PROJECT MANUAL

George Brown College

Casa Loma Athletics Renovation

Project No: 6010

Toronto, Ontario

Issued for Construction
November 21, 2023

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SECTION INDEX

1.0 WORK SCHEDULE

.1 Reach Substantial Performance of the Work by December 13, 2023.

.2 Reach Final Completion of the Work of this project by December 20, 2023.

1.1 SUMMARY OF WORK

.1 Work of this project includes stage 2 renovations to Casa Loma Campus, located at the George Brown College in Toronto, Ontario.

.2 Work specified in Specifications is divided into Divisions and Sections for reference purposes only. Except as may be otherwise specified in Bid Document, division of work among Contractor, Subcontractors, Sub-subcontractors and suppliers is Bidders' responsibility.

.3 Base Building Contractors at 160 Kendal Ave:

.1 Fire Suppression – Rohen Fire Protection Ltd - Wes Jasper, President 416-291-8127 wesjasper@rohenfire.ca

.2 BAS: Honeywell, Nabeel Tariq, Sr. Account Executive nabeel.tariq@honeywell.com Mobile: +1-416-906-0681

.3 Network: GBS gbscomm@gmail.com Mike Martin 416-537-5623

.4 SLD Security: Security Locksmith & Design Ltd. O: 416-504-8861 | T: 1-866-504-8861 E: info@sldsecurity.ca | W: www.sldsecurity.ca

.5 JCI - Gord Wilson gord.walter.wilson@jci.com / Executive Account Manager / Tyco Integrated Fire and Security / Johnson Controls 905-301-8921

1.2 WORK SEQUENCE

.1 Construct Work in stages to accommodate Owner's continued use of premises during construction.

.2 Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction.

.3 Provide a phasing plan for review by the Owner.

.4 Maintain fire access/control.

1.3 WORK RESTRICTIONS

.1 Access and Egress.

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

.2 Use of Site and Facilities

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

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

.3 Where security is reduced by work provide temporary means to maintain security.

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

.3 Alterations, additions or repairs to existing building:

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

.4 Existing Services

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

.2 Where Work involves breaking into or connecting to existing services, give Consultant 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel, pedestrian and vehicular traffic.

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

.5 Special Requirements

.1 Noise generating Work is restricted to after business hours and must be coordinated with the Facility Manager. Provide notice one week prior to commencing noise generating work.

.2 Keep within limits of work and avenues of ingress and egress.

.3 Deliver and removal of material shall be coordinated with the Facility Manager and planned 1 week prior to these activities taking place.

.6 Building Smoking Restrictions

.1 Smoking is not allowed anywhere on the property.

1.4 PAYMENT PROCEDURES FOR TESTING

.1 Related Requirements Specified Elsewhere:

.1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Contractor and approved by Consultant are specified under various Sections.

.2 Appointment and Payment:

.1 Pay for services of testing laboratory through cash allowance indicated except follows:

.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

.2 Inspection and testing performed exclusively for Contractor's convenience.

.3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.

.4 Mill tests and certificates of compliance.

.5 Tests specified to be carried out by Contractor under the supervision of Consultant.

.2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Consultant to verify acceptability of corrected work.

.3 Contractor’s Responsibilities

.1 Provide labour, equipment and facilities to:

.1 Provide access to Work for inspection and testing.

.2 Facilitate inspections and tests.

.3 Make good Work disturbed by inspection and test.

.4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Consultant sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Consultant.

1.5 PROJECT MEETINGS

.1 Preconstruction Meeting:

.1 Within 30 days after award of Contract, hold a meeting to discuss construction strategies and procedure.

.2 Representatives of Owner, Consultant, Contractor, major Subcontractors, suppliers listed in bid form, field inspectors and supervisors must be in attendance.

.3 Coordinate time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with CONSTRUCTION SCHEDULE.

.3 Schedule of submission of shop drawings, samples, colour chips.

.4 Requirements for temporary facilities, site sign, offices, storage, utilities in accordance with Construction Facilities.

.5 Delivery schedule of specified equipment.

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

.7 Record drawings.

.8 Maintenance manuals in accordance with CLOSEOUT SUBMITTALS.

.9 Take-over procedures, acceptance, warranties in accordance with CLOSEOUT SUBMITTALS.

.10 Monthly progress claims, administrative procedures, photographs, hold backs.

.11 Appointment of inspection and testing agencies or firms.

.12 Insurances, transcript of policies.

.2 Progress Meetings:

.1 During course of Work schedule progress meetings every two weeks.

.2 Contractor, major Subcontractors involved in Work and Consultant and Owner are to be in attendance.

.3 Notify parties minimum 5 days prior to meetings.

.4 Contractor to record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for affect on construction schedule and on completion date.

.12 Other business.

1.6 CONSTRUCTION SCHEDULE

.1 Definitions:

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Consultant to enable monitoring of project work in relation to established milestones.

.2 Requirements:

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

.3 Submittals:

.1 Provide submittals in accordance with SUBMITTAL PROCEDURES.

.2 Submit to Consultant within 15 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.4 Project Schedule:

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.

.2 Shop Drawings, Samples.

.3 Permits.

.4 Mobilization.

.5 Removal of demolition work.

.6 Interior Architecture (Walls, Floors and Ceiling).

.7 Lighting.

.8 Electrical.

.9 Piping.

.10 Controls.

.11 Heating, Ventilating, and Air Conditioning.

.12 Fire Systems.

.13 Testing and Commissioning.

.14 Building Flushout (IAQ)

.15 Supplied equipment long delivery items.

.16 Engineer supplied equipment required dates.

.5 Project Schedule Reporting:

.1 Update Project Schedule every two weeks reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

.6 Project Meetings:

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

1.7 SUBMITTAL PROCEDURES

.1 Administrative:

.1 Submit to Consultant 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 metric units.

.4 Where items or information is not produced in metric units, converted values are acceptable.

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

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

.7 Verify field measurements and affected adjacent Work are co-ordinated.

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

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

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

.2 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 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of the Work as required. The Professional Engineer shall be responsible for reviewing the method of seismic restraint and attachment to the structure with the Consultant prior to installation. The Professional Engineer shall also provide field and certification of installation at Sub-contractor's cost.

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

.4 Allow 10 full working days for Consultant's review of each submission.

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

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

.7 Accompany submissions with transmittal letter, containing:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Specification Sections and indication of partial or complete submittal for stated Section

.5 Other pertinent data.

.8 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.

.9 After Consultant's review, distribute copies.

.10 Submit electronic copy of shop drawings for each requirement requested, except where hand drawn copies are produced or colours have to be chosen or confirmed, in specification Sections and as Consultant may reasonably request.

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

.12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Consultant.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit electronic copies of manufacturer’s instructions for requirements requested in specification Sections and as requested by Consultant.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Consultant.

.17 Delete information not applicable to project.

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

.19 If upon review by Consultant, 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.

.20 The review of shop drawings is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that the Consultant 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.

.3 Samples/brochures for colour or texture:

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

.2 Deliver samples prepaid to Consultant's business address.

.3 Notify Consultant 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 Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.6 Make changes in samples which Consultant 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.

.4 Photographs: Digital Format:

.1 Progress Photographs:

.1 Sizes: between 5 and 10 mega pixel image file size, jpeg image file.

.2 Format: CD or DVD (*.jpg), USB (*.jpg) or e-mail.

.3 Viewpoints: A minimum of four (4) photographs from three (3) different viewpoints will be required. Locations determined by Consultant.

.4 Identification: referenced to photo file with name, location, purpose, and number of project and date of exposure.

.5 Frequency: daily.

.5 Certificates and Transcripts:

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

1.8 DELEGATED DESIGN

.1 Intent

.1 The intent of Delegated Design Submittals required is to account for professional engineering responsibility for design, review and acceptance of components of Work forming a part of permanent Work in accordance with Building Code, and that has been assigned to a design entity other than Consultant including, but not limited to, the following:

.1 Design requiring structural analysis of load bearing components and connections and seismic requirements.

.2 Design requiring compliance with fire safety regulations.

.3 Design requiring compliance with life or health safety regulations.

.4 Section 07 84 00 – Firestopping

.5 Section 08 35 16 – Side Folding Grilles

.6 Section 09 22 00 – Non-Structural Metal Framing

.7 Other Sections as indicated.

.2 Delegated Design Submittals are not required for components of Work requiring engineering for temporary Work (i.e.: crane hoisting, engineered lifts, false Work, shoring, concrete formwork) that would normally form a part of Contractor’s scope of Work.

.3 The requirements of this Section are in general conformance with recommended Practice Guidelines and Guideline to Professional Practice and Code of Ethics published by Professional Engineers Ontario (PEO), with regards to duties of specialty professionals appointed during construction period.

.4 The requirements of this Section do not diminish responsibilities of Consultant’s role as Registered Professional of Record; submittals will be used by Consultant to establish that Work is substantially performed in accordance with Building Code.

.2 Delegated Design

.1 Performance and Design Criteria: Provide products and systems complying with specific performance and design criteria indicated where professional design services or certifications by a design professional are specifically required of Contractor by Contract Documents.

.2 If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Consultant.

.3 Delegated design will be required for elements designed by a specialty professional, which may include:

.1 Elements normally fabricated off-site

.2 Elements that require specialized fabrication equipment or a proprietary fabrication process not usually available at job site (i.e.: guardrails, handrails, open web steel joists, wood trusses,

combination wood and metal or plywood joists, prefabricated wood or metal buildings, noise and vibration isolation devices, elevators).

.3 Elements requiring civil engineering, not normally a part of scope of services performed by architectural; structural; mechanical; electrical; or geotechnical disciplines of Consultant.

.3 Certificate of Authorization

.1 The PEO Certificate of Authorization allows individual professional engineers acting as independent contractors or companies to offer or provide professional engineering services directly to the public. Certificate of Authorization holders must stamp their work to indicate their responsibility for the services provided. For Professional Engineers acting as independent contractors or companies, Submit Certificate of Authorization at same time as submission of Letter of Commitment.

.4 Letters of Commitment/Compliance

.1 Submit a signed and sealed Letter of Commitment on company letterhead addressed to Consultant in accordance with format as directed by Consultant prior to starting Work requiring design and seal of a professional engineer.

.2 Submit a signed and sealed Letter of Compliance on company letterhead addressed to Consultant in accordance with format as directed by Consultant on completion of Work requiring design and seal of a professional engineer.

.5 Implementation

.1 Include summary of Work described in technical specification Section as a part of the required Letter of Commitment.

.2 Prepare required submittals and present to Consultant within sufficient time to allow for Consultant’s detailed review and acceptance.

1.9 HEALTH AND SAFETY

.1 Responsibility for Work Site Safety - This Contractor Is "Prime Contractor":

.1 The Contractor shall, for the purposes of the Occupational Health and Safety Act (Ontario), and for the duration of the Work of this Contract:

.1 Be the "Prime Contractor" for the "Work Site", and

.2 Meet all requirements of the Occupational Health and Safety Act and Regulations, Workers Compensation Board legislation, the Fire Code legislation and all other applicable laws that govern work place safety.

.2 The Contractor shall direct all Subcontractors, sub-subcontractors, Other Contractors, employees, suppliers, workers and any other persons at the “Work Site” on safety related matters, to the extent required to fulfill its “Prime Contractor” responsibilities pursuant to the Act, regardless of:

.1 Whether or not any contractual relationship exists between the Contractor and any of these entities, and

.2 Whether or not such entities have been specifically identified in this Contract.

.3 Safety Certification: Safety certification is a condition of contract award; Contractor is required to maintain a valid Certificate of Recognition (COR) for the duration of the Work of this Contract.

.2 References:

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

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

.1 Material Safety Data Sheets (MSDS).

.3 Province of Ontario

.1 Ontario Occupational Health and Safety Act and Regulations.

.3 Submittals:

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

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.2 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Consultant and authority having jurisdiction, weekly.

.3 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.4 Submit copies of incident and accident reports.

.5 Submit WHMIS MSDS - Material Safety Data Sheets.

.4 Filing of Notice:

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

.5 Safety Assessment:

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

.2 Provide training and instruction to occupants of adjacent spaces being added to or renovated, and forming a part of the work of this Contract, about the dangers involved with entering the work site prior to working on site:

.1 Provide educational materials, brochures or pamphlets as a part of the training session.

.2 Provide training sessions prior to the start of work, to verify that knowledge of construction site hazards is reinforced and maintained.

.3 Coordinate the completion of Owner COVID-19 attestation forms.

.6 Meetings:

.1 Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.

.7 Regulatory Requirements:

.1 Do Work in accordance with REGULATORY REQUIREMENTS.

.8 General Requirements:

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Consultant may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

.9 Responsibility:

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

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

.10 Unforeseen Hazards:

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Consultant verbally and in writing.

.11 Health and Safety Coordinator:

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

.1 Have site-related working experience specific to activities.

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

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

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

.5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

.12 Posting of Documents:

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

.13 Correction of Non-Compliance:

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

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

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

.14 Blasting:

.1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Authority Having Jurisdiction.

.15 Powder Actuated Devices:

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

.16 Work Stoppage:

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

1.10 REGULATORY REQUIREMENTS

.1 References and Codes:

.1 Perform Work in accordance with Ontario Building Code (OBC) 2017, ASHRAE 90.1, 2016, and CSA B561-18 including amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

.2 Municipalities:

.1 Perform Work in accordance with the by-laws and ordinances of the Municipality in the jurisdiction of the Work and to the direction of the Authorities Having Jurisdiction.

1.11 QUALITY CONTROL

.1 Inspection:

.1 Allow Consultant 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 Consultant 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 Consultant 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, Consultant shall pay cost of examination and replacement.

.2 Independent Inspection Agencies:

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

.2 Contractor shall provide inspections, tests and other quality control services, unless otherwise indicated as the responsibility of the Owner, specified in the Contract Documents and required by the authorities having jurisdiction. Employ and pay for a qualified independent inspection/testing agency to perform quality control services. Costs for these services are to be included in the Contract Sum.

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

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

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

.3 Access to Work:

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

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

.4 Procedures:

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

.2 Submit samples 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.

.5 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 Consultant 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 Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner 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 Consultant.

.6 Reports:

.1 Submit electronic copies of inspection and test reports to Consultant.

.2 Provide copies to subcontractor of work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

.7 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 Consultant and may be authorized as recoverable.

.8 Mill Tests:

.1 Submit mill test certificates as requested or required of specification Sections.

.9 Equipment and Systems:

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

.2 Submit integrated systems testing reports and verification letter to confirm integrated systems testing for fire protection and life safety systems has been successfully completed in accordance with CAN/ULC-S1001.

1.12 TEMPORARY UTILITIES

.1 References:

.1 U.S. Environmental Protection Agency (EPA) / Office of Water

.1 2003 U.S. EPA Construction General Permit.

.2 Installation and Removal:

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

.2 Remove from site all such work after use.

.3 Water Supply:

.1 Owner will allow use of existing water supply at no cost to the Contractor for renovation Projects.

.4 Temporary Heating and Ventilation:

.1 Owner will allow use of existing heating system for temporary heating required for the project at no cost to the Contractor.

.2 Provide temporary facilities for heating supply such as ducts, diffusers, copper pipe, valves and fans to approval of the Owner.

.3 Be responsible for properly maintaining the temporary heating system and replace any worn out or broken items.

.4 On completion of Work for which permanent heating system is used, replace filters and replace bearing. Thoroughly clean permanent equipment used during construction.

.5 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

.6 Ventilating:

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

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

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

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

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

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

.5 Temporary Power and Light:

.1 Owner will supply power at no cost to the Contractor for renovation Projects to a maximum supply of 230 volts 30 amps. Contractor shall pay for all changes and supply all materials required by use of existing system.

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

.3 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

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

.6 Temporary Communication Facilities:

.1 Provide and pay for temporary telephone, fax, and data hook up lines and equipment as required.

.7 Fire Protection:

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

1.13 CONSTRUCTION FACILITIES

.1 Installation and Removal:

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Indicate use of supplemental or other staging area.

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

.4 Remove from site all such work after use.

.2 Elevators:

.1 Designated existing freight elevators may be used by construction personnel for transporting materials. Co-ordinate use with Owner.

.2 Provide protective coverings for finish surfaces of cars and entrances.

.3 Minimize number of trips required during Work and coordinate with Owner regarding timing of usage.

.3 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.

.4 Construction Parking:

.1 Parking will not be permitted on site.

.5 Offices:

.1 The area of Work is available for project administrative use, to accommodate site meetings and shall be furnished with drawing laydown table.

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

.6 Equipment, Tool and Materials Storage:

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

.2 Locate in area of Work in manner to cause least interference with work activities.

.7 Sanitary Facilities:

.1 Consultant will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.

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

.8 Construction Signage:

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

.9 Clean-up:

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

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

1.14 TEMPORARY BARRIERS AND ENCLOSURES

.1 Installation and Removal:

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

.2 Remove from site all such work after use.

.2 Barriers:

.1 Erect hoarding as required within reasonable distance from scope of work to facilitate construction and to protect the public, workers and private property from injury or damage and subject to the approval of the authority having jurisdiction. Ensure hoarding does not interfere with other college activities. Hoarding shall protect areas including but not limited to:

.1 Provide protection around the convenience stair opening on second floor while the tempered glass is temporarily removed

.2 Provide hoarding outside the varsity lounge while leaving space for the use of convenience stair after construction work around the stair area is completed. Contractor shall coordinate with the GBC.

.3 Dust Tight Screens:

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

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

1.15 COMMON PRODUCT REQUIREMENTS

.1 References:

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2-2020, Stipulated Price Contract.

.2 Within text of each specifications Section, reference may be made to reference standards.

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

.4 If there is question as to whether products or systems are in conformance with applicable standards, Consultant reserves right to have such products or systems tested or to receive test data.

.5 Cost for such testing will be born by Owner in event of conformance with Contract Documents or by Contractor in event of non-conformance.

.2 Quality:

.1 Refer to CCDC 2.

.2 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.3 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

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

.5 Should disputes arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.

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

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

.3 Availability:

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

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

.4 Storage, Handling and Protection:

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

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

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

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

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

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

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

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

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

.5 Transportation:

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

.6 Manufacturer’s Instructions:

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

.2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions.

.7 Quality of Work:

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

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

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

.8 Coordination:

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

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

.9 Concealment:

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

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

.10 Remedial Work:

.1 Refer to CCDC 2 and Execution.

.2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

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

.11 Location of Fixtures:

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

.2 Inform Consultant of conflicting installation. Install as directed.

.12 Fastenings:

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.4 Keep exposed fastenings to a minimum, space evenly and install neatly.

.5 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

.13 Fastenings – Equipment:

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

.2 Use heavy hexagon heads, semi-finished unless otherwise specified.

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

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

.14 Protection of Work in Progress:

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

.15 Existing Utilities:

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

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

1.16 PRODUCT OPTIONS AND SUBSTITUTIONS

.1 Definitions:

.1 Acceptable Materials: The term Acceptable Materials is used to specify products by trade name, manufacturer, catalogue number, model number, or similar reference, and is used within the Project Manual as follows:

.1 Acceptable Materials listings are based on Consultant's determination that materials meet specified requirements and opinion of applicability to the project requirements.

.2 Acceptable Materials listings are deemed to establish the standard of acceptance that Consultant will consider appropriate for the Work.

.3 Any product listed in the Acceptable Materials listing may be used to establish the Bid Price.

.2 Basis-of-Design Materials: The term Basis-of-Design Materials is used to specify a specific material name, manufacturer, catalogue number, model number or similar reference and is used as follows:

.1 Basis-of-Design Materials are used to establish Consultant's preference for a single source product listing based on performance, appearance or configuration.

.2 Use the Basis-of-Design Material to establish the Bid Price, unless an Addendum is issued adding additional Acceptable Materials.

.3 Basis-of-Design Materials designation does not limit the Contractor's ability to submit Proposed Substitutions in accordance with Substitutions requirements of this Section and specific performance requirements listed in Technical Specification Sections.

.3 Non-proprietary specification means a specification which includes descriptive, reference standard or performance requirements, or any combination thereof, but does not include proprietary names of products or manufacturers.

.4 Substitution means a proposal from a Contractor to provide a product, material, or item of equipment not specified in the Contract documents but functionally equivalent and readily exchangeable to a specified item; for consideration by Consultant and Owner.

.2 Submittals:

.1 When requested by Consultant, submit complete data substantiating compliance of a product with requirements of Contract Documents. Include the following:

.1 Product identification, including manufacturer's name and address.

.2 Written verification that the substitute products can be obtained, meet the performance required for the project, and meet requirements of the current Building Code.

.3 Manufacturer's literature providing product description, applicable reference standards, and performance and test data.

.4 Samples, as applicable.

.5 Name and address of projects on which product has been used and date of each installation.

.6 For substitutions and requests for changes to accepted products, include in addition to the above, the following:

.1 Itemized comparison of substitution with named product(s). List significant variations.

.2 Designation of availability of maintenance services and sources of replacement materials.

.3 Product Options:

.1 For products specified by non-proprietary specification:

.1 Select any product, assembly or material that meets or exceeds the specified standards for products specified only by referenced standards and performance criteria.

.2 Acceptable Materials: Select any named product, assembly or material contained in the listing of Acceptable Materials.

.3 Basis-of-Design Materials: Use the named product contained in the Basis-of-Design Material listing, unless an addendum is issued indicating acceptance of additional Acceptable Materials.

.4 Substitutions:

.1 Contractor will assemble requests for substitutions requested by subcontractors and submit to Consultant for review.

.2 Consultant will review proposed substitute products for acceptability only when submitted by Contractor; Consultant will not review requests submitted independently by subcontractors.

.3 No substitutions will be permitted without Consultant's written acceptance; Contractor will be required to remove products and replace with specified materials or provide a credit to the value of the contract at Consultant's discretion where substitutions are found in the Work that have not been formally accepted by Consultant and Owner.

.4 Consultant is not obliged to accept any Proposed Substitution offered by Contractor, and reserves the right to dismiss any item with no further explanation.

.5 Substitute Products: Where substitute products are permitted, unnamed products may be accepted by Consultant, subject to the following:

.1 Substitute products shall be the same type as, be capable of performing the same functions as, and meet or exceed the standards of quality and performance of the named product(s). Substitutions shall not require revisions to Contract Documents nor to work of Other Contractors.

.6 Substitute Manufacturers: Where substitute manufacturers are permitted, unnamed manufacturers may be accepted by Consultant, subject to the following:

.1 Substitute manufacturers shall have capabilities comparable to those of the named manufacturer(s). Substitutions shall not require revisions to Contract Documents nor to work of Other Contractors.

.7 In making a proposal for substitution the Contractor represents:

.1 That they have personally investigated the proposal and (unless the proposal explicitly states otherwise) determined that it performs in a similar way or is superior to the product or method specified.

.2 That the same guaranty will be furnished as for the originally specified product or construction method.

.3 That they will coordinate installation of the accepted substitute into the Work, making such changes in the Work as may be required to accommodate the change.

.4 That they will bear costs and waives claims for additional compensation for costs and time that subsequently become apparent arising out of the substitution.

1.17 EXECUTION

.1 Submittals:

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

.1 Structural integrity of elements of project.

.2 Integrity of weather-exposed or moisture-resistant elements.

.3 Efficiency, maintenance, or safety of operational elements.

.4 Visual qualities of sight-exposed elements.

.5 Work of Owner or separate contractor.

.6 Tenants of occupied portions of building.

.2 Include in request:

.1 Identification of project.

.2 Location and description of affected Work.

.3 Statement on necessity for cutting or alteration.

.4 Description of proposed Work, and products to be used.

.5 Alternatives to cutting and patching.

.6 Effect on Work of Owner or separate contractor or tenants.

.7 Written permission of affected separate contractor.

.8 Date and time work will be executed.

.2 Materials:

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with PRODUCT OPTIONS AND SUBSTITUTIONS.

.3 Preparation:

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

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

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

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

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

.4 Execution:

.1 Execute cutting, fitting, and patching, to complete Work.

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

.3 Uncover Work to install ill-timed Work.

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

.5 Remove samples of installed Work for testing.

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

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

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

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

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

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

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

.13 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

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

1.18 CLEANING

.1 References:

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2 - 2020, Stipulated Price Contract.

.2 Project Cleanliness:

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

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Consultant. 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 Provide and use marked separate bins for recycling. Refer to WASTE MANAGEMENT AND DISPOSAL.

.6 Dispose of waste materials and debris off site.

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

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

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

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

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

.3 Final Cleaning:

.1 Clean work prior to final review by Consultant.

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

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

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

.5 Remove waste products and debris including that caused by Owner or other Contractors.

.6 Remove waste materials from site in accordance with WASTE MANAGEMENT AND DISPOSAL.

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

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

.9 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and horizontal hard surfaces.

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

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

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

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

.14 Clean equipment and fixtures to sanitary condition.

.15 Clean mechanical equipment including replacement of filters.

.16 Remove debris and surplus materials from accessible concealed spaces.

1.19 WASTE MANAGEMENT AND DISPOSAL

.1 Waste Management Goals:

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

.2 Waste Management Goal is to divert construction and demolition materials considered recyclable from landfill sites.

.3 Accomplish maximum control of solid construction and demolition waste.

.4 Preserve environment and prevent pollution and environment damage.

.2 Definitions:

.1 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

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

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

.4 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.

.5 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from re-modelling 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.

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

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

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

.3 Materials Source Separation Program (MSSP):

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Consultant.

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate or combined condition.

.1 Transport to approved and authorized recycling facility.

.2 Ship materials to site operating under Certificate of Approval.

.3 Materials must be immediately separated into required categories for reuse or recycling.

.4 Storage, Handling and Protection:

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

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

.3 Protect, stockpile, store and catalogue salvaged items.

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

.5 Protect structural components not removed for demolition from movement or damage.

.6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Consultant.

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

.8 Separate and store materials produced during dismantling of structures in designated areas.

.9 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.

.5 Disposal of Waste:

.1 Do not bury rubbish or waste materials.

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

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

.4 Keep records of construction waste including:

.1 Number and size of bins.

.2 Waste type of each bin.

.3 Reused or recycled waste destination.

.5 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

1.20 STARTING AND ADJUSTING

.1 A facility start-up process shall be used to bring the facility to a fully operational state, free of deficiencies, in the most efficient and timely manner achievable.

.2 Contractor shall be responsible for testing, adjusting and balancing of all:

.1 Piped, ducted, wired and wireless services and systems, including all components and equipment forming part thereof, and

.2 Manually and mechanically operated systems including all components and equipment forming part thereof.

.3 Perform starting of each system and each item of equipment in accordance with the general requirements specified in this section and is specific to facility start-up and commissioning of the facility.

.4 This section specifies additional requirements to those required for normal Contractor's start-up of equipment and systems as contained in the General Requirements of the Contract, and as follows:

.1 Perform and record tests to confirm proper performance and compliance with requirements of Contract Documents; take corrective action as necessary.

.2 Perform adjustments to ensure proper, efficient and safe operation.

.3 Perform balancing to ensure that the various parts of system are in a proper state of equilibrium.

.5 Performance Testing will begin two weeks prior to declaration of Substantial Performance as described in CLOSEOUT PROCEDURES and will lead to Fine Tuning of equipment and systems.

.6 Fine Tuning will occur prior to declaration of Substantial Performance as described in CLOSEOUT PROCEDURES and will lead to Final Acceptance of the Work.

.7 Quality Assurance

.1 Contractor shall perform testing, adjusting and balancing with Contractor's qualified personnel, or employ and pay for a qualified organization to perform such services.

.2 Perform testing, adjusting and balancing after starting of equipment and systems.

.3 Provide personnel, operate systems at designated times, and under conditions required for proper testing, adjusting, and balancing.

.4 Report to Consultant any deficiencies or defects noted during testing, adjusting and balancing, which cannot be promptly corrected.

.8 Manufacturer's Site Services

.1 Provide manufacturers authorized representative when specified, or when requested by the Owner at site to do the following:

.1 Inspect, check and approve equipment and systems installation before starting.

.2 Supervise placing equipment and systems in operation.

.2 Manufacturers' authorized representative shall provide a written report verifying that equipment:

.1 Is properly installed and lubricated;

.2 Is in accurate alignment;

.3 Is free from any undue stress imposed by connecting lines or anchor bolts; and,

.4 Is being satisfactorily operated under load conditions.

.9 Preparation

.1 Have Contract Documents, shop drawings, product data, and operation and maintenance data at hand during starting process.

.2 Coordinate sequence for starting of various equipment and systems.

.3 Prepare each system and item of equipment for testing, adjusting and balancing.

.4 Verify that each systems and equipment installation is complete and in continuous operation.

.5 Verify ambient conditions.

.10 Field Quality Control

.1 Testing, Adjusting and Balancing

.1 Testing: Perform tests to confirm compliance with requirements of Contract Documents. Take corrective action as necessary.

.2 Adjusting: Perform adjustments to ensure proper, efficient and safe operation.

.3 Balancing: Perform balancing to ensure that the various parts of system are in a proper state of equilibrium.

.4 Provide testing, adjusting and balancing of all:

.1 Piped, ducted, wired and wireless services and systems, including all components and equipment forming part thereof as identified in technical sections, and

.2 Manually and mechanically operated systems including all components and equipment forming part thereof.

.3 Comply with the requirements of all CSA, ASTM, ASHRAE, IEEE and other standards affecting their portion of the work to ensure that systems installed will meet the Owner's testing criteria.

.5 Perform testing, adjusting and balancing after starting of equipment and systems.

.2 Fine Tuning

.1 Fine tuning shall include, but not be limited to, the following:

.1 Air Balancing: final balancing.

.2 Water Balancing: final balancing.

.3 Fire Protection Systems: Verification of fire alarm system and sprinkler system.

.4 Electrical Equipment and Systems: Testing of safety systems and devices.

.5 Other systems and equipment as identified in the technical sections.

.2 Fine tuning shall commence upon Owner's acceptance of Performance Testing results.

.3 Make necessary adjustments to comply with standards established by the Specifications ready for Owner's formalized verification and commissioning process.

.4 Contractor shall do the following during Fine Tuning:

.1 Correct all Contract Deficiencies previously outstanding and those identified during Fine Tuning.

.2 Execute Change Orders issued by Owner.

.3 Perform all other work and activities required for fulfillment of prerequisites to Final Acceptance of the Work as specified in CLOSEOUT PROCEDURES.

.5 Owner will do the following during Fine Tuning:

.1 Conduct user surveys and take environmental measurements as necessary to identify existing and potential problems.

.2 Initiate Change Orders as required.

.3 Perform other activities related to Final Acceptance of the Work as specified in CLOSEOUT PROCEDURES.

.11 Facility Start-Up

.1 Contractor shall do the following during Facility Start-Up, not necessarily in order listed:

.1 Start equipment and systems as specified below.

.2 Test, adjust and balance equipment and systems as specified below.

.3 Demonstrate equipment and systems as specified in DEMONSTRATION AND TRAINING.

.4 Complete and submit Facility Start-Up report forms including:

.1 Contractor's system and equipment start-up reports.

.2 Testing, adjusting and balancing reports.

.3 Manufacturers' equipment start-up reports.

.5 Review Contract Documents and inspect the Work to ensure completeness of the Work and compliance with requirements of Contract Documents.

