's approval.

.2 No advertising will be permitted on this project.

15 ACCESS AND EGRESS

.1 Design, construct, and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

16 SECURITY CLEARANCES

.1 All personnel employed on this project will be subject to security check. Obtain requisite clearance, as instructed, for each individual required to enter the premises.

.2 Personnel will be checked daily at start of work shift and given a pass which must be worn at all

times. Pass must be returned at end of work shift and personnel checked out.

17 BUILDING SMOKING ENVIRONMENT

.1 Smoking is not permitted in the Building. Obey smoking restrictions on building property.

18 DUST CONTROL

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

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

.3 Protect all furnishings within work area with 0.102 mm thick polyethylene film during construction.

19 SCHEDULING

.1 On award of contract submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the PWGSC Representative, take necessary measures to complete work within scheduled time. Do not change schedule without notifying PWGSC Representative.

.2 There is to be no disruption to any existing services or facilities, without the expressed written approval by Frontenac Institution Management. Contractor to provide phasing schedule for review prior to commencing work.

.3 Carry out work during "regular hours", as determined by Frontenac Institution Management.

.4 Site access and laydown requirements to be coordinated with Frontenac Institution Management prior to commencing work.

20 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 List of Outstanding Shop Drawings.
.6 Change Orders.
.7 Other Modifications to Contract.

.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and Other Safety Related Documents.
.11 Other documents as specified:
.1 Ministry of Labour.
.2 MSDS Data Sheets.

21 PRECEDENCE

.1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 00 10 – General Instructions.

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

1.2 ACCESS AND EGRESS

.1 Design, construct, and maintain temporary "access to" and "egress from" work areas, including roadways, parking areas, stairs, runways, ramps or ladders, and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial, and other regulations.

1.3 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with PWGSC Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Closures: protect work temporarily until permanent enclosures are completed.

.4 The Contractor must accept liability for damage, safety of equipment and overloading of existing equipment, services, hard landscaping, and soft landscaping.

1.4 EXISTING SERVICES

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

.2 Where Work involves breaking into or connecting to existing services give PWGSC Representative seven (7) days of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum.

.3 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.4 Water and gas service to be maintained/provided to the building at all time.

1.5 SECURITY CLEARANCES

.1 All personnel requiring access to the site must have Security Clearance in advance of required access to the site. Coordinate with PWGSC Representative.

2 Contractor and Sub-contractors requiring access to the site must have a proper security clearance in advance of required access to the site.

3 Contractor and Sub-contractors who are unable to obtain security clearance, or who refuse to consent to security checks, upon notice by PWGSC Representative, will not be permitted to work on site. PWGSC Representative will not be responsible for any additional costs incurred by the Contractor and Sub-contractors.

4 Contractor and Sub-contractors will be checked daily at start of work shift and provided with a pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

5 The clearance process normally takes 5 weeks after submission of a completed and signed application.

1.6 SECURITY PROCESS/ SCREENING-POST TENDER

.1 Post tender access to the site to perform mobilization, site measurements, shop drawing preparations and other “non-physical’ work will be done under the security requirements of the contract.

1.7 SECURITY ESCORTS

.1 Contractor and Sub-contractors employed on this project must be escorted when on site.

.2 Submit an escort request to PWGSC Representative a minimum two working days prior to the proposed working schedule. Request must be approved before any entry will be allowed. For requests submitted within time noted above, costs of security escort will be paid for by the PWGSC Representative. Cost incurred by late requests will be Contractor's responsibility.

.3 Any escort request may be cancelled free of charge if notification of cancellation is given at least four hours before scheduled time of escort. Cost incurred by late request will be Contractor's responsibility.

.4 Calculation of costs will be based on average hourly rate of security officer for minimum of eight hours per day for late service request and of four hours for late cancellations.

.5 Physical access is restricted to those specific areas of the site required to meet the contract's objectives.

1.8 WORK SCHEDULE RESTRICTIONS

.1 Schedule work to minimize disruption to building tenants, interference to building operations and normal use of premises.

.2 Any work requiring fire alarm system smoke by-pass (e.g. welding, open flame, hot work, volatile substances, or others) shall be coordinated on a daily basis with Frontenac Institution Representative and the Building Operator via the HOT WORK PERMIT. Instruction can be obtained from the PWGSC Representatives.

.3 Contractor and Sub-contractors and/or all items carried into and out of the facility are subject to physical inspection. Removal of such equipment or personnel is at the discretion of the Frontenac Institution Representative. The Frontenac Institution Representative security personnel, guards on duty all have the right to remove any contractor with minimal or no warning if an operational situation arises and work must be curtailed immediately.

1.9 IT SECURITY

.1 No IT devices including but not limited to laptops computers, cell phones, diskettes, CDs, memory sticks, or USB devices shall enter the facility without prior written permission from Frontenac Institution security personnel.

1.10 PHYSICAL AND VEHICLE SECURITY

.1 Security regulations will be strictly enforced. Individuals requiring access to facility to comply with security regulations outlined herein.

.2 Site wide security restrictions may change through the course of the work. Contractor and Subcontractors are required to comply with regulations as they are published. Such regulation changes are required for continued facility operation and security. The Contractor should allow for two (2) days of work to be worked off-site if an event occurs.

.3 Contractor is to be responsible for notifying and ensuring all personnel become familiar with and adhere to regulations including safety, fire, traffic, as well as security regulations outline herein.

.4 PWGSC Representative reserves the right to exclude or remove from the site any employee or agent of Contractor who fails to comply with security regulations outline herein.

.5 Site security is maintained 24 hours per day, 7 days per week. Contractor is responsible for security and protection of materials and equipment related to the work.

.6 Access to the project site, under normal conditions, is from 0600 to 1800 hours, Monday through Friday. Should there be a requirement for extended hours, Contractor must provide a minimum of twenty-four (24) hour notice to PWGSC Representative.

.7 Contractor must provide a minimum of forty-eight (48) hour notice to PWGSC Representative of intended deliveries to the project site. Compliance with this requirement will serve to prevent unnecessary delays in gaining project site access.

.8 When scheduling deliveries to the project site, Contractor must provide to PWGSC Representative the following information:
.1 name of delivering company
.2 expected delivery date and time
.3 name of the on-site contact person.

.9 Access to the loading dock will be granted by PWGSC Representative, under normal conditions, from 0730 to 1530 hours, Monday through Friday. Once access is granted, an escort will be provided on the loading dock. Deliveries for construction material should be scheduled from 0730 to 1530 hours, Monday through Friday while all other normal deliveries should be scheduled from 1000 to 1500 hours, Monday through Friday.

.10 At no time will access be given by an escort to the loading dock area without proper written authorization from the Frontenac Institution Management. All coordination for access to the loading dock area must be made through the PWGSC Representative.

.11 At no time will clutter be left inside the loading dock. Material received or brought into the loading dock area should be removed immediately. The loading dock is not meant to be used as storage for any material. PWGSC Management Shipping & Receiving unit reserves the right to dispose of any clutter or material left unattended in the loading dock area after a 24-hour notice to the Contractor.

.12 Frontenac Institution Management reserves the right to turn away unannounced deliveries. The Contractor will be responsible to re-schedule the delivery with the PWGSC Representative and will be responsible if additional costs are incurred related to additional delivery attempts.

.13 At no time should an overhead door inside the loading dock area be opened by Contractor without the presence of a Frontenac Institution escort.

.14 Contractor and Sub-contractors must obtain a work permit from the Frontenac Institution Management when construction work is either done outside the identified construction zone and/or temporarily affects users/building systems such as but not limited to:
.1 smoke by-pass
.2 hot work
.3 confined space
.4 electrical shutdowns
.5 mechanical shutdowns

.15 Ensure only necessary tools and equipment are brought to each work areas. Keep constant check on these items and at the end of each work shift, remove all tools and equipment from work area.

.16 Any items transported into and out of the project site are subject to daily physical inspection. Physical inspection to be conducted as indicated by PWGSC Representative.

.17 Access to construction site to be controlled through the main entrance, during ‘normal working hours’. PWGSC Representative will provide procedure details for work conducted outside normal working hours, particularly work conducted on weekends when such work is planned.

.18 Passes will be supplied and shall be displayed prominently by Contractor and Sub-contractors at all times within the facility. Return pass at main entrance each time when leaving project site.

.19 The following are not allowed on project site and shall be surrendered to Frontenac Institution Security personnel prior to entry.
.1 Firearms, ammunition, explosives and weapons prohibited under the Criminal Code of Canada.
.2 Radio frequency transmitting equipment, cell phones, two-way pagers, two-way radios, blackberry, and any other radio frequency communications devices.
.3 Image reproduction equipment, e.g. camera, portable copies, video cameras, video recorders, and other image reproduction mediums.

.4 Photography of construction site and/or work is not permitted except by PWGSC Representative.
.5 Digital storage equipment, e.g. Personal Digital Assistants (PDA's), electronic organizers, and all digital storage mediums.

.20 Vehicles entering or leaving the site may be subject to inspection by site security services.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 78 00 – Closeout Submittals.

1.2 ADMINISTRATIVE

.1 Submit to PWGSC Representative, submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for 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 PWGSC Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated 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 PWGSC 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 is coordinated.

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

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

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

1.3 SHOP DRAWINGS AND PRODUCT DATA

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

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

.3 Allow 10 days for PWGSC Representative's review of each submission.

.4 Adjustments made on shop drawings by PWGSC Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to PWGSC Representative prior to proceeding with Work.

.5 Make changes in shop drawings as PWGSC Representative may require, consistent with Contract Documents. When resubmitting, notify PWGSC Representative in writing of revisions other than those requested.

.6 Accompany submissions with transmittal letter containing:
.1 Date.
.2 Project title and number.
.3 Contractor's name and address.
.4 Identification and quantity of each shop drawing, product data, and sample.
.5 Other pertinent data.

.7 Submissions include:
.1 Date and revision dates.
.2 Project title and number.
.3 Name and address of:
.1 Subcontractor.
.2 Supplier.
.3 Manufacturer.
.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
.5 Details of appropriate portions of Work as applicable:
.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.
.3 Setting or erection details.
.4 Capacities.
.5 Performance characteristics.
.6 Standards.
.7 Operating weight.
.8 Wiring diagrams.
.9 Single line and schematic diagrams.
.10 Relationship to adjacent work.

.8 After PWGSC Representative's review, distribute copies.

.9 Submit 3 prints of shop drawings for each requirement requested in specification Sections and as PWGSC Representative may reasonably request.

.10 Submit 3 copies of product data sheets or brochures for requirements requested in specification Sections and as requested by PWGSC Representative where shop drawings will not be prepared due to standardized manufacture of product.

.11 Submit 3 copies of test reports for requirements requested in specification Sections and as requested by PWGSC Representative.

.12 Submit 3 copies of certificates for requirements requested in specification Sections and as requested by PWGSC Representative.

.13 Delete information not applicable to project.

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

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

.16 The review of shop drawings by PWGSC Representative is for sole purpose of ascertaining conformance with general concept.
.1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.4 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to PWGSC Representative's business address.

.3 Notify PWGSC Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

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

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

.6 Make changes in samples which PWGSC Representative may require, consistent with Contract Documents.

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

END OF SECTION

PART 1 – GENERAL

1.1 SUBMITTALS

.1 Submit to PWGSC Representative copies of the following documents, including updates issued:
.1 Health and Safety Program as indicated in paragraph 1.8, prior to commencement of work on the work site.
.2 Written Emergency Response Plan.
.3 Reports or directions issued by authorities having jurisdiction, immediately upon issuance from that authority.
.4 Accident or Incident Reports, within 24 hours of occurrence.
.5 WHMIS – MSDS Data Sheets.

.2 Submit other data, information, and documentation upon request by the PWGSC Representative as stipulated elsewhere in this section.

1.2 COMPLIANCE REQUIREMENTS

.1 Comply with the latest edition of the Ontario Occupational Health and Safety Act, and the Regulations made pursuant to the Act and Canada Labour Code, Part II, Canada Health and Safety Regulations.

.2 Observe and enforce construction safety measures required by:
.1 National Building Code Of Canada (latest edition).
.2 Provincial Workplace Safety Insurance Board.
.3 Municipal statutes and ordinances.

.3 In event of conflict between any provisions of above authorities the most stringent provision shall apply.

.4 Provide and maintain Workplace Safety Insurance Board coverage for all employees for the duration of the contract. Prior to commencement of the work, at the time of Interim Completion and prior to final payment, provide to the PWGSC Representative a letter of Clearance from the Workplace Safety Insurance Board indicating that the Contractor’s account is in good standing.
.1 Should the Contractor be a sole proprietor, provide documented proof in a form acceptable to the PWGSC Representative, of an alternative means of personal coverage that meets or exceeds the requirements set out above for Workplace Safety Insurance Board coverage.

1.3 RESPONSIBILITY

.1 The Contractor is responsible for safety of persons and property on the work site and for protection of federal employees and the general public circulating adjacent to work site operations to extent that they may be affected by conduct of work.

.2 The Contractor is to enforce compliance by workers and other persons granted access to work site with safety requirements of Contract Documents, applicable federal, provincial, and local statues, regulations, and ordinances, and with Contractor's Health and Safety Program.

.3 Should an unforeseen or peculiar safety related hazard or condition become evident during performance of work, immediately take measures to rectify the situation and prevent damage or harm. Advise the PWGSC Representative verbally and in writing of the hazard or conditions.

1.4 SITE CONTROL AND ACCESS

.1 Control all work site access points and work site activities. Delineate and isolate the work site from adjacent and surrounding areas by use of appropriate means to maintain control of all work site access points as per the OHSA and Construction Regulations. If work on a project may endanger a person, close to the project, a sturdy steel mesh fence at least 1.8 metres in height (or equivalent) shall be constructed between the immediate area and the project.

.2 Make provisions for granting permission to access onto work site to all persons who require access. Procedures for granting permission to access are to be in accordance with the Ontario Occupational Health and Safety Act, and the Regulations made pursuant to the Act and the Contractor's Health and Safety Program.

.3 Ensure persons granted access to the work site are in possession of and wear the minimum personal protective equipment (PPE) designated by the Contractor's Health and Safety Program. Ensure persons granted access to the work site are provided with, trained in the use of, and wear, appropriate PPE that are required above and beyond the designated minimums previously noted and as specifically related to the work site activity that they are involved in. Be responsible for the efficacy of the PPE that is provided above and beyond the designated minimums.

.4 For the purpose of this contract, the following are activities that will be required to be performed on

the work site by Public Safety forces. Control of the work site access and activities remain the responsibility of the Contractor as detailed within this specification section.

.1 At the time of this document no Public Safety presence is expected, except for periodic site visits.

.5 Erect signage at access points and at other strategic locations around the work site clearly identifying the work site area(s) as being “off-limits” to non-authorized persons. Signage must be professionally made with well understood graphic symbols and is not to be used as advertising but for the specific use as related to site safety and key contact information.

.6 Secure the work site at all times to protect against un-authorized access.

1.5 FILING OF NOTICE

.1 File Notice of Project and any other required Notices with the Ontario Ministry of Labour prior to commencement of the work. Provide the PWGSC Representative with a copy of the Filed Notice(s) prior to commencement of the work.

1.6 PERMITS

.1 Obtain permits, licenses and compliance certificates at appropriate times and frequencies as required by the authorities having jurisdiction such as but not limited to digging/excavation permits, hot work permits, confined space entry permits.

.2 Post all permits, licenses, and compliance certificates on work site and provide copies to the PWGSC Representative.

1.7 MEETING

.1 Prior to commencement of work attend a pre-commencement meeting conducted by PWGSC Representative. Ensure minimum attendance by contractor’s site superintendent and if required based on what is perceived to be the number of workers on the site, the size of project, or any known factor that would cause the need for the designation of a site health and safety Representative, add the following person to ensure their attendance at the pre-commencement meeting, taking into consideration that the enforcement of the requirement for this Representative resides with the provincial authority and not PWGSC. PWGSC Representative will advise of time, date, and location of the meeting and will be responsible for recording and distributing the minutes.

.2 Conduct site specific occupational health and safety meeting as required by the Workplace Safety Insurance Board, Occupational Health and Safety Act, and the Regulation made pursuant to the Act.

.3 Record and post minutes of all meetings in plain view at the work site. Make copies available to PWGSC Representative upon request.

1.8 HEALTH AND SAFETY PROGRAM

.1 Contractors are required under Occupational Health and Safety Act, and the Regulations made pursuant to the Act to have in place a Health and Safety Program. Compliance requirements for the content, detail and implementation of the program resides with the provincial/territorial authority. For the purpose of this contract the Health and Safety Program shall include a Site-Specific Health and Safety Plan that acknowledges, assesses, and addresses ongoing hazard assessments performed during the progress of work identifying and documenting new or potential health risks and safety hazards not previously known and identified.

.2 Provide one copy of the Health and Safety Program to the PWGSC Representative prior to commencement of work on the work site. The copy provided to the PWGSC Representative is for the purpose of review against the contract requirements related to the known hazardous substances and/or hazardous conditions. The review is not to be construed to imply approval by the PWGSC Representative that the program is complete, accurate, and legislatively compliant with the Ontario Occupational Health and Safety Act, and the Regulations made pursuant to the Act, and shall not relieve the Contractor of their legal obligation under such legislation.

1.9 ACCIDENT REPORTING

.1 Investigate and report incidents and accidents as required by Ontario Occupational Safety and Health Act, and the Regulations made pursuant to the Act.

.2 For the purpose of this contract immediately investigate and provide a report to the PWGSC Representative on incidents and accidents that involve:

.1 A resulting injury that may or may not require medical aid but involves lost time at work by the injured person(s).

.2 Exposure to toxic chemicals or substances.

.3 Property damage.

.4 Interruption to adjacent and/or integral infrastructure operations with potential loss implications.

.3 In the investigation and reporting of incidents and accidents, the Contractor is required to respond in a timely fashion to correct the action that was deemed to have caused the incident and/or accident and advise in writing on the action taken to prevent a re-occurrence of the incident and/or accident.

1.10 RECORD ON SITE

.1 Maintain on site a copy of the safety documentation as specified and any other safety related reports and documents issued to or received from the authorities having jurisdiction.

.2 Upon request, make copies available to the PWGSC Representative.

1.11 UNFORESEEN HAZARDS

.1 When unforeseen or peculiar safety related factor, hazard or condition occurs during performance of the work, follow procedures for Employee's Right to Refuse Work, in accordance with Acts and Regulations of Province Having Jurisdiction and advise PWGSC Representative verbally and in writing.

1.12 CORRECTION OF NON-COMPLIANCE

.1 Immediately address Health and Safety non-compliance issues identified by the Authority Having Jurisdiction or by PWGSC Representative.

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

.3 PWGSC Representative and/or Frontenac Institution Management may stop work if non-compliance of health and safety regulations is not corrected.

1.13 WORK STOPPAGE

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

1.2 INSPECTION

.1 Allow PWGSC 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 PWGSC 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 PWGSC Representative will order 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, PWGSC Representative shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Inspection and Testing:
.1 The contractor to furnish and pay for independent inspection/testing agency, equipment, facilities, and labour to provide Quality Control testing in accordance with the Contractor’s Quality Control Plan.
.2 PWGSC Representative will appoint and pay for independent inspection/testing agency, equipment, facilities and labour to provide Quality Assurance testing outside of those inspections listed in the Contractor’s Quality Control Plan.

.2 The contractor is to 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 PWGSC Representative at no cost to PWGSC. Pay costs for retesting and reinspection.

1.4 ACCESS TO WORK

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

.2 Cooperate to provide reasonable facilities for such access.

1.5 PROCEDURES

.1 Notify appropriate agency and PWGSC 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 orderly sequence to not cause delays 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.

1.6 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 PWGSC 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 PWGSC Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, PWGSC Representative will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by PWGSC Representative.

1.7 REPORTS

.1 Submit 4 copies of inspection and test reports to PWGSC Representative.

.2 Provide copies to subcontractor of work being inspected or tested.

1.8 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by PWGSC Representative and may be authorized as recoverable.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.2 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.3 TEMPORARY HEATING AND VENTILATION

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

1.4 TEMPORARY POWER AND LIGHT

.1 Contractor to provide and pay for temporary power during construction for temporary lighting and operating of power tools.

.2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance, and removal.

1.5 FIRE PROTECTION

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

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 51 00 – Temporary Utilities

.2 Section 01 56 00 – Temporary Barriers and Enclosures

1.2 SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

.1 Detail site plan indicating number of trailers to be used and details of temporary gate/fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

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

.5 Remove from site all such work after use.

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 weight or force that will endanger Work.

1.5 CONSTRUCTION PARKING

.1 Parking will be permitted on site within designated Contractor stockpile/storage area or elsewhere as determined by Frontenac Institution Management.

1.6 OFFICES

.1 Contractor to provide and maintain an office on site to meet their requirements only.

.2 Area on site for office, file storage, and meeting area to be designated by PWGSC Representative.

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

1.7 EQUIPMENT, TOOLS, AND MATERIALS STORAGE

.1 Provide and maintain, in 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 manner to cause least interference with work activities.

.3 Area on site for sheds and materials to be designated by Frontenac Institution Management.

1.8 SANITARY FACILITIES

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

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

1.9 CONSTRUCTION SIGNAGE

.1 Project identification site sign shall not be permitted on the site.

.2 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.

.3 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project.

.4 No other signs or advertisements, other than warning signs are permitted on site.

1.10 CLEAN-UP

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

.2 Clean dirt or mud tracked onto paved or surfaced roadways on a daily basis.

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

.4 Stack stored new or salvaged material not in construction facilities.

.5 Reinstate all surfaces upon completion of the work.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 51 00 – Temporary Utilities.

.2 Section 01 52 00 – Construction Facilities.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)
- .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 Canadian Standards Association (CSA International)
- .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

1.3 INSTALLATION AND REMOVAL

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

.2 Fully secure work site at the end of each work day. Work site to be closed and locked.

.3 Remove from site all such work after use.

1.4 FIRE ROUTES

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

1.5 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

1.6 PROTECTION OF BUILDING FINISHES

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

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with PWGSC Representative locations and installation schedule 3 days prior to installation.

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 77 00 – Closeout Procedures.

1.2 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by PWGSC Representative. Do not burn waste materials on site.

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

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

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

.6 Contractor to maintain dust control on the entire site on a daily basis to prevent blowing dust and debris.

.7 Daily, sweep and wash clean all adjacent areas impacted by Work.

1.3 FINAL CLEANING

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

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

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

.4 Remove waste products and debris.

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

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

.7 Sweep and wash clean adjacent areas impacted by Work.

END OF SECTION

PART 1 - GENERAL

1.1 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with PWGSC Representative to review and discuss Waste Management Plan and Goals.

.2 Accomplish maximum control of solid construction waste.

.3 Preserve environment and prevent pollution and environment damage.

1.2 DEFINITIONS

.1 Class III: non-hazardous waste - construction renovation and demolition waste.

.2 Inert Fill: inert waste - exclusively asphalt and concrete.

.3 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

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

.5 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.

.6 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
.1 Salvaging reusable materials from re-modeling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
.2 Returning reusable items including pallets or unused products to vendors.

.7 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.8 Separate Condition: refers to waste sorted into individual types.

.9 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

1.3 STORAGE, HANDLING, AND PROTECTION

.1 Store materials to be reused, recycled, and salvaged in locations as directed by PWGSC Representative.

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.4 Protect surface drainage, mechanical and electrical from damage and blockage.

.5 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
.1 On-site source separation is recommended.
.2 Remove co-mingled materials to off-site processing facility for separation.
.3 Provide waybills for separated materials.

1.4 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

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

.3 Keep records of construction waste including:
.1 Number and size of bins.
.2 Waste type of each bin.
.3 Total tonnage generated.
.4 Tonnage reused or recycled.
.5 Reused or recycled waste destination.

.4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.5 USE OF SITE AND FACILITIES

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

.2 Maintain security measures established by Frontenac Institution Management.

1.6 SCHEDULING

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 APPLICATION

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

3.2 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

.1 Separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by PWGSC Representative and consistent with applicable fire regulations.
.1 Mark containers or stockpile areas.
.2 Provide instruction on disposal practices.

.2 On-site sale of recyclable materials is not permitted.

.3 Demolition Waste:
.1 Acoustic Tile.
.2 Insulation.
.3 Electrical Equipment.
.4 Mechanical Equipment.
.5 Metals.
.6 Rubble.
.7 Wood.

.4 Construction Waste:
.1 Cardboard.
.2 Plastic Packaging.
.3 Rubble.
.4 Steel.
.5 Wood.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 78 00 – Closeout Submittals.

1.2 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor and Subcontractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
.1 Notify PWGSC Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
.2 Request PWGSC Representative Inspection.

.2 PWGSC Representative Inspection: PWGSC Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:
.1 Work has been completed and inspected for compliance with Contract Documents.
.2 Defects have been corrected and deficiencies have been completed.
.3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
.4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies have been submitted.
.5 Operation of systems has been demonstrated to PWGSC Representative's personnel.
.6 Work is complete and ready for final inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by PWGSC Representative and Contractor. If Work is deemed incomplete by PWGSC Representative, complete outstanding items and request re-inspection.

1.3 CLEANING

.1 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 77 00 – Closeout Procedures.

1.2 SUBMITTALS

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

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

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

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

.5 Two weeks prior to Substantial Performance of the Work, submit to the PWGSC Representative four final copies of the Record Drawings in English.

.6 Pay costs of transportation.

1.3 AS-BUILTS AND SAMPLES

.1 Maintain, at site for PWGSC Representative one record copy of: Contract Drawings.
.1 Specifications.
.2 Addenda.
.3 Change Orders and other modifications to Contract.
.4 Reviewed shop drawings, product data, and samples.
.5 Field test records.
.6 Inspection certificates.
.7 Manufacturer's certificates.

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

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

.4 Keep record documents and samples available for inspection by PWGSC Representative.

1.4 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of black line opaque drawings.

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

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

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
.1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
.2 Field changes of dimension and detail.
.3 Changes made by change orders.
.4 Details not on original Contract Drawings.
.5 References to related shop drawings and modifications.

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

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

1.5 WARRANTIES AND BONDS

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

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to PWGSC Representative approval.

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

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

.5 Submit, warranty information made available during construction phase, to PWGSC Representative for approval prior to each monthly pay estimate.

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

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
.4 Verify that documents are in proper form, contain full information, and are notarized.
.5 Co-execute submittals when required.
.6 Retain warranties and bonds until time specified for submittal.

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

.8 Conduct joint 4 month warranty inspection, measured from time of acceptance, by PWGSC Representative.

.9 Include information contained in warranty management plan as follows:
.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and commissioned systems such as fire protection, alarm systems, and sprinkler systems.
.3 Provide list for each warranted equipment, item, feature of construction or system indicating:
.1 Name of item.
.2 Model and serial numbers.
.3 Location where installed.
.4 Name and phone numbers of manufacturers or suppliers.
.5 Names, addresses, and telephone numbers of sources of spare parts.
.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
.7 Cross-reference to warranty certificates as applicable.
.8 Starting point and duration of warranty period.
.9 Summary of maintenance procedures required to continue warranty in force.
.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names, and phone numbers of persons to call for warranty service.
.12 Typical response time and repair time expected for various warranted equipment.

.4 Contractor's plans for attendance at 4 month post-construction warranty inspections.
.5 Procedure and status of tagging of equipment covered by extended warranties.
.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

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

.11 Written verification will follow oral instructions. Failure to respond will be cause for the PWGSC Representative to proceed with action against Contractor.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 35 29.06 – Health and Safety Requirements.

.2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.3 SCOPE OF WORK

.1 The scope of this specification section pertains to:
.1 The selective demolition of components of the existing building to permit the work. This includes existing floor slab elements, slabs-on-grade, and other items noted for removal on the drawings.

1.4 SUBMITTALS

.1 Prior to beginning of Work on site submit detailed Waste Reduction Work Plan indicating:
.1 Descriptions of and anticipated quantities in percentages of materials to be salvaged, reused, recycled, and landfilled.
.2 Schedule of selective demolition.
.3 Number and location of dumpsters.
.4 Anticipated frequency of tippage.
.5 Name and address of waste facilities.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/ Demolition Waste Management and Disposal.

1.6 SITE CONDITIONS

.1 Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures and notify PWGSC Representative immediately.
.1 Do not proceed until written instructions have been received from PWGSC Representative.

.2 Notify PWGSC Representative before disrupting building access or services.

PART 2 - PRODUCTS

.1 Not used.

PART 3 - EXECUTION

3.1 PREPARATION

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

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

3.2 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent structures and parts of building to remain in place. Provide bracing and shoring as required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services, and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.5 Do work in accordance with Section 01 35 29.06 - Health and Safety Requirements.

3.3 DEMOLITION

.1 Remove parts of existing building to permit new construction. Sort materials into appropriate piles for reuse and recycling.

.2 Trim edges of partially demolished building elements to tolerances as defined by PWGSC Representative and to suit final construction details.

3.4 DISPOSAL

.1 Dispose of removed materials, to appropriate recycling facilities except where specified otherwise, in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 ASTM International
.1 ASTM A1064/A1064M-15, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
.2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.2 CSA International
.1 A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
.2 CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
.3 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings:
.1 Submit concrete mix designs.
.2 Prepare reinforcement drawings in accordance with drawings and RSIC Manual of Standard Practice.

.3 Provide testing results and reports for review by PWGSC Representative and do not proceed without written approval when deviations from mix design or parameters are found.

.4 Provide PWGSC Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.

.5 Inform PWGSC Representative of proposed source of material to be supplied.

1.3 QUALITY ASSURANCE

.1 Provide to PWGSC Representative, minimum two (2) weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete.

.2 Quality Control Plan: provide written report to PWGSC Representative verifying compliance that concrete in place meets performance requirements.

.3 Do construction in accordance with Section 01 35 29.06 – Health and Safety Requirements.

.4 Concrete hauling time: maximum allowable time for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching.
.1 Modifications to maximum time limit must be agreed to by PWGSC Representative and concrete producer as described in CSA A23.1/A23.2.
.2 Deviations to be submitted for review by the PWGSC Representative.
.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

.1 Alternative 1: in accordance with CSA A23.1/A23.2 and as described in Mixes of PART 2 – PRODUCTS.

2.2 PERFORMANCE CRITERIA

.2 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by PWGSC Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 CONCRETE MATERIALS

.1 Cement: to CSA A3001, Type GU.

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

.3 Sealer: boiled linseed oil to ASTM D 260 mixed with mineral spirits 1:1.

.4 Other concrete materials: to CSA A23.1/A23.2.

.5 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland Cement, water reducing and plasticizing agents. Minimum compressive strength: 40MPa at 15 days.

2.4 REINFORCING MATERIALS

.1 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.

.2 Welded steel wire fabric: to ASTM A 185.

2.5 MIXES

.1 Alternative 1 - Performance Method for specifying concrete: to meet Design Engineer's performance criteria to CSA A23.1/A23.2.

.1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 – VERIFICATION.

.2 Proportion normal density concrete in accordance with CAN/CSA A23.1 - latest edition, Table 5.

.3 Provide concrete mix to meet following plastic state requirements:

.1 Uniformity: per Table 13 of A23.1/A23.2.

.2 Placeability: per A23.1/A23.2.

.3 Workability: free of surface blemishes, loss of mortar, colour variations, and segregation.

.4 Finishability: limit amount of bleeding.

.5 Set time: maximum 60 minutes.

.4 Provide concrete mix to meet following hard state requirements:

.1 Cement – Tables 6 and 7 CAN/CSA A23.1 – latest edition.

.2 Supplemental Cementing Materials – Table 8, CAN/CSA A23.1-latest edition.

.3 Minimum 28 day compressive strength: 30 MPa.

.4 Class of Exposure: N

.5 Slump at discharge: – 80 +/- 30mm.

.6 Air content: N/A

.7 Chemical admixtures – in accordance with ASTM C 494.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Provide PWGSC Representative 24-hours' notice before each concrete pour.

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

.1 Prior to placing concrete, obtain PWGSC Representative's approval of reinforcing material and placement.

.2 Substitute different size bars only if permitted in writing by PWGSC Representative.

.3 Provide Class B tension lap splices, unless indicated.

.4 Do not field bend or field weld reinforcement unless

permitted in writing by PWGSC Representative.
.5 Replace bars, which develop cracks or splits.
.6 Ensure cover to reinforcement is maintained during concrete pour.

.3 During concreting operations:
.1 Development of cold joints not allowed.
.2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.

3.2 CONSTRUCTION

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

3.3 INSERTS

.1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.

.2 Sleeves and openings greater than 100 mm x 100 mm not indicated, must be reviewed by PWGSC Representative.

3.4 FINISHES

.1 Pavements, walks, curbs and exposed site concrete:
.1 Screed to plane surfaces and use wood floats.
.2 Provide round edges and joint spacings using standard tools.
.3 Trowel smooth to provide lightly brushed non-slip finish.

3.5 CURING

.1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

3.6 FIELD QUALITY CONTROL

.1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by Owner.

.2 Testing laboratory to carry out field testing program defined in Quality Control plan.

3.7 VERIFICATION

.1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established in Part 2 – Products, by PWGSC Representative and provide verification of compliance as described in Part 1 – Quality Assurance.

.2 Field testing of freshly placed concrete to consist of one test for each instance of a mix (Class) of concrete placed on any given day and one additional test for every 50 m^2 of concrete placed.

.3 One test to be comprised of an air test, slump test and casting of three cylinders for compressive testing.

3.8 CLEANING

.1 Prepare surfaces for application of finish product(s).

.2 Use trigger-operated spray nozzles for water hoses.

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

.4 Cleaning of concrete equipment to be done in accordance with Section 01 35 43 - Environmental Procedures.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 07 92 00 – Joint Sealing.

1.2 REFERENCES

.1 ASTM International
.1 ASTM A1064/A1064M - 15, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 CSA International
.1 CAN/CSA-A165 SERIES-04(R2014), CSA Standards on Concrete Masonry Units (consists of A165.1, A165.2, and A165.3).
.2 CAN/CSA-A179-14, Mortar and Grout for Unit Masonry.
.3 CAN/CSA-A370-14, Connectors for Masonry.
.4 CAN/CSA A371-14, Masonry Construction for Buildings.
.5 CSA S304.1-04(R2010), Design of Masonry Structures.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data:
.1 Submit electronic copy of manufacturer's instructions, printed product literature, and data sheets for masonry products and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit for review and acceptance of each unit type.

.4 Quality Assurance:
.1 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.

.5 Certificates:
.1 Submit Product certificates signed by manufacturer certifying materials comply with

specified performance characteristics and criteria and physical requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect masonry products from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MASONRY UNITS

.1 Standard concrete block units: to CAN/CSA-A165 Series (CAN/CSA-A165.1).
.1 Classification: H/15/A /M to have 1 hour fire rating minimum.
.2 Size: to match existing.
.3 Provide bullnose edges for all units at exposed corners and edges.
.4 Special shapes: match existing shapes. Coordinate with PWGSC Representative if existing cannot be matched.

2.2 MORTAR AND GROUT

.1 Use same brands of materials and source of aggregate for entire project.

.2 Mortar: to CAN/CSA-A179.
.1 Use aggregate passing 1.18 mm sieve where 6 mm/1/4" thick joints are indicated.
.2 Colour: natural mortar colour to be painted.

.3 Mortar for interior masonry.
.1 Loadbearing: type S.
.2 Non Loadbearing: type N.

.4 Grout: to CAN/CSA-A179, Table 3.

2.3 ACCESSORIES

.1 Nailing Inserts: 0.5 mm minimum thickness, galvanized.

.2 Bolts: 12 mm diameter x 150 mm long with ends bent 50 mm at 90 degrees.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate prior to commencing with Work of this section in presence PWGSC Representative.
.2 Inform PWGSC Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from PWGSC Representative.

3.2 INSTALLATION

.1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.
.1 Bond: match existing bond.
.2 Coursing height: match existing course height.
.3 Jointing: match existing jointing.

.2 Build masonry plumb, level, and true to line, with vertical joints in alignment.

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

.4 Install bullnose concrete block to all exposed interior corners unless otherwise indicated.

3.3 CONSTRUCTION

.1 Exposed masonry:
.1 Remove chipped, cracked, and otherwise damaged units, in exposed masonry and replace with undamaged units.
.2 Cut out for electrical switches, outlet boxes,

and other recessed or built-in objects. Make cuts straight, clean, and free from uneven edges.

.2 Jointing: Follow appropriate procedures to match existing jointing
.1 Concave: Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints.
.2 Raked: Allow joints to set just enough to remove excess water, then rake joints uniformly to 6 mm depth and compress with square tool to provide smooth, compressed, raked joints of uniform depth.
.3 Flush: Strike flush joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.

.3 Wetting of masonry:
.1 Except in cold weather, wet bricks having initial rate of absorption exceeding 1 g/minute/ 1000 mm^2: wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface dry.
.2 Wet tops of walls built of masonry qualifying for wetting, when recommencing work on such walls

.4 Provision for movement:
.1 Leave 3 mm/1/8” space below shelf angles.
.2 Leave 6 mm/1/4" space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
.3 Built masonry to tie in with stabilizers, with provision for vertical movement.

3.4 REINFORCING AND CONNECTING

.1 Install masonry connectors and reinforcement in accordance with CAN/CSA-A370, CAN/CSA-A371 and CSA S304.1 unless indicated otherwise.

.2 Prior to placing concrete, mortar, grout, obtain PWGSC Representative's approval of placement of reinforcement and connectors.

3.5 BONDING AND TYING

.1 Bond walls of two or more wythes using metal connectors in accordance with CAN/CSA-A371, CSA S304.1 and as indicated.

3.6 GROUTING

.1 Grout masonry in accordance with CAN/CSA-A179, CAN/CSA-A371 and CSA S304.1 and as indicated.

3.7 SITE TOLERANCES

.1 Tolerances of CAN/CSA-A371 apply.

3.8 REPOINTING

.1 Mixing of the first mortar batch to be prepared with the manufacturer’s representative and the Consultant, in order to obtain their approval to begin work.

.2 Dampen joints and porous masonry units.

.3 Keep masonry damp while pointing is being performed. Completely fill joint with mortar. If surface of masonry units has worn rounded edges keep pointing back from surface to keep same width of joint Avoid feather edges. Pack mortar solidly into voids and joints.

.4 Build-up pointing in layers not exceeding 12 mm in depth.

.5 Allow each layer to set before applying subsequent layers. Maintain joint width.

.6 Finish joints to match original profile. Tool, compact and finish using jointing tool or mason's slick to force mortar into joint.