.6 Correct Contract Deficiencies identified as a result of the foregoing and as may be identified by the Owner.

.7 Execute Change Orders issued by the Owner.

.8 Perform all other work and activities required for fulfillment of prerequisites to Substantial Performance of the Work as specified in CLOSEOUT PROCEDURES.

.12 Starting

.1 Verify that each item of equipment has been checked for proper lubrication; drive rotation, belt tension, control sequence, and other conditions affecting starting and operation; take corrective action as necessary.

.2 Execute starting under supervision of Contractor’s personnel and, when specified or requested by Owner, manufacturer's authorized representative.

.3 Place equipment and systems in operation in proper sequence and in accordance with approved Contractor’s Start-Up sub-schedule.

.4 Take corrective action as necessary.

.13 Partial Utilization of Work

.1 Applicable requirements specified in this Section shall apply to the parts of the Work being utilized when partial utilization of the Work is required.

1.21 CLOSEOUT PROCEDURES

.1 References:

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2 - 2020, Stipulated Price Contract.

.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 Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request Consultant's Field Review.

.3 Consultant's Field Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.2 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, and Utility companies have been submitted.

.5 Verification letter required to confirm integrated systems testing for fire protection and life safety systems has been successfully completed in accordance with CAN/ULC-S1001-11.

.6 Operation of systems have been demonstrated to Owner's personnel.

.7 Work is complete and ready for final inspection.

.3 Final Review: when items noted above are completed, request final review of Work by Owner, Consultant, and Contractor. If Work is deemed incomplete by Owner and Consultant complete outstanding items and request review.

.4 Declaration of Substantial Performance: when Owner and Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article for specifics to application.

.5 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.6 Final Payment: when Owner and Consultant consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2. If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request reinspection.

.7 Payment of Holdback: after issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with CCDC 2.

.3 Cleaning:

.1 In accordance with CLEANING.

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with WASTE MANAGEMENT AND DISPOSAL.

1.22 CLOSEOUT SUBMITTALS

.1 Submittals in accordance with SUBMITTAL PROCEDURES:

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

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

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

.4 Two weeks prior to Substantial Performance of the Work, submit to the Consultant, two final copies and one digital version of Operating and Maintenance manuals in English.

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

.6 Furnish evidence, if requested, for type, source and quality of products provided.

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

.8 Pay costs of transportation.

.9 Submit `redline` marked up construction drawings to the Consultant within 30 days of Substantial Performance and prior to final completion.

.10 Prepare fire safety plan in accordance with Fire Code and local fire bylaw unless specified otherwise by the Owner. Locate in Fire Safety Plan Box.

.2 Operations and Maintenance Manual Format:

.1 Organize data as instructional manual.

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

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

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

.5 Arrange content by systems, process flow, under Section numbers and sequence of Table of Contents.

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

.7 Text: manufacturer's printed data, or typewritten data.

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

.9 Provide 1:1 scaled CAD files in dwg format on CD.

.3 Contents – Each Volume:

.1 Table of Contents: provide title of project;

.1 Date of submission; names.

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

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

.2 For each product or system:

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

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

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

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

.6 Training: refer to DEMONSTRATION AND TRAINING.

.4 As-Built Drawings and Samples:

.1 Maintain, in addition to requirements in General Conditions, at site for Consultant one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

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

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

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

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

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

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

.5 Recording Actual Site Conditions:

.1 Record information on set of drawings, and in copy of Project Manual, provided by Consultant.

.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 depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

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

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: 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.

.6 Equipment and Systems:

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

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

.3 Include installed colour coded wiring diagrams.

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

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

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

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

.8 Include sequence of operation by controls manufacturer.

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

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractors co-ordination drawings, with installed colour coded piping diagrams.

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

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

.14 Include tests as specified in QUALITY CONTROL.

.15 Additional requirements: as specified in individual specification Sections.

.7 Materials and Finishes:

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

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

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

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

.8 Spare Parts:

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

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

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

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

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

.9 Maintenance Materials:

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

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

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

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

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

.10 Special Tools:

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

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

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

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

.11 Storage, Handling and Protection:

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

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

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

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

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

.12 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 Consultant approval.

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

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

.5 Submit, warranty information made available during construction phase, to Consultant 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 Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Consultant.

.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, pumps, motors, transformers.

.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 and 9 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 Consultant to proceed with action against Contractor.

.13 Pre-Warranty Conference:

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

.2 Consultant will establish communication procedures for:

.1 Notification of construction warranty defects.

.2 Determine priorities for type of defect.

.3 Determine reasonable time for response.

.3 Provide name, telephone number and address of licensed and bonded company that is authorized to initiate and pursue construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

.14 Warranty Tags:

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

.2 Attach tags with copper wire and spray with waterproof silicone coating.

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

.4 Indicate following information on tag:

.1 Type of product/material.

.2 Model number.

.3 Serial number.

.4 Contract number.

.5 Warranty period.

.6 Inspector's signature.

.7 Construction Contractor.

1.23 DEMONSTRATION AND TRAINING

.1 Description:

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

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

.2 Quality Control:

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

.3 Submittals in accordance with SUBMITTAL PROCEDURES:

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

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

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

.4 Conditions for Demonstrations:

.1 Testing, adjusting, and balancing has been performed in accordance with Mechanical and Electrical conditions of the Work and equipment and systems are fully operational.

.2 Provide copies of completed Operation and Maintenance manuals for use in demonstrations and instructions.

.5 Preparation:

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

.2 Verify that designated personnel are present.

.6 Demonstration and Instructions:

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the designated location.

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

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

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

.7 Time Allocated for Instructions:

.1 Ensure adequate amount of time required for instruction of each item of equipment or system.

END OF SECTION

.7 Time Allocated for Instructions:

.1 Ensure adequate amount of time required for instruction of each item of equipment or system.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Removal of existing construction necessary to permit installation or performance of other Work and fitting and repairing work required to restore surfaces to original conditions after installation of other Work.

.2 Related Requirements:

.1 Section 02 41 20 – Selective Interior Demolition

1.2 REFERENCES

.1 Definitions:

.1 Cutting: Removal of existing construction necessary to permit installation or performance of other Work.

.2 Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

.1 Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.

.2 Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.

.3 Products: List products to be used and firms or entities that will perform the Work.

.4 Dates: Indicate when cutting and patching will be performed.

.5 Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.

.6 Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure to the Consultant prior to making cuts or modifications.

.7 Consultant's Acceptance: Obtain acceptance of cutting and patching proposal before cutting and patching. Review and acceptance of cutting and patching proposal does not waive right to later require removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

.1 Structural Elements: Do not cut and patch structural elements in a manner that could change their load carrying capacity or load deflection ratio.

.2 Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as

intended or that results in increased maintenance or decreased operational life or safety, including but not limited to the following:

.1 Primary operational systems and equipment.

.2 Air or smoke barriers.

.3 Fire protection systems.

.4 Control systems.

.5 Communication systems.

.6 Electrical wiring systems.

.3 Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety, including but not limited to the following:

.1 Water, moisture, or vapour barriers.

.2 Membranes and flashings.

.3 Exterior curtain wall construction.

.4 Equipment supports.

.5 Piping, ductwork, vessels, and equipment.

.6 Noise and vibration control elements and systems.

.4 Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Consultant's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm, including but not limited to the following:

.1 Processed concrete finishes.

.2 Masonry.

.3 Ornamental metal.

.4 Firestopping and smokeseals.

.5 Finished flooring.

.6 Finished coatings.

.7 Wall covering.

.8 HVAC enclosures, cabinets, or covers.

.5 Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

.6 Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous as defined in the Hazardous Product Act be encountered, stop work, take preventative measures, and notify Consultant and Owner immediately.

1.5 WARRANTY

.1 Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

Part 2 Products

2.1 MATERIALS

.1 General: Comply with requirements specified in other Sections of these Specifications.

.2 Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible:

.1 If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

Part 3 Execution

3.1 EXAMINATION

.1 Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed and in accordance with Delegated Design Requirements:

.1 Provide X-ray or other approved methods to determine locations of existing services and reinforcing in existing concrete slabs and block walls before cutting and renovations. Advise Consultant of findings before proceeding with the Work and revise penetration locations as required and directed by Consultant. Existing concrete slab thickness is to be confirmed by Contractor.

.2 Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

.3 Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Temporary Support: Provide temporary support of Work to be cut.

.2 Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

.3 Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

.4 Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas.

3.3 PERFORMANCE

.1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay:

.1 Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

.2 Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations:

.1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

.2 Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

.3 Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond core drill.

.4 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

.5 Proceed with patching after construction operations requiring cutting are complete.

.3 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications:

.1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

.2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

.3 Floors and Walls: Where walls or partitions that are removed extend from one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, colour, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.

.4 Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

.5 Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even plane surface of uniform appearance.

.6 Maintain existing fire ratings as required.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes, but not limited to, the following:

.1 Demolition, removal completely from site, and disposal of all identified components, materials, equipment and debris.

.2 Selective demolition to allow new walls, bulkheads, ceilings and other materials to meet existing construction as indicated.

.3 Repair procedures for selective demolition operations.

.2 This Section does not include the following:

.1 Removal of hazardous materials or asbestos abatement.

.2 Demolition of exterior building components or structural elements.

.3 Mechanical or electrical equipment, except as required to make minor modifications to allow the work to be completed.

.3 Related Requirements:

.1 Section 09 65 00 – Resilient Flooring

.2 Section 09 68 00 – Carpeting

.3 Division 20 – Mechanical

.4 Division 26 – Electrical

1.2 REFERENCES

.1 Definitions:

.1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.

.2 Remove and Salvage: Detach items from existing construction and deliver them to Owner.

.3 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

.4 Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

.2 Reference Standards:

.1 American Society of Safety Professionals (ASSP):

.1 ASSP A10.8-2019, Scaffolding Safety Requirements.

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

.1 ASTM C475/C475M-17(2022), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.3 Department of Justice Canada (Jus):

.1 Motor Vehicle Safety Act (MVSA), 1993, c.16.

.2 Hazardous Products Act (R.S.C), 1985, c.H-3

.3 Hazardous Materials Information Review Act, 1985, c.24.

.4 Canadian Standards Association (CSA Group):

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

.5 National Fire Protection Association (NFPA):

.1 NFPA (Fire) 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2022 Edition.

.6 Provincial Legislation:

.1 Legislation specific to Authority Having Jurisdiction for work governed by this Section.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Demolition Meeting: Conduct a pre-demolition meeting at Project site in accordance with requirements listed in Section 01 11 00 – General Requirements, Project Meetings, to confirm extent of salvaged and demolished materials; and to review Contractor's demolition plan prepared by a professional engineer.

.2 Coordination:

.1 Coordinate selective demolition work so that work of this Section adheres to aesthetic criteria established by the Drawings and specified dimensions with all elements in planes as drawn, maintaining their relationships with all other building elements.

.2 Coordinate with Owner's building manager ongoing site operations, and limit the number of interruptions during regular business hours.

.3 Coordination with Owner's continuing occupancy of portions of existing building.

.4 Coordination for shutoff, capping, and continuation of utility services.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.2 Qualification Data: For firms and persons specified below to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses and other information specified.

.3 Prior to beginning of Work on site submit detailed Waste Reduction Workplan in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal and indicate:

.1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.

.2 Schedule of selective demolition.

.3 Number and location of dumpsters.

.4 Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Owner reserves the right to make modifications where proposed methods interfere with the Owner's ongoing operations.

.5 Inventory: Submit a list of items that have been removed and salvaged after selective demolition is complete.

.6 Pre-demolition Digital Photographs or Video: Submit photographs or video indicating existing conditions of adjoining construction and site improvements prior to starting Work. Include finish surfaces that may be misconstrued as damage caused by selective demolition operations.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements: Perform work as follows; use most restrictive requirements where differences occur between the municipal, provincial and federal jurisdictions:

.1 Provincial and Federal Requirements: Perform work in accordance with governing environmental notification requirements and regulations of the Authority Having Jurisdiction.

.2 Municipal Requirements: Perform hauling and disposal operations in accordance with regulations of Authority Having Jurisdiction.

.2 Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project:

.1 Conform to the Workplace Safety and Insurance Act and the Occupational Health and Safety Regulations under the Act.

.2 Conform to City of Toronto bylaws and regulations governing this type of work.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Except where otherwise specified, all materials indicated or specified to be permanently removed from the Place of the Work shall become Contractor's property. Maximize to the fullest extent possible, salvage, and recycling of such materials, consistent with proper economy and expeditious performance of the Work.

.2 To reduce the quantity of material otherwise destined for disposal at a landfill, the Contractor is encouraged to consider utilizing the services of businesses and non-profit organizations that specialize in salvage and recycling of used building materials, but does so at his own option and risk.

.3 A current listing of recyclers specializing in specific categories of materials may be obtained during normal office hours from:

Ministry of Environment
Public Information Centre
Phone: (416) 325-4000 or 1-800-565-4923
or by viewing
Ontario Environment Business Directory (OEBD)
Website: www.ontario.ca/page/ontario-environment-business-directory

.4 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.7 SITE CONDITIONS

.1 Visit and examine the site and note all characteristics and irregularities affecting the work of this Section.

.2 Owner will occupy portions of building immediately adjacent to selective demolition area:

.1 Conduct selective demolition so that Owner's operations will not be disrupted.

.2 Provide not less than 72 hours notice to Owner of activities that will affect Owner's operations.

.3 Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities:

.1 Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

.4 Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous as defined in the Hazardous Product Act be encountered, stop work, take preventative measures, and notify Consultant and Owner immediately.

Part 2 Products

2.1 TEMPORARY SUPPORT STRUCTURES

.1 Design temporary support structures required for demolition work and underpinning and other foundation supports necessary for the project using a qualified professional engineer registered or licensed in province of the Work.

2.2 DEBRIS

.1 Make all arrangements for transport and disposal of all demolished materials from the site.

2.3 EQUIPMENT

.1 Provide all equipment required for safe and proper demolition of the building.

2.4 REPAIR MATERIALS

.1 Use repair materials identical to existing materials:

.1 If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

.2 Use material whose installed performance equals or surpasses that of existing materials.

.3 Comply with material and installation requirements specified in individual Specification Sections.

.2 Floor Patching and Levelling Compounds: as indicated on Structural Drawings.

.3 Gypsum Board Patching Compounds: Joint compound to ASTM C475/C475M, bedding and finishing types thinned to provide skim coat consistency to patch and prepare existing gypsum board walls ready for new finishes.

.4 Hoarding and Dust Screens: Refer to Section 01 11 00 – General Requirements, Temporary Barriers and Enclosures for stud framing and gypsum board sheathing materials.

2.5 EXISTING MATERIALS

.1 Items to be retained for re-use in new construction include, but are not limited to the following:

.1 As indicated on Drawings.

.2 Confirm with Consultant any materials that appear to be in re-usable condition prior to disposal.

.3 Confirm with Consultant any materials scheduled for re-use that are not in re-usable condition prior to installation.

Part 3 Execution

3.1 EXAMINATION

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

.2 Locate and protect utilities. Verify that utilities have been disconnected and capped as required.

.3 Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

.4 Notify the Consultant where existing mechanical, electrical, or structural elements conflict with intended function or design:

.1 Investigate and measure the nature and extent of conflict and submit a written report to Consultant.

.2 Consultant will issue additional instructions or revise drawings as required to correct conflict.

.5 Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 PREPARATION

.1 Identify and mark all equipment and materials identified to be retained by Owner or to be re-used in subsequent construction. Separate and store items to be retained in an area away from area of demolition and protect from accidental disposal.

.2 Post warning signs on electrical lines and equipment that must remain energized to serve other areas during period of demolition.

.3 Confirm that all electrical and telephone service lines entering building are not disconnected.

.4 Do not disrupt active or energized utilities crossing the demolition site.

.5 Provide and maintain barricades, warning signs, protection for workmen and the public during the full extent of the Work. Read drawings carefully to ascertain extent of protection required.

.6 Mark all materials required to be re-used, store in a safe place until ready for re-installation.

.7 Adjust all junction boxes, receptacles and switch boxes flush with new wall construction where additional layers to existing construction are indicated.

.8 Protection of In-Place Conditions

.1 Take precautions to guard against damage to adjacent work. Be liable for any damage or injury caused.

.2 Cease operations and notify Consultant if safety or any adjacent work appears to be endangered. Do not resume operations until reviewed with Consultant.

.3 Ensure safe passage of building occupants around and through area of demolition.

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

.5 Protect building systems, services and equipment.

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

.7 Provide and maintain fire prevention equipment and alarms accessible during demolition.

.8 Do Work in accordance with Section 01 11 00 – General Requirements, Health and Safety Requirements.

.9 Utility Services

.1 Coordinate existing services indicated to remain and protect them against damage during selective demolition operations.

.2 Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.

.1 Arrange to shut off affected utilities with utility companies.

.2 If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.

.3 Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

.4 Cut off pipe or conduit to a minimum of 25 mm below slab, and remove concrete mound.

.3 Coordinate with mechanical and electrical sections for shutting off, disconnecting, removing, and sealing or capping utilities.

.4 Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 SELECTIVE DEMOLITION

.1 Demolish and dismantle work in a neat and orderly manner and in strict accordance with all regulations.

.2 At end of each day's work, leave Work in safe condition so that no part is in danger of toppling or falling.

.3 Demolish in a manner to minimize dusting and to prevent migration of dust.

.4 Selling or burning of materials on the site is not permitted.

.5 Fill all openings in gypsum board walls with gypsum board and steel framing to match existing, skim coat to make wall smooth and even.

.6 Demolish existing tile finishes. Remove setting bed or adhesive to the greatest extent possible using mechanical scrapping tools and as follows:

.1 Saw cut edge of tile for clean and even transition joint between existing tile to remain and new flooring materials.

.2 Lightly shot blast or grind floor to remove remnants of setting materials.

.3 Vacuum floor ready for application of skim coating.

.4 Repair all slab depressions and damage with cementitious patching compound. Skim coat floor with minimum 1 mm thick cementitious floor underlayment compatible with new flooring materials.

.7 Patch and repair all walls, floor and ceilings damaged during demolition with material matching adjacent walls, prepare ready for new finishes.

.8 Patch and repair all mechanical equipment and electrical fixtures damaged or exposed during demolition to match adjacent finished surfaces.

3.4 PATCHING AND REPAIRING

.1 Floors and Walls:

.1 Where walls or partitions that are demolished extend from one finished area into another, patch and repair floor and wall surfaces in the new space.

.2 Provide a level and smooth surface having uniform finish colour, texture, and appearance.

.3 Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.

.4 Patch with durable seams that are as invisible as possible.

.5 Provide materials and comply with installation requirements specified in other Sections of these Specifications.

.6 Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.

.7 When requested, test and inspect patched areas after completion to demonstrate integrity of installation.

.8 Maintain fire rating of existing and new construction.

.2 Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.5 CLEANING

.1 Promptly as the Work progresses, and on completion, clean up and remove from the site all rubbish and surplus material. Remove rubbish resulting from demolition work daily.

.2 Maintain access to exits clean and free of obstruction during removal of debris.

.3 Keep surrounding and adjoining roads, lanes, sidewalks, municipal rights-of-way clean and free of dirt, soil or debris that may be a hazard to vehicles or persons.

END OF SECTION

1.0 GENERAL

1.1 Documents

.1 This section, along with the drawings, forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

.2 Drawings include architectural, mechanical, and electrical drawings.

1.2 Description of Work Included

.1 Provide all labour, materials, equipment, access, cooperation, coordination, and services to allow the testing of structural steel, open web steel joists, structural steel deck, and welds to be carried out by a Testing Agency.

.2 The scope of the required quality assurance testing is described in this section to inform the Contractor of the type and scope of testing on the project and to allow the Contractor to make appropriate allowances.

.3 Testing required by the Contractor for the Contractor's own quality control will be paid for by the Contractor.

1.3 Reference Standards

.1 Testing of structural steel shall conform to the requirements of the following Building Code and Reference Standards unless otherwise required by this specification:

.1 Building Code

.1 Ontario Building Code - 2012 0 REG 88/19

.2 Reference Standards

.1 CSA S16 – Limit States Design of Steel Structures

.2 CSA W178.1 – Certification of Welding Inspection Organizations

.3 CSA W59 – Welded Steel Construction (Metal Arc Welding)

.4 CSA W47.1 – Certification of Companies for Fusion Welding of Steel Structures

.5 CSA G40.20 – General Requirements for Rolled or Welded Structural Quality Steel

.6 CSA G40.21 – Structural Quality Steel

.7 CSA S136 – North American Specification for the Design of Cold-Formed Steel Structural Members

.8 ASTM A6/A6M – Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling

.9 CSSBI 10M – Standard for Steel Roof Deck

.10 CSSBI 12M – Standard for Composite Steel Deck

.11 RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts

.12 SDI Manual of Steel Construction with Steel Deck

.13 ASTM A653/A653M – Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.2 The revision date of all referenced codes, standards, and guidelines shall be as indicated in the above referenced Building Code. Where no reference is made within the Building Code, the latest published edition shall be used.

.3 Where the Standard is referenced in this specification, it shall mean the documents specified in this clause and their referenced Standards.

.4 Where there are differences between the specifications and drawings and the codes, standards, or acts, the most stringent shall govern.

1.4 Definitions - For This Section

.1 “Owner”, “Contractor”, and “Consultant” as per the General Conditions and Definitions.

.2 “Structural Engineer” shall mean a representative of Read Jones Christoffersen Ltd.

.3 “Testing Agency” shall mean a third party testing and inspection agency.

.4 “Non-Destructive Testing” shall mean liquid penetrant (LP), magnetic particle (MP), ultrasonic (UT), or radiographic testing (RT) as determined appropriate by the Testing Agency.

.5 “Standard” and “Standards” shall mean the reference standards listed under “Reference Standards” in this section.

1.5 Appointment of Testing Agency

.1 A CSA-Approved Testing Agency (approved under W178.1 - Building Category) shall be appointed to test the structural steel and connections in accordance with Part 3.0

.2 Unless stated otherwise in Division 0 / Division 1 the Testing Agency shall be engaged by the Owner. **(** Engineer should discuss this with the Prime Consultant to ensure this is clearly indicated. The normal process on a design bid build would have the Testing Agency engaged by the Owner. This clause should remain even if indicated in the front end of the specifications.**

.3 The Contractor shall pay for testing which shall include but not be limited to:

.1 Testing of pre-approved connections not on the structural drawings and required by the Contractor for ease of fabrication, transportation, or erection.

.2 Any additional costs due to overtime, shift work, and holiday or weekend work required to meet the schedule.

.3 Costs for retesting or additional testing due to work having failed to meet the specified requirements.

.4 Non-destructive testing will be performed on samples of the work as outlined in Article 3.4 of the specification. Any repair and re-testing shall be done at the Contractor’s expense.

.5 Deficiencies in work will trigger required additional testing.

2.0 DUTIES

2.1 Responsibility of the Contractor

.1 The Contractor shall cooperate fully with the Testing Agency. Allow free access to all parts of the work for the purpose of testing and review at all times.

.2 Notify the Testing Agency and Structural Engineer when work is ready for review.

.3 Prior to commencement of work, provide a schedule of shop fabrication and erection to the Testing Agency and Structural Engineer. Changes in this schedule shall be communicated to these parties in a timely fashion.

.4 Provide a quantity takeoff of all the members in the project for use in determining the number of members required for testing. This takeoff should also indicate the divisions in which the members are to be fabricated to aid in shop inspection planning.

.5 Provide mill certificates in accordance with the Standard, properly correlated to the elements being fabricated.

.6 The contractor shall make available any non-destructive testing reports performed in the shop during fabrication.

.7 The contractor shall prep all areas requiring NDE to an acceptable level. Preparation shall include, but not be limited to:

.1 Ultrasonic Testing (UT) to 300 mm away from the weld by grinding off weld splatter and buffing the area with a wire wheel.

.2 Provision of all necessary access platforms or scaffolding to allow for inspections to be carried out.

.8 The Contractor is solely responsible to provide a finished product that meets the specifications and contract documents. Testing is not carried out for the Contractor's benefit, nor does it make the Structural Engineer or Testing Agency guarantors of the Contractor's work.

2.2 Responsibility and Duties of the Testing Agency

.1 The Testing Agency has the authority to, and is expected to, reject any work not meeting the specifications.

.2 Identify the number, type, and locations of members, connections, studs, etc. to be tested and coordinate required shop and site visits.

.3 Review the structural drawings and specifications prior to carrying out the work.

.4 Provide testing as per the Standards and as per this specification.

.5 Provide timely test reports to the Structural Engineer, Consultant, and Contractor.

3.0 TESTING AND INSPECTION

3.1 General

.1 The Structural Engineer may reject at any time during the progress of the work a piece of material or any member which the Structural Engineer may find defective or not in accordance with the detailed drawings. This material may be rejected notwithstanding any previous acceptance, and components so rejected shall be replaced at no expense to the Owner. In case of dispute, the decision of the Structural Engineer shall be final.

.2 If initial tests indicate that the work failed to meet specification, the Structural Engineer shall decide if any additional testing is necessary. This testing shall be done by the Owner's agency. The proposed additional testing shall have prior approval of the Structural Engineer.

.3 Non-destructive testing operators shall have a Level II qualification as a minimum.

3.2 Documents and Materials

.1 Confirm that the fabricator and erector are certified to CSA-W47.1 and that all welders are properly qualified.

.2 Review mill certificates for all types of material used in the project ensure they meet the requirements of 05 12 00 and forward to the Structural Engineer.

.3 Review approved shop welding procedures.

.4 Confirm welding consumables provided will meet the levels of strength, notch toughness and quality of the base member and that they are properly stored in shop and field.

.5 Review bolt storage, handling, and installation procedures including pre-installation verification testing as required depending on the types of bolts or washers to be used.

.1 Tension Control (TC) Bolts

.1 Pre-installation verification must be carried out in accordance with CSA S16 to ensure that the bolts will function as intended.

.2 Direct Tension Indicator (DTI) Washers

.1 Review fabricator installation procedures.

.2 General review for damage to washers prior to installation.

.6 Review all available non-destructive testing reports performed by the contractor.

.7 Where more than one type of paint is specified, ensure that the colour of each coat of paint differs so that they can be visually identified after applications.

.8 Obtain invoices and product data from the steel supplier for the purchase of the specified primers and paints required for the project. Circulate these documents to both the Structural and Architectural consultants.

3.3 Visual Testing (VT) of Members and Connections (Welded or Bolted)

Perform visual testing of the structural components, framing and connections through a combination of shop and field visits to meet the requirements below.

Structural Framing	Total Project Minimum Sampling
Columns & Base Plates	15%
Bracing	15%
Beams & Joists (Infill members supporting roof / floor)	10%
Girders (Supporting Infill Members)	30%
Trusses & Joist Girders	50%
Moment Connections (By Member Weight)	50%
Splices	100%
Section Reinforcement, hangers & Stiffeners	30%

.1 The Visual Testing (VT) requirements above shall include but not be limited to verifying:

.1 Grade markings on structural steel in fabricator's plant prior to fabrication.

.2 Dimensions, including cross-section, in relation to the specified members (in-house plant QC may be relied upon to perform this task assuming the testing agency is satisfied with the level of QC being carried out).

.3 Locations of all holes, cuts, fittings, and milling of member ends.

.4 Tolerances of joint preparation and fit up (bevel angle, etc.) to be in accordance with CSA S16.1, clause 28.5 Joints in Contact Bearing.

.5 Preheat and interpass temperatures based on the approved welding procedures.

.6 Snug tight bolted connections are properly compacted and brought to the snug tight condition progressing outward from the most rigid part.

.7 Specified beam and / or truss camber and that the cambering procedure does not reduce the member capacity.

.8 Erection tolerances meet the tolerances of CSA S16.

.9 Joist and truss erection tolerances meet CSA S16 requirements, and report twisting, sweeping, and local damage.

.10 Adequate joist bearing on supporting structure as detailed in the drawings.

.11 All truss permanent top and bottom chord bridging and end connections are complete.

.12 The number of headed studs per beam and that stud placement is properly offset towards the closest beam support within composite deck flutes as per the typical details.

.13 All steel surface preparation prior to priming and / or painting is in conformance with the requirements of the Structural and Architectural specifications.

.14 All steel that is exposed or in unconditioned spaces, such as canopies, parapet walls, steel lintels, shelf angles, etc., are galvanized and or painted in accordance with the contract documents.

.2 Any defects noted during the Visual Testing (VT) work shall be reviewed using appropriate comprehensive Non-Destructive Evaluation (NDE), which shall be in addition to the requirements in clause 3.4.

3.4 Comprehensive NDE Testing of Connections (Welded or Bolted)

.1 Perform testing of the connections through a combination of shop and field visits to meet the sampling required in Tables 1 and 2.

.2 The requirements of Table 1 and 2 shall include but not be limited to verifying:

.1 At least one type of unique connection shall be tested irrespective of the sampling requirements.

.2 Bolt types conform to the drawings and specifications prior to start of bolting operations and that any pre-installation verification has been completed.

.3 All bolted connections shall be tested in accordance with CSA S16 with a minimum of two bolts tested for each pre-tensioned connection.

.4 For all bolted connections that are indicated as pre-tensioned or slip critical, pre-installation verification testing is performed by the inspector in cooperation with the Contractor.

.5 For bolted connections indicated as pre-tensioned or slip critical, the Testing Agency shall be present during installation with sufficient frequency to ensure that the pre-tensioning methods of RCSC 8.2.1, 8.2.3, or 8.2.4, as appropriate, are performed.

.6 All welded connections shall be tested in accordance with Annex P of CSA S16 clause 9.5 with an inspection class of IC2 (Medium).

.7 When the overall length of a weld is less than 900 mm, the entire length shall be tested.

.8 Splices not shown on the structural drawings shall be 100% ultrasonically tested (UT) at the Contractor’s expense.

.3 Post-installation review of bolts using the following techniques:

.1 Conventional bolts

.1 Turn of the nut method marked on the washer and bolt head or calibrated torque wrench.

.2 Tension Control (TC) Bolts

.1 Post-installation should be carried out to ensure that the bolt tip is sheared off at the tension control point.

.3 Direct Tension Indicator (DTI) Washers

.1 A post-installation review shall be carried out to ensure even bearing of the connection and no obstructions are present that would cause uneven pressure to be applied to the DTI.

Table 1: Single Piece Members

Structural Framing	Minimum Total % Connection Testing
Columns & Base Plates	10%
Bracing	10%
Beams & Joists	7.5%
Girders	10%
Moment Connections	10%
Splices	100%
Section Reinforcement & Stiffeners	25%
Seismic Systems	100%

Table 2: Multi-Piece Members

Structural Framing	Minimum Total % Connection Testing
Trusses & Joist Girders	15%
Field Reinforcing Work	30%

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes:

- .1 Rooftop equipment bases and support curbs.
- .2 Wood blocking, cants, wall backing, and nailers.
- .3 Wood furring and grounds.
- .4 Sheathing.
- .5 Subflooring and underlayment.
- .6 Plywood backing panels.
- .7 Fiberboard sheet flooring.
- .8 Composite Decking

.2 Related Requirements:

- .1 Section 06 40 00 – Architectural Woodwork
- .2 Section 07 92 00 – Sealants

1.2 REFERENCES

.1 Reference Standards:

- .1 American Society of Mechanical Engineers (ASME):
  - .1 ASME B18.2.1-2012 (R2021), Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series), Includes Errata (2013).
  - .2 ASME B18.6.1-1981 (R2016), Wood Screws (Inch Series).
- .2 American Society for Testing and Materials International (ASTM):
  - .1 ASTM A153/A153M-16a, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - .2 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
  - .3 ASTM A563/A563M-21 ae1, Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric).
  - .4 ASTM A653/A653M-22, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.
  - .5 ASTM C954-22, Standard 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.
  - .6 ASTM D1761-20, Standard Test Methods for Mechanical Fasteners in Wood.
  - .7 ASTM D5456-21e1, Standard Specification for Evaluation of Structural Composite Lumber Products.

.8 ASTM E1333-22, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.

.9 ASTM F1667/F1667M-21a, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

.3 American Wood Preservers Association (AWPA):

.1 AWPA Book of Standards, 2022.

.2 AWPA M2 Standard for the Care of Preservative-Treated Wood Products

.4 California Air Resources Board (CARB):

.1 Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products (2007).

.5 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-11.3-M87, Hardboard. (Withdrawn)

.2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type. (Withdrawn)

.3 CAN-CGSB 71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems. (Withdrawn)

.6 Canadian Hardwood Plywood and Veneer Association (CHPVA)

.7 Canadian Standards Association (CSA Group):

.1 CSA A123.2-03 (R2018), Asphalt-Coated Roofing Sheets, Includes Update No. 1 (2006)

.2 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.3 CSA-G164-18, Hot Dip Galvanizing of Irregularly Shaped Articles, Includes Update No 1 (2020).

.4 CAN/CSA O80 Series:21 – Wood Preservation, Includes Administrative Update (2022) and Errata (2022).

.5 CSA O112 Series-M1977 (R2006), CSA Standards for Wood Adhesives (Withdrawn).

.6 CSA O121-17 (R2022), Douglas Fir Plywood.

.7 CSA O141-05 (R2019), Softwood Lumber.

.8 CSA O151-17 (R2022), Canadian Softwood Plywood.

.9 CSA O153:19, Poplar Plywood.

.10 CSA-O325:21, Construction Sheathing (Adopted NIST PS 2-18, with Canadian deviations). Includes Administrative Update (2021).

.11 CSA O437 Series-93(R2011), Standards on OSB and Waferboard (Withdrawn).

.12 CSA T530-99, Commercial Building Standard for Telecommunications Pathways and Spaces. (Adopted ANSI/TIA/EIA-569-A)

.8 National Lumber Grades Authority (NLGA):

.1 NLGA SPS 2-2019, Special Products Standards on Machine Graded Lumber.

.2 Standard Grading Rules for Canadian Lumber 2017.

.9 South Coast Air Quality Management District (SCAQMD):

.1 SCAQMD Rule 1113-16, Architectural Coatings.

.2 SCAQMD Rule 1168-22, Adhesive and Sealant Applications.

.10 Underwriters' Laboratories of Canada (ULC):

.1 ULC 102.2-18, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies. (ULC S102.2)

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures:

.1 Submit manufacturer’s printed product literature, specifications and data sheets.

.2 Submit SDS sheets or official manufacturer literature stating no urea-formaldehyde was used in the manufacturing of composite wood.

.2 Product Data:

.1 Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

.3 Material Certificates:

.1 For dimensional lumber specified to comply with minimum allowable unit stresses, indicate species, grade, and design values for each use.

.2 For exposed items, omit grade stamp and provide certificates as to species, grade, stress grade, seasoning, moisture content, and other evidence as required to show compliance with the specifications.

1.4 QUALITY ASSURANCE

.1 Lumber shall be graded and stamped by an agency certified by Canadian Lumber Standards Accreditation Board.

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

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver wood products bundled or crated to provide adequate protection during transit. Inspect wood products for damage upon delivery and remove and replace damaged materials.

.2 Store materials a minimum of 150 mm off the ground on blocking. Keep materials under cover and dry. Provide for air circulation within and around stacks and under temporary coverings.

.3 Protect sheet materials to prevent breaking of corners and damage to surfaces.

.4 Packaging Waste Management

.1 Separate waste materials for reuse and recycling in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

Part 2 Products

2.1 MISCELLANEOUS LUMBER

.1 Provide lumber for support or attachment of other construction, including furring, strapping, blocking, nailing strips, ground, rough bucks, cants, curbs, fascia, backing sleepers, and similar members.

.2 Select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work for blocking and nailers.

.3 Fabricate miscellaneous lumber from dimension lumber of sizes indicated, and into shapes shown on drawings.

.4 Moisture Content: 19% maximum for lumber items not specified to receive wood preservative treatment.

.5 Grade: for dimension lumber sizes provide No. 2 or Standard grade lumber per NLGA. For board-sized lumber, provide sheathing grade, S2S.

.6 Kiln dry lumber materials to 8% moisture content or less.

2.2 WOOD PRESERVATIVE

.1 Where lumber or plywood is indicated as preservative treated or is specified to be treated, treated in accordance with CAN/CSA O80.9M and AWPA.

.2 Wood preservatives containing arsenic or chromium are not permitted.

.3 Pressure treat above ground items with waterborne preservatives to minimum retention of 4.0 kg/m^3. After treatment, kiln-dry lumber and plywood to maximum moisture content of 19% and 15% respectively. Treat indicated items and the following:

.1 Wood cants, nailing strips, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapour barriers, and waterproofing.

.2 Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry and concrete.

.3 Wood framing members less than 460 mm above grade.

.4 Wood floor plates installed over concrete slabs directly in contact with earth.

.4 Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to minimum of 6.4kg/m^3

.5 Fire-Retardant Treatment: to CAN/CSA O80.9M, CAN/CSA O80.20M and CAN/CSA O80.27M, pressure impregnated, and as follows:

.1 Flame Spread Classification: FSC 25 maximum.

.2 Smoke developed of not more than: 75.

.6 Complete fabrication of treated items before treatment where possible. If cut after treatment apply field treatment to cut surfaces.

.7 Wood Preservatives: Maximum allowable VOC limit 350 g/L in accordance with SCAQMD Rule #1113 - Architectural Coatings.

2.3 FASTENERS

.1 Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture. Where rough carpentry is exposed to weather (during or after construction), in ground contact, pressure preservative treated, or in area of high relative humidity, provide fasteners with hot dip zinc coating complying with ASTM A153 or of Type 304 stainless steel.

.2 Nails, Spikes, and Staples: ASTM F1667.

.3 Power Driven Fasteners: Fasteners with a CCMC or ICC-ES evaluation report acceptable to authorities having jurisdiction.

.4 Through Bolts and Anchor Bolts: ASTM A307, Grade A; with ASTM A563 hex nuts and where indicated flat washers, hot dip galvanized to ASTM A153.

.5 Wood Screws: ASME B18.6.1 or as specified on Drawings.

.6 Lag Screws: ASME B18.2.1

.1 All lag screws to be machined threaded, not cast threaded.

.2 Pre-drilled hole sized in wood members for lag screws to be in accordance with CSA O86.

.3 Lag screws are acceptable only where specifically indicated on the Drawings. Do not substitute lag screws for self-tapping wood screws.

2.4 FASTENER FINISHES

.1 Galvanizing: to CSA-G164, use galvanized fasteners for pressure-preservative, and fire-retardant treated lumber.

2.5 ACCESSORIES

.1 Sealants: in accordance with Section 07 92 00 – Sealants.

.1 Maximum allowable VOC limit 250 g/L in accordance with SCAQMD Rule 1168.

.2 General purpose adhesive: to CSA O112 Series.

.1 Maximum allowable VOC limit 70 g/L in accordance with SCAQMD Rule 1168.

.3 Nails, spikes and staples: to CSA B111, hot dipped galvanized for exterior work and pressure preservative and fire retardant treated materials.

.4 Surface Applied Wood Preservative:

.1 Containing minimum 19.6% Disodium octaborate tetrahydrate and 1.0% dodecyl dimethyl ammonium chloride in propylene glycol and water in accordance with CAN/CSA-O80.

.2 Apply minimum of two coats applied in accordance with manufacturers written instructions.

.3 Basis-of-Design Materials:

.1 Boracol 20-2BD, Sasco Products Ltd.

.5 Insulating strip: rubberized, moisture resistant, 3 mm thick cork or closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.

.6 Rough Hardware (bolts, nuts, washers, etc.): Hot dip galvanized in conformity to CSA G164 or Grade A low carbon steel, conforming to ASTM A307.

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

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

Part 3 Execution

3.1 INSTALLATION

.1 Comply with requirements of Building Code supplemented by following paragraphs.

.2 Install members true to line, levels and elevations, square and plumb.

.3 Construct continuous members from pieces of longest practical length.

.4 Do not splice structural members between supports unless noted otherwise.

.5 Install spanning members with "crown-edge" up.

.6 Install blocking, plates and backing for all components mounted on gypsum board walls, ceilings, and bulkheads requiring support.

.1 Components include, but not limited to: architectural woodworking components, door frames and hardware, displays, white boards and tack boards, manufactured specialties, mechanical and electrical devices, and items indicated as N.I.C. and requiring support.

.2 Center supporting members on fastening line of supported component.

.3 Supporting members to extend one stud spacing to each side of the supported component.

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

.8 Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

.9 Comply with AWPA M4 and revisions specified in CSA O80 Series, supplementary requirements to AWPA M2 for applying field treatment to cut surfaces of preservative-treated lumber.

3.2 ERECTION

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

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

.3 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section Includes:

.1 Shop manufactured architectural woodwork in accordance with Architectural Woodwork Standards (NAAWS).

.2 Cabinet hardware.

.2 Related Requirements:

.1 Section 06 10 00 – Rough Carpentry

.2 Section 07 92 00 – Sealants

.3 Section 09 21 16 – Gypsum Board Assemblies

.4 Section 09 65 00 – Resilient Flooring

.5 Section 09 91 00 – Painting

.6 Division 22 – Mechanical: Sinks in countertops

.7 Division 26 – Electrical

1.2 REFERENCES

.1 Reference Standards:

.1 American National Standards Institute (ANSI):

.1 ANSI A208.1-2009, Particleboard.

.2 ANSI A208.2-2009, Medium Density Fiberboard (MDF) for Interior Applications.

.3 ANSI/NEMA LD 3-2005, High-Pressure Decorative Laminates. (HPDL).

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

.1 ASTM A666-15, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

.2 ASTM C615/C615M-18e1, Standard Specification for Granite Dimension Stone.

.3 ASTM D1037-12(2020), Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.

.4 ASTM D2555–17a, Standard Practice for Establishing Clear Wood Strength Values.

.5 ASTM D2832-92(2016), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.

.6 ASTM D3574-17, Standard Test Methods for Flexible Cellular Materials-Slab, Bonded, and Molded Urethane Foams.

.7 ASTM D4300-01(2021)e1, Standard Test Methods for Ability of Adhesive Films to Support or Resist the Growth of Fungi.

.8 ASTM D5116-17, Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.

.9 ASTM D5672/D5673M-22, Standard Test Method for Testing Flexible Cellular Materials Measurement of Indentation Force Deflection Using a 25-mm (1-in.) Deflection Technique.

.10 ASTM E1333-22, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.

.3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI):

.1 North American Architectural Woodwork Standards (NAAWS), Most Recent Edition.

.4 California Air Resources Board (CARB):

.1 Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products (2007).

.5 Canadian Hardwood Plywood and Veneer Association (CHPVA)

.6 Canadian Standards Association (CSA Group):

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.2 CAN/CSA O80 Series:21 – Wood Preservation, Includes Administrative Update (2022) and Errata (2022).

.3 CSA O112.9:21, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure), Includes Administrative Update (2022).

.4 CSA O112.10-08 (R2017), Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure), Includes Update No. 1 (2010), Update No. 2 (2010).

.5 CSA O121-17 (R2022), Douglas Fir Plywood.

.6 CSA O141-05 (R2019), Softwood Lumber.

.7 CSA O151-17 (R2022), Canadian Softwood Plywood.

.8 CSA O153:19, Poplar Plywood.

.7 International Organization for Standardization (ISO):

.1 ISO 14040:2006, Environmental Management-Life Cycle Assessment - Principles and Framework.

.2 ISO 14041:1998, Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.

.8 National Lumber Grades Authority (NLGA):

.1 Standard Grading Rules for Canadian Lumber 2017.

.9 South Coast Air Quality Management District (SCAQMD):

.1 SCAQMD Rule 1113-16, Architectural Coatings.

.2 SCAQMD Rule 1168-22, Adhesive and Sealant Applications.

.10 Underwriters Laboratories of Canada (ULC):

.1 ULC-102, Standard Method for Surface Burning Characteristics of Building Materials and Assemblies (ULC S102).

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit shop drawings in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Show location of each item, dimensioned plans and elevations, large scale details, attachment devices, and other components.

.2 Show details of construction, profiles, jointing, fastening and other related details.

.3 Provide seaming diagram for solid surface finishes.

.4 Show materials, thicknesses, finishes and hardware.

.5 Show locations and sizes of cut-outs and holes for plumbing fixtures and other items installed in architectural woodwork.

.2 Submit samples in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Submit two finished samples, 610 mm x 610 mm of each finish to be applied at the factory, to the Consultant for approval. Where materials are being matched, verify that specified materials match existing prior to submitting samples.

.2 Alternative cabinet hardware from that specified shall be submitted to the Consultant for approval.

.3 Reviewed samples shall become the standard for the work.

1.4 CLOSEOUT SUBMITTALS

.1 Project Record Sheet: Submit to the Consultant two copies of the project record sheet identifying the project title and address, Owner, Consultant, and Architectural Woodwork Subcontractor. Indicate materials and finishes used for architectural woodwork and whether shop finished, or site finished and by whom. Include type and source of all cabinet hardware and any special items used under architectural woodwork.

.2 Submit in accordance with Section 01 11 00 – General Requirements, Closeout Submittals.

1.5 QUALITY ASSURANCE

.1 Architectural Woodwork Standards (NAAWS) and Errata shall be used to establish the minimum level of quality for this project.

.2 Execute the work of this Section by a member of AWMAC with five years' experience in work of comparable complexity and scope.

.3 Any reference to Custom or Premium grade in this specification shall be as defined in the NAAWS.

.4 Any item not given a specific quality grade shall be Custom grade as defined in the NAAWS.

.5 A copy of the NAAWS shall be made readily available for reference purposes on the job site.

.6 References in this specification to part and item numbers mean those parts and items contained within the NAAWS.

.7 Perform the Work in accordance with the definition of 'Good Workmanship' as defined in the NAAWS.

.8 Remove and replace finish carpentry Work which does not conform to the NAAWS.

.9 Guarantee and Inspection Service (GIS)

.1 Architectural woodwork shall be manufactured and/or installed to the current AWMAC Architectural Woodwork Standards and shall be subject to an inspection at the factory and/or site by an appointed AWMAC Certified Inspector. Inspection costs shall be included in the tender price for this project. (Contact your local AWMAC Chapter for details of inspection costs). Shop drawings shall be submitted to the AWMAC Chapter office for review before work commences. Work that does not meet the AWMAC Architectural Woodwork Standards, as specified, shall be replaced, reworked and/or refinished by the architectural woodwork contractor, to the approval of AWMAC, at no additional cost to the owner.

.2 If the woodwork contractor is an AWMAC Manufacturer member in good standing, a two year AWMAC Guarantee Certificate will be issued. The AWMAC Guarantee shall cover replacing, reworking and/or refinishing deficient architectural woodwork due to faulty workmanship or defective materials supplied and/or installed by the woodwork contractor, which may appear during a two year period following the date of issuance.

.3 For more information about AWMAC and the GIS Program visit the AWMAC website at www.awmac.com and contact the Ontario AWMAC Chapter office.

.10 Materials and installation shall be in metric measurements.

.11 Mock-Up

.1 Provide mock-up in accordance with requirements of Section 01 11 00 – General Requirements, Quality Control.

.2 Construct mock-up for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution before fabricating and installing interior casework.

.3 Build full size mock-up on site using specified materials and hardware required for the completed work, and as follows:

.1 Place mock-up in location and size indicated.

.2 Notify Consultant seven days in advance of dates and times when mock-up will be fabricated and installed.

.3 Demonstrate the proposed range of aesthetic effects and workmanship; Consultant may request minor changes to finish, fabrication or hardware that does not affect Contract Price.

.4 Obtain Consultant’s acceptance of mock-up prior to starting interior casework fabrication.

.5 Maintain mock-up during construction in an undisturbed condition as a standard for judging the completed work.

.6 Mock-up may form a part of the completed work when accepted by the Consultant.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance with the NAAWS. Control the temperature and humidity in accordance with NAAWS recommendations, before, during, and after delivery, during storage, and during and after installation as required.

.2 Provide protective coverings of suitable material for plastic laminate items, taking special precautions to protect corners.

.3 Do not permit delivery of millwork to the site until the area is sufficiently dry so that woodwork shall not be damaged by excessive changes in ambient humidity.

.4 Packaging Waste Management

.1 Separate waste materials for recycling in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.7 SITE CONDITIONS

.1 Comply with the NAAWS requirements for care and storage for optimum temperature and humidity conditions. Maintain a minimum 430 lx (40 f.c.) illumination on surfaces and areas where work is being installed.

.2 Where work is indicated to be fitted to other construction, check dimensions of other construction by field measurement before fabrication; show recorded field measurements on final Shop Drawings. Coordinate fabrication schedule with construction schedule and progress to avoid delay of Work.

.3 Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication without field measurements. Coordinate other construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.8 WARRANTY

.1 Provide manufacturer's standard ten year warranty for solid surfacing against defects in materials and workmanship; including material and labour to repair or replace defective materials.

.2 Provide two year AWMAC GIS Guarantee or Maintenance Bond.

Part 2 Products

2.1 MATERIALS

.1 Basis-of-Design Materials: Materials and colours listed below form the Basis-of-Design materials for this project.

.2 Materials other than named products Basis-of-Design materials may be acceptable to the Consultant; submit information in accordance with Section 01 11 00 – General Requirements, Product Options and Substitutions no later than seven days prior to bid closing date and as follows:

.1 Proposed alternates shall match colour range, texture and performance characteristics of named products, and shall not require a change to colour board for Project.

.2 Proposed alternates found acceptable by Consultant will be listed in an Addendum.

.3 The Consultant is not obliged to accept any materials presented for their review and does not need to provide reasons for rejection of proposed alternates.

.3 Use clean stock only and comply with NAAWS for quality grades specified.

.4 Furring, Blocking, Shims, and Hanging Strips: Fire retardant treated softwood, Softwood or hardwood lumber, kiln dried to less than 8% moisture content.

.5 Panel Materials: Provide panel materials meeting requirements for moisture content and grades in accordance with NAAWS requirements and as specified below. Panel products must be manufactured with no added urea-formaldehyde.

.6 Douglas fir sheathing, Grade B-B; exposure durability rating shall be 'EXTERIOR', and the glue used shall be a fully waterproof structural adhesive

.7 European Multi-Ply Plywood: Grade B/BB, urea-formaldehyde free.

.8 Softwood Plywood: Meeting CSA O121 or CSA O151, cross-banded, sanded G2S, thickness as indicated.

.9 Poplar plywood: to CSA O153, utility interior moisture resistant type.

.10 Particleboard: to ANSI A208.1, Grade M-2 or better, minimum 720 kg/m3 density, clearly mark panels with grade mark in visible location; extruded particleboard having loose cores with voids will not be permitted; having no added urea formaldehyde.

.1 Acceptable Materials:

.1 Vesta Particleboard, Arauco.

.2 Purekor Platinum Particleboard, Panel Source International.

.3 Encore SDF Sustainable Particleboard, SierraPine Ltd.

.11 Lumber:

.1 Softwood: to CSA O141, kiln dried to maximum moisture content of 12%, dressed 4 sides.

.12 High Pressure Decorative Laminate (PL1): to ANSI/NEMA LD3; Grades and application in accordance with applicable NAAWS requirements and as follows:

.1 Constructed of multiple layers of phenolic resin-saturated kraft paper in combination with a layer of decorative melamine-saturated paper, all fused together under heat and pressure.

.2 Horizontal General Purpose Grade (HGS): thickness of 1.2 mm ±0.12 mm, used on the following:

.1 Horizontal surfaces, unless specified otherwise.

.3 Vertical General Purpose Grade (VGS): thickness of 0.7 mm ±0.10 mm, used on the following:

.1 Vertical surfaces, unless specified otherwise.

.2 Exposed portions of case bodies, including ends, divisions and bottoms.

.3 Exposed shelves.

.4 Casework Doors: exposed and semi-exposed surfaces.

.5 Drawer Faces: exposed and semi-exposed surfaces.

.4 Liner Grade (CLS): thickness of 0.5 mm ±0.10 mm, used on the following:

.1 Semi-exposed shelves.

.2 Interior portions of case bodies.

.3 All surfaces of drawer boxes.

.5 Laminate backer grade (BKL): thickness of 0.5 mm ±0.10 mm, used on the following:

.1 Concealed surface of casework backs.

.2 Concealed surfaces, unless specified otherwise.

.6 Colour Basis-of-Design: as indicated on Section 09 99 99 – Materials List.

.7 Acceptable Materials:

.1 Arborite.

.2 Formica.

.3 Lamin-Art.

.4 Nevamar.

.5 Pionite.

.6 Wilsonart.

.13 Low Pressure Decorative Laminate: to ANSI/NEMA LD3, in accordance with applicable NAAWS requirements, and as follows:

.1 Melamine impregnated papers thermally fused under pressure.

.2 Thickness: 0.5 mm minimum.

.3 Wear Resistance: 400 cycles minimum.

.4 Colours: as indicated on Drawings.

.14 Quartz Surface (QZ-1): Homogeneous mixture containing 93% pure 7% resin binders and pigments.

.1 Thickness: 20 mm

.2 Finish: polished

.3 Colour Basis-of-Design: as indicated on Section 09 99 99 – Materials List.

.4 Acceptable Materials:

.1 Caesarstone.

.2 Cambria

.3 Hanstone Quartz

.4 Silestone, Cosentino.

.5 Vicostone

.6 Zodiaq, DuPont.

.15 Edging:

.1 Edge type shall conform to NAAWS requirements.

.2 High Pressure Decorative Laminate Edging:

.3 All edges of door and drawer panels shall be finished the same as face and back (6 sides finished).

.16 Adhesive:

.1 Decorative laminate: polyvinyl acetate or aliphatic resin in accordance with manufacturer’s recommendation for curing under pressure for bonding to wood cores, water resistant type.

.2 Edge banding: Thermoplastic hot melt, synthetic resin suitable for applying thin veneer wood edge banding and film overlays.

.3 Quartz Mounting Adhesive: Provide structural grade ’50 year’ silicone or epoxy adhesive.

.1 Acceptable silicone manufactures:

.1 Dow Corning.

.2 GE Sealants.

.2 Acceptable epoxy manufactures:

.1 Akemi North America.

.2 Bonstone Material Corporation.

.3 Cambria Two Part Acrylic Adhesive.

.4 Tenax USA.

.17 Sealant: in accordance with Section 07 92 00 – Sealants.

2.2 CABINET WORK

.1 Work shall conform to applicable NAAWS requirements.

.2 Apply edge banding to all four edges.

.3 Door and Drawer Bumpers: Self-adhesive type approximately 6 mm diameter clear silicone bumpers for all cabinet work doors and drawer faces, two per door and drawer, placed at door top and bottom and drawer top.

2.3 CABINET FABRICATION

.1 General

.1 Flush overlay cabinet doors and drawer fronts as detailed.

.2 Fabricate gables and edges meeting walls oversize to allow for scribing to fit on site.

.3 Use non-telegraphing grain plywood when laminate is the specified finish.

.4 Assemble Work with flush butt hairline corners and joints. Cut-outs for services to be done on site during installation. No hairline cracks will be allowed in the face area of cabinet work modules unless approved in writing by Consultant.

.5 Carefully fit, cope or mitre and well glue-up Joints. There shall be no end wood visible on finished surfaces.

.6 Set nail heads in finished surfaces. Countersink screws and bolts, except those detailed to be exposed, and fill holes with edge grain wood plugs to match colour and grain.

.7 Ensure adjacent part of continuous work match in colour and pattern.

.2 Construction

.1 Minimum core thicknesses as follows:

.1 Framing: Solid stock framing assembled with machined dovetailed, mortised tenoned or blind dado joints adequately glued and secured with screws.

.2 Doors, particleboard, 19 mm.

.3 Gables: 19 mm particle board or plywood. Attach gables to framing with tongue and groove attachment. Reinforce connections with supplementary metal angles. Route gables to receive shelf standards and fixed shelving.

.4 Lower case backs against walls, plywood, 6 mm; Conceal joints behind framing, rout backs into end gables.

.5 Upper case backs against walls, plywood, 6 mm; Conceal joints behind framing, rout backs into end gables.

.6 Bottoms: 19 mm plywood attached to front rails with tongue and groove attachment.

.7 Shelves: fixed and adjustable, plywood, 19 mm; Apply plastic laminate to visible edges, except that adjustable shelves shall be edged on front and back.

.8 Base: Solid stock of height equal to base in room.

.9 Counter top cores, Plywood with non-telegraphing grain, 19 mm with 38 mm edge, for wet areas, use plywood with type two adhesive and ensure that all cut-outs are sealed prior to installation of sinks, primer is not considered to be an appropriate sealer;

.10 All other work Poplar Veneer Plywood, 19 mm.

.2 Glue, dowel, mortise, lock joint or dado all cabinet work and cabinet work. Do not use staples. Nailing and screws are acceptable. Do not surface nail or screw through countertops.

.3 Blocking, framing, web frames to be solid lumber.

.4 Cut and adapt all Work to receive hardware.

.1 Drill and prepare end gables for insert type shelf standards on gables.

.2 Install all finishing hardware and fittings in shop.

.3 Fittings which may be susceptible to damage during shipping and installation may be installed after millwork installed on site.

2.4 CABINET HARDWARE

.1 Provide the following cabinet hardware, in quantity required, complete with all screws, bolts, washers for complete installation.

.2 Non-Exposed Fasteners: fabricators choice consistent with quality level specified.

.3 Exposed Fasteners: Architectural appearance, material, finish and fastener tool type as selected by Consultant; coordinate sample submittals before ordering materials.

.4 Draw Bolt Fasteners: Mitre butt joint fastener, adjustable and requiring no special tools for installation, galvanized.

.1 Acceptable Materials:

.1 Häfele Canada Inc.

.2 K&V 516, Knape & Vogt Canada.

.3 BP5162G, Richelieu

.5 Spacers: Rigid PVC to size and profile indicated.

.6 Access Panel Connectors

.1 Basis-of-Design Materials:

.1 Type JCBA0101C2 complete with Tee-Nut 26112, Richelieu.

.7 Pulls: Typical drawers and doors.

.1 Basis of Design Materials:

.1 Richelieu 799616092 Brushed Black Nickle, 220mm

.8 Hinges:

.1 Typical Cabinet Doors: Concealed, euro-style hinge with cover caps; fully adjustable for overlay, depth, height and closing force; opening angle of 110°; self-closing feature; nickel plated steel construction; overlay and half overlay mounting, and soft closers, size and profile to suit cabinet construction:

.1 Acceptable Materials:

.1 CLIP top Series, Blum Canada Ltd.

.2 Tiomos, GRASS Canada.

.3 Salice 700 Series, Häfele Canada Inc.

.4 Sensys, Hettich Canada LP.

.9 Shelf Rests:

.1 Stainless steel pin rests: 7 mm Ø socket collar inserts for steel pin shelf supports, drill holes in cabinet work to accept collar, chrome or nickel finish:

.1 Acceptable Materials:

.1 Series 331/325 grommet, Knape & Vogt Canada.

.2 5829-180/2292-180, Richelieu.

.10 Floating Shelf Support: concealed black flat 305 mm high x 229 mm projection black steel bracket to hold 2550 lb capacity for 50 mm thick shelf.

.1 Basis of Design Material:

.1 6240090290, Richelieu

2.5 FACTORY FINISHING – CABINET WORK

.1 Cabinet work for High Pressure Decorative Laminate Finish:

.1 NAAWS Quality Grade Custom.

.2 Construction: Cabinet work shall conform to applicable sections of the NAAWS.

.3 Exposed Parts and interior of cabinet doors: High pressure decorative laminate, substrate as indicated.

.4 Semi-Exposed Parts: Low pressure decorative laminate, substrate as specified above.

.5 Concealed parts: Low pressure decorative laminate backer to balance face materials.

.6 Moveable shelf: high pressure decorative laminate, substrate as specified above.

Part 3 Execution

3.1 EXAMINATION

.1 Site Conditions for installation of architectural woodwork shall be in accordance with applicable NAAWS requirements.

.2 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.

3.2 PREPARATION

.1 Obtain measurements from site.

.2 Check access to ensure large pieces of work can be safely handled to their place of final installation.

.3 Verify that solid blocking for support and anchoring of woodwork is installed where required. Confirm exact height and location with Drawings and Consultant.

.4 Protect finished surfaces and materials of other trades from damage.

.5 Ensure services and roughing-in which affect or are connected to or through this work are complete and acceptable.

.6 Back prime cabinet work immediately after delivery to site.

3.3 INSTALLATION

.1 Install work to applicable NAAWS and Quality Assurance requirements.

.2 Install cabinet work in its indicated locations, plumb, level, and true.

.3 Anchor to floor, walls, blocking, or ceiling using fastening devices and hardware consistent with the building materials encountered. Do not use wood plugs. Do not use plastic plugs for ceilings or walls. Provide wall strapping as required.

.4 Anchor cabinet work and millwork to building structure. Shim level and set square in relation to adjoining surfaces. Scribe to adjacent Work. Provide allowance for finish flooring installation to base.

.5 Cabinet work:

.1 Fasten to framing using zinc-coated bolts, countersunk and plugged with matching wood plugs.

.2 Set cabinetwork in place, on base, anchoring securely to building structure and to adjoining cabinetwork. Use approved connector type fasteners between items of cabinetwork to hold adjoining pieces tightly together.

.3 Scribe to smooth snug fit with adjoining surfaces and materials to align work. Mitre corners.

.4 Perform cutting, fitting, repairing in woodwork as required by other trades where their work is connected to or part of this work.

.5 Cut out openings for mechanical, electrical, and communications fittings and fixtures. Coordinate and cooperate in the connection and installation of mechanical, electrical, and communications work.

.6 Apply sealant between countertops and adjoining walls and cabinetwork. Seal edges of cut-out core material before fixtures installed.

.7 Install finishing hardware shipped loose.

.6 Supply and install hardware required for the completion of architectural woodwork, including, without limitations, adjustable shelf supports and cabinet hinges, catches, pulls, drawer accessories, bumpers, drawer slides and closet hanger bars, and similar items. Install millwork hardware in the shop wherever possible. Install millwork hardware secure, plumb, level, true to line, and in accordance with the hardware manufacturers' printed instructions. Cut and fit to millwork for proper installation and operation. Provide smoothly operating units free from binding. Clean and adjust hardware for proper operation.

3.4 INSTALLATION, SOLID SURFACING

.1 Install extra support as required for size and weight of solid surfacing in accordance with AWMAC recommendations.