.7 Remove excess mortar from masonry face before it sets.

3.9 FIELD QUALITY CONTROL

.1 Inspection will be carried out by PWGSC Representative.

3.10 CLEANING

.1 Progress Cleaning:
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools, and equipment.

3.11 PROTECTION

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

.2 Repair damage to adjacent materials caused by masonry products installation.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 The work of this section includes the provision of all labour, materials, equipment and services required to execute sealant work, as indicated on the drawings, as specified herein and as required by job conditions and normally considered to be work covered by this Section.

.2 The term “sealant” to be interpreted as synonymous with the term “caulking” where used on the drawings and/or in the specifications.

.3 Text to complete other various Sections containing sealant or caulking specifications.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 09 91 23 – Interior Painting.

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM):
.1 ASTM C 919-12, Standard Practice for Use of Sealants in Acoustical Applications.
.2 ASTM C834-14, Standard Specification for Latex Sealants.

.2 Canadian General Standards Board (CGSB):
.1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
.2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
.3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
.4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
.5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
.1 Material Safety Data Sheets (MSDS).

1.4 SUBMITTALS

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

.2 Manufacturer's product to describe:
.1 Caulking compound.
.2 Primers.
.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.4 Submit duplicate samples of each type of material and colour.

.5 Cured samples of exposed sealants for each color where required to match adjacent material.

.6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
.1 Instructions to include installation instructions for each product used.

1.5 QUALITY ASSURANCE/MOCK-UP

.1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up to show location, size, shape, and depth of joints complete with back-up material, primer, caulking, and sealant.

.3 Mock-up will be used:
.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.4 Locate where directed by PWGSC Representative.

.5 Allow 48 hours for inspection of mock-up by PWGSC Representative before proceeding with sealant work.

.6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.7 PROJECT CONDITIONS

.1 Environmental Limitations:
.1 Do not proceed with installation of joint sealants under following conditions:
.1 When ambient and substrate temperature

conditions are outside limits permitted by joint sealant manufacturer or are below 4.4°C.
.2 When joint substrates are wet.

.2 Joint-Width Conditions:
.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:
.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

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 labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 Ventilate area of work as directed by PWGSC Representative by use of approved portable supply and exhaust fans.

PART 2 – PRODUCTS

2.1 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.2 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers.

.3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Silicones One Part:
.1 To CAN/CGSB-19.13.
.2 Mildew resistant to CAN/CGSB-19.22M.

.2 Butyl:
.1 To CGSB 19-GP-14M.

.3 Preformed Compressible and Non-Compressible Back-up Materials:
.1 Polyethylene, Urethane, Neoprene or Vinyl Foam:
.1 Extruded closed cell foam backer rod.
.2 Size: oversize 30 to 50 %.
.2 Neoprene or Butyl Rubber:
.1 Round solid rod, Shore A hardness 70.
.3 High Density Foam:
.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.
.4 Bond Breaker Tape:
.1 Polyethylene bond breaker tape that will not bond to sealant.

2.3 SEALANT SELECTION

.1 Control and expansion joints on the interior of exterior surfaces of unit masonry walls: Sealant Type: one-part silicone.

.2 Interior control and expansion joints in floor surfaces: Sealant Type: one-part silicone.

.3 Perimeters of interior frames, as detailed and itemized: Sealant Type: acrylic latex.

.4 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant Type: acrylic latex.

.5 Perimeter of washroom countertop and washroom fixtures (e.g. sinks, tubs, urinals, stools, water closets, basins, vanities): Sealant Type: mildew resistant silicone.

.6 Exposed interior control joints in drywall: Sealant Type: acrylic latex.

2.4 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Primer: as recommended by manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

.1 Sealant:
.1 Apply sealant in accordance with manufacturer's written instructions.
.2 Mask edges of joint where irregular surface

or sensitive joint border exists to provide neat joint.
.3 Apply sealant in continuous beads.
.4 Apply sealant using gun with proper size nozzle.
.5 Use sufficient pressure to fill voids and joints solid.
.6 Dry 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 Clean-up:
.1 Clean adjacent surfaces immediately and leave Work neat and clean.
.2 Remove excess and droppings, using recommended cleaners as work progresses.
.3 Remove masking tape after initial set of sealant.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 07 92 10 – Joint Sealing.

.3 Section 09 22 16 – Non-Structural Metal Framing.

1.2 REFERENCES

.1 Aluminum Association:
.1 Designation for Aluminum Finishes-2003.

.2 American Society for Testing and Materials International, (ASTM):
.1 ASTM C1396/C1396M-14a, Standard Specification for Gypsum Board
.2 ASTM C 475-15, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
.3 ASTM C 840-13, Specification for Application and Finishing of Gypsum Board.
.4 ASTM C 954-15, Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
.5 ASTM C 1002-14, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
.6 ASTM C 1047-14, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
.7 ASTM C 1280-13, Specification for Application of Gypsum Sheathing Board.
.8 ASTM C 1178/C1178M-13, Specification for Glass Mat Water-Resistant Gypsum Backing Board.

.3 Association of the Wall and Ceilings Industries International (AWEI).

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in original packages, containers, or bundles bearing manufacturers brand name and identification.

.2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.

.3 Handle gypsum boards to prevent damage to edges, ends, or surfaces. Protect metal accessories and trim from being bent or damaged.

1.4 SITE ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Standard board: to ASTM C 36/C36M regular, thickness as indicated, 1200 mm wide x maximum practical length, ends square cut, edges rounded.

.2 Cement Board: lightweight Portland cement board with vinyl coated woven glass-fiber mesh embedded in front and back surfaces, square cut.

.3 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.

.4 Steel drill screws: to ASTM C 1002.

.5 Laminating compound: as recommended by manufacturer, asbestos-free.

.6 Casing beads, corner beads, control joints and edge trim: to ASTM C 1047, galvanized steel, 0.5 mm base thickness, perforated flanges, one piece length per location.

.7 Sealants: in accordance with Section 07 92 10 - Joint Sealing.

.8 Joint compound: to ASTM C 475, asbestos-free.

PART 3 – EXECUTION

3.1 ERECTION

.1 Do application and finishing of gypsum board in accordance with ASTM C 840 except where specified otherwise.

.2 Do application of gypsum sheathing in accordance with ASTM C 1280.

.3 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C 840 except where specified otherwise.

.4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
.1 Install work level to tolerance of 1:1200.
.2 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.
.3 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

.5 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

3.2 APPLICATION

.1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.

.2 Apply gypsum board to framing using screw fasteners.
.1 Single-Layer Application:
.1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C 840.
.2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
.2 Double-Layer Application:
.1 Install gypsum board for base layer and exposed gypsum board for face layer.
.2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
.3 Apply base layers at right angles to supports unless otherwise indicated.
.4 Apply base layer on walls and face layers vertically with joints of base layer

over supports and face layer joints offset at least 250 mm with base layer joints.

.3 Apply cement board as back-up to all porcelain and ceramic tile finishes and where noted on drawings.

.4 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.

.5 Install gypsum board with face side out.

.6 Do not install damaged or damp boards.

.7 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.3 INSTALLATION

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

.4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.

.5 Provide continuous polyethylene dust barrier behind and across control joints.

.6 Locate control joints at changes in substrate construction, and at approximate 15 m spacing on ceilings.

.7 Install control joints straight and true.

.8 Construct expansion joints at building expansion and construction joints.

.9 Install expansion joint straight and true.

.10 Install access doors to electrical and mechanical fixtures specified in respective sections.

.1 Rigidly secure frames to furring or framing systems.

.11 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.12 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:
.1 Level 5, typical quality level: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.

.13 Finish corner beads and control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.14 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.15 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.16 Completed installation to be smooth, level and plumb, free from waves and other defects and ready for surface finish.

.17 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
.1 ASTM C 645-00, Specification for Nonstructural Steel Framing Members.
.2 ASTM C 754-00, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

.2 Canadian General Standards Board (CGSB).
.1 CAN/CGSB-1.40-97, Primer, Structural Steel, Oil Alkyd Type.

.3 Environmental Choice Program (ECP).
.1 CCD-047a -98, Paints - Surface Coatings.
.2 CCD-048-98, Surface Coatings - Recycled Water-borne.

1.3 QUALITY ASSURANCE

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

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

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Non-load bearing channel stud framing: to ASTM C 645, stud size as noted, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.

.2 Floor and ceiling tracks: to ASTM C 645, in widths to suit stud sizes, 32 mm flange height.

.3 Metal channel stiffener: 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.

PART 3 - EXECUTION

3.1 ERECTION

.1 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.

.2 Install damp-proof course under stud shoe tracks of partitions on slabs-on-grade.

.3 Place studs vertically at noted spacing and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.4 Erect metal studding to tolerance of 1:1000.

.5 Attach studs to track using screws.

.6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.7 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.8 Install steel studs or furring channel between studs for attaching electrical and other boxes. Use double stud at head of walls attached to building structure.

.9 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.

3.2 CLEANING

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

END OF SECTION

PART 1 – GENERAL

1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
.1 Material Safety Data Sheets (MSDS).

.2 Master Painters Institute (MPI):
.1 MPI Architectural Painting Specifications Manual, 2004.

.3 National Fire Code of Canada – Latest Edition.

.4 Society for Protective Coatings (SSPC):
.1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

1.2 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 tradesperson in accordance with trade regulations.

.2 Conform to latest MPI requirements for interior painting work including preparation and priming.

.3 Materials (primers, paint, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) to be in accordance with MPI Painting Specification Manual “Approved Product” listing and will be from a single manufacturer for each system used.

.4 Retain purchase orders, invoices and other documents to provide conformance with noted MPI requirements when requested by PWGSC Representative.

.5 Standard of Acceptance:
.1 Walls: No defects visible from a distance of 100 mm at 90º to surface.
.2 Ceilings: No defects visible from floor at 45º to surface when viewed using final lighting source.
.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.3 SCHEDULING

.1 Submit work schedule for various stages of painting to PWGSC Representative for review. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from PWGSC Representative for changes in work schedule.

1.4 SUBMITTALS

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

.2 Product Data:
.1 Submit product data and instructions for each paint and coating product to be used.
.2 Submit product data for the use and application of paint thinner.

.3 Samples:
.1 Submit full range colour sample chips to indicate where colour availability is restricted.
.2 Submit duplicate 200 x 300 mm sample panels of each, paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
.1 3 mm plate steel for finishes over metal surfaces.
.2 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
.3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
.4 Manufacturer's Instructions:
.1 Submit manufacturer's installation and application instructions.
.5 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 33 00 – Submittal Procedures include following:
.1 Product name, type and use.
.2 Manufacturer's product number.
.3 Colour numbers.
.4 MPI Environmentally Friendly classification system rating.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Packing, Shipping, Handling and Unloading:
.1 Pack, ship, handle and unload materials in accordance with manufacturer's written instructions.

.2 Acceptance at Site:
.1 Identify products and materials with labels

indicating:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Storage and Protection:
.1 Provide and maintain dry, temperature controlled, secure storage.
.2 Store materials and supplies away from heat generating devices.
.3 Store materials and equipment in well ventilated area with temperature range 7°C to 30°C.

.5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.

.7 Remove paint materials from storage only in quantities required for same day use.

.8 Fire Safety Requirements:
.1 Provide one 9 kg 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 National Fire Code of Canada requirements.

1.6 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:
.1 Coordinate use of existing ventilation system with PWGSC Representative and ensure its operation before, during, and after application of paint as required.
.2 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
.3 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless preapproved written approval by specifying body and product manufacturer, perform no painting when:
.1 Ambient air and substrate temperatures are below 10°C.
.2 Substrate temperature is above 32°C unless paint is specifically formulated for application at high temperatures.
.3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
.4 The relative humidity is under 85% or when the dew point is more than 3°C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3°C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
.5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
.6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
.2 Perform painting work when maximum moisture content of the substrate is below:
.1 Allow new concrete and masonry to cure minimum of 28 days.
.2 15% for wood.
.3 12% for plaster and gypsum board.
.3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
.4 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:
.1 Apply paint finish 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 to adequately prepared surfaces and to surfaces within moisture limits.
.3 Apply paint when previous coat of paint is dry or adequately cured.

.4 Additional interior application requirements:
.1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Provide paint materials for paint systems from single manufacturer.

.3 Only qualified products with E2 "Environmentally Friendly" rating are acceptable for use on this project.

.4 Conform to latest MPI requirements for interior painting work including preparation and priming.

.5 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.

.6 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.

.7 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
.1 Water-based.
.2 Biodegradable.
.3 Manufactured without compounds that contribute to ozone depletion in the upper atmosphere.
.4 Manufactured without compounds that contribute to smog in the lower atmosphere.

2.2 COLOURS

.1 Colour schedule will be based upon selection of two base colours and one accent colour. No more than three colours will be selected for entire project and no more than three colours will be selected in each area. Colour Schedule as provided by PWGSC Representative.

.2 Selection of colours from manufacturer’s standard range of colours.

.3 Where specific products are available in restricted range of colours, selection based on limited range.

.4 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from PWGSC Representative for tinting of painting materials.

.2 Mix paste, powder, or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.4 Thin paint for spraying in accordance with paint manufacturer's instructions.

.5 Remix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss 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 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	

.2 Gloss level ratings of painted surfaces as indicated.

2.5 INTERIOR PAINTING SYSTEMS

.1 Galvanized Metal: doors, frames, railings, miscellaneous steel, pipes, overhead decking, and ducts:
.1 INT 5.3N - Institutional low odour/low VOC 35-70 gloss level, semi-gloss finish.

.2 Concrete Masonry Units: smooth and split face block and brick:
.1 INT 4.2D – High performance architectural latex, gloss level 3, eggshell finish.

.3 Plaster and Gypsum Board: gypsum wallboard, drywall, “sheet rock type material”, and textured finishes:
.1 INT 9.2C – Alkyd, gloss level 1, flat finish (over latex sealer).

.4 Wood Paneling and Casework: plywood:
.1 INT 6.4B – Alkyd, gloss level 5, semi-gloss finish (over alkyd sealer).

PART 3 – EXECUTION

3.1 GENERAL

.1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to PWGSC Representative damages, defects, unsatisfactory or unfavourable 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 Maximum moisture content as follows:
.1 Stucco, plaster and gypsum board: 12%.
.2 Concrete: 12%.
.3 Concrete Block/Brick: 12%.
.4 Wood: 15%.

3.3 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. If damaged, clean and restore surfaces as directed by PWGSC Representative.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect building occupants and general public in and about the building.

.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. Signs to approval of PWGSC Representative.

.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.

.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and allow to dry thoroughly.

.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.

.6 Use trigger operated spray nozzles for water hoses.

.7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease,

oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap, and resinous areas.
.2 Apply wood filler to nail holes and cracks.
.3 Tint filler to match stains for stained woodwork.

.6 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.

.7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets, and corners to be painted by brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.

.8 Touch up of shop primers with primer as specified.

.9 Do not apply paint until prepared surfaces have been accepted by PWGSC Representative.

3.4 APPLICATION

.1 Method of application to be as approved by PWGSC Representative. Apply paint by brush and/or roller. Conform to manufacturer's application instructions unless specified otherwise.

.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. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.

.4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.6 Sand and dust between coats to remove visible defects.

.7 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.

.8 Finish closets and alcoves as specified for adjoining rooms.

.9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.5 MECHANICAL/ ELECTRICAL EQUIPMENT

.1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.

.2 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.3 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.4 Do not paint over nameplates.

.5 Keep sprinkler heads free of paint.

.6 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.7 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.8 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.

.9 Do not paint interior transformers and substation equipment.

3.6 SITE TOLERANCES

.1 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.7 RESTORATION

.1 Clean and reinstall 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 PWGSC Representative. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by PWGSC Representative.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 AA-M32C12A32 - Metal Finishes for Architectural and Metal Products.

.2 American Society for Testing and Materials (ASTM):
.1 ASTM A 167-94a, Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
.2 ASTM A653/A653M-95, General Requirements for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
.3 ASTM B117-95, Method of Salt Spray (Fog) Testing.

.3 Canadian General Standards Board (CGSB):
.1 CAN/CGSB-12.5-M86, Mirrors, Silvered.

.4 Canadian Standards Association (CSA):
.1 CSA-W55.3-1965, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

1.2 SUBMITTALS

.1 Shop Drawings:
.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit shop drawings for each item complete with dimensions, mounting heights, construction details, and description of gauges, finishes, hardware and capacity.
.3 Show height from floor to actual dispensing and operating portions of items to be used by occupants. Show clearances required for door swings and servicing.

.2 Samples:
.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
.2 If requested by PWGSC Representative, submit samples of all washroom accessories. Do not commence final production before samples have been inspected for compliance with specifications.

.3 Maintenance Instructions:
.1 Submit maintenance instructions including technical data sheets of each item, service and parts manual, name of local representative for field service or consultation.

.4 Installation Instructions:
.1 Submit installation instructions that will indicate manufacturer’s recommended methods of installation.

1.3 QUALITY ASSURANCE

.1 Qualifications:
.1 Employ only qualified installers with proven experience in this type of work.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver products to the place of work undamaged.

.2 Store products as required by manufacturer.

.3 Replace damaged products at no cost to Owner.

PART 2 - PRODUCTS

2.1 SHEET METAL FABRICATIONS

.1 Type 302/304 stainless steel with satin finish for interior and exterior surfaces for all washroom accessories.

.2 Grind smooth and slightly round corners, edges or portions of the unit that can be reached by hand. Eliminate hazards liable to create injury to persons properly or improperly using the equipment.

.3 Neatly cut, fit, fill, and smooth corners of returns to provide neat inconspicuous fully closed joints.

.4 Heliarc weld and grind seams smooth and polish to required face finish.

.5 Visible welding or soldering marks on exposed faces are not acceptable.

.6 Minimum 1.2 mm nominal thickness for stainless steel sheet.

2.2 ACCESSORIES

.1 Refer to drawings for item description and quantity required.

2.3 LOCATIONS

.1 Refer to drawings for locations.

2.4 PRODUCTS

.1 Folding Shower Seat (FS): Compact Rectangular Phenolic Fold-up Shower Seat 400 mm deep x 570 mm wide. All metal parts fabricated of 18-8 alloy type 304 stainless steel. Seat frame and support legs shall be 25 mm Ø and 32 mm square x 1.2 mm. 4.8 mm thick mounting flanges and 1.5 mm guide bracket/arm support. All exposed surfaces shall have satin finish. Structural assembly shall be of welded construction and all exposed edges and corners shall be radiused and/or deburred. Seat shall be 8 mm thick solid phenolic with white colour top and bottom surfaces and shall have black edges. Support arm shall fold up when in retracted position to provide low profile against wall. No extra fittings shall be required to retain seat in storage position.

.2 Grab Bar Type 1 (GB1): 762 mm x 762 mm 90-degreee grab bar. 18-8, type-304, 18-gauge (1.2 mm) stainless steel tubing with satin-finish. 32 mm outside diameter. Ends are Heliarc welded to concealed mounting flanges. Clearance between the grab bar and wall to be 38 mm. Concealed Mounting Flanges – 18-8, type-304, 1/8" (3 mm) thick, stainless steel plate; end flanges 50 mm x 80 mm with two holes for attachment to wall. Intermediate flanges 65 mm x 80 mm wide x 80 mm diameter. Snap Flange Covers – 18-8, type-304, 22-gauge (0.8 mm) drawn stainless steel with satin-finish 85 mm diameter x 16 mm deep. Cover snaps over mounting flange to conceal screws.

.3 Grab Bar Type 2 (GB2): 1067 mm long grab bar. 18-8, type-304, 18-gauge (1.2 mm) stainless steel tubing with satin-finish. 32 mm outside diameter. Ends are Heliarc welded to concealed mounting flanges. Clearance between the grab bar and wall to be 38 mm. Concealed mounting flange 3 mm thick, type 304 stainless steel plate, 50 mm x 80 mm, with screw holes for concealed anchors. Cover is 22-gauge (0.8 mm), type 304 stainless steel with satin finish, 85 mm diameter. Cover snaps over mounting flange to conceal screws.

.4 Robe Hook (RH): Vandal resistant clothes hook secured from the front. Type 304 satin-finish stainless steel. Back plate is 14–gauge (2 mm). Hook snaps down for safety if excessively loaded. Back plate 100 x 100 x 20 mm. Hook projects 30 mm from the back plate. Furnished with tamper-resistant mounting screws.

.5 Shower Curtain Rod (SR): Type-304, 18-gauge (1.2 mm) stainless steel with satin finish and with an outside diameter of 30 mm. One-piece, die-formed flanges shall be type-304, 20-gauge (1.0 mm)

stainless steel with satin finish. Width to be 670 mm +/- (verify on site).

.6 Shower Curtain (SC): Opaque matte white vinyl, 0.2 mm thick, with anti-bacterial and flame retardant agents. Nickel plated brass grommets along top, one every 150 mm. Bottom and sides are hemmed. 1065 mm wide x 1830 mm high. Supply with heavy duty stainless steel shower curtain hooks with nickel plated brass rollers.

PART 3 - EXECUTION

3.1 EXAMINE WORK

.1 Examine substrate surfaces to receive the work of this Section and ensure that work done as part of the work of other Sections is complete and that there are no conditions that will adversely affect the performance of this work. Notify Contractor of any unsatisfactory conditions. Do not proceed with this Work until unsatisfactory conditions have been corrected. Commencement of Work implies acceptance of surfaces and conditions.

.2 Review walls for correct dimension, plumbness of blocking or frames, and other preparation that would affect installation of washroom accessories.

.3 Review areas to receive surface mounted units for conditions that would affect quality and execution of work.

3.2 INSTALLATION

.1 Install all work of this Section in accordance with manufacturer’s installations instructions, and as specified herein.

.2 Securely fasten accessories, level and plumb. Where fasteners are exposed, use tamper-proof fasteners finished to match items secured.

.3 Install all work of this Section where specified and where indicated on drawings or where directed by the PWGSC Representative. Do **not** install any item until PWGSC Representative has reviewed the location.

.4 Use manufacturer’s recommended anchoring systems.

3.3 ADJUSTING AND CLEANING

.1 Upon completion of the work or when directed, remove all traces of protective coatings or paper.

.2 Test mechanisms, hinges, locks, and latches; and where necessary, adjust and lubricate and ensure that washroom accessories are in perfect working order.

.3 Clean and polish all surfaces.

3.4 CLEAN-UP

.1 Remove excess debris and products from the place of the work.

END OF SECTION

PART 1 – GENERAL

1.1 DOCUMENTS

.1 The Contract Documents are complementary, what is required by any one shall be as binding as if required by all. Specification sections and drawings cannot be read in isolation and it shall be the responsibility of the Contractor and suppliers to ensure they have sufficient information to provide specified material and services as required by the complete Contract Documents.

.2 These specifications are an integral part of the Contract Documents. Refer to other Sections to ensure a completed operational product and fully coordinated standard of work.

.3 Definitions:
.1 "Provide" means to "supply and install".
.2 "Concealed" means within chase, furred space, shaft, or hung ceiling.
.3 "Exposed" means "not concealed" as defined herein.
.4 “Demolish” means to “remove from site and depose of in an appropriate manner”.

.4 Conform to Canadian Metric Practice Guide CSA CAN3-234.1.

.5 Provide all required adapters between "metric" and "imperial" installations.

.6 Metric descriptions in this Division are nominal equivalents of Imperial values.

.7 “NPS” refers to Nominal Pipe Size and is the ASME B36 designation for various standard pipe sizes.

.8 Drawings do not indicate exact architectural, structural, or electrical features. Examine drawings prior to fabricating and installing work to ensure no interference exists. Report conflict with work to PWGSC Representative before proceeding.

.9 Drawings show general design and arrangement of mechanical system installation, and are diagrammatic in some details. Coordinate all drawings and with all trades for complete operational system.

.10 Do not scale drawings to order material. Take field measurements before ordering materials and make material conform to site conditions.

1.2 CO-OPERATION WITH OTHER TRADES

.1 Review all Contract Documents, including those of the other trades, and coordinate with work of other Divisions and trades.

.2 Cooperate fully with Divisions 22, 23, 25 and Division’s 26 and 27 prior to installation to lay out location of ducts, diffusers, piping, lighting fixtures, and other mechanical and electrical components in all areas.

.3 Report areas of conflict immediately to PWGSC Representative for comment. Do not continue work until corrective measures are prescribed.

.4 Locate distribution systems, access doors, equipment, and materials for maximum useable space to satisfaction of PWGSC Representative.

1.3 CONTRACTOR REQUESTS FOR INFORMATION

.1 The Contractor may, after exercising due diligence to locate required information, request from the Consultant clarification or interpretation of the requirements of the Contract Documents. The Consultant shall, with reasonable promptness, respond to the Contractor’s requests for clarification or interpretation. However, if the information requested by the Contractor is apparent from field observations, is contained in the Contract Documents, or is reasonably inferable from them, the Contractor shall be responsible to the Client for all reasonable costs charged by the Consultant to the Client for the Additional Services required to provide such information.

1.4 CODES AND BYLAWS PERMITS AND FEES

.1 Comply with all Codes and By-laws relating to system and equipment installations. Provide certificates to verify that the work installed conforms to the laws and regulations of all authorities having jurisdiction.

.2 Give all necessary notice, obtain all permits, and pay all fees in order that the work specified herein may be completed.

.3 Co-ordinate with all other contractors prior to tender submission the application and payment, for

all required building permit and inspection fees. The costs for these regulatory requirements shall be borne by this Contract.

.4 Employ all sub consultants or testing agencies required for completion of the work specified herein may be completed and properly verified.

1.5 PROJECT SCHEDULE

.1 Phase work in accordance with Division 1.

1.6 CONTRACTOR QUALITY ASSURANCE PROGRAM

.1 Contractor is solely responsible for the control, charge, and supervision of construction means, methods, techniques, sequences and procedures, and for safety precautions and programs required in connection with the work.

.2 Contractor is solely responsible for the discovery and correction of deficiencies, errors and omissions in the execution and performance of the work and for the preparation of submissions (shop drawings, reports, etc.) relating to the work.

.3 Contractor is solely responsible for providing the appropriate quality assurance program to ensure that the work is carried out and performs in accordance with the Contract Documents, industry standards and relevant codes and legislation. Contractor Quality Assurance Program is to ensure the following:

.1 The use of qualified tradesmen, experts, and professionals with the level of skill and experience required for the proper execution and performance of the work.

.2 The level of direction, supervision, and inspection required for the proper execution and performance of the work.

.3 The level of coordination between trades, field conditions, material requirements, and product requirements required for the proper execution and performance of the work.

.4 The level of management required for the quality assurance program to operate effectively so that deficiencies, errors, and omissions in the work are identified by the Contractor on a continuous basis and that corrective action is carried out promptly.

.5 The level of management and communication required for the status of the work to be properly monitored and reported to PWGSC Representative.

.4 Field review (observations) of the work by the PWGSC Representative is not to be considered part of the Contractor's Quality Assurance Program.

.5 The review of Contractor prepared submissions (shop drawings, reports, etc.) by the PWGSC Representative is not to be considered part of the Contractor's Quality Assurance Program.

1.7 WARRANTIES

.1 Contractor to provide all labour and material to promptly correct defects or deficiencies in the work and the performance of the work, which appear prior to and during the one year Warranty period. Warranty is to include complete labour and material Product warranties for all Products included in the work.

.2 Warranty period for the corrected work is to be extended for an additional year following the correction of defects and deficiencies in the work carried out in the initial warranty period.

1.8 MECHANICAL SUBMITTALS

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

.2 Shop drawings to show mounting arrangements and operating and maintenance clearances.

.3 Shop drawings and product to include:
.1 Detailed drawings of bases, supports, and anchor bolts.
.2 Acoustic sound power data, where applicable.
.3 Points of operation on performance curves.
.4 Manufacturer certification of current equipment production.
.5 Certification of compliance to applicable codes.
.6 Additional data:
.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
.7 Site records:
.1 This Contractor shall maintain, on site, a complete set of the Contract Documents. This Contractor shall mark changes as work progresses and as changes occur.
.2 Make available as requested for reference purposes and inspection.
.3 Upon request deliver the site record drawings to a local print shop so that color

copies of the site record drawings can be produced.

.8 Record drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of record drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "RECORD DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to PWGSC Representative for review and make corrections as directed.

.4 Perform testing, adjusting and balancing, as specified in Division 23, for HVAC utilizing the record drawings.

.5 Submit copies of record drawings for inclusion in final TAB report.

.6 Record Drawings should provide information such as;

.1 Record and identify all revisions made to contract drawings and reference fabrication drawings included.

.2 Record locations of primary isolation valves for emergency isolation of systems.

.3 Record locations of concealed components of mechanical and electrical services.

1.9 INTERRUPTION OF EXISTING SERVICES

.1 Arrange schedule and perform work with minimum disturbance to existing facilities and services.

.2 Notify PWGSC Representative in writing at least 48 hours in advance of planned interruption to existing service.

.3 Drawings approximately indicate known existing underground facilities. Avoid damage to existing services. Bear cost of repairs and replacements.

1.10 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

PART 2 – PRODUCTS

2.1 ARCHITECTURAL SERVICE ACCESS DOORS

.1 Coordinate with architectural drawings for locations and wall and ceiling finishes.

.2 Size: 300 mm x 300 mm or larger, as required to properly service concealed equipment and devices.

.3 Material: 2.5 mm thick, flush type steel door, frame, and anchor straps, with concealed hinge.

.4 Fire Rated where penetrating fire rated assemblies.

.5 Finish: to suit painted gypsum, plaster or suspended tile ceiling.

PART 3 – EXECUTION

3.1 INSTALLATION

.1 Location of access doors to be located by responsible division. Access doors to be installed by drywall or block installer.

.2 Locate access doors to serve concealed equipment, fire dampers, expansion joints, valves, cleanouts, and any other equipment requiring accessibility for operation and maintenance.

.3 Be prepared to demonstrate accessibility of devices through access doors. Relocate or enlarge access doors to suit conditions.

3.2 PAINTING REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 91 23 - Interior Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore finishes which have been damaged to new condition.

3.3 PROTECTION OF WORK

.1 Repair damage caused to surfaces of building without cost to Owner and to satisfaction of PWGSC Representative.

.2 Be responsible for condition of all materials and equipment supplied and/or installed. Provide protection prior to, during and after installation until takeover by Owner.

.3 Protect floor drains, pipe and duct openings, filters, elements, and materials against dirt and abuse during construction.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE DESCRIPTION SUMMARY

.1 The following provide insulation requirements for the following systems:
.1 All plumbing systems.

1.2 REFERENCES

.1 Unless dated references are identified below, it shall be the latest standard issued by the regulatory agency that shall be utilized as the applicable reference.

.2 Thermal Insulation Association of Canada (TIAC)
.1 TIAC Best Practices Guide.

.3 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
.1 ANSI/ASHRAE 90.1-SI Edition, Energy Standard for Buildings except Low-Rise Residential Buildings.

.4 Underwriters Laboratories of Canada (ULC)
.1 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Product data shall be submitted for all PART 2 - PRODUCTS specified herein.
.2 Provide manufacturer's printed product literature and datasheets for material specified, and include product characteristics, performance criteria, physical size, finish, and limitations.
.3 Product data shall include all relevant information to confirm the specifications have been met.

.3 Provide copies WHMIS MSDS - Material Safety Data Sheets in accordance with Division 1 where material specified has MSDS Sheets.

1.4 QUALITY ASSURANCE

.1 The manufacturer of the insulation shall be a listed member of TRIC (Thermal Insulation Association of Canada).

.2 Performance Requirements defined: Catalogued or published ratings for manufactured items obtained from tests carried out by manufacturer or those ordered by manufacturer from an independent testing agency signifying adherence to codes and standard and standardized testing of performance criteria.

.3 The contractor performing the work of this section shall be a recognized installer of insulation systems and have a minimum of five (5) years' experience which can be documented and verified. The contractor shall be a current and listed member of TIAC (Thermal Insulation Association of Canada).

.4 Installation shall be in accordance with TIAC (Thermal Insulation Association of Canada) National Insulation Standards.

.5 Where applicable products shall bear a ULC or UL label.

1.5 DEFINITIONS

.1 "Concealed": insulated piping in chase, trench, furred space, shaft, or hung ceiling. Services in tunnels are not considered concealed.

.2 "Exposed": pipe not "concealed" as defined herein.

.3 Mineral fibre: includes glass fibre, rock wool, slag wool.

PART 2 – PRODUCTS

2.1 FIRE AND SMOKE RATING

.1 All insulation systems shall be ULC listed and certified.

.2 Flame spread and smoke development ratings shall be in accordance with CAN/ULC S102-M88:
.1 Maximum flame spread rating: 25.
.2 Maximum smoke developed rating: 50.

.3 Flame proofing treatment to withstand high humidity conditions without deterioration.

.4 Materials containing asbestos are strictly prohibited.

2.2 SUSTAINABILTY

.1 The products provided under this section shall be Formaldehyde free and have a low VOC content.

2.3 PIPE INSULATION MATERIALS

.1 Provide adhesives, sealers, vapor coating, mastics, laggings, and bedding compounds compatible with materials to which they are applied. Material not to soften, corrode or otherwise deteriorate in either wet or dry state and be of type recommended by insulation manufacturer as suitable for proposed application. Apply material within ambient temperatures recommended by manufacturer.

.2 All Pipe (Hot or Cold) - TIAC Code 1501-C:
.1 Application surface temperatures not to exceed 177°C (350°F).
.2 Type: Rigid mineral fiber board, molded to fit pipe, with factory applied vapor retarder jacket.
.3 Factory Applied Facing: ASJ (All Service Jacket) vapor barrier consisting of a fiberglass yarn reinforced high density white Kraft paper laminated to a thin layer of aluminum foil. The jacket shall include a longitudinal, self-sealing closure lap for securing to the pipe.
.4 Density: 68 kg/cuM (4.25 lb/cuft).
.5 R – Value 25 mm (1") Thick Board: 0.8 K•m^2/W (4.2 h•sqft•°F/Btu)
.6 Conductivity: 0.032 W/sqM°C @ 24°C (0.22 Btu-in/hr.ft^2°F @ 75°F).
.7 Refer to installation instructions for material thickness required.

.3 Pipe Fittings
.1 Type: Rigid mineral fiber board, molded to fit fitting or valve body, with factory applied white pre-formed PVC jacket. These PVC fitting covers and jacketing, when combined, form a completely sealed system, integral to the pipe insulation system.
.2 Pre-manufactured fitting insulation assemblies shall meet the performance criteria established for the Pipe insulation system.

2.4 PIPE INSULATION FASTENINGS AND JACKETS

.1 Fastenings:
.1 Stainless Steel Staples.
.2 Tie wire: 304 stainless steel, 1.5 mm (0.06") diameter.
.3 Bands: 304 stainless steel, 19 mm wide, 0.5 mm thick.

.2 Jackets Interior Application:
.1 TIAC Code: CEF/2 Indoor.

.3 Miscellaneous Materials:
.1 Tape: self-adhesive, aluminum, reinforced, 75 mm (3") wide minimum.
.2 Contact adhesive: quick-setting, low VOC content.
.3 Vapor retarder lap adhesive: Water based, fire retardant type, compatible with insulation.

PART 3 - EXECUTION

3.1 GENERAL

.1 Install will be in accordance with TIAC (Thermal Insulation Association of Canada) National Standards.

.2 Prior to installation ensure that surfaces to be covered are clean and dry, insulation is clean and dry.

.3 Prior to installation ensure all pressure tests and verification of system integrity has been completed, that inspections have been performed, and that the installation of insulation systems will not hide incomplete or defective distribution systems.

.4 Cold Surfaces: Insulate all surfaces which may have a surface temperature of less than 20°C (68°F), both for energy conservation as well as to prevent ambient air meeting dew point to prevent surface condensation.

.5 Hot Surfaces: Insulate all surfaces which may have a surface temperature of greater than 62°C (145°F), both for energy conservation as well as to reduce surface temperature and prevent injury due to contact by personnel during normal duties.

.6 Maintain uninterrupted continuity and integrity of vapor retarder jacket and finishes. Ensure hangers, and supports are outside vapor retarder jacket. Provide all saddles and spacers as required.

.7 With multi-layered insulation use staggered butt joint construction. When double layering, the inner layer should not be jacketed.

.8 Identify system devices which may require periodic maintenance or inspection and provide insulating systems at such devices which permit periodic removal and replacement without damage to adjacent insulation.

.9 Locate insulation and cover seams in the least visible location. All surface finishes shall be extended in such a manner as to protect all raw edges, ends, and surfaces of insulation. Exposed insulation shall be coated to prevent deterioration.

.10 Pressure-sensitive tape shall be applied with moving pressure using a squeegee or other appropriate sealing tool.

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 datasheet.

3.3 PIPE INSULATION APPLICATION SCHEDULE

.1 Apply thickness of insulation as listed in following table.

.2 The following table will encompass all piping for the systems identified as well as all in line devices and valves.

Pipe Insulation Application Schedule

Piping Service	Pipe Surface Temperature	Insulation Material (TIAC Code)	Insulation Thickness			Jacket Exposed (TIAC Code)	Jacket Concealed (TIAC Code)
			Pipe Size ≤ NPS 2 (2″Ø)	Pipe Size NPS 2½ (2½″Ø) to NPS 4 (4″Ø)	Pipe Size ≥ NPS 6 (6″Ø)		
Domestic Cold Water	0°C–24°C (32°F–75°F)	Rigid Fiber Board (1501-C)	25 mm (1″)	25 mm (1″)	25 mm (1″)	PVC (Green) (CPF/4)	Factory ASJ Vapor Barrier (CPF/2)
Domestic Hot Water	24°C–82°C (75°F–180°F)	Rigid Fiber Board (1501-C)	25 mm (1″)	25 mm (1″)	38 mm (1½″)	PVC (Green) (CPF/4)	Factory ASJ Vapor Barrier (CPF/2)
Domestic Hot Water Recirculation	24°C–82 °C (75°F–180°F)	Rigid Fiber Board (1501-C)	25 mm (1″)	25 mm (1″)		PVC (Green) (CPF/4)	Factory ASJ Vapor Barrier (CPF/2)

3.4 PIPE INSULATION INSTALLATION REQUIREMENTS

.1 In addition to general installation requirements, listed above.

.2 Install insulation with smooth and even surfaces, with round shapes laid to true circular and concentric

shape, shaped to blend with fitting insulation and adjacent covering.