.2 Install components plumb and level, in accordance with shop drawings and manufacturers written installation requirements.

.3 Form joints and seams between solid polymer components using manufacturer's approved seam adhesive. Joints shall be inconspicuous in appearance and without voids to create a monolithic appearance.

.4 Rout and finish component edges to a smooth, uniform appearance and finish. Edge shapes and treatments, including any inserts, shall be as detailed on the drawings. Rout all cutouts, then sand all edges smooth. Repair or reject defective or inaccurate work.

.5 Adhere sinks to countertops using manufacturer's recommended adhesive and mounting hardware.

.6 Install backsplashes and end splashes as indicated on Drawings; adhere to countertops using manufacturer's standard colour matched silicone sealant.

.7 Coordinate plumbing connections and electrical requirements with affected Sections of work.

3.5 ADJUSTING

.1 During and after installation adjust all hardware and operating parts as necessary to ensure smooth and proper operation.

3.6 CLEANING

.1 Clean all cabinet, countertops, shelves and fixtures.

.2 Repair any marks, scratches or marring.

.3 Remove and replace damaged, marked, or stained architectural woodwork.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Through penetration firestopping and smokeseal systems for penetrations through the following fire resistance rated assemblies, including both empty openings and openings containing penetrating items:

.1 Floors.

.2 Wall and partitions.

.3 Smoke barriers.

.4 Construction enclosing compartmentalized areas.

.2 Fire resistive joint systems for the following:

.1 Floor-to-floor joints.

.2 Floor-to-wall joints.

.3 Head-of-wall joints.

.4 Wall-to-wall joints.

.5 Joints between perimeter edge of fire resistance rated floor assemblies and back of curtainwall system.

.3 Requirements for Rated Systems or systems requiring Engineered Judgements (EJ):

.1 Use of materials that have not been tested in a system or that are not capable of obtaining an Engineered Judgement will not be acceptable for use on this Project.

.2 Materials having only a ULC, CUL or FM Approved label will not be acceptable for use on this Project, unless supporting documentation is provided indicating its use in a ULC and FM Approved Rated Assembly Listing for Firestop Systems and Components of an Engineered Judgement specific to the installation conditions of the project.

.4 Requirements for installation of Fire Stop systems under a single source of responsibility; either through direct supervision of the Contractor or a single trade responsibility performed by a specialty Subcontractor at the choice of the Contractor.

.5 Requirements for third-party verification of installed Fire Stop system components forming a part of the work of this Section by an inspection agency that employs personnel who are qualified to perform this work in accordance a recognized training program acceptable to the Consultant and Authority Having Jurisdiction.

.2 Related Requirements:

.1 Section 01 11 00 – General Requirements, Delegated Design

.2 Section 09 21 16 – Gypsum Board Assemblies

.3 Division 21-23 Mechanical

.4 Division 26-28 Electrical

1.2 REFERENCES

.1 Definitions:

.1 Fire-Resistance Rating: The time in minutes or hours that a material or assembly of materials will withstand the passage of flame and transmission of heat when exposed to fire meeting the requirements of CAN/ULC 101 or as determined by formal testing of material or assembly of materials meeting requirements of CAN/ULC 115, or an interpretation of information derived from formal testing in accordance with requirements of the Building Code and acceptable to the Authority Having Jurisdiction.

.2 Fire Separation: Assembly that acts as a barrier against the spread of fire, smoke and noxious gases resulting from combustion as defined by the Building Code and includes the following assemblies having a Fire-Resistance Rating requiring Fire Stopping as follows:

.1 Penetration-Type Fire Stop systems located within load bearing walls and partitions.

.2 Penetration-Type Fire Stop systems located within non-load bearing walls and partitions.

.3 Penetration-Type located within floor assemblies.

.4 Building Perimeter-Type located between floor assemblies and exterior wall and roof construction.

.5 Construction Joint-Type and other assemblies having a Fire-Resistance Rating indicated on Drawings or Schedules.

.3 Fire Compartment: Spaces within a building that are enclosed by exterior walls or separated from other parts of the building by enclosing Fire Separations having a Fire-Resistance Rating.

.4 Firewall: Assembly that is a Fire Separation constructed from non-combustible construction subdividing a building or separating adjoining buildings to resist the spread of fire and that has a Fire-Resistance Rating, and structural stability to remain intact under fire conditions for the required fire-rated time.

.5 Fire Stop: System consisting of a material, component and means of support used to fill gaps between Fire Separations or between Fire Separations and other assemblies, or used around items that wholly or partially penetrate a Fire Separation.

.2 Reference Standards:

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

.1 ASTM A1008/A1008M-21a, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

.2 ASTM E119-22, Standard Test Methods for Fire Tests of Building Construction and Materials.

.3 ASTM E814-13a(2017), Standard Test Method for Fire Tests of Penetration Firestop Systems.

.4 ASTM E1966-15(2019), Standard Test Method for Fire-Resistive Joint Systems.

.5 ASTM E2174-20a, Standard Practice for On-Site Inspection of Installed Firestop Systems..

.6 ASTM E2307-20, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus.

.7 ASTM E2393-20a, Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

.2 Factory Mutual (FM):

.1 FM Approval 4990, Firestopping. 2009.

.2 FM Approval 4991, Approval of Firestop Contractors. 2013.

.3 Firestop Contractors International Association (FCIA):

.1 FCIA Manual of Practice, 8th Edition.

.4 International Firestop Council (IFC):

.1 IFC Guidelines for Evaluating Fire Stop Systems in Engineering Judgments. 2018

.2 IFC Guidelines for Evaluating Engineering Judgements -: Perimeter Fire Barrier Systems. 2018

.3 Recommended IFC Guidelines for Evaluating Engineering Judgments on Fire Resistant Duct Enclosure Systems for Ventilation Ducts. 2009

.5 National Fire Protection Agency (NFPA):

.1 NFPA (Fire) 251, Standard Methods of Tests of Fire Endurance of Building Construction and Materials, 2006 Edition.

.6 Underwriters Laboratories Inc. (UL):

.1 UL 1479-2015, Standard for Fire Test of Through-Penetration Firestops.

.7 Underwriter's Laboratories of Canada (ULC):

.1 ULC Firestop Systems and Components, 2017 Edition.

.2 ULC 101-2014, Standard Methods of Fire Endurance Tests of Building Construction and Materials. (CAN/ULC-S101-14)

.3 ULC 102-2018, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies. (ULC S102)

.4 ULC 114-2018, Standard Method of Test for Determination of Non-Combustibility in Building Materials.

.5 ULC 115-2018, Standard Method of Fire Tests of Firestop Systems.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Consultant in accordance with Section 01 11 00 – General Requirements, Project Meetings to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.2 Schedule: Submit a schedule listing surfaces or components to which firestopping and smokeseals is to be applied, and indicating the firestopping and smokeseals system and materials required and detailing installation not later than 30 working days following Award of Contract.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.2 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Provide electronic copy of Workplace Hazardous Materials Information System WHMIS SDS - Safety Data Sheets in accordance with WHMIS acceptable to Labour Canada, and Health and Welfare Canada.

.3 Quality assurance submittals: submit following in accordance with Section 01 11 00 – General Requirements, Quality Control.

.1 Test reports: in accordance with CAN-ULC-101 for fire endurance and CAN-ULC-102 for surface burning characteristics and CAN-ULC 115.

.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.

.2 Document from Engineer of Record showing compliance of alternative fire stopping solution with CAN-ULC 115 and the EJ guidelines provided by the National Research Council, *Best Practices Guide on Fire Stops and Fire Blocks and Their Impact on Sound Transmission*.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

.4 Manufacturer's Field Reports: submit to manufacturer's written reports within three days of review, verifying compliance of Work, as described in PART THREE - FIELD QUALITY CONTROL.

.4 Provide a third party inspection agency upon completion of the Work of this Section to inspect the fire stopping work and submit written reports and verifications/approval of the installation of products and systems and the products are installed to the manufacturer’s requirements to achieve the required fire ratings.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements: Use materials and methods of determining required thickness of application that have the full acceptance of Authority Having Jurisdiction and that are tested in accordance with ULC 115, and that form a part

of a ULC or CUL listed system, Engineered Judgement or Equivalent Fire Resistance Rated Assembly.

.2 Use materials and methods of determining required thickness of application that have the full acceptance of authority having jurisdiction.

.3 Qualifications: Installer: company or person specializing in fire stopping installations and approved by manufacturer with five years documented experience

.4 Where possible determine thickness to be applied from tests of assemblies identical to the assembly to be protected, conducted in accordance with ULC 101, ASTM E119, UL 1479, NFPA 251, and ASTM E814.

.5 Determine system from available engineering studies, or correspondence with the labelling agency indicating the effect of the differences on the fire separation of the assembly. Confirm acceptance of system by authorities having jurisdiction in writing.

.6 Where the assembly includes conditions that do not correspond to those included in any previously tested assembly and for which no relevant engineering information is available use the same system and material as would be required for a tested assembly with similar conditions and that will achieve at least the minimum level of performance required in a previously tested assembly.

.7 Use materials tested to ULC 115. Assemblies containing the materials shall be in accordance with assemblies tested and approved by agencies acceptable to authority having jurisdiction.

.8 Source Responsibility: Obtain through penetration firestop and joint systems, for each kind of penetration and construction condition indicated, from a single source of installation responsibility.

.9 Delegated Design Professional: Use a Professional Engineer, registered in the province of the Work and familiar with installations of similar scope and complexity to design firestopping and smokeseals.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with Section 01 11 00 – General Requirements, Common Product Requirements.

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

.3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, and ULC markings.

.2 Storage and Protection:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.3 Use stock before its expiration date.

.3 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.7 SITE CONDITIONS

.1 Ambient Conditions:

.1 Install firestopping and smokeseals materials only when the areas in which they are scheduled are closed-in and protected from dampness.

.2 Install firestopping and smokeseals systems when ambient or substrate temperatures are within temperature and moisture limits permitted by firestopping and smokeseals system manufacturers or when substrates are not wet due to rain, frost, condensation, or other causes.

.3 Ventilate firestopping and smokeseals systems in accordance with manufacturer's written instructions by natural means or forced air circulation where natural means are not adequate.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers: Subject to compliance with requirements specified in this Section, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:

.1 3M Canada Inc.

.2 Carboline (formerly A/D Fire Protection Systems Inc.)

.3 EZ-Path Fire Rated Pathways.

.4 Firestop Systems Inc.

.5 Hilti Canada Ltd.

.6 Johns Manville Fire Protection Systems.

.7 Nuco Self Seal Firestopping Products.

.8 Passive Fire Protection Partners Firestop Systems Inc.

.9 Roxtec, Preformed Fire Stopping Systems.

.10 Specified Technologies Inc.

.11 Tremco Ltd.

2.2 PERFORMANCE/DESIGN CRITERIA

.1 Delegated Design Requirements: Design firestopping and smokeseals required by the Contract Documents to withstand fire ratings indicated and in accordance with requirements of the Building Code, and as described in Section 01 11 00 – General Requirements, Delegated Design.

.2 Performance Requirements: Manufacturer shall design proprietary assemblies to withstand the listed ratings in accordance with the Building Code, Underwriters Laboratories Canada, and authorities having jurisdiction, and as follows:

.1 Provide through penetration firestop and joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire resistance rating of assembly penetrated:

.1 Fire resistance rated load bearing walls, including partitions, with fire protection rated openings.

.2 Fire resistance rated non-load bearing walls, including partitions, with fire protection rated openings.

.3 Fire resistance rated floor assemblies.

.2 F-Rated Systems: Provide through penetration firestop systems with F-ratings indicated, as determined by ULC 115 or ASTM E814, but not less than that equalling or exceeding fire resistance rating of constructions penetrated.

.3 T-Rated Systems: For the following conditions, provide through penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per by ULC 115 or ASTM E814, where systems protect penetrating items exposed to potential contact with adjacent materials:

.1 Penetrations located outside wall cavities.

.2 Penetrations located outside fire resistive shaft enclosures.

.3 Penetrations located in construction containing fire protection rated openings.

.4 Penetrating items larger than 100 mm diameter nominal pipe or 100 cm^2 in overall cross sectional area.

.4 Firestopping and Smokeseals Systems Exposed To View: Systems exposed to view, traffic, moisture, and physical damage; provide products that after curing do not deteriorate when exposed to these conditions both during and after construction, and as follows:

.1 Provide moisture resistant through penetration firestop systems for piping penetrations for plumbing and wet pipe sprinkler systems.

.2 Provide firestopping and smokeseals systems capable of supporting floor loads involved either by installing floor plates or by other means for floor penetrations with annular spaces exceeding 100 mm in width and exposed to possible loading and traffic.

.3 Provide firestopping and smokeseals systems not requiring removal of insulation for penetrations involving insulated piping.

.4 Provide products with flame spread ratings of less than 25 and smoke developed ratings of less than 50 for firestopping and smokeseals and joint systems exposed to view.

.5 Fire Resistance of Joint Systems: Assembly ratings and movement capabilities indicated, but with assembly ratings not less than that equalling or exceeding fire resistance rating of constructions in which joints are located.

2.3 MATERIALS: FIRESTOPPING AND SMOKESEALS, GENERAL

.1 Compatibility: Provide firestopping and smokeseals systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating firestopping and smokeseals systems, under conditions of service and application, as demonstrated by firestopping and smokeseals system manufacturer based on testing and field experience, and as follows:

.1 Service penetration assemblies: certified by ULC in accordance with ULC 115 and listed in ULC Guide No. 40 U19.

.2 Service penetration firestopping and smokeseals components: certified by ULC in accordance with ULC 115 and listed in ULC Guide No. 40 U19.13, under the Label Service of ULC.

.3 Fire resistance rating of installed firestopping and smokeseals assembly not less than the fire resistance rating of surrounding floor and wall assembly.

.4 Firestopping and Smokeseals at openings intended for ease of re-entry such as cables: elastomeric seal; do not use cementitious or rigid seal at such locations.

.5 Firestopping and Smokeseals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal; do not use a cementitious or rigid seal at such locations. Exemption to fire dampers.

.2 Accessories: Provide components for each firestopping and smokeseals systems that are needed to install fill materials. Use only components specified by firestopping and smokeseals system manufacturer and approved by the qualified testing and inspecting agency for firestopping and smokeseals systems indicated. Accessories include, but are not limited to, the following items:

.1 Permanent forming, damming and backing materials, including the following:

.1 Slag or rock wool fibre insulation.

.2 Sealants used in combination with other forming, damming or backing materials to prevent leakage of fill materials in liquid state.

.3 Fire-rated form board.

.4 Fillers for sealants.

.2 Temporary forming materials.

.3 Substrate primers.

.4 Collars.

.5 Steel sleeves.

.6 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.7 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.8 Metal fire stop: Commercial galvanized steel, to ASTM A1008/A1008M, zinc coating 260 g/m^2, minimum metal core thickness 0.912 mm.

.9 Steel Deck Moulded Flute Inserts: One piece moulded mineral fibre flute inserts, sized for steel deck profiles, for placement at top of fire rated wall assemblies:

.1 Basis-of-Design Materials:

.1 Hilti CP777 Speed Plugs.

.10 Labels: Peel-and-stick labels printed with the following information:

.1 ATTENTION: FIRE RATED ASSEMBLY. DO NOT MODIFY.

.2 Name of firestopping manufacturer.

.3 Names of products used.

.4 Hour Rating of Assembly.

.5 Manufacturers standard detail number, or Engineered Judgement identifier; ULC or $_{c}UL_{us}$ Number.

.6 Date of installation.

.7 Name of installing Subcontractor.

.8 Contact telephone number for repair or replacement of firestopping materials.

2.4 FILL MATERIALS

.1 General:

.1 Provide firestopping and smokeseals systems containing the types of fill materials indicated in the Firestopping and Smokseals System Schedule below by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.

.2 Firestopping and smoke seal systems shall be tested in accordance with ULC 115, and be comprised of asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases, and not to exceed opening sizes for which they are intended for the ratings as indicated on drawings.

.2 Cast-in-Place Firestopping and Smokeseals Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

.3 Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

.4 Firestopping and Smokeseals Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrating item.

.5 Cable Penetration Devices:

.1 Pre-manufactured intumescent blocks.

.1 Acceptable Materials:

.1 CFS-BL Intumescent Blocks, Hilti.

.2 Intumescent Blocks, Roxtec.

.2 Pre-manufactured sleeves, consisting of an adjustable core.

.1 Acceptable Materials:

.1 CP 653 Speed Sleeves, Hilti.

.2 EZ-Path Fire Rated Pathway, Specified Technologies.

.3 Pre-manufactured cable management system, consisting of a system of intumescent inserts and adjustable cores

.1 Acceptable Materials:

.1 Transit, Hilti.

.2 Preformed Fire Stopping Systems, Roxtec.

.6 Intumescent Composite Sheets: Rigid panels consisting of aluminum foil faced elastomeric sheet bonded to galvanized steel sheet.

.7 Intumescent Putties: Non-hardening dielectric, water resistant putties containing no solvents, inorganic fibres, or silicone compounds.

.8 Intumescent Spray Foam: Expanding spray-in-place intumescent foam sealant.

.9 Intumescent Wrap Strips: Single component intumescent elastomeric sheets with aluminum foil on one side.

.10 Mortars: Pre-packaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.

.11 Pillows/Bags: Reusable, heat expanding pillows/bags consisting of glass fibre cloth cases filled with a combination of mineral fibre, water insoluble expansion agents and fire retardant additives.

.12 Silicone Foams: Multi-component, silicone based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

.13 Silicone Sealants: Moisture curing, single component, silicone based, neutral curing elastomeric sealants of grade indicated below:

.1 Grade for Horizontal Surfaces: Pourable (self levelling) formulation for openings in floors and other horizontal surfaces.

.2 Grade for Vertical Surfaces: non-sag formulation for openings in vertical and other surfaces.

2.5 MIXING

.1 For those products requiring mixing before application, comply with firestopping and smokeseals system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

Part 3 Execution

3.1 EXAMINATION

.1 Examine surfaces, components, materials to receive firestopping and smokeseals material; report any conditions which would detrimentally affect the application of the material or the proper firestopping and smokeseals of the system.

.2 Commence Work when conditions of surfaces and the working conditions are suitable.

.3 Where penetration sealants or caulking are required, ensure all service lines are in place, tested and approved.

.4 Verify all proper blocking, framing (using non-combustible materials) are properly installed and prepared to receive firestopping and smokeseals. Notify Consultant in writing of any deficiencies affecting the proper performance of the firestopping and smokeseals, do not proceed until deficiencies are corrected.

3.2 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.

.1 Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

.4 Prime surfaces as required.

.5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

.2 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.3 Apply firestopping and smokeseals materials/systems to maintain the fire separations in the project as indicated on drawings.

.4 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.5 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.6 Tool or trowel exposed surfaces to neat finish.

.7 Remove excess compound promptly as work progresses and upon completion.

3.4 FIELD QUALITY CONTROL

.1 Review: notify Consultant when ready for review and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.1 Cut tests may be made at random by the Owner. Frequency of cut tests shall be determined by the Consultant, but will not be more than 1% of total length of firestopping and smokeseals.

.2 Make all necessary repairs and correct all deficiencies noted after completion of cut tests.

.2 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 Section 01 11 00 – General Requirements, Submittal Procedures.

.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, twice during progress of Work at 25% and 60% complete.

3.5 CLEANING

.1 Proceed in accordance with Section 01 11 00 – General Requirements, Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.6 SCHEDULE

.1 Design and provide through penetration firestopping and smokeseals as follows for:

.1 Systems with No Penetrating Items: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Silicone sealant.

.3 Intumescent putty.

.4 Intumescent foam blocks or boards.

.5 Intumescent spray foam.

.2 Systems for Metallic Pipes, Conduit, or Tubing: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Silicone sealant.

.3 Intumescent putty.

.4 Intumescent foam blocks or boards.

.5 Intumescent spray foam.

.3 Systems for Non-metallic Pipe, Conduit, or Tubing: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Silicone sealant.

.3 Intumescent putty.

.4 Intumescent wrap strips.

.5 Firestopping and Smokeseals device.

.6 Intumescent spray foam.

.4 Re-enterable and Cable Managed Systems for Electrical, and Data and Communications Cables:

.1 Prefabricated Firestop Sleeve CP653 (Hilti).

.2 Preformed Intumescent Blocks CFS-BL (Hilti).

.3 Preformed Intumescent Blocks (Roxtec).

.4 Prefabricated Cable Pathways (EZ-Path).

.5 Systems for Electrical, and Data and Communications Cables: Select one or more of the following fill materials:

.1 Latex sealant.
.2 Silicone sealant.
.3 Intumescent putty.
.4 Silicone foam.
.5 Prefabricated Firestop Sleeve CP 653 (Hilti).
.6 Preformed Intumescent Blocks CFS-BL (Hilti).
.7 Preformed Intumescent Blocks (Roxtec).
.8 Prefabricated Cable Pathways (EZ-Path).
.9 Intumescent foam blocks or boards.
.10 Intumescent spray foam.

.6 Systems for Cable Trays: Select one or more of the following fill materials:
.1 Latex sealant.
.2 Intumescent putty.
.3 Silicone foam.
.4 Pillows/bags.
.5 Intumescent foam blocks or boards.

.7 Systems for Insulated Pipes: Select one or more of the following fill materials:
.1 Latex sealant.
.2 Intumescent putty.
.3 Silicone foam.
.4 Intumescent wrap strips.
.5 Intumescent foam blocks or boards.
.6 Intumescent spray foam.

.8 Systems for Miscellaneous Electrical Penetrations: Select one or more of the following fill materials:
.1 Latex sealant.
.2 Intumescent putty.
.3 Intumescent foam blocks or boards.
.4 Intumescent spray foam.

.9 Systems for Miscellaneous Mechanical Penetrations: Select one or more of the following fill materials:
.1 Latex sealant.
.2 Intumescent foam blocks or boards.
.3 Intumescent spray foam.

.10 Systems for Groupings of Penetrations: Select one or more of the following fill materials:
.1 Latex sealant.
.2 Intumescent wrap strips.
.3 Firestopping and Smokeseals device.
.4 Intumescent composite sheet.
.5 Intumescent foam blocks or boards.

.6 Intumescent spray foam.

.2 Design and provide joint firestopping and smokeseals as follows for:

.1 Floor-to-Floor, Fire Resistive Joint System: Provide materials to meet the following criteria:

.1 Assembly Rating: As indicated.

.2 Nominal Joint Width: As indicated.

.3 Movement Capabilities: Compression and extension.

.2 Floor-to-Wall, Fire Resistive Joint System: Provide materials to meet the following criteria:

.1 Assembly Rating: As indicated.

.2 Nominal Joint Width: As indicated.

.3 Movement Capabilities: To be confirmed, compression, extension, or horizontal shear.

.3 Head-of-Wall, Fire Resistive Joint System: Provide materials to meet the following criteria:

.1 Assembly Rating: As indicated.

.2 Nominal Joint Width: As indicated.

.3 Movement Capabilities: Compression and extension.

.4 Wall-to-Wall, Fire Resistive Joint System: Provide materials to meet the following criteria:

.1 Assembly Rating: As indicated.

.2 Nominal Joint Width: As indicated.

.3 Movement Capabilities: Compression and extension.

.3 Design and provide perimeter fire containment firestopping and smokeseals as follows for:

.1 Perimeter Fire Containment System: Provide materials to meet the following criteria:

.1 Integrity Rating: As indicated.

.2 Insulation Rating: As Indicated.

.3 Linear Opening Width: As indicated.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Sealant types:

.1 Acrylic latex one part.

.2 Mould and mildew resistant.

.3 Silicone for general construction and air-seal.

.4 Silicone for structural glazing.

.5 Acoustical.

.6 Multi-component polyurethane.

.7 Single-component polyurethane or hydrid.

.8 Horizontal joint two component, self-levelling.

.9 One part moisture curing, low modulus polyurethane.

.10 Control joint.

.11 One component advanced polyurethane, elastomeric sealant/adhesive, gun grade.

.2 Accessories: Rod backings, high density foam, bond breaker tape, preformed sealants, primer, joint cleaner and bond breaker.

.2 Related Requirements:

.1 Section 06 40 00 – Architectural Woodwork

.2 Section 08 80 50 – Glazing

.3 Section 09 21 16 – Gypsum Board Assemblies

.4 Section 09 65 00 – Resilient Flooring

.5 Division 23 – Mechanical

.6 Other technical sections as required

1.2 REFERENCES

.1 Reference Standards:

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

.1 ASTM C794-18, Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.

.2 ASTM C834-17, Standard Specification for Latex Sealants.

.3 ASTM C919-22, Standard Practice for Use of Sealants in Acoustical Applications.

.4 ASTM C920-18, Standard Specification for Elastomeric Joint Sealants.

.5 ASTM C1193-16, Standard Guide for Use of Joint Sealants.

.6 ASTM C1330-18, Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.

.7 ASTM C1521-19 (2020), Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

.8 ASTM D2240-15(2021), Standard Test Methods for Rubber Property, Durometer Hardness.

.2 Department of Justice Canada (Jus):

.1 Canadian Environmental Protection Act, 1999 (2018) (CEPA).

.3 Sealant, Waterproofing, and Restoration Institute (SWRI):

.1 Sealants: The Professionals' Guide 2013 Edition.

.4 South Coast Air Quality Management District (SCAQMD):

.1 SCAQMD Rule 1168-22, Adhesives and Sealants Applications.

.5 Transport Canada (TC):

.1 Transportation of Dangerous Goods Act, 1992 (2019 ammend.) (TDGA).

.6 Underwriters Laboratories of Canada (ULC):

.1 ULC 115-2018, Standard Method of Fire Tests of Firestop Systems.

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Submit Workplace Hazardous Materials Information System WHMIS SDS - Safety Data Sheets. WHMIS SDS acceptable to Labour Canada and Health and Welfare Canada for sealants. Indicate VOC content.

.2 Submit samples in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Provide colour samples of the actual sealants for approval; painted or printed colour charts are not acceptable.

.3 When required by Consultant, submit test certificates from an approved Canadian materials testing laboratory indicating that sealants meet the requirements of the standards specified, and that the tests have been conducted in accordance with ASTM D2240.

.4 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:

.1 Caulking compound.

.2 Primers.

.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.4 Manufacturers Warranty.

.5 Submit manufacturer's installation instructions for each product used.

1.4 QUALITY ASSURANCE

.1 Caulking shall be performed by a manufacturer approved contractor with minimum three years successful experience in Work of similar size and complexity.

.2 Before performing Work of this Section, submit the names of proposed materials. If specified using Standards, indicate Qualification Number.

.3 Compatibility: Ensure sealants are compatible with adjacent materials and are approved by manufacture for use with adjacent materials.

.4 Mock-Ups:

.1 Construct mock-up in accordance with Section 01 11 00 – General Requirements, Quality Control.

.2 Before performing caulking work do sample applications of each type of sealant for approval. Site locations for sample applications shall be designated by Consultant. Approved samples shall form standard for this project and no work of inferior quality will be allowed. Start no final work until approval of samples is given by the Consultant.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 11 00 – General Requirements, Common Product Requirements.

.2 Deliver containers labelled and sealed, complete with written application and maintenance instructions.

.3 Store materials in a dry heated enclosure in accordance with manufacturer's instructions.

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

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.7 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.8 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Consultant.

.9 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.

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

.11 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.6 SITE CONDITIONS

.1 Ambient Conditions:

.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 degrees 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.

.2 Substrate must be clean, dry, and frost free.

1.7 WARRANTY

.1 Contractor hereby warrants that caulking work will not leak, crack, crumble, melt, shrink, run, lose adhesion or stain adjacent surfaces in accordance with General Conditions, but for three years.

.2 Provide Warranty for sealants to include in maintenance manuals as specified in Section 01 11 00 – General Requirements, Closeout Submittals.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers: Subject to compliance with requirements in this Section and as recommended by the manufacturer, manufacturers offering products that may be incorporated into the Work include the following:

.1 Master Builders Solutions (previously BASF, Sonneborn).

.2 Chemtron Manufacturing Ltd.

.3 Dow

.4 GE Silicones Limited.

.5 Loxon, Sherwin Williams

.6 MAPEI Inc.

.7 Pecora

.8 Sika Chemical of Canada Ltd.

.9 Tremco Ltd.

2.2 PERFORMANCE/DESIGN CRITERIA

.1 Sealant system shall satisfy following requirements for duration of warranty period:

.1 Waterproof, flexible, and thermally compatible with substrate under applicable service conditions.

.2 Provide a weather-tight seal that does not allow moisture penetration.

.3 Shall not debond, crack, or craze.

.4 Shall not leak.

.2 Reference to products does not relieve manufacturer of responsibility to comply fully with specified criteria.

2.3 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, or are applied several months before occupancy to maximize offgas time.

.3 Unless otherwise specified, VOC content limits of sealants shall be in accordance with SCAQMD Rule 1168 and as follows:

.1 Architectural Materials:

.1 Sealants: VOC content limit 250 g/L.

.2 Sealant Primers for Non-Porous Surfaces: VOC content limit 250 g/L.

.3 Sealant Primers for Porous Surfaces: VOC content limit 775 g/L.

.2 All Other Applications:

.1 Sealants: VOC content limit 420 g/L.

.2 Sealant Primers: VOC content limit 750 g/L.

2.4 SEALANT MATERIAL DESIGNATIONS

.1 Type S-1: Acrylic Latex One Part, Shore A Hardness 20, to ASTM C834.

.1 Acceptable Materials:

.1 Latacalk, Chemtron.

.2 Sonolac, BASF Sonneborn.

.3 Latex 100, Tremco.

.2 Type S-2: Silicone Sealant, mould and mildew resistant to ASTM C920; type S; grade NS; class 50; use NT, G, and A.

.1 Acceptable Materials:

.1 Multiseal, Chemtron.

.2 Dowsil 795 Silicone, Dow

.3 SCS2000, GE.

.4 895 NST, Pecora

.5 Spectrem 2 Silicone, Tremco Inc.

.3 Type S-2: Silicone Sealant, mould and mildew resistant to ASTM C920; type S; grade NS; class 50; use NT, G, and A.

.1 Acceptable Materials:

.1 Dowsil 790 Silicone, Dow.

.2 SilPruf SCS 2000, GE.

.3 890 NST, Pecora

.4 Spectrem 1 Silicone, Tremco Inc.

.4 Type S-2: Silicone Sealant, mould and mildew resistant to ASTM C920; type S; grade NS; class 25; use NT, G, and A.

.1 Acceptable Materials:

.1 OmniPlus, BASF Sonneborn.

.2 Dowsil 786 Silicone, Dow.
.3 SCS1700, General Electric.
.4 898 NST, Pecora
.5 Tremsil 200, Tremco Inc.

.5 Type S-3: Silicone Sealant, general construction and air-seal sealant.

.1 To ASTM C920: type S; grade NS; class 25; use NT, M, G, A, O.
.1 Acceptable Materials:
.1 Dowsil 790 Silicone, Dow (for porous substrates)
.2 Dowsil 795 Silicone, Dow (for non-porous substrates)

.6 Type S-4: Silicone Sealant, structural glazing.