.3 Apply insulation and secure firmly with factory supplied self-sealing closure lap. Additionally utilize mechanical staples (outward facing) and self-adhesive tape where pipe size precludes use of self-sealing closure lap. Insure proper sealing of self-sealing tape with moving pressure using a squeegee or other appropriate sealing tool. Gouge out insulation for proper fit where there is interference between weld bead and insulation.

.4 Elbows: Utilize preformed elbows or obtain approval to utilize miter, sectional insulation for elbow insulation installation.

.5 Screwed Joints: Utilize preformed elbows or utilize excessive thickness insulation at fittings to maintain specified thickness at fittings. Gouge out insulation for proper fit at fittings. Exposed insulation shall be coated to prevent deterioration.

.6 Provide factory fabricated easily disassembled insulation for equipment requiring periodic maintenance of parts and sub-assemblies.

.7 For electrically traced piping, increase insulation one size to accommodate wiring.

.8 Where pipes pass through sleeves, pack solid with mineral fiber insulation for depth of penetration. Vapor barrier jacket to be continuous. Pipe sleeves to accommodate full insulation thickness and allow pipe expansion. Provide mastic caulking.

.9 Terminate insulation at each end of unions and flanges and at other points where required, with insulation cement, CGSB 51-GP-6M, toweled on a bevel.

3.5 CLEANING

.1 During the course of, and upon completion of installation of insulation systems, remove surplus materials, rubbish, tools, and equipment.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE DESCRIPTION SUMMARY

.1 This section describes the materials and methods for the installation of plumbing water distribution piping within the building.

1.2 REFERENCES

.1 Unless dated references are identified below, it shall be the latest standard issued by the regulatory agency that shall be utilized as the applicable reference.

.2 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)
.1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.
.2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
.3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
.4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.
.5 ANSI/SP-58, Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation

.3 ASTM International Inc.
.1 ASTM A 536, Standard Specification for Ductile Iron Castings.
.2 ASTM B 88M, Standard Specification for Seamless Copper Water Tube (Metric).

.4 American National Standards Institute/NSF International (ANSI)/NSF)
.1 ANSI/NSF 61, Drinking Water System Components – Health Effects.

.5 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
.1 MSS-SP-67, Butterfly Valves.
.2 MSS-SP-70, Gray Iron Gate Valves, Flanged and Threaded Ends.
.3 MSS-SP-71, Gray Iron Swing Check Valves, Flanged and Threaded Ends.
.4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

.6 Part 7 National Building Code.

.7 Part 7 Ontario Building Code.

1.3 INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Product data shall be submitted for all PART 2 – PRODUCTS specified herein.
.2 Provide manufacturer's printed product literature and datasheets for material specified, and include product characteristics, performance criteria, physical size, finish, and limitations.
.3 Product data shall include all maintenance access points and dimensional clearances, such that the Contractor can properly layout the equipment to ensure proper access.
.4 Product data shall include all relevant information to confirm the specifications have been met.
.5 Product data shall include information as specified in 22 05 01 Common Work Results – Mechanical Submittals, unless modified with additional information required below.

1.4 MAINTENANCE REQUIREMENTS

.1 The Contractor shall verify and demonstrate that proper maintenance can be performed on equipment and material installed.

1.5 QUALITY ASSURANCE

.1 Performance Requirements defined: Catalogued or published ratings for manufactured items obtained from tests carried out by manufacturer or those ordered by manufacturer from an independent testing agency signifying adherence to codes and standard and standardized testing of performance criteria.

PART 2 – PRODUCTS

2.1 GENERAL

.1 The products utilized shall be those accepted by the local AHJ (Authority Having Jurisdiction).

2.2 DOMESTIC WATER PIPING – BUILDING INTERIOR – COPPER

.1 Applications:
.1 Potable Domestic Cold Water Distribution.
.2 Potable Domestic Hot Water Distribution.
.3 Potable Domestic Hot Water Recirculation.

.2 Piping:
.1 Seamless copper tube, hard drawn, Type L to ASTM B 88M.

.3 Fittings:
.1 Full flow, standard radius, wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

.4 Joints:
.1 Soldered Joints: Soldered connections utilizing lead free, 95-5 tin-antimony solder, to ASTM B 32.

2.3 BALL VALVES

.1 Ball Valve, Soldered End:
.1 NPS 2½ (2½"Ø) and under, soldered:
.2 2 piece forged brass body, full port, stainless steel ball, PTFE adjustable packing, brass gland, and PTFE seat.
.3 Extended brass stem for handle operation outside insulation.
.4 Steel lever handle, with plastic coated contact surface. Provide locking handle type for lockshield service.
.5 Class 150 WSP. With CSA, UL, and FM approval.

2.4 GATE VALVES

.1 Gate Valve NRS, Soldered End:
.1 NPS 2½ (2½" Ø) and under, soldered:
.2 Non Rising Stem style, full port flow, all bronze construction. Cast bronze body, screw in cast bronze bonnet, bronze stem, and solid bronze wedge disc. Adjustable PTFE packing.
.3 Aluminum round ridged handle, with PVC coated contact surface. Zinc plated handle nut.
.4 Class 150 WSP. Conforming to MSS-SP-80.

PART 3 – EXECUTION

3.1 GENERAL

.1 Support piping in accordance with the AHJ (Authority Having Jurisdiction), the Building Code, and the manufacturer's requirements.

.2 System shall be installed using industry best practices for pipe installation and run parallel to building lines. Refer to 21 05 05 – Installation of Pipe for piping layout and methodology.

.3 Install cold water piping below and away from hot water piping and other hot piping so as to maintain temperature of cold water as low as possible.

.4 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

.5 Install groups of pipes parallel to each other on trapeze hangers spaced to permit application of insulation, identification, and service access.

.6 Install eccentric reducers in horizontal piping to permit drainage and eliminate air pockets.

.7 Where pipe sizes differ from connection sizes of equipment, install reducing fittings close to equipment. Reducing bushings are not permitted.

.8 Ream ends of pipes and tubes before fabrication.

.9 Lay copper tubing so that it is not in contact with dissimilar metal or contact with hangers without protection.

.10 Install dielectric couplings where joining dissimilar metals.

.11 Make provision to protect water system from water hammer due to rapid operation of valves and fixtures.

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 datasheet.

3.3 VALVE INSTALLATION

.1 Remove internal components of valve when soldering or brazing to prevent damage internal components.

.2 Install isolation valves to isolate individual equipment and fixtures with ball valves.

.3 Install isolation valves to isolate branch take offs and supplies to individual grouped washrooms with NRS gate valves.

.4 Install valves to balance recirculation system using globe valves. Mark settings and record on as-built drawings on completion.

.5 Ensure vales are accessible for maintenance staff and are identified as to service.

.6 Provide hose bibbs or sediment faucets for complete system drainage.

3.4 SYSTEM TESTING

.1 Contractor to complete installation inspection, integrity (pressure, leak) tests, and support system inspection of piping system before system is insulated or enclosed. Piping not to be covered until all inspection and testing deficiencies have been corrected and successful re-testing has been completed.

.2 Test pressure: Domestic potable water system to be capable of withstanding, without leakage, water test, or air test greater of 1 times maximum system operating pressure or 860 KPa (125 PSI), or to the authority having jurisdiction.

.3 Coordinate with authority having jurisdiction the requirement of the authority to witness tests and inspect piping system.

.4 Isolate system components not designed for test pressure during test.

3.5 FLUSHING, CLEANING, AND DISINFECTION

.1 Flushing: Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw a sample off longest run. Submit to testing laboratory to verify that system is clean to the potable water guidelines. Let system flush for additional 2 hours, then draw off another sample for testing.

.2 Flush out, disinfect and rinse system to the requirements of authority having jurisdiction

END OF SECTION

PART 1 – GENERAL

1.1 REFERENCES

.1 Unless dated references are identified below, it shall be the latest standard issued by the regulatory agency that shall be utilized as the applicable reference.

.2 In addition to those listed below, individual product specifications refer to specific references for that product.

.3 Part 7 National Building Code

.4 Part 7 Ontario Building Code.

.5 American National Standards Institute (ANSI).

.6 American Society of Mechanical Engineers International (ASME).

.7 ASTM International Inc.

.8 American Water Works Association (AWWA).

.9 American National Standards Institute/NSF International (ANSI)/NSF)
.1 ANSI/NSF 61, Drinking Water System Components – Health Effects.

.10 Canadian Standards Association (CSA International).

1.2 INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Product data shall be submitted for all PART 2 – PRODUCTS specified herein.
.2 Provide manufacturer's printed product literature and datasheets for material specified, and include product characteristics, performance criteria, physical size, finish, and limitations.
.3 Product data shall include all maintenance access points and dimensional clearances, such that the Contractor can properly layout the equipment to ensure proper access.
.4 Product data shall include all relevant information to confirm the specifications have been met.
.5 Product data shall provide all relevant data and operational points that verify the engineered criteria have been met and that field operational

tolerances can be accommodated, i.e., equipment are not supplied, which are operating at their upper and lower limits for their design duty performance.
.6 Product data shall identify all ancillary field installed devices and provide all information required for the co-ordination of the installation with other trades.
.7 Product data shall include any relevant information which Div. 25 requires for a properly functioning building automation system.
.8 Product data shall include information as specified in 22 05 01 Common Work Results – Mechanical Submittals, unless modified with additional information required below.

1.3 MAINTENANCE REQUIREMENTS

.1 The Contractor shall verify and demonstrate that proper maintenance can be performed on equipment and material installed.

1.4 QUALITY ASSURANCE

.1 Performance Requirements defined: Catalogued or published ratings for manufactured items obtained from tests carried out by manufacturer or those ordered by manufacturer from an independent testing agency signifying adherence to codes and standard and standardized testing of performance criteria.

.2 Electrical Equipment shall bear a CSA label or have an ESA certification.

.3 Where applicable equipment shall bear a ULC or UL label.

PART 2 – PRODUCTS

2.1 GENERAL

.1 The products utilized shall be those accepted by the local AHJ (Authority Having Jurisdiction).

.2 Provide piping specialties as required and as specified to meet the installation requirements of the plumbing distribution systems.

2.2 TRAP SEAL PRIMERS

.1 General: Trap Primers shall comply with ANSI/ASSE 1018-2001 -Performance Requirements for Trap Seal Primer Valves - Potable Water Supplied.

.2 Standard Trap Seal Primer, Fixture activated:
.1 Provide trap seal primers in washrooms and other areas to suit building code requirements. Primer to introduce regulated amount of water into trap or traps when the connected fixture used. Primer to be either flow activated or pressure drop activated.
.2 Construction: cast brass body, removable cap, equipped with internal vacuum breaker, non-liming internal operating piston, stainless steel spring, removable bronze seat with metering orifice, and sealed bronze cover. . NPS 1/2 (1/2″ Ø) solder ends, NPS ½ (1/2″ Ø) drip line connection.
.3 Primer shall operate and provide trap flow at pressures below 175 kPa (25 PSI).

2.3 DIELECTRIC PIPE FITTINGS

.1 Provide dielectric fittings to isolate system components from galvanic currents. Material of dielectric fittings to suit dissimilar metals in system.

2.4 WATER HAMMER ARRESTORS

.1 General: Water Hammer Arrestors shall comply with ASME A112.26.1M - Water Hammer Arrestors.

.2 Water hammer arrestors shall be sized for application and shall be designed to protect water lines during pressure surges following quick valve closure. This excessive pressure surge shall be absorbed by the pre-charged cushion of air permanently sealed within the water hammer arrester.

.3 Construction: Lead free copper construction, brass tailpiece and brass piston. Pre charged and sealed at the factory.

PART 3 – EXECUTION

3.1 GENERAL

.1 Installation shall be in compliance with the AHJ (Authority Having Jurisdiction).

.2 Remove internal components of valve when soldering or brazing to prevent damage internal components.

.3 Where pipe sizes differ from connection sizes of equipment, install reducing fittings close to equipment. Reducing bushings are not permitted.

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 datasheet.

3.3 PRODUCT SPECIFIC

.1 Trap Primers:
.1 Install trap seal primers in cold water supply and connect to trap prime connection of drain. Verify automatic water supply action.
.2 Install for floor drains and elsewhere, as indicated.
.3 Install on cold water supply to nearest frequently used plumbing fixture, in concealed space.
.4 Install plastic tubing to floor drain. Maintain pressure in tubing during the concrete pour to prevent collapse of the tubing.
.5 Provide access door for maintenance.

.2 Water Hammer arrestors:
.1 Install on branch supplies to fixtures or group of fixtures and as indicated.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE DESCRIPTION SUMMARY

.1 The section describes the materials and methods for the installation of sanitary and storm drainage piping within the building.

1.2 REFERENCES

.1 Unless dated references are identified below, it shall be the latest standard issued by the regulatory agency that shall be utilized as the applicable reference.

.2 ASTM International Inc.
.1 ASTM B 32, Standard Specification for Solder Metal.
.2 ASTM B 306, Standard Specification for Copper Drainage Tube (DWV).
.3 ASTM A74, Standard Specification for Cast Iron Soil Pipe and Fittings.
.4 ASTM C 564, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
.5 ASTM A 888, Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
.6 ASTM C 1277, Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings.
.7 ASTM D 2564, Standard Specification for Solvent Cements for Poly (Vinyl-Chloride) (PVC) Plastic Piping Systems.

.3 Canadian Standards Association (CSA International)
.1 CSA B67, Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.
.2 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
.3 CAN/CSA-B125.3, Plumbing Fittings
.4 CAN/CSA-B1800, Thermoplastic Nonpressure Pipe Compendium - B1800 Series.

.4 ANSI Approved/MSS Manufacturers Standardization Society
.1 ANSI/SP-58, Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

.6 Part 7 National Building Code.

.7 Part 7 Ontario Building Code.

1.3 INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Product data shall be submitted for all PART 2 – PRODUCTS specified herein.
.2 Provide manufacturer's printed product literature and datasheets for material specified, and include product characteristics, performance criteria, physical size, finish, and limitations.
.3 Product data shall include all maintenance access points and dimensional clearances, such that the Contractor can properly layout the equipment to ensure proper access.
.4 Product data shall include all relevant information to confirm the specifications have been met.
.5 Product data shall include information as specified in 22 05 01 Common Work Results – Mechanical Submittals unless modified with additional information required below.

1.4 MAINTENANCE REQUIREMENTS

.1 The Contractor shall verify and demonstrate that proper maintenance can be performed on equipment and material installed.

1.5 QUALITY ASSURANCE

.1 Performance Requirements defined: Catalogued or published ratings for manufactured items obtained from tests carried out by manufacturer or those ordered by manufacturer from an independent testing agency signifying adherence to codes and standard and standardized testing of performance criteria.

PART 2 – PRODUCTS

2.1 GENERAL

.1 The products utilized shall be those accepted by the local (AHJ) authority having jurisdiction.

2.2 BELOW GRADE DRAINAGE PIPING – BUILDING INTERIOR – PVC

.1 All PVC Piping, fitting and joining materials shall conform to CAN/CSA-B1800 – Applicable section.

.2 Buried PVC (polyvinyl chloride) drain, solvent weld bell, waste and vent pipe and fittings. Pipe shall be schedule 40 solid wall pipe, intended for use in

a non-pressurized piping systems where the fluid conveyed does not exceed 60°C (140°F).

.3 Fittings: PVC solvent weld bell type, same material as the piping.

.4 Joints: Solvent Weld type. Pipe joint to be an integral bell used for solvent weld. Plastic solvent cement adhesive resin shall be approved by the pipe manufacturer.

2.3 ABOVE GRADE DRAINAGE PIPING – DWV COPPER

.1 Above Grade DWV copper, sanitary and vent, shall be type DWV copper pipe and shall conform to ASTM B 306, intended for use in a non-pressurized application.

.2 Fittings: Wrought copper conforming to CAN/CSA-B125.3.

.3 Joints: Soldered connections utilizing lead free, 95-5 tin-antimony solder, to ASTM B 32.

PART 3 – EXECUTION

3.1 GENERAL

.1 Support piping in accordance with the AHJ (Authority Having Jurisdiction), the Building Code, and the manufacturer’s requirements.

.2 System shall be installed using industry best practices for pipe installation and run parallel to building lines. Refer to 20 05 05 – Installation of Pipe for piping layout and methodology.

.3 All drainage piping shall be sloped minimum, 1:50 (1/4” per foot), unless otherwise indicated on the drawings. Prior to installation of pipe runs, co-ordinate piping locations and height to determine if an interference exists with other trades.

.4 Provide all clean outs as required for drainage piping installation and in accordance with the building code.

.5 Provide all vent piping as required in accordance with the building code and proper system operation.

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 datasheet.

3.3 SYSTEM VERIFICATION

.1 Cleanouts:
.1 Ensure accessible and that access doors are correctly located.
.2 Open, cover with linseed oil, and re-seal.
.3 Verify cleanout rods can probe as far as the next cleanout, at least.

.2 Test to ensure traps are fully and permanently primed.

.3 Ensure fixtures are properly anchored, connected to system, and effectively vented.

3.4 SYSTEM TESTING

.1 Coordinate with authority having jurisdiction the requirement of the authority to witness tests and inspect piping system.

.2 Perform a ball test, roll a hard dense non floating ball (min 50 mm (2″) diameter down the pipe and retrieve at the end. Ball should roll freely without assistance.

.3 Leak test buried systems before backfilling. When testing, the system should be properly restrained at all bends, changes of direction, and the end of runs.

.4 Submit piping system to a hydrostatic test equivalent to 3M (10′) head. Examine each joint visually to ensure system is leak-proof. Maintain original water level without replenishing for 1 hour. No water may leak from connections in system during test.

.5 Contractor to complete installation inspection, integrity (pressure leak) tests, and support system inspection of piping system before system is insulated or enclosed. Piping not to be covered until all inspection and testing deficiencies have been corrected and successful re-testing has been completed.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE DESCRIPTION SUMMARY

.1 This section shall describe specialty equipment utilized for the installation of the sanitary waste system.

1.2 REFERENCES

.1 Unless dated references are identified below, it shall be the latest standard issued by the regulatory agency that shall be utilized as the applicable reference.

.2 In addition to those listed below, individual product specifications refer to specific references for that product.

.3 Part 7 National Building Code.

.4 Part 7 Ontario Building Code.

.5 CSA International
.1 CSA B79, Commercial and Residential Drains and Cleanouts.

1.3 INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Product data shall be submitted for all PART 2 – PRODUCTS specified herein.
.2 Provide manufacturer's printed product literature and datasheets for material specified, and include product characteristics, performance criteria, physical size, finish and limitations.
.3 Product data shall include all maintenance access points and dimensional clearances, such that the Contractor can properly layout the equipment to ensure proper access.
.4 Product data shall include all relevant information to confirm the specifications have been met.
.5 Product data shall provide all relevant data and operational points that verify the engineered criteria have been met and that field operational tolerances can be accommodated, i.e., equipment are not supplied, which are operating at their upper and lower limits for their design duty performance.
.6 Product data shall identify all ancillary field installed devices and provide all information required for the co-ordination of the installation

with other trades.
.7 Product data shall include any relevant information which Div. 25 requires for a properly functioning building automation system.
.8 Product data shall include information as specified in 22 05 01 Common Work Results – Mechanical Submittals unless modified with additional information required below.

1.4 MAINTENANCE REQUIREMENTS

.1 The Contractor shall verify and demonstrate that proper maintenance can be performed on equipment and material installed.

1.5 QUALITY ASSURANCE

.1 Performance Requirements defined: Catalogued or published ratings for manufactured items obtained from tests carried out by manufacturer or those ordered by manufacturer from an independent testing agency signifying adherence to codes and standard and standardized testing of performance criteria.

.2 Where applicable equipment shall bear a ULC or UL label.

PART 2 – PRODUCTS

2.1 GENERAL

.1 The products utilized shall be those accepted by the local AHJ (Authority Having Jurisdiction).

.2 Provide drainage piping specialties as required and as specified to meet the installation requirements of the plumbing drainage systems.

.3 All Drains and Cleanouts shall conform to CSA B79 - Commercial and Residential Drains and Cleanouts.

2.2 FLOOR DRAINS

.1 Floor Drains as scheduled and detailed on the drawings and shall conform to the following:
.1 Construction: Cast iron epoxy coated body.
.2 Each Drain shall be equipped with an anchor flange with weep holes and membrane clamping collar suitable with the floor that it is installed in.
.3 Each Drain shall be equipped with a NPS ½ (½″ Ø) trap seal primer connection.
.4 Outlet, no hub mechanical joint connection. Size as indicated, minimum NPS 3 (3″ Ø) for below

grade piping connections.
.5 Drain heads shall be adjustable.
.6 Grates shall be as indicated and appropriate to the service required.
.7 Adjustable head and 125 mm (5″) diameter round polished type 304 cast stainless steel strainer.
.8 Complete with the following:
.1 Sediment basket.
.2 Vandal Proofed and secured grate.
.3 Recessed flooring tile flange.

2.3 CLEANOUTS

.1 Cleanout Plugs: heavy cast iron male ferrule with brass screws and threaded brass or bronze plug. Sealing-caulked lead seat or neoprene gasket.

.2 Floor Access: round cast iron body and frame with adjustable secured nickel bronze top

.3 Cover for Tile and Linoleum Floors: polished nickel bronze with recessed cover for linoleum or tile infill, complete with vandal-proof locking screws.

PART 3 – EXECUTION

3.1 GENERAL

.1 Installation shall be in compliance with the AHJ (Authority Having Jurisdiction).

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 datasheet.

3.3 PRODUCT SPECIFIC

.1 Floor Drains:
.1 Provide floor drains with trap seal primers.
.2 Coordinate installation with floor construction. Equip floor drains with seepage flange where floor is of waterproof construction.
.3 Equip each floor drain with 0.15 mm (6 mil) polyethylene sheeting under strainer to prevent dirt from entering the system during construction. Remove polyethylene only after final cleanup.
.4 Verify operation of trap seal primer.
.5 Prime, using trap primer. Adjust flow rate to suit site conditions.
.6 Clean out baskets.

.2 Cleanouts:
.1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required code, and as indicated.
.2 Bring cleanouts to wall or finished floor unless serviceable from below floor.
.3 Provide clean out at sanitary discharge from building.
.4 Ensure access doors are provided and the clean outs can be properly accessed.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE DESCRIPTION SUMMARY

.1 This section will define the plumbing fixtures to be utilized.

1.2 REFERENCES

.1 Unless dated references are identified below, it shall be the latest standard issued by the regulatory agency that shall be utilized as the applicable reference.

.2 In addition to those listed below, individual product specifications refer to specific references for that product.

.3 Canadian Standards Association (CSA International)
.1 CAN/CSA-B45 Series - Plumbing Fixtures.
.2 CAN/CSA-B125.3 - Plumbing Fittings.
.3 CAN/CSA-B651, Accessible Design for the Built Environment.

1.3 INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Product data shall be submitted for all PART 2 – PRODUCTS specified herein.
.2 Provide manufacturer's printed product literature and datasheets for material specified, and include product characteristics, performance criteria, physical size, finish, and limitations.
.3 Product data shall include all maintenance access points and dimensional clearances, such that the contractor cam properly layout the equipment to ensure proper access.
.4 Product data shall include all relevant information to confirm the specifications have been met.
.5 Product data shall provide all relevant data and operational points that verify the engineered criteria have been met and that field operational tolerances can be accommodated, i.e.; equipment are not supplied, which are operating at their upper and lower limits for their design duty performance.
.6 Product data shall include any relevant information which Div 25 requires for a properly functioning building automation system.
.7 Product data shall include information as specified in 22 05 01 Common Work Results – Mechanical Submittals unless modified with additional information required below.

1.4 MAINTENANCE REQUIREMENTS

.1 The contractor shall verify and demonstrate that proper maintenance can be performed on equipment and material installed.

1.5 QUALITY ASSURANCE

.1 Performance Requirements defined: Catalogued or published ratings for manufactured items obtained from tests carried out by manufacturer or those ordered by manufacturer from an independent testing agency signifying adherence to codes and standard and standardized testing of performance criteria.

.2 Electrical Equipment shall bear a CSA label or have an ESA certification.

.3 Where applicable equipment shall bear a ULC or UL label.

.4 Provide and construct mock-ups in accordance with Section 01 45 00 - Quality Control.

1.6 WARRANTY

.1 For the Work of this Section, the 12 months contractor warranty period is extended to number of years specified for each product.

.2 The warranty shall be inclusive of the installing contractor’s labor for replacement of defective products.

PART 2 – PRODUCTS

2.1 GENERAL

.1 The products utilized shall be those accepted by the local AHJ (Authority Having Jurisdiction).

.2 Fixtures, trim and accessories to be new, free from imperfections, and labelled with CSA mark of approval.

.3 Plumbing fixtures of a kind, to be product of one manufacturer and white unless otherwise noted.

.4 All exposed piping shall be chrome plated and chrome plated escutcheon plates shall be provided at wall pipe penetrations.

.5 All barrier free fixtures and trim shall comply with CSA B651 - Accessible design for the built environment.

2.2 FIXTURE MAXIMIUM FLOW RATES

.1 Fixtures shall meet or be less than the code required maximum flow rates, or the flow rates identified below, whichever is less. With the exception of fixtures identified as an “ultra-low flow fixture” with a specified maximum flow.
.1 Shower Heads: 9.5 L/min (2.50 GPM)
.2 Residential Showers: 7.6 L/min (2.50 GPM)

2.3 SHOWERS/BATHS

.1 General requirements for all specified Showers unless otherwise noted:
.1 All plumbing trim shall comply with ASME A112.18.1/CSA B125.1 - Plumbing supply fittings.
.2 All plumbing waste fittings shall comply with ASME A112.18.2/CSA B125.2 - Plumbing waste fittings.
.3 All trim shall be lead free and comply with ANSI/NSF Standard 61.
.4 Trim shall operate with a minimum 175 kPa (25 PSI) water pressure.
.5 Supplies to fixture shall be equipped with isolation valves. All exposed piping shall be chrome plated and chrome plated escutcheon plates shall be provided at wall pipe penetrations.
.1 All Showers/Tubs shall be equipped with a minimum NPS 1 ½ (1 ½ “Ø) metal drain and P-Trap.
.2 Refer to drawings schedule of fixtures.

.2 Shower flow control/mixing valve:
.1 Type 3 Public/Vandal proof/Multiple Showers.
.1 @ Shower - Self-Metering Valve: 14 gage, type 304 stainless steel push button and face plate. Valve to be Air-Control, metering, non-hold open type. NPS ½ (1/2″Ø) connections. In/out port design, with built-in screwdriver shut-off valve. Provide as indicated for multiple showers.
.2 @ Central Control, multiple shower heads mixing valve.
.3 Valve assembly mounted within a locked stainless steel recessed box.
.4 NPS ¾ - NPS 2 (3/4″Ø – 2″Ø) Thermostatic mixing valve for tempered water system with check stops. Lead free cast bronze or brass body utilizing a paraffin-based thermostat to sense and adjust outlet temperature. Provide thermostat on discharge of valve. Valve shall be approved to ASSE 1017 & CSA B125.3 standards.
.1 Temperature Adjustment Range: 32 - 82°C (90 - 180°F)
.2 Hot Water Inlet Temperature Range: 42 - 82°C (120 - 180°F)
.3 Cold Water Inlet Temperature

Range; 4 - 27°C (40 - 80°F)
.4 c/w fail safe cold water bypass mode.
.5 Outlet temperature maintained between +/- 2.5°C.

.3 Shower Head Type:
.1 Type 2 Vandal-proof institutional style, non-adjustable shower head, set at a 15° shower angle. Chrome plated brass with integral wall mount/escutcheon. Maximum flow rate of 9.5 L/min (2.50 GPM). Flow limited orifice provided for fixtures identified as Ultra Low Flow.

.4 Shower type SH1 – Individual:
.1 Type 3 Shower Mixing Valve.
.2 Type 2 Shower Head.

PART 3 – EXECUTION

3.1 GENERAL

.1 Installation shall be in compliance with the AHJ (Authority Having Jurisdiction).

.2 Where pipe sizes differ from connection sizes of equipment, install reducing fittings close to equipment. Reducing bushings are not permitted.

.3 Provide supports, required to set fixtures level and square. Mount fixtures so that 90 kg (200#) weight will not loosen or distort mounting. Fasten fixtures on walls or partitions with 12 mm (½") carriage bolts passing through wall to 3 mm (1/8") steel plates (recessed where required) on other side of wall.

.4 Protect units with water-resistant temporary covering. Do not allow temporary use of plumbing fixtures.

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 datasheet.

3.3 FIXTURE ADJUSTMENT

.1 Conform to required water conservation requirements.

.2 Adjustments:
.1 Adjust water flow rate to design flow rates.
.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
.3 Adjust flush valves to suit actual site conditions.

.3 Checks:
.1 Aerators: operation, cleanliness.
.2 Vacuum breakers, backflow preventers: operation under all conditions.
.3 Thermostatic controls: Verify temperature settings, operation of control, limit, and safety controls.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE DESCRIPTION SUMMARY

.1 This section will define the duct construction standards to be utilized.

1.2 RELATED REQUIREMENTS

.1 The contract documents are complementary, what is required by any one shall be as binding as if required by all. Specification sections and drawings cannot be read in isolation and it shall be the responsibility of the contractor and suppliers to ensure they have sufficient information to provide specified material and services as required by the complete contract documents.

.2 Refer to specification section 22 05 01 Common Work Results for Mechanical.

.3 For systems and equipment requiring painting, refer to Div. 9 for painting requirements and co-ordinate the work with the Painting Contractor.

1.3 REFERENCES

.1 Unless dated references are identified below, it shall be the latest standard issued by the regulatory agency that shall be utilized as the applicable reference.

.2 Sheet Metal Air Conditioning Contractors' National Association (SMACNA).
.1 SMACNA HVAC Duct Construction Standards, Metal and Flexible.
.2 SMACNA HVAC Air Duct Leakage Test Manual.
.3 SMACNA IAQ Guideline for Occupied Buildings under Construction.

.3 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).

.4 National Fire Protection Association (NFPA).
.1 NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.
.2 NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.

1.4 MAINTENANCE REQUIREMENTS

.1 The contractor shall verify and demonstrate that proper maintenance can be performed on equipment and material installed.

.2 The contractor shall supply the following materials to site just prior to substantial being awarded.
.1 Provide one replacement filter for each installed filter.

1.5 QUALITY ASSURANCE

.1 Performance Requirements defined: Catalogued or published ratings for manufactured items obtained from tests carried out by manufacturer or those ordered by manufacturer from an independent testing agency signifying adherence to codes and standard and standardized testing of performance criteria.

.2 The contractor performing the work of this section shall be a recognized fabricator and installer of ductwork systems.

.3 Air moving equipment shall bear an AMCA label.

.4 Where applicable equipment shall bear a ULC or UL label.

.5 Supports, anchors and restraints to conform to and be coordinated with the structural requirements of the Ontario Building Code and the requirements of the Structural Engineer responsible for the design of structural support systems for mechanical systems and equipment.

1.6 SMACNA VARIANCES

.1 The use of SMACNA Duct Construction Standards – Metal and Flexible (Latest Edition) shall be utilized except where deviations are noted herein.

PART 2 – PRODUCTS

2.1 GENERAL

.1 Provide ductwork of aluminum except where otherwise noted on drawings or specified herein.

.2 Construct round, rectangular, square, and flat oval duct as specified herein.

.3 Duct dimensions shown in the contract drawings are for airflow area. When ducts are acoustically lined, their dimensions shall be increased as necessary.

2.2 DUCT MATERIAL - METAL

.1 Aluminum
.1 For Humid Applications, utilization Dryer Vent/Shower Exhaust.
.2 Aluminum type: 3003-H-14.
.1 Thickness, fabrication and reinforcement: to SMACNA requirements.
.2 Joints: to SMACNA construction standards.
.3 Joints to be continuous inert gas welded.

2.3 DUCT FITTINGS

.1 Fabrication: to SMACNA. Application as follows or as indicated on the drawings.

PART 3 – EXECUTION

3.1 GENERAL

.1 Ductwork shall be fabricated/manufactured and installed to meet or exceed the requirements of SMACNA.

.2 Provide dielectric isolation or other method to prevent corrosion due to contact with uncoated steel or copper.

.3 Coordinate duct and supporting elements with building architectural, structural, and electrical systems to ensure proper installation and access for maintenance and service.

.4 Coordinate duct supporting elements with other mechanical systems.

.5 Do not conceal duct installation before the completion of the Contractor's quality assurance inspection and testing and approval of local authorities having jurisdiction.

.6 Protect openings against entry of foreign material.

.7 Install ductwork to minimize furring space, maximize headroom, and conserve space.

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 datasheet.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE DESCRIPTION SUMMARY

.1 This section will describe:
.1 Exhaust grilles and registers, diffusers and linear grilles, for commercial and residential use.

1.2 RELATED REQUIREMENTS

.1 The contract documents are complementary, what is required by any one shall be as binding as if required by all. Specification sections and drawings cannot be read in isolation and it shall be the responsibility of the contractor and suppliers to ensure they have sufficient information to provide specified material and services as required by the complete contract documents.

.2 Refer to specification section 23 01 01 Common Work Results for general mechanical requirements.

1.3 REFERENCES

.1 Unless dated references are identified below, it shall be the latest standard issued by the regulatory agency that shall be utilized as the applicable reference.

.2 American Society for Testing and Materials International (ASTM)
.1 ASTM E 90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.3 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

.4 American Heating and Refrigeration Institute (AHRI)
.1 AHRI Standard 855—Procedure for estimating occupied space sound levels in the application of air terminals and air outlets.

1.4 INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Product data shall be submitted for all PART 2 – PRODUCTS specified herein.
.2 Provide manufacturer's printed product literature and datasheets for material specified, and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Product data shall include all maintenance access points and dimensional clearances, such that the contractor cam properly layout the equipment to ensure proper access.
.4 Product data shall include all relevant information to confirm the specifications have been met.
.5 Product data shall identify all ancillary field installed devices and provide all information required for the co-ordination of the installation with other trades.
.6 Product data shall include information as specified in 20 01 01 Common Work Results – Mechanical Submittals unless modified with additional information required below.
.7 Additional information required:
.1 Capacity.
.2 Throw and terminal velocity.
.3 Noise criteria.
.4 Pressure drop.
.5 Neck velocity.
.6 Anchorage, accessories, finish.
.7 Louver Free Area.

1.5 MAINTENANCE REQUIREMENTS

.1 The contractor shall verify and demonstrate that proper maintenance can be performed on equipment and material installed.

1.6 QUALITY ASSURANCE

.1 Performance Requirements defined: Catalogued or published ratings for manufactured items obtained from tests carried out by manufacturer or those ordered by manufacturer from an independent testing agency signifying adherence to codes and standard and standardized testing of performance criteria.

PART 2 – PRODUCTS

2.1 GENERAL

.1 Grilles, registers and diffusers of same generic type, products of one manufacturer.

.2 Air diffusion/inlet products shall meet capacity, pressure drop, terminal velocity, throw, noise level, neck velocity as indicated.

.3 Colors and finish: standard painted finish (powder coat) unless otherwise noted.

.4 Provide balancing dampers with grilles where indicated.

PART 3 – EXECUTION

3.1 GENERAL DIFFUSER/ GRILLE INSTALLATION

.1 Coordinate installation of units with ceiling construction.

.2 Install plaster frames for units in plaster ceiling.

.3 Fit frames tightly to prevent leakage and smudging.

.4 Visible screw fasteners to be countersunk and with matching finish.

.5 Properly support units and coordinate with ductwork.

.6 Carry out installation of fire rated equipment in accordance with code requirements.

.7 Coordinate insulation and access provisions with integral balancing dampers.

.8 Utilize round diffusers in drywall ceilings or where square diffusers specified; insure diffusers are installed with edges parallel with adjacent walls and/or bulkheads.

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 datasheet.

END OF SECTION

PART 1 – GENERAL

1.1 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

1.2 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion, remove surplus materials, rubbish, tools, and equipment

1.3 FIRESTOPPING

.1 All fire-stopping to be performed by a single certified contractor.

.2 This contractor will coordinate the construction of all openings through fire rated assemblies with the fire-stopping contractor.

1.4 DOCUMENTS

.1 These specifications are an integral part of the Contract Documents. Refer to other Sections to ensure a completed operational product and fully coordinated standard of work.

.2 "Provide" in this Division means to "supply, install, test, and commission".

.3 Conform to Canadian Metric Practice Guide CSA CAN3- 234.1.

.4 Provide all required adapters between "Metric" and "Imperial" installations.

.5 Metric descriptions in this Division are nominal equivalents of Imperial values.

1.5 ELECTRICAL SYSTEM SUPPORT ANCHORAGE AND SEISMIC RESTRAINT

.1 Provide support, anchorage, and restraint of electrical distribution systems and equipment, designed and constructed in accordance with the latest edition of the following:
.1 National Building Code, Section 4.1.9
.2 Ontario Building Code, Section 4.1.9
.3 ASHRAE Applications, Seismic Restraint Design.

.2 Provide installation documents prepared by a Structural Engineer licensed in the Province of Ontario. Documents to provide all required seismic supports, fastenings, and bracings. For the proposed installations, documents to be sealed and signed by the Structural Engineer and submitted as part of the shop drawing package for review, prior to commencement of any work.

.3 Coordinate electrical system support, anchorage, and restraint system with the requirements and constraints of the structure, vibration isolation systems and the support, anchorage, and restraint systems for mechanical and architectural components of the building.

.4 At completion of project, provide confirmation in writing, signed and sealed by a Structural Engineer licensed in the Province of Ontario, stating that the electrical installation is in general conformance with the structural drawings submitted with the shop drawing package.

1.6 REFERENCES

.1 Carry out all work in accordance with these drawings and specifications, meet latest regulations of Electrical Code and applicable Municipal and Provincial Codes and Regulations. In each and every instance of application, the Code, Regulation, Statute, Bylaw, or Specification having most stringent requirements applies.
.1 Canadian Standards Association (CSA International)
.1 Ontario Electrical Safety Code (25th Edition), and its amendments.
.2 CAN/CSA-C22.3 No. 1-01(Update March 2005), Overhead Systems.
.3 CAN3-C235-83(R2000), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
.2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
.1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.7 DEFINITIONS

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications and on drawings, are those defined by IEEE SP1122.

1.8 DESIGN REQUIREMENTS

.1 Operating Voltages: to CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
.1 Equipment to operate in extreme operating conditions established in above standard, without damage to equipment.

.3 Language operating requirements: provide identification nameplates and labels for control items in English.

.4 Use one nameplate or label for each language.