.1 To ASTM C920: type S; grade NS; class 25; use NT, A, G, O.
.1 Acceptable Materials:
.1 SSG4000, General Electric. (black colour) Shore A 39
.2 860, Pecora (black or white colour) Shore A 25
.3 Proglaze SSG, Tremco Inc. (black colour) Shore A 40
.2 To ASTM C920: type S; grade NS; class 50; use NT, A, G, O.
.1 Acceptable Materials:
.1 Dowsil 995 Silicone, Dow. (black, grey or white colour) Shore A 40

.7 Type S-5: Acoustical Sealant, interior, non-skimming, non-hardening, simple component synthetic rubber sealant.

.1 Acceptable Materials:
.1 Metaseal, Chemtron.
.2 AIS 919, Pecora
.3 Acoustical Sealant, Tremco.

.8 Type S-6: Multi-component polyurethane sealant, chemical curing, exterior wall sealant.

.1 To ASTM C920: type M; grade NS; class 50; use T, NT, M, A, O.
.2 Acceptable Materials:
.1 MasterSeal NP2, BASF.
.2 Thioplast 400, Chemtron.
.3 830, Isoflex.
.4 Dynatrol II, Pecora
.5 Sikaflex 2c NS, Sika.
.6 Dymeric, Tremco.

.9 Type S-7: Single-component polyurethane or hydrid sealant, non-sag, for general construction.

.1 To ASTM C920: type S; grade NS; class 25; use NT, M, A, O, T.
.2 Acceptable Materials:
.1 Masterseal NPI or 150, BASF Sonneborne.
.2 Multiflex, Chemtron.

.3 H1 or S1, Loxon
.4 Mapeflex P1, MAPEI Inc.
.5 Dynatrol I-XL Hybrid, Pecora
.6 Sikaflex 1a or SikaHyflex 150LM, Sika.
.7 Dymonic FC, Tremco Inc.
.8 Pourthane NS, W.R. Meadows Canada.

.10 Type S-8: Horizontal joint sealant, two component, self-levelling.

.1 To ASTM C920: type M; grade P; class 25; use T, M, O.
.2 Acceptable Materials:
.1 Sonolastic SG, BASF Sonneborn.
.2 Mapeflex P2 SL, MAPEI Inc.
.3 Dynatrol II, Pecora
.4 Sikaflex 2c SL, Sika.
.5 THC-901, Tremco Inc

.11 Type S-9: One part moisture curing, low modulus polyurethane sealant for sealing joints in level and slightly slope surfaces conforming to ASTM C920, type S, grade P, class 50, use T, M, A, O, MC-1-25-B-N.

.1 Acceptable Materials:
.1 Sonolastic SL 1, BASF Sonneborn.
.2 Urexpan NR-201, Pecora
.3 Vulkem 45 SSL, Tremco Inc.

.12 Type S-10: Control joint sealant, two-component, epoxy-urethane, self-levelling, load bearing saw cut or preformed control joints.

.1 Basis-of-Design Materials:
.1 Loadflex, Sika.

.13 Type S-11: Control Joint Sealant, two component, polyurea based, load bearing, self levelling sealant.

.1 Acceptable Materials:
.1 Euco Qwikjoint 200, Euclid Chemical.
.2 Planiseal Rapid Joint 15, MAPEI Inc.

.14 Type S-12: Control Joint Sealant, two component, semi-rigid epoxy, load bearing, self levelling sealant.

.1 Acceptable Materials:
.1 Dural 340 SL, Euclid Chemical.
.2 Rezi-Weld Flex, WR Meadows.

.15 Type S-13: Single-component polyurethane sealant, medium-modulus, non-sag, low-VOC, UV stable.

.1 To ASTM C920: type S; grade NS; class 50; use NT, T, M, A, O, I.
.2 Acceptable Materials:
.1 Multiflex, Chemtron.
.2 Vulkem 116, Mameco.

.3 Dymonic 100, Tremco Inc.

2.5 COLOURS

.1 Colours: To match adjacent materials, as selected by Consultant, from manufacturer's standard colour range. Confirm with Consultant prior to application.

2.6 SEALANT SELECTION

.1 Where no specified type of sealant is shown or specified, confirm sealants specified in this Section appropriate for its location.

.2 Make sealant selections consistent with manufacturer's recommendations.

.3 Use acrylic sealant Type S-1 only on the interior and only in situations where little or no movement can occur.

.4 Use mould & mildew resistant silicone sealant Type S-2 for non-moving joints in washrooms and kitchens. Do not use on floors.

.5 Use silicone general construction sealant Type S-3 or Type S-6 and S-7 for all joints, interior and exterior, where no other specific sealant type specified. Use Type S-6 for joints over 19 mm.

.6 Use structural glazing silicone Type S-4 for sealing glass, interior and exterior.

.7 Use acoustical sealant Type S-5 and air seal sealant Type S-3 only where they will be fully concealed and only where no constant or consistent air pressure difference will exist across the joint.

.8 Use multi-component sealant type S-6, primed penetration element surfaces other than concrete, for mechanical and electrical service penetrations in concrete foundation walls.

.9 Use multi-component sealant Type S-8 for horizontal joint sealant of plaza, floors and decks, exterior areas only, subject to pedestrian and vehicular traffic.

.10 Use polyurethane, semi-self levelling sealant Type S-9 for in expansion joints in sidewalks, plazas, floors and other pedestrian and vehicular horizontal surfaces with slopes up to 6%.

.11 Use control joint sealant S-10 as filler for interior, horizontal saw cut or preformed control joints where joints are subject to load bearing conditions.

.12 Use control joint sealant S-11 as filler for interior, horizontal saw cut or preformed control joints, where joints are subject to low temperatures (freezer floors) and where joints require nosing support.

.13 Use control joint sealant S-12 as filler for interior, horizontal saw cut or preformed control joints where joints are subject to thermal shock conditions, traffic loops, and where a high bond strength is required.

.14 Use sealant S-13 for sealing exterior holes and penetrations around pipes and other services passing through concrete foundations and requiring greater movement capability.

2.7 ACCESSORIES

.1 Preformed Compressible and Non-Compressible back-up materials that are non-staining, compatible with joint substrate, sealants, primers, and other joint fillers,

and are approved for applications indicated by sealant manufacturer based on site experience and laboratory testing.

.1 Rod Type Sealant Backings:

.1 ASTM C1330, Type C (closed cell material with a surface skin), Type O (open cell material) or Type B (bi-cellular material with a surface skin).

.2 Use any of the preceding types, as approved in writing by joint sealant manufacturer for joint application indicated.

.3 Size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

.4 Non-adhering to sealant, to maintain two sided adhesion across joint.

.5 Allow backer rod to breathe outside of packaging 24 hours before application.

.2 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.

.3 Bond Breaker Tape.

.1 Polyethylene bond breaker tape or other tape recommended by sealant manufacturer which will not bond to sealant.

.2 Preformed Sealants

.1 Preformed Silicone Sealant System: Manufacturer's standard system consisting of pre-cured low modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral curing silicone sealant for bonding extrusions to substrates:

.1 Acceptable Materials:

.1 Dowsil; 123 Silicone Seal, Dow.

.2 UltraSpan US1100, GE Silicones

.3 Spectrem Simple Seal, Tremco.

.3 Primer: Non-staining type as recommended by sealant manufacturer.

.4 Joint Cleaner: Non-corrosive solvent type recommended by sealant manufacturer for applicable substrate materials.

.5 Bond Breaker: Pressure-sensitive plastic tape that will not bond to sealants.

Part 3 Execution

3.1 PROTECTION

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

3.2 EXAMINATION

.1 Carefully inspect surfaces, materials to receive sealants and verify they are physically capable of retaining sealant bond.

.2 Verify that fillers and backing provided under other Sections properly installed.

.3 Grind joint surfaces if required to achieve adequate surface preparation.

3.3 PREPARATION

.1 Prepare surfaces in accordance with manufacturer's instructions.

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

.3 Maintain workmanship of highest quality in accordance with best trade practice.

.4 Ensure that joint forming materials are compatible with sealant.

.5 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work. Wire brush loose materials and other foreign matter which might impair adhesion of sealant.

.6 Use air stream to blow out dirt and water from crevices.

.7 Ensure joint surfaces are dry and frost free.

.8 Prime all porous material (e.g. wood, masonry, concrete, ceramic or paver tile, etc).

.9 Prime other joints when recommended by manufacturer. Use a brush that will reach all parts of the joints. Mask adjoining surfaces with tape prior to priming to prevent staining.

3.4 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.

3.5 BACKUP MATERIAL

.1 Use backer rod as specified, to limit depth of sealant and to act as bond breaker at back of joint.

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

.3 Where depth of joint does not permit the use of backer rod apply paper masking tape to back of joint to act as bond breaker.

.4 Ensure that no joints are formed which are bonded on adjacent sides where there is any possibility of movement.

3.6 MIXING

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

3.7 APPLICATION

.1 Apply sealant in strict accordance with manufacturer's recommendations.

.2 For joints where movement is possible, apply backer rod to achieve a joint depth of one half the joint width but not less than 9 mm; for joints larger than 25 mm use a depth of 13 mm.

.3 Use pressure gun fitted with suitable nozzle. Use sufficient pressure to fill voids and joints solid.

.4 Form surface of sealant smooth, free from ridges, wrinkles, sags, or air pockets and imbedded impurities. Neatly tool surface to a slight concave appearance.

.5 Tool sealants to achieve air tight joints. Use wet tools as required.

.6 Ensure bead is solid, filling entire space between sides and bedding material, exerting sufficient pressure to obtain maximum bond, by allowing sealant to bulge out in advance of nozzle.

.7 Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature range.

.8 Seal perimeters of hollow metal door frames on both sides.

.9 Seal control joints in gypsum board and stucco, and junctures between interior partitions with exterior walls.

.10 Seal window and door frames around the inside perimeter, so that an airtight seal is obtained, as indicated on drawings.

.11 Seal joints in floors and walls and around service and mechanical and electrical fixture penetrations.

.12 Seal at all locations where dissimilar material meet.

.13 Curing

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.3 On porous surfaces allow sealant to cure overnight, and remove excess by light wire brushing.

3.8 CLEANING

.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.

.4 Correct staining and discolouring of adjacent surfaces as directed by Consultant.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes: Aluminum-framed glass doors, aluminum swing doors, hardware and aluminum brakeshapes as indicated on Drawings.

.2 Related Requirements:

.1 Section 05 50 00 – Metal Fabrications.

.2 Section 06 10 00 – Rough Carpentry.

.3 Section 07 92 00 – Sealants

.4 Section 08 71 00 – Door Hardware.

.5 Section 08 80 50 – Glazing

1.2 REFERENCES

.1 Reference Standards:

.2 Aluminum Association (AA):

.1 AA DAF-45-2003 (R2009), Designation System for Aluminum Finishes.

.3 American Architectural Manufacturers Association (AAMA)/Fenestration and Glazing Industry Alliance (FGIA):

.1 AAMA 609 & 610-15, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

.2 AAMA 611-20, Voluntary Specification for Anodized Architectural Aluminum.

.4 American National Standards Institute (ANSI)/Builders Hardware Manufacturers Association (BHMA):

.1 ANSI/BHMA A156.3-2020, Standard for Exit Devices.

.5 American Society for Testing and Materials International (ASTM):

.1 ASTM A240/A240M-22b, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.2 ASTM A653/A653M-22b, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.

.3 ASTM B209/B209M-21a, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.4 ASTM B221-21, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.5 ASTM B429/B429M-20, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

.6 ASTM C920-18, Standard Specification for Elastomeric Joint Sealants.

.7 ASTM D2000-18, Standard Classification System for Rubber Products in Automotive Applications.

.6 Canadian General Standards Board (CGSB):

.1 CAN/CGSB 1.40-97, Anticorrosive Structural Steel Alkyd Primer (Withdrawn).

.2 CAN/CGSB-12.1-2017, Safety Glazing.

.7 Canadian Standards Association (CSA Group):

.1 CSA-G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel., Includes Update No. 1 (2014).

.2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles, Includes Update No. 1 (2020).

.3 CSA W47.1:19, Certification of Companies for fusion Welding of Steel.

.4 CSA W47.2-11 (R2020), Certification of Companies for Fusion Welding of Aluminum, Includes Update No.1 (2011), Update No.2 (2012).

.5 CSA W59-18, Welded Steel Construction, Includes Errata (2020).

.6 CSA W59.2-18, Welded Aluminum Construction, Includes Errata (2020).

.8 The Society for Protective Coatings (SSPC)/National Association of Corrosion Engineers (NACE International):

.1 Surface Preparation Guidelines:

.1 SSPC-SP COM, Surface Preparation Commentary for Metal Substrates.

.2 SSPC-PS 12.01, One Coat Zinc-Rich Painting System. (Includes 2004 Revisions),

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with contractor's representative and Consultant in accordance with Section 01 11 00 – General Requirements, Project Meetings to:

.1 Verify project requirements.

.2 Review manufacturer's installation instructions and warranty requirements.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures:

.1 Submit manufacturer's printed product literature, specifications and data sheets.

.2 Submit WHMIS SDS - Safety Data Sheets. WHMIS SDS acceptable to Labour Canada and Health and Welfare Canada. Indicate VOC's for caulking materials during application and curing.

.2 Submit shop drawings in accordance with Section 01 11 00 – General Requirements, Submittal Procedures:

.1 Indicate materials and profiles and provide full-size, scaled details of components for each type of door and frame. Indicate:

.1 Interior trim and exterior junctions with adjacent construction.

.2 Junctions between combination units.

.3 Elevations of units.

.4 Core thicknesses of components.

.5 Type and location of exposed finishes, method of anchorage, number of anchors, supports, reinforcement, and accessories.

.6 Location of caulking.

.7 Each type of door system including location.

.8 Arrangement of hardware and required clearances.

.2 Submit catalogue details for each type of door and frame illustrating profiles, dimensions and methods of assembly.

.3 Manufacturer's Instructions: Submit manufacturer's installation instructions.

.4 Manufacturers' Field Reports: Submit two copies of manufacturers field reports.

1.5 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual specified in Section 01 11 00 – General Requirements, Closeout Submittals.

1.6 QUALITY ASSURANCE

.1 Obtain door and curtainwall materials from single manufacturer and/or ensure materials ordered and supplied are compatible with one another.

.2 Qualifications:

.1 Fabricator shall have minimum of five years successful experience in fabrication and erection of metal entrances of similar sizes, shapes and finishes to units required for this project and shall have ample facilities to produce, furnish and supply units as required for installation without delay to Work.

.3 Certifications:

.1 Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Preconstruction Testing:

.1 Certified test reports showing compliance with specified performance characteristics and physical properties.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Protection:

.1 Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings that will become hard to remove or leave residue.

.2 Leave protective covering in place until final cleaning of building.

.2 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.8 WARRANTY

.1 Provide manufacturers written guarantee, signed and issued in name of Owner, to replace following items for defective material and workmanship for time stated from date of Substantial Performance:

.1 Framing, panels and glazing: failure of performance requirements; two years.

.2 Sealed glass units: misting, dusting and seal failure; ten years.

.3 Sealants, caulking: failure to maintain seal; two years.

.4 Aluminum brakeshapes: oil canning and delaminating; two years.

.5 Finishes: failure specified finishes not attributable to normal weathering: 20 years.

.2 Anodized Aluminum: Provide 2 year for Class II finishes and 5 years for Class 1 Finishes that metal will not change colour more than 5 DEcmc per AAMA 611 and finished metal will not crack, blister, check, or peel.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:

.1 A & D Prevost Inc.

.2 Alumicor Limited.

.3 CRL/U.S. Aluminum

.4 Desa Glass

.5 Ferguson Corporation

.6 Kawneer Canada Ltd.

.7 Oldcastle Building Envelope

2.2 PERFORMANCE / DESIGN CRITERIA.

.1 Design glass, framing members, and anchorage to the requirements of the Ontario Building Code for wind, seismic, guard, and human impact loads.

.2 Engage Registered Professional Engineer to review structural design and attachment to building structure, seal shop drawings, carry out field reviews.

.3 Size glass thickness and glass unit dimensions to limits.

2.3 MATERIALS

.1 Aluminum extrusions: Aluminum Association alloy AA6063-T5, T6, or T54 anodizing quality.

.2 Sheet aluminum: Alloy 1100, F temper, 3 mm minimum thickness exposed sheet finished to match frames as specified.

.3 Steel reinforcement: to CSA-G40.20/G40.21, grade 300 W, shop painted with zinc chromate primer, thickness as required to support imposed loads and in no case less than 4.8 mm thick.

.4 Fasteners: aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum components of suitable size to sustain imposed loads. Do not use exposed fasteners except where unavoidable for application of hardware. Match finish of adjoining metal. Provide Phillips flat-head machine screws for exposed fasteners.

.5 Door bumpers: black neoprene, entrance manufacturer's standard.

.6 Isolation coating: bituminous paint, acid and alkali resistant asphaltic paint in accordance with MPI Architectural Painting Specification Manual approved product listing.

.7 Glazing materials: refer to Section 08 80 50 - Glazing.

.8 Glass Gaskets: silicone as specified in Section 08 80 50 - Glazing.

.9 Spacers for glazing, backpans/aluminum spandrels to be full length, purpose made, aluminum channels.

.10 Sealant: Including primer, joint filler, as specified in Section 07 92 00 - Sealants.

2.4 ALUMINUM FRAMES

.1 Interior Partition Aluminum Frames: provide frames with the following characteristics:

- .1 Rectangular design.
- .2 Profiles: 38.1 mm face profiles.
- .3 Trim: 38.1 mm with 9.5 mm return.
- .4 Throat size: 123.8 mm.
- .5 Glazing: to suit 6 mm monolithic/6 mm laminated glazing with SSG butt joints.
- .6 Sound Transmission: 46.
- .7 Basis-of-Design Materials:
  - .1 487 Series, CRL/U.S. Aluminum.

.2 Interior Frame Profile with 45 mm Sight Line: Nominal 45 mm x 60 mm, centre glazed, and as follows:

- .1 Basis-of-Design Materials:
  - .1 LiteSpace Interior Aluminum Framing, Special-Lite

2.5 ALUMINUM SWING DOORS

.1 Aluminum doors fabricated of rigid extruded rectangular aluminum tube cut and welded together and with internal reinforcing at corners. Some manufacturer's may have to modify their standard system to meet the minimum bottom rail size noted for standard door construction.

.2 Doors 45 mm thickness with 127 mm top rail and 165.1 mm bottom rail, standard interlock, meeting and 127 mm jamb stiles with 6 mm sealed unit safety glass, door sizes as scheduled.

.1 Acceptable Materials:

.1 2700, A & D Prevost Inc.

.2 600A Series, Alumicor.

.3 550 Series, CRL/US Aluminum.

.4 500 Series, Desa Glass.

.5 500 Series Wide Stile, Kawneer Canada Ltd.

2.6 HARDWARE MATERIALS

.1 Hardware as indicated on Drawings.

.2 Provide all hardware of each type from one manufacturer.

.3 Keying as indicated in Section 08 71 00 - Door Hardware.

2.7 ALUMINUM FINISHES

.1 Clear Anodized: Exposed aluminum surfaces shall be Aluminum Association (AA) Architectural Class I, AA-M12C22A41, clear anodized matching Kawneer #14.

.2 Isolation Coating

.1 Isolate aluminum from the following components, by means of isolation coating:

.1 Dissimilar metals except stainless steel, zinc, or white bronze.

.2 Concrete, mortar and masonry.

.3 Wood.

.3 Unexposed aluminum: Mill finish.

2.8 STEEL FINISHES

.1 Finish steel clips and reinforcing steel with steel primer to CGSB 1.40.

2.9 ALUMINUM BRAKESHAPES

.1 Shop laminate sheet aluminum to treated plywood backing over rigid insulation to profiles and sizes as indicated; Conceal plywood backing with aluminum.

.2 Brake aluminum to profiles prior to painting and/or anodizing (except clear anodized anodic oxide finish).

.3 Finish: To match window exterior exposed aluminum.

2.10 FABRICATION GENERAL

.1 Doors and framing to be by same manufacturer.

.2 Fit and assemble all Work in the shop insofar as practical.

.3 Reinforce members and joints with steel plates, bars, rods or angles for rigidity and strength as needed to fulfill performance requirements. Use concealed stainless steel fasteners for jointing which cannot be welded.

.4 Fit joints tightly and secure mechanically.

.5 Provide cut-outs and integral reinforcing as required to receive hardware.

.6 Separate unlike metals or alloys with a heavy coating of bituminous paint, separator gaskets or slip gaskets as required to prevent galvanic action.

.7 Provide weepholes in glazing recess and an airseal at interior glassline.

.8 Glazing to be held by pressure plate system with snap-on covers.

.9 Glass fabrication specified under Section 08 80 50 - Glazing.

Part 3 Execution

3.1 EXAMINATION

.1 Inspect Work and conditions affecting the Work of this Section. Proceed only after deficiencies, if any, have been corrected.

.2 Construct flashings built-in or integrated with system to divert moisture to exterior.

.3 Verify that anchors and setting or installing components provided by this Section to others for installation are properly located and installed.

.4 Verify that building air and vapour retarding membranes can be sealed to entrance units to maintain building envelope system integrity.

3.2 PREPARATION

.1 Obtain all dimensions from the job site.

.2 Provide data, dimensions and components, anchors and assemblies to be installed in proper time for installation.

3.3 INSTALLATION

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

.2 Install in accordance with the manufacturer's written instructions and the contract documents, plumb, true, level and rigid.

.3 Seal door threshold to back angle with liquid sill membrane to continue up jambs 150 mm, in line with door adapter, seal door adapter to curtain wall mullion. Seal thermally broken door thresholds with air seal compression gasket.

.4 Gun-apply three continuous beads of sealant under extruded aluminum thresholds. Make bead diameter sufficient to ensure a full width seal. Remove excess sealant.

.5 Conceal all anchors and fitments. Exposed heads of fasteners not permitted. All joints in exposed work to be flush hairline butt joints.

.6 Use anchors that will permit sufficient adjustment for accurate alignment. Make allowance for deflection of building structure.

.7 Build in and provide any supplementary reinforcing and bracing required by assembly loads and deflections.

.8 Secure Work adequately to structure in a manner not restricting thermal and wind movement. Make allowances for deflection of structure to ensure that structural loads are not transmitted to frames.

.9 Correctly locate and install flashings, deflectors and weep holes and verify proper drainage of moisture to exterior.

.10 Maintain alignment with adjacent Work.

.11 Isolate aluminum surfaces from adjacent dissimilar materials and metals with coatings of bituminous paint.

.12 Verify all stops, gaskets, splines, seals, etc. are perfectly aligned and ready to receive glazing and insulated panels as specified herein.

.13 Install glazing to details and instruction, using material specified.

.14 When a full mullion is used at perimeter framing, glazing, pocket may be stabilized for pressure plate with a block of rigid insulation.

.15 Glazing stops, snap covers and pressure plates shall be of a continuous length from corner to corner, and be fitted at corners.

.16 All preformed tapes or gaskets shall be of a continuous length corner to corner and shall be cut over length to prevent stretching. Joints, splices and corners shall be mitred and sealed.

.17 Clean all contact surfaces of glazing with solvent and wipe dry. Verify all glazing channels are clean, true to line, and free of dirt or debris and that weep and drainage vents are open.

.18 Rest glazing on setting blocks at 1/4 points.

.19 Seal full perimeter of door lights to provide and maintain the designed air/vapour/thermal barrier integrity and weather tightness.

.20 Pack fibrous insulation or low expansion foamed-in-place insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

.21 Hang doors using hardware scheduled. Adjust as required for proper operation.

.22 Install sealants and back-up materials in strict accordance with manufacturer's written instruction.

.23 Make cut-outs for hardware i.e.: card readers and push buttons.

3.4 CLEANING

.1 Perform cleaning of aluminum components in accordance with AAMA 609.1 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.

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

.3 Clean aluminum with damp rag and approved non-abrasive cleaner.

.4 Remove traces of primer, caulking, epoxy and filler materials; clean doors and frames.

.5 Clean glass and glazing materials with approved non-abrasive cleaner.

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

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes requirements for supply and installation for manually operated side folding grilles panels to extend the existing side folding security barrier.

.2 Related Requirements:

.1 Section 01 11 00 – General Requirements, Delegated Design

.2 Section 05 50 00 – Metal Fabrications

.3 Section 06 10 00 – Rough Carpentry

.4 Section 08 71 00 – Door Hardware

.5 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCES

.1 Reference Standards:

.1 Aluminum Association (AA):

.1 AA DAF 45-2003 (R2009), Designation System for Aluminum Finishes.

.2 American Architectural Manufacturers Association (AAMA) / Fenestration & Glazing Industry Alliance (FGIA):

.1 AAMA 609 & 610 -15, Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.

.2 AAMA 611-20, Voluntary Specification for Anodized Architectural Aluminum.

.3 AAMA 2603-22, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

.4 AAMA 2604-22, Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

.5 AAMA 2605-22, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

.3 American Society for Testing and Materials International (ASTM):

.1 ASTM A653/A653M-22, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM A666-15, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

.3 ASTM A924/A924M-22a, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

.4 ASTM B209/B209M-21a, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.5 ASTM B221-21, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.4 Canadian General Standards Board (CGSB):

.1 CAN/CGSB 12.1-2017, Safety Glazing.

.2 CAN/CGSB 12.12-M90, Plastic Safety Glazing Sheets (Withdrawn).

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Floor Flatness: Coordinate manufacturer's requirements for floor flatness and level required.

.2 Support Structure: Coordinate manufacturer's requirements for size and configuration of miscellaneous steel support beam required for attachment of track suspension system.

.3 Above Track Construction: Coordinate manufacturer's requirements for sound rated ceilings and plenums with other sections relating to ceiling construction; install sound barrier construction above partition track to maintain sound rating performance specified in this Section.

.2 Pre-installation meeting: one week prior to beginning work of this Section, with Contractor, Consultant, installer, manufacturer's representative to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Submit manufacturer's printed product literature, specifications and data sheet.

.2 Submit shop drawings in accordance with Section 01 11 00 – General Requirements, Submittal Procedures:

.1 Indicate assembly and instruction details, dimensions of fabrication, required clearances materials, finishes, and hardware.

.2 Retain a Professional Engineer, registered in the Province of the work, for the design, fabrication, and erection of the structure required for this Section in accordance with applicable Building Code and Contract Documents requirements including, but not limited to, the following:

.1 Seal and signature to shop drawings and design submittals.

.2 Field review of installed components.

.3 Completion of Letters or Commitment and Supervision specified in Section 01 11 00 – General Requirements, Delegated Design.

.3 Submit samples in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Submit two samples of each type of exposed finish required in sizes as follows:

.1 Door Curtain: 300 mm long.

.2 End Post: 150 mm long.

.3 Intermediate Post: 150 mm long.

.4 Lead Post: 150 mm long.

.5 Floor Guide: 150 mm long.

.6 Panel Inserts: 300 mm long.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for side folding grilles and closures and hardware for incorporation into manual specified in Section 01 11 00 – General Requirements, Closeout Submittals.

.2 Provide Owner training on operation and basic maintenance procedures.

.3 Provide a detailed spare parts list.

1.6 QUALITY ASSURANCE

.1 Qualifications: Provide proof of qualifications when requested by Consultant:

.1 Manufacturer: A company specializing in the manufacturing of folding grille products required for the project with a minimum of ten years documented experience.

.2 Installers: Use installers that have completed manufacturer's authorized training program and that certified to install and maintain units delivered for this Project.

.3 Source Limitations: Obtain products through one source from a single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

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

.2 Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

.3 Store materials in a dry, warm, ventilated weathertight location.

.4 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.8 SITE CONDITIONS

.1 Site Measurements: Verify dimensions by site measurements before fabrication and indicate measurements on shop drawings where overhead coiling grilles are

required to fit within openings; coordinate fabrication schedule with construction progress to avoid delaying the Work.

.2 Established Dimensions: Establish dimensions and proceed with fabricating overhead coiling grilles without site measurements where site measurements cannot be made without delaying the Work; coordinate construction to ensure that actual site dimensions correspond to established dimensions.

1.9 WARRANTY

.1 Provide manufacturers standard 5 year warranty including electric operation equipment.

Part 2 Products

2.1 MATERIALS

.1 Aluminum Extrusions: ASTM B221, alloy 6063-T5.

.2 Aluminum sheet metal: mill finish plain utility sheet.

.3 Anodized aluminum sheet metal: plain anodizing quality.

.4 Stainless Steel Sheet, Strip, Plate, and Flat Bars: ASTM A666, Type 304.

2.2 DOOR CURTAIN

.1 Existing side folding door to be reinstalled and extended using new panels and tracks to match existing.

2.3 HARDWARE

.1 Hardware: To match existing.

2.4 OPERATION

.1 Equip grille for operation by:

.1 Hand, install handles.

2.5 FINISHES

.1 Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes and to match existing.

.1 Clear Anodized Finish:

.1 Class I Finish: Architectural Class I, clear coating 0.018 mm or thicker in accordance with AAMA 611.

.2 Mill finish is acceptable for non-exposed components.

Part 3 Execution

3.1 INSTALLATION

.1 Install side folding grilles, operating equipment and required hardware, jamb and head moulding strips, anchors, inserts, hangers, and equipment supports in

accordance with shop drawings, manufacturer's written instructions and as specified.

.2 Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

.3 Install master keyed cylinder specified in Section 08 71 00 - Door Hardware.

.4 Adjust operating components to ensure smooth opening and closing of side coiling grilles and closures.

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

3.2 FIELD QUALITY CONTROL

.1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its product[s], and submit written reports in acceptable format to verify compliance of Work with Contract.

.2 Manufacturer's field services: 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 at stages listed:

.1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

.3 Upon completion of Work, after cleaning is carried out.

.4 Obtain reports within three days of review and submit.

3.3 CLEANING

.1 Perform cleaning of aluminum components in accordance with: AAMA 609 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.

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

.3 Clean aluminum and stainless steel with damp rag and approved non-abrasive cleaner in accordance with manufacturer's instructions.

.4 Remove traces of primer, caulking materials; clean grilles and frames.

.5 Clean glass and glazing materials with approved non-abrasive cleaner.

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

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Related Requirements:

.1 Section 08 11 16 – Aluminum Doors and Office Front

.2 Division 26: Electrical wiring for magnetic strikes, electric releases and electric locks.

1.2 REFERENCES

.1 Reference Standards:

.1 American National Standards Institute (ANSI)/Builders Hardware Manufacturers Association (BHMA)

.1 BHMA 2012 Certified Products Directory.

.2 BHMA A156 Standards Set

.2 Canadian Standards Association (CSA Group):

.1 CSA B651-18, Accessible Design for the Built Environment, Includes Errata 1 (2020)

.3 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA):

.1 CSDFMA Canadian Metric Conversion Guide for Steel Doors and Frames.

.4 Door and Hardware Institute (DHI):

.1 DHI TDH-003-20 Sequence and Format for the Hardware Schedule (2019).

.2 DHI TDH-007-20, Installation Guide for Doors and Hardware (2020).

.3 DHI TDH-009-20, Recommended Location for Architectural Hardware for Standard Steel Frame – Updated 2020.

.4 DHI WDHS-3, Recommended Hardware Locations for Wood Flush Doors, 1996.

.5 International Code Council (ICC):

.1 ICC A117.1-2017, Accessible and Usable Buildings and Facilities.