1.9 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data: submit WHMIS MSDS sheets.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by Contractor, unless otherwise noted.
.2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.
.3 Identify on wiring diagrams circuit terminals, and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
.4 Indicate on drawings, clearances for operation, maintenance, and replacement of operating equipment devices.
.5 Submit drawings and product data to authority having jurisdiction.
.6 If changes are required, notify PWGSC Representative of these changes before they are made.
.7 The review of Contractor-prepared submissions (shop drawings, reports, etc.) by the PWGSC Representative is not to be considered part of the Contractor Quality Assurance Program.
.8 Provide CSA certified equipment and material.
.9 Where CSA certified equipment and material is

not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to site.
.10 Submit test results of installed electrical systems and instrumentation.
.11 Permits and fees: in accordance with General Conditions of contract.
.12 Submit certificate of acceptance from authority having jurisdiction to PWGSC Representative upon completion of Work.

1.10 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control.

.2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.
.1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
.2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

.3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.
.1 Contractor is solely responsible for the control, charge, and supervision of construction means, methods, techniques, sequences, and procedures, and for safety precautions and programs required in connection with the work.
.2 Contractor is solely responsible for the discovery and correction of deficiencies, errors, and omissions in the execution and performance of the work and for the preparation of submissions (shop drawings, reports, etc.) relating to the work.
.3 Contractor is solely responsible for providing the appropriate quality assurance program to ensure that the work is carried out and performs in accordance with the Contract Documents, industry standards, and relevant codes and legislation. Contractor Quality Assurance Program is to ensure the following:
.1 The use of qualified tradesmen, experts, and professionals with the level of skill and experience required for the proper execution and performance of the work.
.2 The level of direction, supervision, and

inspection required for the proper execution and performance of the work.
.3 The level of coordination between trades, field conditions, material requirements, and product requirements required for the proper execution and performance of the work.
.4 The level of management required for the quality assurance program to operate effectively so that deficiencies, errors, and omissions in the work are identified by the Contractor on a continuous basis and that corrective action is carried out promptly.
.5 The level of management and communication required for the status of the work to be properly monitored and reported to the PWGSC Representative.

.4 Field review (observations) of the work by the PWGSC Representative is not to be considered part of the Contractor Quality Assurance Program.

1.11 FIELD QUALITY CONTROL

.1 Contractor to have qualified personnel to continuously direct and monitor all electrical work.

.2 Contractor may be required to list names and qualifications of supervisory personnel on tender form.

.3 Supervisory personnel to attend all site meetings.

.4 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks - the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

.5 The work of this division to be carried out by a contractor who holds a valid Master Electrical Contractor license, as issued by the Province that the work is being constructed.

.6 Conduct and pay for following tests:
.1 Power distribution system, including phasing, voltage, grounding, and load balancing.

.2 Circuits originating from branch distribution panels.
.3 Lighting and its control.
.4 Motors, heaters, and associated control equipment including sequenced operation of systems, where applicable.

.7 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions and the Owner’s personnel have been trained in its operation and maintenance.

.8 Insulation resistance testing.
.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
.2 Megger 350-600 V circuits, feeders, and equipment with a 1000 V instrument.
.3 Check resistance to ground before energizing.

.9 Provide instruments, meters, equipment, and personnel required to conduct tests during and at conclusion of project.

.10 Submit test results for PWGSC Representative's review.

1.12 OPERATING INSTRUCTIONS

.1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.

.2 Operating instructions to include following:
.1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
.2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
.3 Safety precautions.
.4 Procedures to be followed in event of equipment failure.
.5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

.3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.

.4 Post instructions where directed.

.5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.13 PROGRESS PAYMENTS

.1 Electrical progress payment requests are to separately identify labour and material costs on a system-by-system basis in coordination with the Contractor Status Report, which is to be submitted with each payment request. Testing and commissioning work is to be identified separately.

.2 Payment for work which must prove performance through testing, balancing, and commissioning activities will be approved individually and progressively in accordance with the following, as the Contractor verifies, demonstrates, and certifies that the work has been carried out and is performing in accordance with the Contract Documents.

.1 Payment for equipment: maximum of 70% of material until the successful completion of the following:

.1 Equipment on site.

.2 Payment for equipment: maximum of 80% of labour and material until the successful completion of the following:

.1 Equipment manufacturer's startup tests.

.2 Continuity, Megger tests.

.3 Payment for equipment: maximum of 97% of labour and material until the successful completion of the following:

.1 Final testing, phase rotation, voltage outputs.

.2 Commissioning verification of proper (fully automatic) operation and performance under all load conditions (part load, full load).

.3 Commissioning verification of proper (fully automatic) operation and performance under upset conditions (power failure, control failure).

.4 Equipment manufacturer's approval of installation and operation.

.3 Inspections from authorities having jurisdiction.

1.14 PERMITS, FEES, AND INSPECTION

.1 PWGSC Representative will provide drawings and specifications required by Electrical Safety Authority and Supply Authority.

.2 Notify PWGSC Representative of changes required by Electrical Safety Authority prior to making changes.

.3 Furnish Certificates of Acceptance from authorities having jurisdiction on completion of work to PWGSC Representative.

.4 Obtain a Certificate of Acceptance from Inspection Authority on completion of work and hand it over to PWGSC Representative.

.5 Notify Inspection Authority in sufficient time for them to inspect work.

.6 PWGSC Representative will carry out inspections and prepare deficiency lists for correction by Contractor during and on completion of construction.

.7 Contractor to correct deficiencies and advise the PWGSC Representative in writing that they have been corrected.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

.1 Material and equipment to be CSA certified. Where CSA certified material and equipment is not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.

2.2 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of authority having jurisdiction.

.2 Decal signs, minimum size 175 x 250 mm.

2.3 WIRING TERMINATIONS

.1 Ensure lugs, terminals, and screws used for termination of wiring are suitable for either copper or aluminum conductors.

.2 As specified and to meet requirements of Electrical Safety Authority and PWGSC Representative.

2.4 EQUIPMENT IDENTIFICATION

.1 Identify all electrical equipment supplied under this Division. Hand-painted identification will not be accepted.

.2 Use phenolic plastic laminate, machine engraved nameplates attached with self-adhesive.

.3 Use black plates with white letters for normal power.

.4 Size as follows:

	DIMENSIONS (metric)	# LINES	LETTER HEIGHT
Size 1	10 x 50 mm	1	3 mm
Size 2	12 x 70 mm	1	5 mm
Size 3	12 x 70 mm	2	3 mm
Size 4	20 x 90 mm	1	8 mm
Size 5	20 x 90 mm	2	5 mm
Size 6	25 x 100 mm	1	12 mm
Size 7	25 x 100 mm	2	6 mm
Size 8	50 x 150 mm	1	25 mm
Size 9	75 x 150 mm	2	19 mm

.5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.6 All identification to be in English.

.7 Disconnects, Starters, and Contactors: indicate equipment being controlled and voltage.

.8 Terminal Cabinets and Pull Boxes: indicate system and voltage.

.9 Panel nameplates, size 7, to identify panels, as indicated, and voltage characteristics.

.10 Identify circuit numbers on back of receptacle and switches with wire markers.

.11 Correct existing panel legends and nameplates to reflect changes made.

.12 Nameplate on each remote control device to be size 1 engraved "name of equipment controlled".

.13 Nameplates, size 5, for terminal cabinets, pull boxes, and junction boxes to indicate system and/or voltage characteristics.

2.5 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour Coding: to CSA C22.1.

.4 Provide phase identification markings on both ends of phase conductors of feeders. Arrange uniform phase-to-main lug connection on all equipment, i.e., panelboard, starter, disconnect switches.

.5 Provide numbered tape markings on all branch conductors including neutrals. Where common neutrals are used, identify branch circuit numbers.

.6 Maintain phase sequences and colour coding throughout.

.7 The following colour coding of conductor insulation is to be strictly adhered to:

120/208 V System

Phase A	-	red
Phase B	-	black
Phase C	-	blue
Neutral	-	white
Neutral	-	green

.8 At all junction boxes, splitters, cabinets and outlet boxes, maintain identification system.

2.6 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes, and metallic sheathed cables.

.2 Coding to be located on all conduits and cables exposed after completion of building and in suspended removable ceilings.

.3 Coding to be plastic tape or paint at all points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.4 Colours to be 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
Other	Green	Blue

2.7 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust-resistant primer inside and outside, and at least two coats of finish enamel.
.1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1-1955.
.2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1-1958.

.2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.3 Clean and prime exposed non-galvanized hangers, racks, and fastenings.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1, except where specified otherwise.

3.2 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels, and identification nameplates are visible and legible after equipment is installed.

3.3 CONDUIT AND CABLE INSTALLATION

.1 If plastic sleeves are used in fire-rated walls or floors, remove before conduit installation.

.2 Install cables, conduits, and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

.3 Provide all cutting of chases, drilling holes, and other structural work required to install electrical conduits, cables, pull boxes, and outlet boxes.

3.4 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment, unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Install electrical equipment at following heights, unless indicated otherwise.
.1 Local switches: 1200 mm.
.2 Wall receptacles:

.1 General: 400 mm.
.2 Above top of continuous baseboard heater: 200 mm.
.3 Above top of counters or counter splash backs: 175 mm.

3.5 FIELD QUALITY CONTROL

.1 Load Balance:
.1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
.2 Measure phase voltages at loads, and adjust transformer taps to within 2% of rated voltage of equipment.

.2 Conduct following tests in accordance with Section 01 11 00 – Summary of Work.
.1 Circuits originating from branch distribution panels.
.2 Lighting and its control.

.3 Provide instruments, meters, equipment, and personnel required to conduct tests during and at conclusion of project.

.4 Manufacturer's Field Services:
.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting, and cleaning of product, and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.6 CLEANING

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.2 Clean and prime exposed non-galvanized hangers, racks, and fastenings to prevent rusting.

3.7 SCOPE OF WORK

.1 Provide and install lighting and controls as indicated.

.2 Coordinate installations with Mechanical Contractor.

.3 Commission electrical systems, assist with other systems.

.4 Maintain existing to remain systems as required.

END OF SECTION

PART 1 - GENERAL

1.1 COMMISSIONING DESCRIPTION

.1 The Electrical Contractor will assist in the commissioning of all electrical equipment.

.2 The Contractor will appoint a person who will be responsible for the electrical commissioning process in conjunction with the General Contractor.

.3 The appointed electrical representative from the Electrical Contractor will be part of the building commissioning team and be required to attend all scheduled commissioning meetings.

1.2 COMMISSIONING REQUIREMENTS

.1 The electrical representative will be responsible for coordination of electrical system startup. The representative will schedule these system startups based on the overall building schedule.

.2 The electrical representative will complete all equipment information forms as supplied in the specification. The information will detail the building electrical equipment as installed.

.3 The point-to-point verification for the Fire Alarm and Lighting Control systems will be documented and submitted to the PWGSC Representative for review and acceptance.

.4 The electrical contractor will document all equipment start-up and testing, as detailed herein. The system testing will include, but not be limited to, the following:
.1 Power and grounding.
.2 Branch circuits.
.3 Lighting system.

.6 The electrical contractor will participate and assist in troubleshooting in all commissioning activities associated with the mechanical systems as required to demonstrate each complete and operational system.

.8 All system startup/testing documentation, authority inspection reports, and equipment information forms will be included in the commissioning manual.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Wire & Box Connectors:
.1 CSA International
.1 CAN/CSA-C22.2 No.18 Latest Edition, Outlet Boxes, Conduit Boxes and Fittings.
.2 CAN/CSA-C22.2 No.65 Latest Edition, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
.1 EEMAC 1Y-2 Latest Edition, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
.3 National Electrical Manufacturers Association (NEMA)

.2 Building Wire:
.1 Chemically cross-linked thermosetting polyethylene insulation on wire and cable to CSA C22.2 No. 38.
.2 T90 thermoplastic nylon jacket to CSA C22.2 No. 75.
.3 Armoured cables to CSA C22.2 No. 51.
.4 Teck cable to CAN/CSA C22.2 No. 131.

.3 Connectors and Terminations:
.1 Canadian Standards Association (CSA International)
.1 CSA C22.2 Latest Edition.
.2 CSA C22.2 No.41 Latest Edition, Grounding and Bonding Equipment.

.4 Grounding Secondary:
.1 American National Standards Institute/ Institute of Electrical and Electronics Engineers (ANSI/IEEE)
.1 ANSI/IEEE 837 Latest Edition, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

.5 Outlet Boxes, Conduit Boxes, and Fittings:
.1 Canadian Standards Association (CSA International)
.1 CSA C22.1-06 or Latest Edition, Ontario Electrical Safety Code.
.2 Outlet boxes, conduit boxes, and fittings for rigid PVC conduits to CSA C22.2 No. 85.
.3 Outlet boxes, conduit boxes, and fittings to CSA C22.2 No.18.

.6 Conduits, Conduit Fastenings, and Conduit Fittings:
.1 Canadian Standards Association (CSA

International)

.1 CAN/CSA C22.2 No. 18-98 (R2003) or Latest Edition, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.

.2 CSA C22.2 No. 45 Latest Edition, Rigid Metal Conduit.

.3 CSA C22.2 No. 56 Latest Edition, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.

.4 CSA C22.2 No. 83 Latest Edition, Electrical Metallic Tubing.

.5 CSA C22.2 No. 211.2 Latest Edition, Rigid PVC (Un-plasticized) Conduit.

.13 ASTM A641 – Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

PART 2 - PRODUCTS

2.1 CONNECTORS

.1 Pressure type wire connectors to: CAN/CSA-C22.2 No. 65, with current carrying parts of copper sized to fit copper conductors, as required.

.2 Fixture type splicing connectors to: CAN/CSA-C22.2 No. 65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Clamps or connectors for armoured cable, TECK cable, flexible conduit, as required to: CAN/CSA-C22.2 No. 18.

2.2 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 1000 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE.

.3 Type RW90-40 at working temperatures lower than -7°C.

.4 #14 for control circuits for mechanical equipment.

.5 Type RWU90 for underground wiring.

.6 Aluminum conductors not acceptable.

.7 Size all wiring as per Ontario Electrical Safety Code.

2.3 ARMOURED CABLES

.1 Conductors: insulated, copper, size as indicated.

.2 Type: AC90.

.3 Armour: interlocking type fabricated from galvanized steel strip.

.4 Connectors: anti-short connectors.

2.4 CONNECTORS AND TERMINATIONS

.1 Compression connectors to CSA C22.2, as required, sized for conductors. Wire connectors, pressure type, sized to fit copper conductors.

.2 Use twist-on connectors for #14 to #8 wires.

.3 Split bolt connectors for #6 conductors and larger.

2.5 WIRE IDENTIFICATION

.1 Each conductor to be identified with a numbered stick-on exclusive number.

2.6 GROUNDING

.1 Grounding conductors: bare stranded copper, tinned, soft annealed, size as indicated.

.2 Insulated grounding conductors: green, copper conductors, size as indicated.

2.7 JUNCTION AND PULL BOXES

.1 Construction: welded steel enclosure.

.2 Covers Flush Mounted: 25 mm minimum extension all around.

.3 Covers Surface Mounted: screw-on covers.

2.8 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 Combination boxes with barriers where outlets for more than one system are grouped.

2.9 CONDUIT BOXES

.1 Cast FS or FD boxes with factory-threaded hubs and mounting feet for surface wiring of devices.

2.10 FITTINGS – GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

2.11 FASTENINGS AND SUPPORTS FOR EQUIPMENT

.1 Use lead anchors or nylon shields to secure equipment to solid masonry, tile, and plaster surfaces.

.2 Use expandable inserts to secure equipment to poured concrete.

.3 Use toggle bolts to secure equipment to hollow masonry walls or suspended drywall ceilings.

2.12 SUPPORT CHANNELS

.1 Support channels, U shape, size minimum 41 x 41 mm, 2.5 mm thick, lengths as required, U shape, for surface, or suspended, or set in poured concrete walls and ceilings applications.

2.13 CONDUIT FASTENINGS

.1 Use straps for fastening of conduit or cables to building construction or support systems.
.1 One-hole steel straps to secure surface conduits NPS 2 50 mm and smaller.
.2 Two-hole steel straps for conduits larger than 50 mm.

.2 Do not use wire lashing, Ty-raps, or perforated strap to support or secure raceways or cables.

.3 Provide adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.4 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of PWGSC Representative.

2.14 CONDUIT FITTINGS

.1 General:
.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.
.2 Ensure factory "ells" where 90 degree bends

for 25 mm and larger conduits.
.3 Steel couplings and connectors for EMT conduit.
.1 Cast couplings and connectors are not acceptable.
.4 Watertight connectors and couplings for EMT in damp locations.
.1 Set screw couplings and connectors are not acceptable.
.5 All fittings used to be manufactured as accessories to the associated raceway and of consistent material, i.e., PVC where PVC conduit is used.
.6 Bushings and connectors with nylon insulated throats.
.7 Push-pennies to prevent entry of foreign materials.
.8 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.

.2 Fittings for Rigid Conduit:
.1 Threaded-type steel couplings and fittings.
.2 Double locknuts and insulated bushings on sheet metal boxes.
.3 Use explosion-proof fittings in areas indicated.

.3 Fittings for EMT to be set screw type zinc-coated steel connectors and couplings.

.4 Fittings and connectors for PVC conduits to be solvent weld. Use manufactured bends.

.5 Fittings in wet or damp locations to be watertight in areas indicated and as required.

2.15 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings acceptable to the structural engineer.

2.16 FISH CORD

.1 Polypropylene.

2.17 COVER PLATES

.1 Provide cover plates for all wiring devices.

.2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.

.3 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

.4 Stainless steel 1 mm thick cover plates, for all wiring devices mounted in a flush-mounted outlet box.

.5 Colours to match local devices specified and all to be of one single colour.

.6 Weatherproof cover plates for GFI receptacles to be P&S 1591-WP.

.7 Blank plates, finish to match other plates in area, for boxes without wiring devices.

.8 Use PVC cover plates for PVC outlet boxes.

2.18 IDENTIFICATION

.1 Refer to Section 26 05 00 - Common Work Results for Electrical.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform tests using method appropriate to site conditions and to approval of PWGSC Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

3.2 INSTALLATION – WIRE AND BOX CONNECTORS

.1 Remove insulation carefully from ends of conductors and cables and:
.1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
.2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.
.3 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap.

3.3 WIRING TO INDOOR LIGHTING FIXTURES

.1 LED fixtures:
.1 Use 2.12 AC90 from outlet to recessed fixtures in non-removable ceilings.
.2 Use 2.12 AC90 from outlet to recessed LED fixtures in removable tile ceilings. Use double connectors if two or more fixtures are wired on one run from outlet (leave enough cable to move fixture one tile in any direction.)

.3 Connect leads from surface-mounted fixture in outlet box.

3.4 DAMAGED CONDUCTORS

.1 Replace at no cost to Owner any wire or cable showing evidence of mechanical injury after installation.

3.5 GENERAL CABLE INSTALLATION

.1 Terminate cables as defined in Section 2 of this specification.

.2 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.

.3 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

.4 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

3.6 INSTALLATION OF BUILDING WIRES

.1 Install wires in conduits or ducts as indicated.

.2 Do not pull spliced wires in conduits or ducts.

.3 Install multiple wires in conduits or ducts simultaneously.

.4 Use CSA certified lubricants of type compatible with insulation to reduce pulling tension.

3.7 WIRE IDENTIFICATION

.1 Each conductor to be identified with a numbered stick-on exclusive number.

3.8 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible.

.2 Terminate cables as defined in Section 2 of this specification.

.3 Cabling not to exceed 2.6 metres.

3.9 TESTING

.1 Conduct tests in accordance with Section 26 05 00.

.2 Perform tests using qualified personnel only. Provide necessary instruments and equipment to demonstrate that:
.1 All circuits are continuous and free from

short circuits and grounds.
.2 All circuits are free from unspecified grounds; that insulation resistance to ground of all circuits is greater than permitted by Code.
.3 Provide PWGSC Representative with list of test results showing location at which each test was made, circuit and result of each test.

3.10 INSTALLATION CONNECTORS AND TERMINATIONS

.1 Install stress cones, terminations, and splices in accordance with manufacturer's instructions.

.2 Bond and ground as required to CSA C22.2 No.41.

.3 Remove insulation carefully from ends of conductors and install above connections to manufacturer's recommendations.

.4 Accommodate all strands of conductor in lugs of switches, panels, etc. Where insulation on conductors is stripped to excess, neatly tape conductor so that only lug remains exposed.

3.11 INSTALLATION GENERAL - GROUNDING

.1 Install connectors in accordance with manufacturer's instructions.

.2 Protect exposed grounding conductors from mechanical injury.

.3 Use mechanical connectors for grounding connections to equipment provided with lugs.

.4 Soldered joints not permitted.

.5 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.6 Make grounding connections in radial configuration only, with connections terminating at single grounding points. Avoid loop connections.

.7 Bond single-conductor, metallic armoured cables to cabinet at supply end and load end.

3.12 GROUNDING - FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of PWGSC Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

3.13 JUNCTION, PULL BOXES, AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m above finished floor, except where indicated otherwise.

.3 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.14 OUTLET BOXES, CONDUIT BOXES, AND FITTING INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges, or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations, mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated, and armoured cable connections. Do not install reducing washers.

.5 Vacuum clean interior of outlet boxes before installation of wiring devices.

.6 Identify systems for outlet boxes as required.

3.15 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

.2 Install fastenings and supports as required for each type of equipment, cables, and conduits, and to manufacturer's installation recommendations.

3.16 INSTALLATION – CONDUITS, CONDUIT FASTENING AND CONDUIT FITTINGS

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Drawings do not show all conduits. Those shown are in diagrammatic form only. Install conduits to conserve headroom in exposed locations and cause

minimum interference in the spaces through which they pass.

.3 Use electrical metallic tubing (EMT) for all work, except where specified otherwise, and all work concealed in walls and ceiling spaces, except where armoured cable type AC is permitted by this specification.

.4 Use liquidtight flexible metal conduit for:
.1 Specifically indicated applications.
.2 Wet or corrosive locations

.5 Install ground wire in all conduits.

.6 Minimum conduit size for lighting and power circuits: 19 mm.

.7 Bend conduit cold:
.1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.8 Mechanically bend steel conduit over 19 mm diameter.

.9 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.10 Install polypropylene fish cord in empty conduits.

.11 Remove and replace blocked conduit sections.
.1 Do not use liquids to clean out conduits.
.2 For concealed conduits, corrosive agents are prohibited.

.12 Dry conduits out before installing wire.

3.17 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Group conduits wherever possible on suspended or surface channels.

.3 Do not pass conduits through structural members except as indicated.

.4 Do not locate conduits less than 150 mm parallel to steam or hot water lines with minimum of 50 mm at crossovers.

.5 Coordinate routing with all other trades.

3.18 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

3.19 INSTALLATION – WIRING DEVICES

.1 Switches:
.1 Install single-throw switches with handle in "UP" position when switch closed.
.2 Install switches in gang-type outlet box when more than one switch is required in one location.
.3 Mount toggle switches at height in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Receptacles:
.1 Install receptacles in gang-type outlet box when more than one receptacle is required in one location.
.2 Mount receptacles at height in accordance with Section 26 05 00 - Common Work Results for Electrical.
.3 Install GFI type receptacles as indicated.

.3 Cover plates:
.1 Install suitable common cover plates where wiring devices are grouped.
.2 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

3.20 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.

.3 Repair damage to adjacent materials caused by wiring device installation.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI)
.1 ANSI C82.1-04, Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
.2 ANSI C82.4-02(R2007), Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps Multi Supply Type.

.2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
.1 ANSI/IEEE C62.41-1991, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.

.3 ASTM International Inc.
.1 ASTM F 1137-00(2006), Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.

.4 Canadian Standards Association (CSA International).

.5 ICES-005-07, Radio Frequency Lighting Devices.

.6 Underwriters' Laboratories of Canada (ULC).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data:
.1 Provide manufacturer's printed product literature, specifications, and data sheet and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Quality assurance submittals: provide following in accordance with Section 01 45 00 – Quality Control
.1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

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

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Divert unused metal materials from landfill to metal recycling facility.

.4 Disposal and recycling of fluorescent lamps as per local regulations.

PART 2 - PRODUCTS

2.1 LED LAMPS

.1 Optical Assemblies: LEDs shall be provided with discreet optical elements to provide IESNA Type II, III, IV, or V distributions. Additional distributions for spill light control shall be utilized when light trespass must be mitigated. All optical assemblies will be mounted parallel to the ground, aimed in the same direction, and shall provide the same optical pattern such that catastrophic failures of individual LEDs will not constitute a loss in the distribution pattern. The luminaire shall have minimum efficiency of 85 lm/W as reported by an LM-79 report for each luminaire wattage and photometric distribution considered.

.2 All photometric data will be measured by the IESNA LM-79-08 standard and formatted per IESNA LM-63-02 as an electronic .ies file.

.3 Lumen depreciation shall not decrease by more than 30% over the expected operating life of a minimum of 80,000 hours @ 25 degrees Celsius. The measurements shall be calibrated to standard photopic calibrations. The LED device manufacturer shall have tested the lumen maintenance characteristics of the LED package in accordance with the guidelines of IESNA LM-80-08 “Approved Method of Lumen Maintenance Testing of LED Light Sources.” A copy of the manufacturer’s LM-80 reports shall be submitted for review, accompanied by lumen depreciation estimates for 10, 15, and 25 degrees Celsius luminaire ambient operating temperatures.

.4 Light Colour/Quality: The luminaire shall have a correlated colour temperature (CCT) range of 4,000 K to 4,500 K. The colour rendition index (CRI) shall be 70 or greater. Binning of LEDs shall conform to ANSI/G.NEMA SSL 3-2010.

.5 Backlight-Uplight-Glare: The luminaire shall not allow more than 10 percent of the rated lumens to project above 80 degrees from vertical. The luminaire shall not allow more than 2.5 percent of

the rated lumens to project above 90 degrees from vertical. Backlight and glare ratings as per fixture schedule and calculated per IESNA TM-15.

2.2 LED DRIVERS

.1 Power Consumption: maximum power consumption allowed for the luminaire shall be determined by application. The luminaire shall not consume power in the off state.

.2 Operation Voltage: the luminaire shall operate from a 60 Hz AC line over a voltage ranging from 108 Vac to 305 Vac. The fluctuations of line voltage shall have no visible effect on the luminous output.

.3 Power Factor: the luminaire shall have a power factor of 0.90 or greater.

.4 THD: total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent over entire load range 0-100%.

.5 Surge Suppression: the luminaire onboard circuitry shall include surge protection devices (SPD) to withstand high repetition noise transients as a result of utility line switching, nearby lightning strikes, and other interference. The SPD shall protect the luminaire from damage and failure for common mode transient peak voltages up to 10 kV (minimum) and transient peak current up to 5 Ka (minimum). SPD performance shall be tested per the procedures in ANSI/IEEE C62.41-1992 (or current edition) for category C (standard). The SPD shall fail in such a way as the luminaire will no longer operate. The SPD shall be field replaceable.

.6 The power supply driver enclosure should be sealed to protect against the entry of dust and water. This area should be sealed to minimum Ingress Protective level 65 (IP65).

.7 RF Interference: LED drivers must meet Class A emission limits referred to in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.

.8 The total current harmonic distortion of power supply driver inducted into an AC power line shall not exceed 20%.

2.3 FINISHES

.1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

2.4 OPTICAL CONTROL DEVICES

.1 As indicated in luminaire schedule on drawing.

2.5 LUMINAIRES

.1 As indicated in luminaire schedule on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Locate and install luminaires as indicated.

.2 Provide adequate support to suit ceiling system.

3.2 WIRING

.1 Connect luminaires to lighting circuits.
.1 Install flexible or rigid conduit for luminaires as indicated.

3.3 LUMINAIRE SUPPORTS

.1 For suspended ceiling installations, support luminaires independently of ceiling.

3.4 LUMINAIRE ALIGNMENT

.1 Align luminaires mounted in continuous rows to form straight uninterrupted line.

.2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

3.5 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.
.1 Remove surplus materials, excess materials, rubbish, tools, and equipment.

.2 Waste Management: separate waste materials for reuse and recycling.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittal Requirements.

.2 Section 01 35 29.06 – Health and Safety Requirements.

.3 Section 01 77 00 – Closeout Procedures.

1.2 REFERENCES

.1 ASTM International

.1 ASTM C 307-03(2012), Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings.

.2 ASTM C 413-01(2012), Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacings.

.3 ASTM C 579-01(2012), Standard Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concretes.

.4 ASTM C 580-02(2012), Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

.5 ASTM C 882/C 882M-13a, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.

.6 ASTM C883-89, Standard Test Method for Effective Shrinkage of Epoxy-Resin Systems Used with Concrete.

.7 ASTM D 638-10, Standard Test Method for Tensile Properties of Plastics.

.8 ASTM D 1044-13, Standard Test Method for Resistance of Transparent Plastics to Surface Abrasion.

.9 ASTM D 1308-02(2013), Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

.10 ASTM D 2047-11, Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.

.11 ASTM D 2240-05(2010), Standard Test Method for Rubber Property - Durometer Hardness.

.12 ASTM D 4541-09e1, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.

.2 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S102.2-07, Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

.3 United States Military Standards (MIL)

.1 MIL-D-3134J-1989, Deck Covering Materials.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for epoxy wall coatings and include product characteristics, performance criteria, physical size, finish, and limitations.
.1 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements. Indicate VOC's during application and curing.

.3 Shop Drawings:
.1 Submit drawings, including details at floor and ceiling and changes in wall coating materials.

.4 Samples:
.1 Submit 2 300 x 300 samples of epoxy wall coating.

.5 Certificates:
.1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Test Reports:
.1 Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return packing materials to manufacturer in accordance with Section 01 74 21 - Construction/ Demolition Waste Management and Disposal.

1.5 ENVIRONMENTAL REQUIREMENTS

.1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

1.6 WARRANTY

.1 For epoxy wall coating materials the 12 month warranty period is extended to 60 months.
.1 Extended warranty period to include warranty against delamination of epoxy wall system from substrate, and other failure of system to provide complete, integral, seamless wall covering meeting specified performance requirements, for specified time period.

PART 2 - PRODUCTS

2.1 PRODUCT INFORMTION

.1 Walls and Ceiling to be finished with a two (primer and finish) coat system:
.1 Seal walls and ceiling with a two part water based, high performance epoxy filler.
.2 Finish walls and ceiling with a two part, high solids, low odour, low VOC, fine textured, glossy coating.

2.2 PERFORMANCE REQUIREMENTS

.1 Epoxy wall coating components to form integral, seamless wall and ceiling coating meeting the following performance characteristics:
.1 Compressive strength: to ASTM C 579, 79.28 MPa after 7 days.
.2 Tensile strength: to ASTM C 307, 15.16 MPa.
.3 Flexural strength: to ASTM C 580, 34.47 MPa.
.4 Bond strength: to ASTM C 882/C 882M 550 psi.
.5 Linear shrinkage: to ASTM C 883, nil.
.6 Hardness: to ASTM D 2240, Shore D durometer 85-90.
.7 Water absorption; to ASTM C 413, 0.01% maximum.
.8 Flammability: to CAN/ULC-S102.2, flame spread 49, smoked developed 304.
.9 Elongation: to ASTM D 638, 14%.
.10 Coefficient of friction: to ASTM D 2047, 0.6.
.11 Abrasion resistance: to ASTM D 1044, CS-17 wheel, 0.1 g maximum weight loss.
.12 Impact resistance: to MIL-D-3134J, 0.225 mm.
.13 Chemical resistance: no chemical attack or discolouration when tested in accordance with ASTM D 1308 at 72 degrees F for 7 days, against

following reagents and concentrations:
.1 Ammonium hydroxide; 28%.
.2 Clorox.
.3 Ethylene Glycol.
.4 Gasoline.
.5 Isopropyl Alcohol: 98%.
.6 Mineral spirits.
.7 Skydrol #500.
.8 Sodium Hydroxide: 30%.
.9 Urine-synthetic: 6.6%.

.14 Pin holing: no pin holing permitted.

2.3 MANUFACTURER

.1 All epoxy wall and ceiling system materials from same manufacturer.

.2 Ensure compatibility for epoxy wall materials including primers, resins, hardening agents, finish coats, and sealer coats.

2.4 MATERIALS

.1 Materials: as required to achieve specified performance criteria; functionally compatible with adjacent materials and components.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for epoxy wall coverings installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of PWGSC Representative.
.2 Inform PWGSC Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from PWGSC Representative.

3.2 PREPARATION

.1 Prepare substrate surfaces in accordance with epoxy wall coating material manufacturer's instructions.

3.3 INSTALLATION

.1 Comply with manufacturer's written installation instructions.

.2 Install epoxy wall and ceiling coating material at the rate and to thickness required to achieve complete conformance with the specified performance requirements.

.3 Apply in compliance with manufacturer's product data, including product technical bulletins, application and installation instructions.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5 PROTECTION

.1 Protection: protect installed product and finish surfaces from damage during construction.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittal Requirements.

.2 Section 01 35 29.06 – Health and Safety Requirements.

.3 Section 01 77 00 – Closeout Procedures.

1.2 REFERENCES

.1 ASTM International

.1 ASTM C 307-03(2012), Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings.

.2 ASTM C 413-01(2012), Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacings.

.3 ASTM C 579-01(2012), Standard Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concretes.

.4 ASTM C 580-02(2012), Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

.5 ASTM C 882/C 882M-13a, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.

.6 ASTM C883-89, Standard Test Method for Effective Shrinkage of Epoxy-Resin Systems Used with Concrete.

.7 ASTM D 638-10, Standard Test Method for Tensile Properties of Plastics.

.8 ASTM D 1044-13, Standard Test Method for Resistance of Transparent Plastics to Surface Abrasion.

.9 ASTM D 1308-02(2013), Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

.10 ASTM D 2047-11, Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.

.2 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S102.2-07, Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

.3 United States Military Standards (MIL)

.1 MIL-D-3134J-1989, Deck Covering Materials.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for epoxy floor coatings and include product characteristics, performance criteria, physical size, finish, and limitations.
.1 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements. Indicate VOC's during application and curing.

.3 Shop Drawings:
.1 Submit drawings including details at drains and upstands and changes in flooring materials and wall bases.

.4 Samples:
.1 Submit 2 300 x 300 x 6 samples of epoxy floor coating.

.5 Certificates:
.1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Test Reports:
.1 Submit certified test reports from independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

1.4 QUALITY ASSURANCE

.1 Installer Qualifications: company or person experienced in performing work of this section with documented experience and approved by epoxy flooring material manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Replace defective or damaged materials with new.

1.6 SITE CONDITIONS

.1 Ambient Conditions:
.1 Moisture: ensure substrate is within moisture limits prescribed by manufacturer.
.2 Temperature: maintain ambient temperature in accordance with manufacturer's written instructions.
.3 Relative humidity: maintain relative humidity in accordance with manufacturer's written instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

1.8 WARRANTY

.1 Warranty: 60 months against delamination of epoxy flooring system from substrate, and other failure of system to provide complete, integral, seamless floor covering meeting specified performance requirements.

PART 2 - PRODUCTS

2.1 PRODUCT INFORMATION

.1 Floors in shower areas to be:
.1 Sealed with a two component, solvent free, chemically cured, elastomeric, crack bridging, polyurethane waterproofing membrane.
.2 Finished with a solid colour, high gloss, textured, resin-rich, aggregate-filled, seamless, epoxy-based floor coating.

2.2 PERFORMANCE REQUIREMENTS

.1 Select and install epoxy floor coating components to form complete, integral, seamless flooring system meeting the following performance characteristics:
.1 Compressive strength: to ASTM C 579, 79.28 MPa after 7 days.
.2 Tensile strength: to ASTM C 307, 15.16 MPa.
.3 Flexural strength: to ASTM C 580, 34.47 MPa.
.4 Bond strength: to ASTM C 882/C 882M 550 psi.
.5 Linear shrinkage: to ASTM C 883, nil.
.6 Water absorption; to ASTM C 413, 0.01% maximum.
.7 Flammability: to CAN/ULC-S102.2, flame spread 49, smoked developed 304.
.8 Elongation: to ASTM D 638, 14%.
.9 Coefficient of friction: to ASTM D 2047, 0.6.
.10 Abrasion resistance: to ASTM D 1044, CS-17 wheel, 0.1 g maximum weight loss.

.11 Impact resistance: to MIL-D-3134J, 0.225 mm.
.12 Chemical resistance: no chemical attack or discolouration when tested in accordance with ASTM D 1308 at 72 degrees F for 7 days, against following reagents and concentrations:
.1 Ammonium hydroxide; 28%.
.2 Clorox.
.3 Ethylene Glycol.
.4 Gasoline.
.5 Isopropyl Alcohol: 98%.
.6 Mineral spirits.
.7 Skydrol #500.
.8 Sodium hydroxide: 30%.
.9 Urine-synthetic: 6.6%.
.13 Pin holing: no pin holing permitted. Pin holing to be tested using holiday test.

2.3 MANUFACTURER

.1 Epoxy flooring materials from same manufacturer.

.2 Ensure compatibility for epoxy flooring materials including primers, resins, hardening agents, finish coats, and sealer coats.

2.4 MATERIALS

.1 Materials: as required to achieve specified performance criteria; functionally compatible with adjacent materials and components.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for epoxy floor coating applications in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of PWGSC Representative.
.2 Inform PWGSC Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from PWGSC Representative.

3.2 PREPARATION

.1 Prepare substrate surfaces in accordance with epoxy floor coating material manufacturer's instructions.

3.3 PREPARATION OF CONCRETE FLOOR SUBSTRATES

.1 Ensure work penetrating substrate has been completed before preparing substrate and applying coating.

.2 Protect coated surfaces, equipment, fixtures, and fittings.

.3 Clean and prepare surfaces in accordance with manufacturer's instructions.
.1 Chemical cleaning: clean surfaces with detergent, trisodium phosphate or other proprietary concrete cleaner.
.2 Mechanical cleaning: Mechanically clean concrete surfaces using mechanical cleaning in accordance with manufacturer's written instructions.

3.4 INSTALLATION

.1 Comply with manufacturer's instructions.

.2 Prime clean concrete subfloor as recommended by manufacturer.

.3 Apply epoxy sub-floor filler to cracks, depressions, and low spots to achieve floor level to a tolerance of 1:500; allow to cure.

.4 Prime concrete and subfloor filler substrate surfaces as recommended by manufacturer.

.5 Install epoxy floor coating material at the rate and to thickness required to achieve complete conformance with the specified performance requirements.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.6 PROTECTION

.1 Protection: protect installed product and finish surfaces from damage during construction.

END OF SECTION