.6 Underwriters Laboratory of Canada (ULC):

.1 ULC S133, Standard Method of Tests for Door Closers Intended for Use with Swinging Doors (CAN/ULC-S133:2016).

.2 ULC/ORD-C14(e)-M1985 Guide for Hardware for Fire Doors and Emergency Exits.

.3 ULC/ORD-C228-1995 Door Closers and Holders.

.4 ULC C305-M1972 Panic Hardware.

.5 ULC 132, Tests for Emergency Exit and Emergency Fire Exit Hardware (CAN/ULC-S132-2016).

.6 ULC 533, Standard for Egress Door Securing and Releasing Devices (CAN/ULC-S533-15).

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings: convene pre-installation meeting in accordance with Section 01 11 00 – General Requirements, Project Meetings to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's warranty requirements.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures:

.1 Submit manufacturer's printed product literature, specifications and data sheets.

.2 Submit samples in accordance with Section 01 11 00 – General Requirements, Submittal Procedures:

.1 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.

.2 After approval samples will be returned for incorporation in the Work.

.3 Hardware List:

.1 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

.2 Coordinate Division 28 Security Contractor, Division 26 Electrical Contractor and Division 8 Door and Hardware Contractors to jointly prepare, submit, and obtain certified approval from the Consultant shop drawings for work related to door access control systems prior to undertaking the on-site work. The joint submission will clarify and assign responsibility between these Divisions for labour and materials associated with the supply and installation of electronic and physical components for doors and access control. An individual drawing shall be submitted in Cadd format for each door within the project scope depicting both public and secure side of door and arrangement of access control and security components, conduit, and cabling.

.4 Keying Schedule:

.1 Submit keying schedule prepared by or under the supervision of qualified Architectural Hardware Consultant (AHC), detailing Owner's final keying instructions for locks, including schematic keying diagram and index each key set to unique door designations.

.5 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for door closers, locksets, door holders electrified hardware and fire exit hardware for incorporation into manual specified in Section 01 11 00 – General Requirements, Closeout Submittals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 01 11 00 – General Requirements, Closeout Submittals.

.2 Supply two sets of wrenches for door closers locksets and fire exit hardware.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.

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

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

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

.1 Deliver, store, handle and protect materials in accordance with Section 01 11 00 – General Requirements, Common Product Requirements.

.2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

.2 Storage and Protection:

.1 Store finishing hardware in locked, clean and dry area.

.3 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.9 WARRANTY

.1 Provide written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

.2 Failures include, but are not limited to, the following:

.1 Structural failures including excessive deflection, cracking, or breakage.

.2 Faulty operation of operators and door hardware.

.3 Deterioration of metals, metal finishes, and other materials beyond normal weathering.

.3 Warranty Period: From date of Substantial Performance, and as follows:

Hardware Type	Warranty Term
Locks, latches and cylinders	Two years
Closers	25 years
Hinges	One year
Panics	Three years
Miscellaneous	One year
Electrical Hardware:	Five years

Part 2 Products

2.1 HARDWARE -GENERAL

.1 Use one manufacturer's products only for similar items.

2.2 DOOR HARDWARE

.1 Door Hardware Sets as indicated on Drawings.

2.3 FASTENINGS

.1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.3 Exposed fastening devices to match finish of hardware.

.4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.

.5 Use fasteners compatible with material through which they pass.

2.4 KEYING

.1 Doors, padlocks and cabinet locks to be keyed as directed. Prepare detailed keying schedule in conjunction with Consultant.

.2 Provide keys in duplicate for every lock in this Contract.

.3 Provide three masterkeys for each MK or GMK group.

.4 Stamp keying code numbers on keys and cylinders.

.5 Provide Keying as follows:

.1 For Varsity Lounge Entrance door, override security key, provided by SLD

.2 For Varsity Operation Office Door, key to match existing Admin office at the athletics area, CDA key, provided by SLD

.3 For Coaches' Office, key to match existing GYM door, CDA4 key, provided by SLD

.6 Provide all permanent cores and keys to Owner.

Part 3 Execution

3.1 INSTALLATION GENERAL

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

.2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.3 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 HARDWARE

.1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Conversion Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.

.2 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.3 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of quick type fasteners, unless specifically supplied by manufacturer, is unacceptable.

.4 Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

.1 Standard Steel Doors and Frames: DHI TDH-009 Recommended Locations for Architectural Hardware for Standard Steel Frame.

.2 Wood Doors: DHI WDHS.3, Recommended Locations for Architectural Hardware for Wood Flush Doors.

.3 Where indicated to comply with accessibility requirements, comply with ICC A117.1 Accessible and Usable Buildings and Facilities.

.4 Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

.5 Remove construction cores when directed by Owner, install permanent cores and check operation of locks.

3.3 ADJUSTING

.1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.

.2 Lubricate hardware, operating equipment and other moving parts.

.3 Adjust door hardware to provide tight fit at contact points with frames.

3.4 CLEANING

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

.2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.

.3 Remove protective material from hardware items where present.

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

3.5 CLOSEOUT ACTIVITIES

.1 Demonstration:

- .1 Keying System Setup:
- .2 Set up key control system with file key tags, duplicate key tags, numerical index, alphabetical index and key change index, label shields, control book and key receipt cards.

.2 Maintenance Staff Briefing:

- .1 Brief maintenance staff regarding:
  - .1 Proper care, cleaning, and general maintenance of projects complete hardware.
  - .2 Description, use, handling, and storage of keys.
  - .3 Use, application and storage of wrenches for door closers, locksets, and fire exit hardware.

.3 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

- .1 Tempered safety glass.
- .2 Ultra clear tempered safety glass.
- .3 Smoke baffle
- .4 Accessories: Sealant, setting blocks, Glazing tape, Screws, bolts, fasteners, Lock-strip gaskets:

.2 Related Requirements:

- .1 Section 07 92 00 – Sealants
- .2 Section 08 11 16 – Aluminum Doors and Office Front

1.2 REFERENCES

.1 Reference Standards:

- .1 American National Standards Institute (ANSI):
  - .1 ANSI Z97.1-2015 (R2020), Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- .2 American Society for Testing and Materials International (ASTM):
  - .1 ASTM C542-05 (2017), Specification for Lock-Strip Gaskets.
  - .2 ASTM D2240-15(2021), Standard Test Method for Rubber Property - Durometer Hardness.
  - .3 ASTM E84-22, Standard Test Method for Surface Burning Characteristics of Building Materials.
- .3 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-12.1-2017, Safety Glazing.
  - .2 CAN/CGSB 12.20-M89, Structural Design of Glass for Buildings. (Withdrawn)
- .4 Fenestration and Glazing Industry Alliance (FGIA):
- .5 Glazing Association of North America (GANA):
  - .1 GANA Glazing Manual – IYOG Edition 2022.
- .6 Insulating Glass Manufacturers Alliance (IGMA).
- .7 Underwriters Laboratories ECOLOGO Certification Program (UL):
  - .1 UL 2761, Sealants and Caulking Compounds (formerly CCD-045) 2011.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Convene pre-installation meetings: one week prior to beginning work of this Section.

- .1 Verify project requirements.
- .2 Review installation conditions.
- .3 Co-ordinate with other building subtrades.
- .4 Review manufacturer's instructions and warranty requirements.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

- .1 Submit manufacturer's printed product literature, specifications and data sheet.
- .2 Submit electronic copy of WHMIS SDS - Safety Data Sheets. Indicate VOC's:
  - .1 For glazing sealant materials during application and curing.

.2 Submit shop drawings in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

- .1 Submit shop drawings for window glazing and include the following:
  - .1 Submit glass thermal and wind load stress analysis documenting adequate glass thickness and/or heat treatment to meet stresses generated. Thermal stress analysis to consider effects of external shading, conduction at glass edge, heat build-up and contribution of Low-E coatings.
- .2 Shop drawings shall be signed and sealed by a professional engineer qualified in the province of the Work, and who was responsible for their preparation.

.3 Submit samples in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

- .1 Submit 300 mm x 300 mm size of each glazing type. Consultant reserves the right to change type and colour of glass after review of submitted samples.

.4 Certificates: Submit proof of FGIA (formerly IGMAC) certification for insulating glass units, including component codes.

.5 Manufacturer's Instructions: Submit manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

.1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 11 00 – General Requirements, Closeout Submittals.

1.6 QUALITY ASSURANCE

.1 Manufacturer’s technical recommendations:

- .1 Perform glazing work in accordance with written recommendations from the glass manufacturer or glass fabricator.
- .2 Certify glass compatibility with glazing materials (i.e. insulating glass sealants, structural sealants and silicones, gaskets, setting blocks, etc.).
- .3 Designs to be analyzed for thermal stress and wind/snow loads.
- .4 Provide shop inspection for glass.

.2 Window fabricator qualifications: shall be a member in good standing of the Ontario Glass And Metal Association (OGMA) and adhere to the rules and regulations for workmanship, training and personnel as set forth by the association.

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

.1 Provide testing and analysis of glass under provisions of Section 01 11 00 – General Requirements, Quality Control.

.2 Provide shop inspection and testing for glass.

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

.5 Glass panels in doors, lites and windows shall have a permanent label located in the lower right-hand side of the glass unit in accordance with CAN/CGSB-12.1

.6 Mock-ups:

.1 Construct mock-ups in accordance with Section 01 11 00 – General Requirements, Quality Control.

.2 Construct mock-up to including glazing.

.3 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.4 Locate where directed.

.5 Allow 24 hours for inspection of mock-up before proceeding with work.

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

1.7 SITE CONDITIONS

.1 Install glazing when ambient temperature is 4 degrees C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 11 00 – General Requirements, Common Product Requirements.

.2 Coordinate Work of this Section with Work of other Sections so as not to delay construction schedule.

.3 Deliver, store and handle all components to prevent damage.

.4 Provide secure, temporary, dry enclosed structure for storage of glass units.

.5 All individual cases of glass to be secured, blocked and braced to prevent falls.

.6 Replace any broken, scratched, or damaged materials at Contractor’s expense.

.7 Protect all exposed surfaces from stain, discolouration, corrosion, and other abuse.

.8 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.9 WARRANTY

.1 Provide manufacturers guarantee for the following types of glass listed, against defects in materials and workmanship for the period indicated, commencing from the date of Substantial Performance of Work.

.1 Provide warranty for glazing to include in maintenance manuals as specified in Section 01 11 00 – General Requirements, Closeout Submittals.

Part 2 Products

2.1 MANUFACTURERS

.1 Basis of Design products are named in this Section; additional manufacturers offering similar setting systems may be incorporated into the work provided they meet the performance requirements established by the named products.

.2 Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

.1 Vision Glass:

.1 AGC Flat Glass North America (formerly AFG or AFGD).

.2 AHC Glass (formerly Visteon).

.3 Cardinal Glass Industries Inc.

.4 Guardian Glass.

.5 Hartung Glass Industries

.6 Pilkington Glass of Canada.

.7 Prelco Inc.

.8 Vitro Architectural Glass (formerly PPG Industries).

.9 Schott Glass AG.

2.2 PERFORMANCE / DESIGN CRITERIA

.1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads as measured in accordance with ANSI/ASTM E330/E330M and in accordance with CAN/CGSB-12.20.

.3 Limit center-of-glass deflection to the smallest of:

.1 Displacement associated with the structural capacity of the glazing unit.

.2 L-100, where L is the shortest side dimension of the unit measured in inches.

.3 Or 19 mm.

2.3 MATERIALS

.1 Ultra Clear Glass: high visible light transmission, low iron composition and as follows:

.1 Type: 1-Tempered.

.2 Thickness: as indicated on Drawings.

.3 Acceptable Materials:

.1 Krystal Klear, AGC.

.2 Ultra-White, Guardian Industries.

.3 Opti-White, Pilkington.

.4 Starphire, PPG Industries Inc.

2.4 SMOKE BAFFLES

.1 Aluminum smoke baffle shoe to hold 13 mm tempered glass and with 9.5 mm roll-in spline to both sides of glass.

.2 Fasteners: steel stainless screw & rigid nylon grommet

.3 Structural Sealant: clear silicone sealant between each pane of glass.

.4 Finish: Clear Anodized.

.5 Basis of Design Material:

.1 Aluminum Smoke Baffle B5B0RBC, CR Lawrence

2.5 ACCESSORIES

.1 Sealant: in accordance with Section 07 92 00 – Sealants.

.2 Setting blocks: Neoprene, EPDM, or Silicone, 80-90 Shore A durometer hardness to ASTM D2240, length to suit glazing method, glass light weight and area.

.3 Glazing tape:

.1 Preformed butyl compound with integral resilient tube spacing device, ten-fifteen Shore A durometer hardness to ASTM D2240; coiled on release paper; black colour.

.2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25%, to effect an air and vapour seal.

.4 Screws, bolts and fasteners: Type 304 stainless steel.

.5 Glass presence markers: easily removable, non-residue depositing.

.6 Lock-strip gaskets: to ASTM C542.

2.6 FABRICATION

.1 Verify glazing dimensions on Site.

.2 Clearly label each glass light with maker's name, weight, quality, type and certification number. Do not remove labels until after work has been reviewed by Engineer.

.3 Accurately size glass to fit openings allowing the clearances shown on the following tables:

.1 Minimum glass clearances:

	Thickness	Edge Clearance	Face Clearance
(1)	2 mm	3 mm (a)	1.5 mm
(2)	3 mm	3 mm (a)	3 mm
(3)	4 mm	3 mm (a)	3 mm
(4)	5 mm	3 mm (a)	3 mm
(5)	6 mm	5 mm	3 mm
(6)	6 mm	6 mm	3 mm
(7)	over 6 mm	6 mm or 3/4 times the glass thickness, whichever is greater	

(a) where any dimension of glass exceeds 760 mm increase minimum edge clearance by 1.5 mm.

.4 Bite of glass edge on stop:

.1 Up to 1270 mm united size: 6 mm minimum.

.2 1270 mm to 2540 mm united size: 10 mm minimum.

.3 Over 2540 mm united size: 13 mm minimum.

Part 3 Execution

3.1 EXAMINATION

.1 Verify that openings for glazing are correctly sized and within tolerance.

.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.2 PREPARATION

.1 Ensure all glazing rebates smooth and true, free of projections nails, screws, fastenings properly set to prevent contact with glass.

.2 Ensure all stops, splines, glazing accessories provided are accurately cut to length and proper size and type for specific glazing.

.3 Clean contact surfaces with solvent and wipe dry.

.4 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.5 Prime surfaces scheduled to receive sealant.

3.3 GENERAL INSTALLATION

.1 Install work in accordance with the Quality Management provisions specified in this section and manufacturer’s written instructions.

.2 Size glass to Code requirements and verify glass for openings are correctly sized and are within allowable tolerances. Install glass with full contact and adhesion at perimeter. Maintain edge clearance recommended by glass manufacturer.

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

.4 Remove and replace glazing stops in original locations, using original fasteners, securely set and undamaged.

.5 Use setting blocks, spacers and, for wet glazing, shims, as required to properly support the glass, centred in place in the glazing space independent of the glazing materials and to uniformly distribute its load.

.6 Use a minimum of two setting blocks, located at the quarter points. Locate spacers at jamb edges of glass, uniformly spaced at 600 mm o.c. maximum, and 300 mm maximum from top to bottom.

.7 Handle and install heat absorbing glass in accordance with manufacturer's directions.

.8 Prevent nicks, abrasion and other damage likely to develop stress on edges.

.9 Set glass properly centred with uniform bite and face and edge clearance, free from twist, warp or other distortion likely to develop stress.

.10 Trim tape protruding more than 2 mm above stop.

.11 Leave labels on glass until it has been set and inspected and accepted. Leave glass whole and without cracks, scratches or other defects and with settings in perfect condition at completion. Remove rejected, broken or damaged glass due to defective materials or improper setting and replace with acceptable materials. Units producing distorted vision shall be rejected and replaced at no cost to the Owner.

.12 Remove, dispose of, and replace broken, cut and abraded glass.

.13 Install glass presence markers in two cross stripes extending from diagonal corners. Maintain markers until final clean-up.

3.4 INTERIOR

.1 Glazing materials and installation to meet Ontario Building Code requirements for fire rated separations where required; refer to drawings for locations of fire-rated separations.

.2 Arrange for installed glass to have labels facing the interior. Ensure that sufficient space is left within the glazing space to allow thermal movement of glass without imposing stress on the glass.

.3 Provide insulating glass units in sound attenuated partitions.

.4 Unless otherwise specified or indicated, interior glazing shall be dry glazing.

.5 Install extruded resilient channel gasket around entire perimeter of glass. Make tight butt joint at corners of lights. Place setting blocks at sill and spacers at both jambs as required to centre the unit in the frame. Place the unit into the frames and apply the stops against the gaskets. Tighten the screws or clips to obtain positive uniform pressure avoiding excessive pressure.

.6 Ensure rattle free cushioning.

.7 Install spacer shims at 600 mm o.c. to centre balustrade glazing in rebate space. Install shims 6 mm below sight line. Apply cap bead of glazing sealant to uniform line, flush with rebate sightline and tool to smooth appearance, both sides.

.8 Install two-sided frameless structural butt joint glass assemblies where indicated using tempered safety glass with slightly wet grinded kerf and polished butt-joint

edges for aesthetics. Ensure precise levelling of sill member achieved and provision made at head to accommodate deflection of structure. For glazing at head and sill use wet, dry, or wet/dry glazing systems. Position glazing so vertical edges spaced slightly apart and seal with clear, colourless, or coloured silicone sealant. At framing or rebate locations, provide silicone sealant in clear, colourless, or colour selected by Consultant. Ensure sealant flush with and does not protrude above glazing stop or rebate.

.9 Install wet glazing materials to obtain complete contact and adhesion over the full bite area of the unit and to be free from gaps, air bubbles and embedded foreign matter. Use primers where recommended by the glazing material manufacturer. Use sufficient bedding compound so that when glass is pressed into place, excess compound is forced well out around entire margin. Use shims to ensure maintenance of uniform face clearance. Where required on both sides of a unit, make shims coincident.

.10 Install glazing tape to ensure complete contact and adhesion over the full bite area of the unit. Make joints only at corners of the unit. Use preshimed glazing tape at glass installed with pressure plates. Fit tape accurately with tight joints, free from tension, gaps and cracks. After installation of the glass, the glazing tape shall not extend more than 3 mm above the line of the fixed stop. Remove and reglaze units where the glazing tape exceeds this tolerance.

.11 Gun in a heel bead of glazing compound ensuring a continuous seal between glazed element and frame.

.12 Finish gunned bead surfaces uniformly smooth and straight, to slope away from glass.

3.5 CLEANING

.1 At completion of Work, remove and dispose of all protections, clean down all exposed aluminum surfaces, replace all damaged members, including members with damaged finishes.

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

.3 Remove traces of primer, caulking.

.4 Remove glazing materials from finish surfaces.

.5 Remove labels after work is complete.

.6 Clean glass using approved non-abrasive cleaner in accordance with manufacture's instructions.

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

3.6 PROTECTION OF FINISHED WORK

.1 After installation, mark light with an "X" by using removable plastic tape or paste.

3.7 SCHEDULE

.1 Aluminum Doors:

.1 Interior: Single 10 mm clear low iron tempered safety glazing.

.2 Borrowed Light in Aluminum Frames:

.1 Single 10 mm clear low iron tempered safety glazed units.

.3 Other glass types as indicated on Drawings.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes equipment and services necessary for mechanical preparation of existing substrates to receive new flooring finishes.

.2 Related Requirements:

.1 Section 03 35 00 – Concrete Finishing.

.2 Section 09 05 23 – Common Work Results for Flooring Preparation: Floor levelling and toppings required for improved floor flatness tolerances relating to applied finishes.

1.2 REFERENCES

.1 Reference Standards:

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

.1 ASTM D4258-05 (2017), Standard Practice for Surface Cleaning Concrete for Coating.

.2 ASTM D4259-18, Standard Practice for Preparation of Concrete by Abrasion Prior to Coating Application.

.2 International Concrete Repair Institute (IRCI):

.1 IRCI Technical Guideline No. 310.2R-2013, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate work of this Section with requirements of floor levelling and topping materials specified in Section 09 05 23 – Common Work Results for Flooring Preparation for surface profile.

.2 Pre-Construction Meetings: Conduct a pre-construction meeting to discuss existing concrete slab condition, procedures proposed for substrate preparation, location of required on-site mock-ups and surface profile requirements for installation of levelling products in accordance with Section 01 11 00 – General Requirements, Project Meetings, attended by Consultant, Contractor, Subcontractor and other Subcontractors or Suppliers affected by work of this Section.

.3 Scheduling: Schedule work of this Section to occur during non-work hours in occupied buildings to minimize disturbance to adjacent spaces.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures:

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data: Submit product data sheets describing mechanical preparation methods and cleaning methods and equipment proposed for use on project.

.3 Informational Submittals: Provide the following submittals before starting any work of this Section:

.1 Dust and Water Control Plan: Submit written description of materials and procedures used to control and remove dust and water from work area, methods to prevent spread of dust and water to adjacent occupied spaces and to prevent contamination of HVAC systems.

1.5 QUALITY ASSURANCE

.1 Qualifications: Provide proof of qualifications when requested by Consultant:

.1 Installer: Use installer having experience in preparation of flooring substrates of similar extent and complexity as required for this Project, using equipment and methods to reduce risk of damage to substrates.

.2 Mock-Ups:

.1 Provide required Mock-Up in accordance with Section 01 11 00 – General Requirements, Quality Control, and as follows:

.1 Notify Consultant and others affected by work of this Section a minimum of 48 hours in advance of installation of work described in this Section.

.2 Mock-up minimum 10 m^2 area indicating typical surface preparation required for the Project, at location as directed by Consultant and agreed upon in advance; create a separate mock-up for each different surface profile required by floor levelling.

.3 Allow 24 hours for review of mock-up by Consultant and others affected by work of the Section before completing work of this Section.

.4 Mock-up will be reviewed for consistency of surface profile required by floor levelling.

.5 Acceptable mock-up will serve as standard for remainder of the Work required for the Project.

.1 Correct mock-up and request additional review by Consultant when changes are required.

.2 Mock-up will remain in place and serve as minimum acceptable standard for work of this Section and related Sections when accepted by Consultant.

Part 2 Products

2.1 EQUIPMENT

.1 Surface Preparation Equipment: Use equipment of a type recommended by Subcontractor that minimizes dust and water generation, and that provides surface profiles required by subsequent floor levelling, and as follows:

.1 CSP 2 through CSP 4 Surface Profiling: Abrasive blast or grinding type equipment with vacuum recovery systems to control dust and collect surface aggregate.

.2 CSP 3 through CSP 8 Surface Profiling: Dry shot blast type equipment with vacuum recovery systems to contained blast materials and collect surface aggregate.

.3 CSP 2 through CSP 10 Surface Profiling: Mechanical impact or high or ultra-high pressure water jet type equipment with aggregate and effluent recovery system.

.2 Limitations: Notify and obtain acceptance from Consultant where surface profiling required by floor levelling use of high or ultra-high pressure water jet, or mechanical impact methods that have moderate to high potential to cause microcracking before starting work of this Section:

.1 Consultant may consider alternate methods of floor preparation when less damaging methods are not practical based on site conditions or timing of work required by this Section.

Part 3 Execution

3.1 EXAMINATION

.1 Verify that work of others affected by this Section, or work required by this Section is complete before starting mechanical preparation and surface profiling and as follows:

.1 Confirm degree of floor profile require for installation of floor levelling specified in other Sections before starting work of this Section.

.2 Starting work of this Section denotes acceptance of site conditions and implementation of surface profile required of floor levelling required by other Sections.

3.2 PREPARATION

.1 Use methods that reduce potential for microcracking of concrete substrates, and that minimize the amount of water or residue clean-up.

.2 Prepare concrete substrate and create surface profile in accordance with ASTM D4259; clean concrete in accordance with ASTM D4258 using methods compatible with levelling, and as follows:

.1 Prepare surface profiles required by levelling in accordance with ICRI Technical Guideline No. 310.2.

.2 Acceptable substrate surfaces will be free of laitance, oil, grease, flooring adhesive, paint, and other surface contaminates capable of affecting bond of specified floor finishes to concrete substrate.

.3 Prepare surfaces to receive Self-Levelling Underlayment as specified in Section 09 05 23 - Common Work Results for Flooring Preparation to minimum CSP 3 or as otherwise required by Self-Levelling Underlayment manufacturer.

3.3 SITE QUALITY CONTROL

.1 Testing and Inspection Agency: Owner will appoint inspection and testing agency in accordance with Section 01 11 00 – General Requirements, Quality Control, and as follows:

.1 Notify Consultant, and inspection and testing agency with sufficient timing to allow reasonable opportunity for review; provide assistance and access to the Work.

.2 Inspection and testing will include visual inspection of completed substrate preparation to verify that contamination is removed and specified ICRI surface profile are achieved using ICRI standard rubber mold for visual comparison.

.2 Non-Conforming Work: Repair work that does not meet specified ICRI surface profile at no additional expense to the Owner.

3.4 PROTECTION

.1 Protect prepared substrates from contamination; re-clean substrates that are contaminated by construction operations prior to installation of specified floor levelling.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes requirements for preparation of new concrete slabs and existing slabs to receive applied flooring for installation required flatness, and levelness. This Sections applies as follows:

.1 New concrete slabs that meet the requirements specified in Section 03 35 00 - Concrete Finishing but require further preparation to meet substrate requirements for flooring finishes specified in various Division 09 Specification Sections.

.2 Related Requirements:

.1 Section 09 05 13 – Mechanical Preparation of Flooring Substrates: Preparation of concrete substrates to receive self-levelling underlayment.

.2 Section 09 65 00 – Resilient Flooring: Coordination with minimum requirements for substrate flatness, levelness and patching of surface imperfections that prevent achieving specified installation.

.3 Section 09 68 00 – Carpeting: Coordination with minimum requirements for substrate flatness, levelness and patching of surface imperfections that prevent achieving specified installation.

.4 Division 21 – Fire Suppression: Coordination of pipes and pipe fittings and other materials penetrating floor assemblies.

.5 Division 22 – Plumbing: Coordination of pipes and pipe fittings and other materials penetrating floor assemblies.

.6 Division 23 – Heating, Ventilation and Air Conditioning: Coordination of ductwork and other materials penetrating floor assemblies.

.7 Division 25 – Integrated Automation: Coordination conduit and other materials penetrating floor assemblies.

.8 Division 26 – Electrical: Coordination conduit and other materials penetrating floor assemblies.

.9 Division 27 – Communications: Coordination conduit and other materials penetrating floor assemblies.

.10 Division 28 – Electronic Safety and Security: Coordination conduit and other materials penetrating floor assemblies.

1.2 REFERENCES

.1 Reference Standards:

.1 Southern Coast Air Quality Management District (SCAQMD):

.1 Rule 1113, Architectural Coatings, Amended 2016.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate compatibility of products specified in this Section with adhesive products specified in Section 09 65 00 - Resilient Flooring and Section 09 68 00 - Carpeting; submit Compliance Certification in accordance with items below.

.2 Pre-Construction Meetings: Arrange for Pre-Construction Meeting in accordance with Section 01 11 00 – General Requirements, Project Meetings, with

Contractor, Subcontractor, Subcontractors or suppliers affected by the Work of this Section, and Consultant to discuss installation requirements and site reviews required by the Consultant.

.3 Provide minimum 72 hours to Consultant before starting Work of this Section; increase notice period where time period spans weekends or statutory holidays.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Provide required information in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.2 Action Submittals: Provide the following submittals before starting any Work of this Section:

.3 Product Data: Submit product data for products specified indicating physical properties, performance characteristics, acceptability of substrates, application limitations and test results.

1.5 QUALITY CONTROL

.1 Qualifications: Provide proof of qualifications during the course of the Work of this Section:

.1 Manufacturer: Obtain specified products through one source from a single manufacturer or using materials from a secondary source that are acceptable to the manufacturer.

.2 Installer: Install using personnel experienced in installation of flooring preparation products specified in this Section who are trained, licenced or otherwise approved by the manufacturer.

.2 Certifications: Provide proof of the following during the course of the Work:

.1 Compliance Certification: Provide letter from flooring adhesive manufacturers stating that product selected from Acceptable Products specified in this Section is compatible with flooring adhesives specified in Sections listed in Related Requirements.

1.6 SITE CONDITIONS

.1 Ambient Conditions: Maintain air temperature and substrate temperature in accordance with manufacturer’s printed installation instructions.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Products Manufacturers: Subject to compliance with requirements specified in this Section; where multiple listings of manufacturers occur, use any of the following listed manufacturers’ Products in accordance with Section 01 11 00 – General Requirements, Product Options and Substitutions:

.1 Ardex Engineered Cements.

.2 Custom Building Products

.3 Laticrete Canada

.4 MAPEI Canada Inc.

.5 Sika Canada Ltd.

.6 W.R. Meadows of Canada.

.2 Unsolicited Substitutions: Consultant may consider additional manufacturers having similar products to Acceptable Products Manufacturers listed above during the construction period, provided they meet the performance requirements established by the named Products and provided they submit requests for substitution before starting any work of this Section:

.1 Do not use substitute materials to establish Bid Price.

.2 Apparent Substitutions that appear as a part of the Project without review and acceptance by the Consultant will be rejected, and replaced with one of the specified Products.

2.2 PERFORMANCE REQUIREMENTS

.1 Volatile Organic Compound (VOC) Limitations: Provide products for each site applied coating used within the building envelope (interior side of weatherproofing system) complying with the VOC Limits established by South Coast Air Quality Management District Rule #1113, Architectural Coatings.

2.3 PATCHING AND LEVELLING MATERIALS

.1 Underlayment: Cementitious, self-levelling, single component, polymer modified underlayment with manufacturer's recommended primer and crack repair materials; for application thicknesses to a minimum feather edge to 13 mm; interior grade and as follows:

.1 Acceptable Materials:

.1 K 15 Premium Self Levelling Underlayment, Ardex.

.2 CustomTech TechLevel 150, Custom Building Products

.3 Supercap SC500, Laticrete

.4 Novoplan® 2 Plus, MAPEI.

.5 Sikafloor Level 125, Sika.

.6 Sure-Flo ST, W.R. Meadows.

.2 Patching and Flash Patching Materials: Cementitious based, polymer modified, fine aggregate, single component, rapid curing, early strength floor patching compounds having high adhesion with manufacturer's recommended primer and surface profile; for application in thicknesses from 4 mm to 25 mm, and as follows:

.1 Acceptable Materials:

.1 SD-P, Ardex.

.2 CustomTech TechPatch MP, Custom Building Products

.1 Skim Lite, Laticrete.

.3 Planiprep SC, MAPEI Inc.

.4 SikaQuick 1000, Sika.

.5 Sealtight Meadow-Crete H, W.R. Meadows.

.3 Fine Finish Flash Patching Materials: Cementitious based, polymer modified, fine aggregate, single component, ultra-fast drying, early strength floor patching

compounds having high adhesion with manufacturer's recommended primer and surface profile; for application in thicknesses from 0 mm to 6 mm, and as follows:

.1 Acceptable Materials:

.1 SD-F Feather Finish®, Ardex.

.2 CustomTech Silk Patch, Custom Building Products

.3 Laticrete

.4 Planipatch®, MAPEI.

.5 Sika® Level SkimCoat CA, Sika.

.6 Sealtight Meadow-Patch® T1, W.R. Meadows.

2.4 ACCESSORIES

.1 Primer: Product compatible with and as recommended by patching and levelling product manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: Verify concrete substrates before beginning of installation of Products specified in this Section.

.1 Ensure concrete floors are dry by using test methods recommended by flooring manufacturer, and exhibit negative alkalinity, carbonization or dusting.

.2 Installation of products specified in this Section will denote acceptance of site conditions.

3.2 PREPARATION

.1 Surface Preparation – General:

.1 All substrates must be structurally sound, dry, solid and stable.

.2 Substrate must be clean and free of dust, dirt, oil, grease, paint, curing agents, concrete sealers, latex compounds, loosely bonded toppings, loose particles, laitance, adhesive residue, and any other substance or condition that may prevent or reduce adhesion.

.3 Ensure substrates are sound, level, free of cracks greater than 3 mm in width, and changes in elevation that may adversely affect installation.

.4 Ensure concrete is free of any negative hydrostatic pressure and excessive moisture.

.2 Prepare and mechanically profile concrete slabs in accordance with Section 09 05 13 - Mechanical Preparation of Flooring Substrates.

.1 Ensure substrate and ambient room temperatures are between 10°C and 35°C before application and for 72 hours after application.

3.3 INSTALLATION – UNDERLAYMENTS

.1 Mixing:

.1 Mix in a clean mixer in accordance with manufacturer's written instructions. Use appropriate mixing and delivery method in accordance with area to receive underlayment.

.2 If pump mixing is being used, periodically clean pump in accordance with manufacturer's written instructions.

.1 Do not overwater.

.2 Thoroughly mix with high-speed mixer (at about 1100 rpm) to a homogenous, smooth, lump-free consistency.

.3 Do not overmix; which could cause air to become trapped, shortening the pot life or cause pin holing during application and curing.

.3 Application:

.1 Place Product in a ribbon pattern to achieve a continuous flow of wet material to avoid trapping air or creating a cold joint.

.2 Set width of pour that is ideal for maintaining a wet edge throughout placement; adjust width of pour to maintain wet edge.

.3 Immediately after placing Product, spread with gauge rake; smooth surface after achieving required thickness.

3.4 INSTALLATION – PATCHING AND FLASH PATCHING PRODUCTS

.1 Mixing:

.1 Mix in a clean container in accordance with manufacturer's written instructions.

.2 Do not overwater.

.3 Thoroughly mix with low-speed mixer (at about 300 rpm) to a smooth, lump-free consistency.

.4 Do not mix more material than can be applied within eight to ten minutes.

.5 Avoid air entrapment and prolonged mixing, which will shorten pot life.

.2 Application:

.1 Select an appropriate flat-edge steel trowel.

.2 Immediately apply mixed patching and levelling products to substrate, according to the desired thickness. Do not exceed manufacturer's maximum single-coat thickness.

.3 Blend into the surrounding area and finish to the required smoothness

3.5 PROTECTION

.1 Protect from traffic dirt or dust from other trades until the final installation of the floor covering.

.2 Allow for extended periods of cure and protection when temperatures drop below 16°C and/or when relative humidity is higher than 70%.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Incudes:

.1 Interior gypsum wallboard of all types.
.2 Metal furring runners
.3 mineral fiber acoustical insulation
.4 Fibrous Glass Acoustical Insulation:
.5 Ceiling/wall access doors
.6 Accessories such as nails, screws, adhesives, casing beads, caps, mouldings, sealants, trims, gaskets and joint treatments.

.2 Related Requirements:

.1 Section 06 10 00 – Rough Carpentry
.2 Section 07 84 00 – Firestopping and Smokeseals
.3 Section 07 92 00 – Sealants
.4 Section 09 22 00 – Non-Structural Metal Framing
.5 Section 09 91 00 – Painting

1.2 REFERENCES

.1 Reference Standards:

.1 Aluminum Association (AA):

.1 AA DAF-45-2003(R2009), Designation System for Aluminum Finishes.

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

.1 ASTM A653/A653M-22, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
.2 ASTM C423-22, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
.3 ASTM C475/C475M-17(2022), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
.4 ASTM C514-04(2020), Specification for Nails for the Application of Gypsum Board.
.5 ASTM C557-03(2017), Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
.6 ASTM C612-14(2019), Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
.7 ASTM C635/C365M-22, Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
.8 ASTM C645-18, Standard Specification for Nonstructural Steel Framing Members.

.9 ASTM C665-17, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

.10 ASTM C840-20, Standard Specification for Application and Finishing of Gypsum Board.

.11 ASTM C919-22, Standard Practice for Use of Sealants in Acoustical Applications.

.12 ASTM C954-22, Standard 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.

.13 ASTM C1002-22, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.14 ASTM C1047-19, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.15 ASTM C1396/C1396M-17, Standard Specification for Gypsum Board.

.16 ASTM E84-22, Standard Test Method for Surface Burning Characteristics of Building Materials.

.17 ASTM E90-09(2016), Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.18 ASTM E413-22, Classification for Rating Sound Insulation.

.3 Association of the Wall and Ceiling Industry (AWCI).

.4 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-71.25-M88, Adhesives, for Bonding Drywall to Wood Framing and Metal Studs. (Withdrawn)

.2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction. (Withdrawn)

.5 Gypsum Association (GA):

.1 GA-214-2021 Levels of Finish for Gypsum Panel Products.

.6 South Coast Air Quality Management District (SCAQMD):

.1 SCAQMD Rule 1168-22, Adhesives and Sealants Applications.

.7 Underwriters' Laboratories of Canada (ULC):

.1 ULC 102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies. (ULC S102)

.2 ULC 114, Standard Method of Test for Determination of Non-Combustibility in Building Materials.

.3 ULC 702.1, Standard for Thermal Insulation Mineral Fibre for Buildings, Part 1: Material Specification (ULC S702.1).

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures:

.1 Submit manufacturer's printed product literature, specifications and data sheet for each product specified.

1.4 DELIVERY, STORAGE, AND HANDLING

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

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

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

.4 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.5 SITE CONDITIONS

.1 Ambient Conditions:

.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 MANUFACTURERS

.1 Acceptable Manufacturers:

.1 CertainTeed Gypsum Canada Inc.

.2 CGC Inc.

.3 Georgia-Pacific Canada, Inc.

2.2 GYPSUM MATERIALS

.1 Standard board: to ASTM C1396/C1396M and as follows:

.1 Type: regular and fire resistant.

.2 Size: 1220 mm x maximum practical length.

.3 Thickness: as indicated on Drawings.

.4 Ends: square cut.

.5 Edges: tapered.

.6 Acceptable Materials:

.1 Wallboard (Type X) CertainTeed.

.2 Sheetrock (Firecode), CGC Inc.

.3 Toughrock Gypsum Wallboard (Fireguard) Georgia-Pacific Canada, Inc.

.2 Sag Resistant Gypsum Board: to ASTM C1396/C1396M and as follows:

.1 Type: regular.

.2 Thickness: as indicated on Drawings.

.3 Acceptable Materials:

.1 Interior Ceiling Board, CertainTeed.

.2 Sheetrock Interior Ceiling Board, CGC Inc.

.3 CD Ceiling Board, Georgia-Pacific Canada, Inc.

2.3 FRAMING MATERIALS

.1 Studs and Tracks: as indicated in Section 09 22 00 - Non-Structural Metal Framing.

.2 Metal furring runners, hangers, tie wires, inserts, anchors.

.3 Drywall furring channels: 0.75 mm core thickness galvanized steel channels for screw attachment of gypsum board.

.4 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

2.4 INSULATION MATERIALS

.1 Mineral Fiber Insulation for Fire and Smoke Rated Assemblies: Un-faced preformed GreenGuard™ or formaldehyde free binder stone wool insulation meeting the requirements of ULC 702.1; having maximum flame spread and smoke developed of 0/0 in accordance with ULC 102 and ASTM E84 and being non-combustible in accordance with ULC 114 and as follows:

.1 Type: 1 to ASTM C665.

.2 Width: to friction fit in stud spaces.

.3 Thickness: to fill a minimum of 90% of the cavity thickness.

.4 STC Ratings: as indicated on Drawings.

.5 Acceptable Materials:

.1 Thermafiber SAFB, Owens-Corning Canada Inc.,

.2 AFB Acoustical Fire Batt, Rockwool Inc.

.3 Safe n Sound, Rockwool Inc.

.2 Fibrous Glass Acoustical Insulation for Non-rated Assemblies: Un-faced, preformed GreenGuard™ or formaldehyde free binder fibrous insulation meeting the requirements of ASTM C423, ASTM E90, ASTM E413 and ULC 702.1 and as follows:

.1 Type: One.

.2 Width: to friction fit in stud spaces.

.3 Thickness: to fill a minimum of 90% of the cavity thickness.

.4 Acceptable Materials:

.1 NoiseReducer, Sound Control Fibre Glass Batts, CertainTeed.

.2 Sound Shield Glass Fibre Batts, Johns Manville.

.3 Quietzone Acoustic Insulation, Owen-Corning Canada Inc.

2.5 CEILING/WALL ACCESS DOORS

.1 Architectural, flush mounting access panels for gypsum board installation, thickness and fire rating to match wall assembly, manufacturer's standard sizes selected to suit access requirements, complete with extruded aluminum frame, concealed hinge and a removable door panel, air tight gasket and screwdriver slot latch mechanism. Confirm proposed location and number of access doors with Consultant prior to installation.

.1 Non-Rated Access Doors and Frames:

.1 Concealed Flange Access Panel: Flush design frame with a drywall bead taping flange, specifically for use with gypsum board.

.1 Frame: 1.90 mm (14 gauge) galvanized steel.

.2 Door Panel: 1.52 mm (16 gauge) galvanized steel.

.3 Hinge: Fully concealed pin type hinge with 175 degree opening.

.4 Latch: Screwdriver operated cam latch.

.2 Exterior Flange Stainless Steel Access Panel: Surface mounted with exposed flange frame design. No. 4 polished finish 304 stainless steel.

.1 Frame: 1.21 mm (18 gauge) stainless steel.

.2 Door Panel: 1.52 mm (16 gauge) stainless steel.

.3 Hinge: Fully concealed pin type hinge with 175 degree opening.

.4 Latch: Screwdriver operated cam latch.

.2 Fire-Rated Access Doors and Frames:

.1 Concealed Flange Fire-Rated Wall Access Panel: Flush design frame with a drywall bead taping flange, specifically for use with gypsum board.

.1 Frame: 1.61 mm (14 gauge) galvanized steel.

.2 Door Panel: 1.99 mm (16 gauge) galvanized steel, uninsulated.

.3 Hinge: Fully concealed pin type hinge with 90 degree opening, self-closing device. Latch: Allen key operated latch with interior latch release.

.4 Rating: as indicated.

.2 Concealed Flange Fire-Rated Ceiling Access Panel: Flush design frame with a drywall bead taping flange, specifically for use with gypsum board.

.1 Frame: 1.99 mm (16 gauge) galvanized steel.

.2 Door Panel: 1.31 mm (18 gauge) galvanized steel, with high temperature insulation and 0.85 mm (22 gauge) metal liner.

.3 Hinge: Fully concealed pin type hinge with 90 degree opening, self-closing device.

.4 Latch: Allen key operated latch with interior latch release.

.5 Rating: as indicated.

.3 Acceptable Manufacturers:

.1 Access Panel Solutions.

.2 Acudor Products, Inc.

.3 Chicago Metallic/Rockfon Corporation.

.4 Nystrom Building Products Co.

2.6 FINISHES

.1 Paint: in accordance with Section 09 91 00 – Painting.

2.7 ACCESSORIES

.1 Nails: to ASTM C514.

.2 Steel drill screws: to ASTM C1002.

.3 Stud adhesive: to CAN/CGSB-71.25-M88.

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

.5 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, 0.5 mm base thickness galvanized metal to ASTM A653, perforated flanges, one piece length per location.

.6 Strippable Edge Trim: Extruded PVC with pre-masked L-shaped tape on trim with tear away protective serrated strip for removal after compound and paint is applied, for use at areas where gypsum butts aluminum frames and where gypsum butts concrete or concrete block.

.7 Sealants: in accordance with Section 07 92 00 - Sealants.

.8 Acoustic sealant: non-hardening, non-skinning, permanently flexible and having VOC content less than the VOC limits of State of California's South Coast Air Quality Management District Rule #1168 in accordance with Section 07 92 00 – Sealants.

.9 Firestopping: refer to Section 07 84 00 - Firestopping and Smokeseals for project as required for all new and existing surfaces, penetrations, irregular connections, and locations as described in Section 07 84 00 - Firestopping and Smokeseals.

.10 Joint Treatment Materials: Provide joint compound and accessory materials in accordance with ASTM C475/C475M and as follows:

.1 Joint Tape:

.1 Interior Gypsum Board: Paper.

.2 Joint Compound for Interior Gypsum Board: Vinyl based, non-asbestos, low dusting type compatible with other compounds applied on previous or for successive coats, and as follows:

.1 Pre-filling: Setting type taping compound.

.2 Embedding and First Coat: Drying type compound.

.3 Fill Coat: Drying type compound.

.4 Finish Coat: Drying type, sandable topping compound.

.5 Skim Coat: Drying type, sandable topping compound.

.6 Acceptable Materials:

.1 CertainTeed Dust Away.

.2 CGC Dust Control.

Part 3 Execution

3.1 ACOUSTIC ASSEMBLIES

.1 Maintain continuity of acoustic rated assemblies, including at junction with dissimilar adjacent materials and components such as beams, slabs, columns above ceilings and the like.

3.2 ERECTION

.1 Perform application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.

.2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.

.3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.4 Install work level to tolerance of 1:1200.

.5 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.

.6 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

.7 Furr gypsum board faced vertical bulkheads within and at termination of ceilings.

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

.9 Install gypsum 19 mm above finished floor at base of walls and seal joint for acoustic partitions to achieve STC rating as indicated.

.10 Seal fire rated partitions with fire caulking as indicated in Section 07 84 00 - Firestopping and Smokeseals and authority having jurisdiction.

.11 Install wall furring for gypsum board wall finishes in accordance with ASTM C840, except where specified otherwise.

.12 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.13 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

.14 Erect drywall resilient furring transversely across studs and joists spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.

.15 Install 150 mm continuous strip of gypsum board along base of partitions where resilient furring installed.

3.3 APPLICATION

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

.2 Apply single or double layer gypsum board to metal furring or framing using screw fasteners for first layer, screw fasteners for second layer. Maximum spacing of screws 300 mm on centre.

.1 Single-Layer Application:

.1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.

.2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.

.2 Double-Layer Application:

.1 Install gypsum board for base layer and exposed gypsum board for face layer.

.2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.

.3 Apply base layers at right angles to supports unless otherwise indicated.

.4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.

.3 No offset in exposed face of walls and partitions will be permitted because of single-ply and two-ply or three-ply application requirements.

.3 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components in accordance with ASTM C919. Seal full perimeter of cut-outs around electrical boxes, ducts, in partitions where perimeter sealed with acoustic sealant.

.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 on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.

.6 Install gypsum board with face side out.

.7 Do not install damaged or damp boards.

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

3.4 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 or using contact adhesive for full length.

.2 Install casing beads where ceilings abut dissimilar materials.

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

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

.5 Install shadow mould at gypsum board/ceiling juncture as indicated. Minimize joints; use corner pieces and splicers.

.6 Construct control joints of preformed units or two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.

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

.8 Locate control joints where indicated and at changes in substrate construction at approximate 10 m spacing on long corridor runs at approximate 15 m spacing on ceilings.

.9 Install control joints straight and true.

.10 Construct expansion joints at building expansion and construction joints. Provide continuous dust barrier.

.11 Install expansion joint straight and true.

.12 Splice corners and intersections together and secure to each member with three screws.

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

.1 Rigidly secure frames to furring or framing systems.

.14 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.

.15 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with GA-214:

.1 Levels of finish (at locations below or as indicated on drawings)

.1 Level 0: No taping, finishing or accessories required for areas of temporary construction.

.2 Level One: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable. Use at plenum areas above ceilings, in attics, or in concealed spaces.

.3 Level Two: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable. Use when gypsum is used as a substrate for tile.

.4 Level Three: Embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges and where areas are to receive a heavy coating of textured material.

.5 Level Four: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges and where light textures or wall coverings are to be applied.

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

.17 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.

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

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

.20 Mix joint compound slightly thinner than for joint taping.

.21 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.

.22 Allow skim coat to dry completely.

.23 Remove ridges by light sanding or wiping with damp cloth.

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

3.5 NON-CONFORMING WORK

.1 Touch-up minor damage to finishes in accordance with manufacturer's instructions; remove and replace ceiling components that cannot be successfully cleaned and repaired.

3.6 CLEANING

.1 Clean exposed surfaces of panels, including trim, edge mouldings, and suspension system members in accordance with manufacturer's instructions.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Incudes:

.1 Non-load bearing channel stud framing.
.2 Runners.
.3 Metal channel stiffener.
.4 Sheet metal backing.
.5 Acoustical sealant.
.6 Insulating strip (sill gasket).
.7 Fasteners.

.2 Related Requirements:

.1 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

.1 Reference Standards:

.1 American Iron and Steel Institute (AISI):

.1 AISI S220-15, North American Standard for Cold-Formed Steel Framing, Nonstructural Members

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

.1 ASTM A653/A653M-22, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM C645-18, Standard Specification for Nonstructural Steel Framing Members.

.3 ASTM C754-20, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

.4 ASTM C919-22, Standard Practice for Use of Sealants in Acoustical Applications.

.3 Association of the Wall and Ceiling Industry (AWCI).

.4 Canadian Standards Association (CSA Group):

.1 CSA S136-16, North American specification for the design of cold-formed steel structural members.

.2 CSA S304-14 (R2019), Design of Masonry Structures, Includes Update No. 1 (2015).

.5 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer (Withdrawn).

.6 Canadian Sheet Steel Building Institute (CSSBI):

.1 CSSBI 51-06, Lightweight Steel Framing Design Manual – 2nd Edition.

.2 CSSBI SSF 03-17, Care and Maintenance of Prefinished Sheet Steel Building Products.

.3 CSSBI Technical Bulletin, Vol. 7, No 1, Maximum Height Tables for Interior Non-Loadbearing Partitions.

.7 Underwriters Laboratories ECOLOGO Certification Program (UL):

.1 UL 2760, Sustainability for Surface Coatings: Recycled Water-Borne.

.2 UL 2768 Architectural Surface Coatings (formerly CCD-047).

1.3 ADMINSTRATIVE REQUIREMENTS

.1 Convene pre-installation meetings one week prior to beginning work of this Section in accordance with Section 01 11 00 – General Requirements, Project Meetings to:

.1 Verify project requirements.

.2 Review installation conditions.

.3 Co-ordinate with other building subtrades.

.4 Review manufacturer's instructions.

1.4 ACTION SUBMITTALS / INFORMATIONALSUBMITTALS

.1 Delegated Design:

.1 Professional engineers sealed and signed shop drawings and design submittals requiring structural engineering.

.2 Provide delegated design for the studs where heights or loads exceed manufacturers standard designs.

.2 Evaluation Reports: Submit steel manufacturer evaluation reports certified under an independent third-party inspection program reviewed to the local building code.

.3 Submit signed and sealed drawings stamped by a Professional Engineer registered in the Province of the work and as indicated in Section 01 11 00 – General Requirements, Delegated Design.

1.5 QUALITY ASSURANCE

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

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

.3 Retain a professional engineer, registered in the province of the Work, to design fabrication and erection of the Work of this Section in accordance with applicable Building Code and Contract Document requirements including, but not limited to, the following:

.1 Submittals.

.2 Site review and certification of installed components.

.3 Completion of Letters or Commitment and Supervision specified in Section 01 11 00 – General Requirements, Delegated Design.

.4 Verify stud thickness based on maximum deflections and loads from cladding on exterior walls.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

.1 System Design: Design and size components in accordance with CSA S136, to withstand dead loads, and live loads caused by wind loads acting normal to plane of wall as calculated in accordance with applicable code.

.1 Wind Loads: In accordance with Local Building Code with importance factors indicated on structural drawings.

.2 Maximum deflections under specified wind loads shall conform to the following:

.1 Wall studs supporting masonry veneer shall meet the requirements of CSA S304, with veneer deflections limited to L/600 or with stud deflections limited to L/720.

.2 Wall studs supporting other finishes = L/360.

.3 Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges. Design wind bearing stud end connections to accommodate floor/roof deflections such that the studs are not loaded axially.

.4 Conform to the requirements of specified fire rated and sound rated assemblies.

.5 Provide bridging to prevent member rotation and member translation perpendicular to the minor axis. Provide for secondary stress effects due to torsion between lines of bridging. Do not rely on sheathing to resist torsion or minor axis buckling.

.6 Design assembly to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

.7 Design door support assemblies to accommodate suspended loads, deflection of building structural members, and clearances of intended sliding door openings.

.8 Connections between lightweight steel framing members shall be bolts, welding or sheet metal screws.

.9 Resistances for sheet metal screws shall be based on the manufacturer’s lower bound test values multiplied by the appropriate resistance factor given in CSA S136.

2.2 MATERIALS

.1 Non-load bearing channel stud framing: to ASTM C645, stud sizes as indicated on Drawings, roll formed from 0.45 mm thickness hot dipped galvanized steel sheet complying with ASTM A653/A653M, Z120; or coating with equivalent corrosion resistance, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.

.1 Coating shall demonstrate equivalent corrosion resistance with an evaluation report acceptable to authorities having jurisdiction.

.2 Runners: Width, gauge and galvanizing to match steel studs, and as follows:

.1 Double Runner Deflection Track: Outside runner using 50 mm flanges; inner runner 33 mm; maintaining 25 mm minimum deflection space.

.2 Deep Leg Deflection Track: Top runner having 50 mm down standing legs; maintaining 13 mm minimum deflection space.

.3 Slotted Deflection Track for Fire Separations: Premanufactured slotted top runner with 63 mm down standing legs and having 6 mm wide x 38 mm high slots spaced at 25 mm o/c along length of runner; tested and certified for use in fire rated wall construction:

.1 Acceptable Materials:

.1 Bailey Metal Products Ltd.

.2 SliptrackSystems, Brady Innovations LLC.

.3 BlazeFrame DSL Slotted Deflection Track, ClarkDietrich.

.2 Base Runner: Bottom track with 33 mm upstanding legs.

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

.4 Provide 20 gauge x 200 mm high sheet metal backing at all locations to support equipment, furniture, architectural woodwork, or casework.

.5 Acoustical sealant: to Section 07 92 00 - Sealants.

.6 Insulating strip (sill gasket): rubberized, moisture resistant 3 mm thick cork or foam strip, width to suit, with self sticking adhesive on one face, lengths as required.

.7 Fasteners for Metal Framing: Type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

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 400 mm on centre 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 bottom or ceiling track using screws, crimp method, or pop rivets.

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

.7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.

.8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.

.9 Install heavy gauge (1.52 mm thick) single jamb studs at openings if required.

.10 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.

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

.12 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.

.13 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.14 Extend partitions to underside of roof except where noted otherwise on drawings.

.15 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50 mm leg ceiling tracks. Use double track slip joint as indicated.

.16 Install continuous insulating strips to isolate studs from uninsulated surfaces.

.17 Install two continuous beads of acoustical sealant or continuous insulating strip under studs and tracks around perimeter of sound control partitions in accordance with ASTM C919.

3.2 CLEANING

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

3.3 STEEL STUD HEIGHT SCHEDULE

.1 Table below is a standard non-load bearing steel stud height table, provide delegated design as indicated in Section 01 11 00 – General Requirements, Delegated Design for anything not indicated below.

Maximum Stud Height (mm) based on lateral pressure of 240 Pa with deflection limit of L/240

Stud Spacing O.C.	300	400	600	300	400	600
Stud Depth (mm)	0.45 mm Steel Design Thickness			0.80 mm Steel Design Thickness		
64	3630	3430	3230	4240	3910	3530
92	4670	4370	4090	5440	5000	4500
102	5000	4670	4320	6070	5590	5000
152	6730	6020	5110	8150	7470	6580

Maximum Hard Board Stud Height (mm) based on lateral pressure of 240 Pa with deflection limit of L/240

Stud Spacing O.C.	305	406	610	305	406	610
Stud Depth (mm)	362S150-B18			600S150-B18		
5PSF						
L/120	7213	6553	5359	9779	8458	6908
L/240	5944	5385	4724	8407	7645	6680
L/360	5131	4674	4064	7290	6604	5766
10 PSF						
L/120	5359	4648	3785	6909	5994	4877
L/240	4724	4293	3734	6680	5994	4877
L/360	4064	3708	3150	5766	5258	4572

Based upon tests with 13 mm gypsum board both sides with screw fasteners spaced at 300 mm o.c. Heights also apply to greater gypsum board thickness and multiple gypsum board layers.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Acoustic panels.

.2 Acoustical suspension system.

.3 Accessories: sealants and expansion joints.

.2 Related Requirements:

.1 Section 09 21 16 – Gypsum Board Assemblies

.2 Division 23 – HVAC

.3 Division 26 - Electrical

1.2 REFERENCES

.1 Reference Standards:

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

.1 ASTM C423-22, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

.2 ASTM C635/C635M-22, Standard Specifications for Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.

.3 ASTM C636/C636M-19, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

.4 ASTM E580/E580M-22, Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.

.5 ASTM E1264-22, Standard Classification for Acoustical Ceiling Products.

.6 ASTM E1477-98a (2022), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.

.7 ASTM F1667/F1667M-21a, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

.2 Association of the Wall and Ceiling Industry (AWCI).

.3 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units. (Withdrawn)

.4 Department of Justice Canada (Jus):

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

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

.5 Underwriter's Laboratories of Canada (ULC):

.1 ULC 102-2018, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies (ULC S102).

1.3 ADMINISTRATIVE REQUIREMENTS.

.1 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Submit manufacturer's printed product literature, specifications and data sheet for each product specified.

.2 Submit shop drawings in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling mounted items indicating the following:

.1 Ceiling suspension system members.

.2 Method of attaching suspension system hangers to building structure.

.3 Ceiling mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special mouldings at walls, column penetrations, and other junctures of acoustic ceilings with adjoining construction.

.3 Submit samples in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Submit duplicate full size samples of each type of acoustical unit.

.2 Include accessories and mitered interior and exterior corners of wall mouldings.

.4 Submit Workplace Hazardous Materials Information System WHMIS SDS - Safety Data Sheets acceptable to Labour Canada and Health and Welfare Canada.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials

.1 Provide extra materials of acoustic units in accordance with Section 01 11 00 – General Requirements, Closeout Submittals.

.2 Provide acoustical units amounting to 5% of gross ceiling area for each pattern and type required for project.

.3 Ensure extra materials are from same production run as installed materials.

.4 Clearly identify each type of acoustic unit, including colour and texture.

.5 Deliver to Consultant, upon completion of the work of this Section.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by Canadian Certification Organization accredited by Standards Council of Canada.

.2 Single-Source Responsibility: Provide perimeter trim components, panels and grid components by a single manufacturer.

.3 Mock-Ups:

.1 Construct mock-ups in accordance with Section 01 11 00 – General Requirements, Quality Control.

.2 Construct mock-up 10 m^2 minimum of each type of acoustical panel ceiling including one inside corner and one outside corner.

.3 Construct mock-up where directed.

.4 Allow 24 hours for inspection of mock-up by Consultant before proceeding with ceiling work.

.5 When accepted, mock-up will demonstrate minimum standard for this work. Reviewed mock-up may remain as part of the finished work.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 11 00 – General Requirements, Common Product Requirements and as follows:

.1 Protect on site stored or installed absorptive material from moisture damage.

.2 Store extra materials required for maintenance, where directed by Consultant.

.2 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.8 SITE CONDITIONS

.1 Permit wet work to dry before beginning to install.

.2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20-40% before and during installation.

.3 Store materials in work area 48 hours prior to installation.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:

.1 Acoustic Panels:

.1 Armstrong World Industries Canada Ltd.

.2 CertainTeed.

.3 CGC Interiors, A USG Company.

.4 Rockfon.

.2 Suspension Systems:

.1 Armstrong World Industries Canada Ltd.

.2 CertainTeed.

.3 CGC Interiors, A USG Company.

.4 Chicago Metallic / Rockfon.

2.2 PERFORMANCE/DESIGN CRITERIA

.1 Maximum deflection: 1/360th of span to ASTM C635/C635M deflection test.

2.3 MATERIALS

.1 Acoustic Panels (C1): conforming to ASTM E1264:

.1 Classification: Type IV, Form 2.

.2 Surface Texture: Smooth.

.3 Size: 610 mm x 1220 mm.

.4 Edge: square.

.5 Colour: white.

.6 Noise Reduction Coefficient (NRC): 0.75.

.7 Flame Spread: Class A.

.8 Basis of Design:

.1 Symphony M 1220-75-1M, CertainTeed.

2.4 ACOUSTICAL SUSPENSION SYSTEM

.1 Intermediate duty system to ASTM C635/C635M.

.2 Basic materials for suspension system: commercial quality cold rolled steel.

.3 Suspension system: non fire rated, exposed tee bar grid width as appropriate for materials specified.

.4 Acceptable Materials: materials to match products specified, use only materials from same manufacturers of panel products and as indicated on Section 09 99 99 – Materials List.

.5 Exposed tee bar grid components: shop painted satin sheen white. Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.

.6 Hanger wire: galvanized soft annealed steel wire:

.1 3.6 mm diameter for access tile ceilings.

.2 To suit seismic requirements and ceiling flatness requirements.

.3 2.78 mm diameter for other ceilings.

.7 Hanger inserts: purpose made.

.8 Accessories: splices, clips, wire ties, retainers and wall moulding flush, to complement suspension system components, as recommended by system manufacturer.

.9 Edge Mouldings and Trim: Sheet metal edge mouldings and trim selected from manufacturer's standard mouldings for edges and penetrations that fit specified acoustic panel edge and suspension system, and as follows:

.1 Provide edge mouldings fabricated to diameter required to fit circular penetrations exactly.

.2 Provide edge mouldings and trims that match width and configuration of exposed runners including the following configurations:

.1 Sheet Metal Fillers: Light zinc coated sheet steel finished to match T-bar.

.2 Wall Mould: Channel or angle shape with a 25 mm or 22 mm exposed face.

.10 System Accessories:

.1 Sealant: Acrylic type as specified in Section 07 92 00 - Sealants for use in exposed locations, colour to match ceiling grid.

.2 Expansion Joint: 50% movement santoprene with mill finish aluminum base, colour from manufacturers standard range, confirm colour with Consultant.

.1 Basis-of-Design Material:

.1 ACWW-3, Balco.

Part 3 Execution

3.1 EXAMINATION

.1 Do not install acoustical panels and tiles until work above ceiling has been reviewed by Consultant.

3.2 PREPARATION

.1 Store materials in work area 48 hours prior to installation.

3.3 INSTALLATION OF SUSPENSION SYSTEM

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

.2 Installation: in accordance with ASTM C636/C636M except where specified otherwise.

.3 Install suspension system to manufacturer's instructions and Certification Organizations tested design requirements.

.4 Conform to building code for seismic restraints of ceiling grid and as follows:

.1 Minimum 50 mm wall molding.

.2 Attach suspension system to two adjacent walls, opposite walls must have a 19 mm clearance.

.3 Use heavy duty suspension system.

.4 Ceiling areas over 93 m2 must have horizontal restraint wire or rigid bracing.

.5 Ceiling areas over 232 m2 must have seismic separation joints or full height partitions.

.6 Ceilings without rigid bracing must have 50 mm oversized trim rings for sprinklers and other penetrations.

.7 Changes in ceiling plane must have positive bracing.

.8 Cable trays and electrical conduits must be independently supported and braced.

.9 Suspended ceilings are subject to special inspection.

.10 Provide perimeter support wires within 200 mm.

.5 Do not erect ceiling suspension system until all mechanical and electrical work above ceiling has been inspected by Consultant.

.6 Secure hangers to overhead structure using attachment methods acceptable to Consultant.

.7 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.

.8 Lay out system according to reflected ceiling plan.

.9 Ensure suspension system is co-ordinated with location of related components.

.10 Install wall moulding to provide correct ceiling height.

.11 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers grilles and speakers.

.12 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.13 Interlock cross member to main runner to provide rigid assembly.

.14 Finished ceiling system to be square with adjoining walls and level within 1:1000.

.15 Expansion joints:

.1 Erect two main runners parallel, 25 mm apart, on building expansion joint line. Lay in strip of acoustic tile/board, painted colour as directed, 25% narrower than space between 2 'T' bars.

3.4 INSTALLATION OF ACOUSTIC PANELS

.1 Install acoustic panels and tiles in ceiling suspension system.

3.5 APPLICATION

.1 Refer to reflected ceiling plan.

.2 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

.3 Paint cut panel edges remaining exposed after installation; match colour of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.6 SYSTEM INTEGRATION

.1 Co-ordinate ceiling work to accommodate components of other Sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Incudes:

- .1 Solid vinyl floor tile.
- .2 Sheet vinyl.
- .3 Resilient base.
- .4 Accessories:
  - .1 Metal edge strips.
  - .2 Cove support strip.
  - .3 Primers and adhesives.
  - .4 Welding rod.
  - .5 Sealer and wax.

.2 Related Requirements:

- .1 Section 07 92 00 – Sealants
- .2 Section 09 05 13 – Mechanical Preparation of Flooring Substrates
- .3 Section 09 05 23 – Common Work Results for Flooring Preparation
- .4 Section 09 68 00 – Carpeting

1.2 REFERENCES

.1 Reference Standards:

- .1 American Society for Testing and Materials International (ASTM):
  - .1 ASTM F150-06(2018), Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring
  - .2 ASTM F710-22, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
  - .3 ASTM F1516-13(2018), Standard Practice for Sealing Seams of Resilient Flooring Products by the Heat Weld Method (when Recommended).
  - .4 ASTM F1700-20, Standard Specification for Solid Vinyl Floor Tile.
  - .5 ASTM F1861-21, Standard Specification for Resilient Wall Base.
  - .6 ASTM F1869-22, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
  - .7 ASTM F1913-19, Standard Specification for Vinyl Sheet Floor Covering Without Backing.
  - .8 ASTM F2170-19a, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- .2 National Floor Covering Association (NFCA):
  - .1 NFCA Floor Covering Reference Manual of Canada.
  - .2 NFCA Quality Assurance Program (QAP).
  - .3 NFCA Accredited Quality Assurance (AQA) Provider.
- .3 South Coast Air Quality Management District (SCAQMD):
  - .1 SCAQMD Rule 1113-16, Architectural Coatings.

.2 SCAQMD Rule 1168-22, Adhesives and Sealants Applications.

.4 Underwriters Laboratories of Canada (ULC):

.1 ULC 102.2-2018, Standard Method of Test for Surface Burning Characteristics of Floor Coverings and Miscellaneous Materials and Assemblies (ULV S102.2).

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Provide product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Submit one copy of product data for each type of product specified.

.2 Submit Workplace Hazardous Materials Information System WHMIS SDS - Safety Data Sheets for flooring adhesive and seam welding. Indicate VOC content.

.3 Provide seaming diagram prior to laying flooring.

.2 Provide samples in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base and edge strips.

1.4 CLOSEOUT SUBMITTALS

.1 Provide manufacturer's printed recommendations for general maintenance, including cleaning instructions and guidelines for use of waxes and other protective coatings and appearance enhancers in accordance with Section 01 11 00 – General Requirements, Closeout Submittals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials

.1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 11 00 – General Requirements, Closeout Submittals.

.2 Provide 2 % of each colour, pattern and type flooring material required for project for maintenance use.

.3 Extra materials one piece and from same production run as installed materials.

.4 Clearly identify each roll of sheet flooring and each container of adhesive.

.5 Deliver to Owner upon completion of the work of this Section.

.6 Store where directed by Consultant.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: Provide products that meet requirements of ULC 102.2 as applicable for required flame spread ratings; labelled and listed by Underwriters Laboratories of Canada (ULC), or another testing and inspecting agency acceptable to authorities having jurisdiction.

.2 Provide preparation, materials and workmanship in strict accordance with NFCA requirements as detailed in the latest (online) edition of the NFCA Floor Covering Reference Manual of Canada, (www.floorcoveringreferencemanual.com) and the

material manufacturer's written recommendations for conditions of work and guarantee periods stated.

.3 Qualifications: Provide proof of qualifications when requested by Consultant:

.1 Installer shall be Trade Qualified for their specific flooring products by the National Floor Covering Association.

.2 Resilient Flooring Installer: Use an installer who is competent in heat welding and have a minimum of five years documented experience in the installation of resilient sheet flooring and seams in accordance with manufacturer's training or certification program:

.3 Source Limitations: Obtain each type, colour, and pattern of flooring or accessories specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

.4 Mock-Up:

.1 Provide mock-up in accordance with Section 01 11 00 – General Requirements, Quality Control.

.2 Construct mock-ups as directed by Consultant to verify selections made under sample Submittals and to demonstrate aesthetic effects, patterns, and qualities of materials, and execution before installing flooring materials and accessories in accordance with requirements in Section 01 11 00 – General Requirements, Quality Control.

.3 Install in a representative room designated by the Consultant, a sample flooring installation of at least 10 m^2 in area showing pattern as directed by Consultant, colour matching, and longitudinal and transverse joints for the Consultants' review and acceptance.

.4 The mock-up room shall represent the minimum acceptable standard for the Work when identified modifications to the mock-up are completed, reviewed, and accepted by the Consultant.

.5 Accepted mock-up room installation can remain as part of the Work.

1.7 NFCA QUALITY ASSURANCE PROGRAM

.1 All Work described in this Section is included under the Quality Assurance Program (QAP) of NFCA (National Floor Covering Association), as detailed in the latest (online) edition of the Floor Covering Reference Manual of Canada (www.floorcoveringreferencemanual.com) and will be reviewed in accordance with QAP requirements therein by a third party Inspection Agency assigned by the Accredited Quality Assurance (AQA) Provider. Include the cost of this program in the Contract Price.

.2 Replace preparation, materials, and workmanship that do not meet NFCA requirements in accordance with Quality Assurance requirements without any additional cost to the Owner.

.3 Provide a two-year NFCA Maintenance Bond.

.4 Request a QA Review Form (Part A04A) from NFCA and submit prior to ordering materials.

.5 Meet the requirements detailed in PART A05 Trade Qualifications in the latest edition of the NFCA Floor covering Reference Manual.

.6 Installer Qualifications: be a member in good standing of the National Floor Covering Association (NFCA) and referenced on the NFCA website (www.nfca.ca).

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 11 00 – General Requirements, Common Product Requirements.

.2 Deliver materials in good conditions to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.

.3 Store materials in a clean, dry, enclosed space off the ground, and protect from the weather and from extremes of heat and cold. Protect adhesive from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

.4 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.9 SITE CONDITIONS

.1 Ambient Conditions: Maintain air temperature and structural base temperature at flooring installation area above 20 degrees for 48 hours before, during and 48 hours after installation.

1.10 WARRANTY

.1 Vinyl Plank: Provide Manufacturers Warranty for product to be free from manufacturers defects for a period of ten (10) years from date of substantial performance.

.2 Vinyl Sheet: Provide Manufacturers Warranty for product to be free from manufacturers defects for a period of twenty (20) years from date of substantial performance.

.3 Provide a two-year NFCA Maintenance Bond as indicated above.

Part 2 Products

2.1 MATERIALS

.1 Basis-of-Design Materials: Materials and colours listed below form the Basis-of-Design materials for this project.

.2 Materials other than named products Basis-of-Design materials may be acceptable to the Consultant; submit information in accordance with Section 01 11 00 – General Requirements, Product Options and Substitutions no later than seven days prior to bid closing date and as follows:

.1 Proposed alternates shall match colour range, texture and performance characteristics of named products, and shall not require a change to colour board for Project.

.2 Proposed alternates found acceptable by Consultant will be listed in an Addendum.

.3 The Consultant is not obliged to accept any materials presented for their review and does not need to provide reasons for rejection of proposed alternates.

2.2 TILE FLOORING

.1 Solid Vinyl Floor Tile (VT1): to ASTM F1700, and as follows:

.1 Class: III – printed film.
.2 Type: A – smooth surface and B – embossed surface.
.3 Thickness: 5 mm.
.4 Size: as indicated on Section 09 99 99 – Materials List
.5 Colour: as indicated on Section 09 99 99 – Materials List.
.6 Basis of Design:
.1 Expona Simply PUR, Ployflor

2.3 SHEET FLOORING

.1 Sheet vinyl without backing (SF1): to ASTM F1913, commercial.

.1 Minimum width: 2.0 meters.
.2 Total Thickness: nominal 2 mm.
.3 Texture: smooth.
.4 Colour: as indicated on Section 09 99 99 – Materials List.
.5 Basis of Design:
.1 IQ Optima, Tarkett

2.4 RESILIENT BASE

.1 Resilient Base (RB1): to ASTM F1861, and as follows:

.1 Type: TP – rubber, thermoplastic
.2 Group: One – solid.
.3 Style: B – Cove.
.4 Thickness: 3.17 mm.
.5 Height: 101 mm.
.6 Length: 36.5 meter rolls.
.7 End Stops and External Corners: premoulded.
.8 Colour: as indicated on Section 09 99 99 – Materials List.
.9 Basis of Design:
.1 Traditional Duracove, Tarkett

2.5 ACCESSORIES

.1 Metal edge strips (TS1 and TS2):

.1 Extruded, smooth, stainless steel with lip to extend under floor finish, shoulder flush with top of adjacent floor finish and as indicated on Section 09 99 99 – Materials List.
.2 Basis of Design:
.1 Schluter.

.2 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.

.1 Resilient base adhesives:

.1 Acrylic polymer, vertical surface impact resistant adhesive with maximum VOC limit 50 g/L to SCAQMD Rule 1168.

.2 Basis-of-Design Materials:

.1 Ultrabond ECO 575, MAPEI Inc.

.2 Vinyl Floor Adhesives (sheet, tile and plank):

.1 Vinyl acrylic polymer, wet-lay pressure sensitive adhesive with maximum VOC limit 50 g/L to SCAQMD Rule 1168.

.2 Basis-of-Design Materials:

.1 Ultrabond ECO 360, MAPEI Inc.

.3 Welding rod: designed to weld seams of sheet flooring, as recommended by flooring manufacturer, colour as directed by Consultant.

.4 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location that does not affect the warranty or the slip resistance.

.1 Sealer: maximum VOC limit 100 g/L to SCAQMD Rule 1113.

Part 3 Execution

3.1 EXAMINATION

.1 Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture tests.

.2 Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring substrate.

.3 Ensure concrete floors have maximum 2.5% moisture content, exhibit normal alkalinity and no carbonization or dusting.

.4 Ensure concrete floors are clean, smooth, and flat to plus or minus 3 mm over 3 meters.

3.2 PREPARATION

.1 Remove existing resilient flooring.

.2 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.

.3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

.4 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

.5 Prohibit traffic until filler is cured

.6 Clean substrates of contaminates.

.7 Alkalinity and Adhesion Testing: perform tests recommended by manufacturer. Proceed with installation after substrates pass testing.

.8 Moisture Testing: perform tests recommended by manufacturer and as follows:

.1 Perform anhydrous calcium chloride test ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapour-emission rate of 3 lb of water/1000 sq. ft in 24 hours.

.2 Perform relative humidity test using in situ probes, ASTM F2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.

.3 Proceed with installation after substrates pass testing.

.9 Prime or seal concrete slab or plywood sub-floor to resilient flooring manufacturer's printed instructions.

3.3 INSTALLATION: GENERAL

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

.2 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.

.3 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.

.4 Cut flooring around fixed objects.

.5 Install flooring in pan type floor access covers. Maintain floor pattern.

.6 Continue flooring over areas which will be under built-in furniture.

.7 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

.8 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

.9 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.4 APPLICATION: INTEGRAL FLASH COVE BASE

.1 Install flash coving in strict accordance with instructions published by flooring manufacturer.

.2 Height: 150 mm or as indicated on Drawings.

.3 Install cove support strips continuously where sheet flooring is to be coved to vertical surfaces. Seams are not allowed withing 305 mm horizontally on integrally coved base sheet products.

.4 Apply cove sticks with adhesive.

.5 Heat weld seams.

.6 Do not apply cap strips where flexible vinyl wall covering is to be installed.

.7 Straight cut top; finish with clear silicone sealant as indicated in Section 07 92 00 – Sealants.

3.5 INSTALLATION: FLOOR TILE

.1 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.

.2 Install flooring to pattern with joints aligned as indicated on Drawings..

.3 As installation progresses and after installation is complete, roll resilient tile flooring in accordance with manufacture’s instructions.

3.6 INSTALLATION: SHEET FLOORING

.1 Lay flooring with seams parallel to building line or as indicated on drawings to produce a minimum number of seams. Border widths minimum 1/3 width of full material.

.2 Run sheets in direction of traffic. Double cut sheet joints and continuously seal or heat weld according to manufacturer's printed instructions.

.3 Provide seams in strict accordance with manufacturer’s recommendations. Heat weld seams with welding rod when heat welded seams are a permitted option by manufacturer.

.4 As installation progresses and after installation is complete, roll resilient sheet flooring in accordance with manufacture’s instructions.

3.7 INSTALLATION: BASE

.1 Lay out base to keep number of joints at minimum.

.2 Clean substrate and prime with one coat of adhesive.

.3 Apply adhesive to back of base.

.4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.

.5 Install straight and level to variation of 1:1000.

.6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.

.7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.

.8 Use toeless type base where floor finish will be carpet, coved type elsewhere.

.9 Install toeless type base before installation of carpet on floors.

.10 Heat weld base in accordance with manufacturer's printed instructions.

3.8 INSTALLATION: ACCESSORIES

.1 Install metal edge strips at unprotected and exposed edges where flooring terminates, and where flooring meets other floorings of different heights..

3.9 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 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.

3.10 CLEANING

.1 Proceed in accordance with Section 01 11 00 – General Requirements, Cleaning.

.2 Remove excess adhesive from floor, base and wall surfaces without damage.

.3 Clean, seal and wax floor and base surface to flooring manufacturer's printed instructions.

3.11 PROTECTION

.1 Protect new floors from time of final set of adhesive until final inspection.

.2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Carpet Tile.

.2 Accessories such as adhesive and carpet protection.

.2 Related Requirements:

.1 Section 09 05 13 – Mechanical Preparation of Flooring Substrates

.2 Section 09 05 23 – Common Work Results for Flooring Preparation

.3 Section 09 65 00 – Resilient Flooring

1.2 REFERENCES

.1 Reference Standards:

.1 American Association of Textile Chemists and Colourists (AATCC):

.1 AATCC 16.1-2014, Colour Fastness to Light: Outdoor.

.2 AATCC 16.1-2014, Colour Fastness to Light: Carbon-Arc.

.3 AATCC 16.3-2020, Colour Fastness to Light: Xenon-Arc.

.4 AATCC 20-2018, Fiber Analysis: Qualitative.

.5 AATCC 23-2015e(2020), Colourfastness to Burn Gas Fumes.

.6 AATCC 118-2020, Oil Repellency: Hydrocarbon Resistance Test.

.7 AATCC 129-2016, Colour Fastness to Ozone in the Atmosphere Under High Humidities.

.8 AATCC 134-2019, Electrostatic Propensity of Carpet.

.9 AATCC 171-2019, Carpets: Cleaning of; Hot Water Extraction Method.

.10 AATCC 174-2016, Antimicrobial Activity Assessment of Carpets.

.11 AATCC 175-2013, Stain Resistance: Pile Floor Coverings.

.12 AATCC 189-2017, Fluorine Content of Carpet Fibers.

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

.1 ASTM D1335-21, Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings.

.2 ASTM D1667-22, Standard Specification for Flexible Cellular Materials-Poly (Vinyl Chloride) Foam (Closed-Cell).

.3 ASTM D3676-18, Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay.

.4 ASTM D3936-21 Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering.

.5 ASTM D5252-20, Standard Practice for the Operation of the Hexapod Tumble Drum Tester.

.6 ASTM D5417-21, Standard Practice for Operation of the Vettermann Drum Tester.

.7 ASTM D6004-21, Standard Test Method for Determining Adhesive Shear Strength of Resilient Flooring and Carpet Adhesives.

.8 ASTM D7799-12a (2021), Standard Specification for Tufted and Woven Broadloom Carpet Adhesives Without Homogenous PVC or Non-PVC Backings.

.9 ASTM E84-22, Standard Test Method for Surface Burning Characteristics of Building Materials.

.10 ASTM E648-19ae1, Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

.11 ASTM E662-21ae1, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.

.3 Canadian General Standards Board (CGSB):

.1 CAN/CGSB 4.129-93, Carpet for Commercial Use. (Withdrawn)

.2 CAN/CGSB 4.2-M (Complete Set), Textile Test Methods (Complete Set)

.3 CAN/CGSB 4.2 No. 27.6-2015, Textile Test Methods - Flame Resistance - Methemine Tablet Test for Textile Floor Coverings.

.4 CAN/CGSB 4.2 No.77.1-94/ISO 4919:1978 (R2012), Textile Test Methods - Carpets - Determination of Tuft Withdrawal Force. (Withdrawn)

.5 CGSB 4-GP-36M, Thibaude, type fibre. (Withdrawn)

.6 CAN/CGSB 4.155-M88 (R2013) – Flammability of Soft Floor Coverings - Sampling Plans

.7 CGSB 20-GP-23M-78, Cushion, Carpet, Flexible Polymeric Material. (Withdrawn)

.8 CAN/CGSB 25.20-95, Surface Sealer for Floors. (Withdrawn)

.4 Carpet and Rug Institute (CRI):

.1 CRI 104/105, Carpet Installation Standards

.2 CRI GLP Green Label Plus Testing.

.3 Indoor Air Quality Carpet Testing Programs.

.5 National Floor Covering Association (NFCA):

.1 NFCA Floor Covering Reference Manual of Canada.

.2 NFCA Quality Assurance Program (QAP).

.3 NFCA Accredited Quality Assurance (AQA) Provider.

.6 NSF International (NSF) / American National Standards Institute (ANSI):

.1 NSF/ANSI 140-2019, Sustainability Assessment for Carpet.

.7 South Coast Air Quality Management District (SCAQMD):

.1 SCAQMD Rule 1168-22, Adhesives and Sealants Applications.

.8 Underwriters' Laboratories of Canada (ULC):

.1 ULC 102.2-18, Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies. (ULC S102.2)

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

- .1 Submit product data sheet for each carpet, under-cushion, adhesive, carpet protection and subfloor patching compound.
- .2 Submit Workplace Hazardous Materials Information System WHMIS SDS - Safety Data Sheets acceptable to Labour Canada and Health Canada for carpet adhesive and seam adhesive. Indicate VOC content. Indoor carpet adhesives shall not exceed 50 grams per litre VOC limit.
- .3 Submit data on specified products, describing physical and performance characteristics, sizes, patterns, colours, and methods of installation.
- .4 Submit verification to demonstrate compliance with ULC S102.2.

.2 Submit shop drawings in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

- .1 Indicate locations and lengths of seams for carpeted areas.
- .2 Indicate nap direction, open edges, special patterns, and other details required by Consultant to clarify work.
- .3 Submit drawings showing columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required as well as direction of carpet pile and pattern, location of edge moldings and edge bindings to Consultant for review prior to installation of carpet.
- .4 Submit carpet schedule using same room designations indicated on drawings.

.3 Submit samples in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

- .1 Submit duplicate 610 mm x 610 mm pieces of each type of carpet specified, duplicate 225 x 225 mm pieces for each colour selected, termination edge strip, and base and divider strip.

.4 Submit carpet manufacturer's installation instructions: Indicate special procedures and perimeter conditions requiring special attention.

.5 Submit proof that carpet has been tested and passed the Indoor Air Quality (IAQ) Carpet Testing Program requirements of the Carpet and Rug Institute (CRI).

.6 Submit report outlining proposed dust control measures.

1.4 CLOSEOUT SUBMITTALS

.1 Submit closeout data in accordance with Section 01 11 00 – General Requirements, Closeout Submittals.

- .1 Submit maintenance data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

.2 Submit control submittals in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.3 Submit report verifying that tuft bind meets requirements of CAN/CGSB-4.129 when tested to CAN/CGSB-4.2 No.77.1.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials

.1 Provide extra materials of carpet, base, and adhesives in accordance with Section 01 11 00 – General Requirements, Closeout Submittals.

.2 Provide 2% of each colour, pattern and type of carpeting. Provide sheet goods in one continuous full width roll.

.3 Extra materials to be from same production run as installed materials.

.4 Identify each package of carpet and each container of adhesive.

.5 Store where directed by Consultant.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Prequalification: compliance with Department of Consumers and Corporate Affairs regulations under "Hazardous Products Act", Part II of the Schedule, tested to CAN/CGSB-4.2-No.27.6.

.2 Indoor Air Quality: compliance with CRI/CCI Green Label Indoor Air Quality Program, CRI -IAQ requirements for maximum total volatile chemicals released into air. Label each carpet product with CRI -IAQ label.

.2 Installer Qualifications:

.1 Flooring contractor requirements.

.1 Specialty contractor normally engaged in this type of work, with prior experience in installation of these types of materials.

.2 Certified by carpet manufacturer prior to bid submission.

.3 Must not sub-contract labour without written approval of Consultant.

.4 Installer shall be Trade Qualified for their specific flooring products by the National Floor Covering Association.

.3 Provide preparation, materials and workmanship in strict accordance with NFCA requirements as detailed in the latest (online) edition of the NFCA Floor Covering Reference Manual of Canada, (www.floorcoveringreferencemanual.com) and the material manufacturer’s written recommendations for conditions of work and guarantee periods stated.

.4 Be responsible for proper product installation, including floor testing and preparation as specified and in accordance with carpet manufacturers written instructions.

.5 Mock-Up:

.1 Provide mock-up in accordance with Section 01 11 00 – General Requirements, Quality Control.

.2 Construct mock-ups as directed by Consultant to verify selections made under sample Submittals and to demonstrate aesthetic effects, patterns, and qualities of materials, and execution before installing flooring materials and accessories in accordance with requirements in Section 01 11 00 – General Requirements, Quality Control.

.3 Install in a representative room designated by the Consultant, a sample flooring installation of at least 10 m^2 in area showing pattern as directed by Consultant, colour matching, and longitudinal and transverse joints for the Consultants' review and acceptance.

.4 The mock-up room shall represent the minimum acceptable standard for the Work when identified modifications to the mock-up are completed, reviewed, and accepted by the Consultant.

.5 Accepted mock-up room installation can remain as part of the Work.

1.7 NFCA QUALITY ASSURANCE PROGRAM

.1 All Work described in this Section is included under the Quality Assurance Program (QAP) of NFCA (National Floor Covering Association), as detailed in the latest (online) edition of the Floor Covering Reference Manual of Canada (www.floorcoveringreferencemanual.com) and will be reviewed in accordance with QAP requirements therein by a third party Inspection Agency assigned by the Accredited Quality Assurance (AQA) Provider. Include the cost of this program in the Contract Price.

.2 Replace preparation, materials, and workmanship that do not meet NFCA requirements in accordance with Quality Assurance requirements without any additional cost to the Owner.

.3 Provide a two-year NFCA Maintenance Bond.

.4 Request a QA Review Form (Part A04A) from NFCA and submit prior to ordering materials.

.5 Meet the requirements detailed in PART A05 Trade Qualifications in the latest edition of the NFCA Floor covering Reference Manual.

.6 Installer Qualifications: be a member in good standing of the National Floor Covering Association (NFCA) and referenced on the NFCA website (www.nfca.ca).

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Label packaged materials.

.2 Store packaged materials in original containers or wrapping with manufacturer's seals and labels intact.

.3 Store carpeting and accessories in location as directed by Consultant. Store carpet and adhesive at minimum temperature of 18°C and relative humidity of maximum 65% for minimum of 48 hours before installation.

.4 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness.

.5 Store materials in area of installation for minimum period of 48 hours prior to installation.

.6 Tile carpet: store on pallet form as supplied by Manufacturer. Do not stack pallets.

.7 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.9 SITE CONDITIONS

.1 Ambient Conditions:

.1 Moisture: Ensure substrate is within moisture limits and alkalinity limits prescribed by manufacturer. Prepare moisture testing and provide report to Consultant.

.2 Temperature: Maintain ambient temperature of not less than 18°C from 48 hours before installation to at least 48 hours after completion of work.

.3 Relative humidity: Maintain relative humidity between 10 and 65% RH for 48 hours before, during and 48 hours after installation.

.2 Site Conditions:

.1 Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete.

.2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.3 Ventilation:

.1 Arrange for ventilation system to be operated during installation of carpet by use of approved portable supply and exhaust fans.

.2 Ventilate enclosed spaces in accordance with Section 01 11 00 – General Requirements, Temporary Utilities. Provide fans with HEPA filters.

.3 Provide continuous ventilation during and after carpet application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for seven days after completion of carpet installation.

.4 Test existing floor levelling compound for presence of asbestos contamination. Notify Consultant for additional instructions where asbestos is discovered.

1.10 WARRANTY

.1 Manufacturer Warranty:

.1 Provide manufacturers warranty for ten years from date of Substantial Performance and as follows:

.1 Ten year limited abrasive wear warranty.

.2 Lifetime limited anti-static warranty.

.3 Lifetime limited no zipper or edge ravel warranty.

.2 Provide a two-year NFCA Maintenance Bond as indicated above.

Part 2 Products

2.1 MATERIALS

.1 Carpet Tile (CP1): Other manufacturers may submit to the Consultant materials that match colour, texture, pattern variation, and performance and as follows:

.1 Yarn: 100% first quality, high performance bulk continuous filament nylon. Identification of yarn to AATCC 20. Fibre shape to have maximum

Modification Ratio of 1.5 for soil release capabilities. Fibre manufacturer to be separate from carpet tile manufacturer, and must offer a construction and certification program to the details as contained herein.

.2 Static Control: Permanent built-in anti-static filament for life of carpet. AATCC 134 test with static discharge that does not exceed 3.5 kilovolts after minimum 5 HWE. (AATCC 171 Hot Water Extraction test) under standard conditions of 21 C and 20% relative humidity. Electrostatic Propensity (Static delayed signal): to AATCC 134.

.3 Construction: Tufted pattern loop.

.4 Size: as indicated on Section 09 99 99 – Materials List

.5 Face Yarn Weight: Minimum 542 g/m^2.

.6 Finished Pile Thickness: Average 2.8 mm.

.7 Dye Method: solution dyed.

.8 Stitches/Gauge: 47.2/39.4/10 cm.

.9 Backing: anti-static grade standard vinyl.

.10 Tuft Bind: Lifetime of carpet.

.11 Edge Ravel: Lifetime of carpet.

.12 Delamination: Lifetime of carpet.

.13 Stain Resistance: Lifetime stain warranty, ten year Lightfastness and Atmospheric Contaminant Warranty.

.14 Flammability: to ASTM E648 flooring radiant panel class one, smoke density less than 450.

.15 Colour: as indicated on Section 09 99 99 – Materials List.

.16 Basis-of-Design Materials:

.1 Street Smart Collection, Interface

2.2 ACCESSORIES

.1 Subfloor filler: premix latex requiring only water to produce cementitious paste.

.2 Base:

.1 Resilient base: as indicated in Section 09 65 00 – Resilient Flooring.

.3 Floor carpet tile adhesive self release type, recommended by the carpet tile manufacturer. Carpet tile adhesive shall be a low odour based type free of volatile hydrocarbons such as toluene and mineral spirits. A SDS - Safety Data Sheet acceptable to Labour Canada and Health and Welfare Canada shall be provided to Owner for the carpet tile adhesive and seam cement proposed for use.

.4 Carpet protection: non-staining heavy duty kraft paper.

.5 Concrete floor sealer: to CAN/CGSB-25.20, Type One.

.6 Furniture System Lifts: Mechanical screw or hydraulic furniture lifts specifically designed to vertically lifting office furniture systems in occupied spaces allowing removal and replacement of modular carpet having adjustable clips and components to suit specific furniture moving requirements without removing furniture from area.

Part 3 Execution

3.1 PREPARATION

.1 Prepare floor surfaces in accordance with CRI Carpet Installation Standard for Installation of Commercial Carpet.

.2 Concrete substrates shall be free of paint, dirt, grease, oil, curing or parting agents, and other contaminates, including sealers, that may interfere with the bonding of the adhesive.

.3 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.

.4 Seal porous and powdery surfaces with concrete floor sealer and apply sub-floor filler to low spots and cracks to achieve level floor to a tolerance of 1:500 in accordance with manufacturer’s written requirements.

.5 Pre-condition carpeting following manufacturer's printed instructions.

.6 Lay down an area as indicated to confirm pattern direction with Consultant.

3.2 INSTALLATION

.1 Install carpeting using minimum of pieces.

.2 Install in accordance with manufacturer's printed instructions and in accordance with Carpet and Rug Institute Carpet Installation Standard of Commercial Carpet.

.3 Install carpet after finishing work is completed but before demountable office partitions and telephone and electrical pedestal outlets are installed.

.4 Finish installation to present smooth wearing surface free from conspicuous seams, burring and other faults.

.5 Use material from same dye lot. Ensure colour, pattern and texture match within any one visual area. Maintain constant pile direction.

.6 Fit neatly around architectural, mechanical, electrical and telephone outlets, and furniture fitments, around perimeter of rooms into recesses, and around projections.

.7 Install carpeting to underfloor duct system and to access covers.

.8 Install carpeting in pan type floor access covers.

.9 Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

.10 Install carpet smooth and free of bubbles, puckers, and other defects.

3.3 TILE CARPET

.1 Apply adhesive in accordance with manufacturer’s recommendations and install tile carpet in accordance with manufacturer's written instructions.

.2 Installation Pattern: install in pattern as indicated in Drawings.

.3 Lay tile carpet with butt seams.

.4 Roll tile carpet with appropriate roller for complete contact of carpet with mill-applied adhesive to sub-floor.

3.4 SEAMS

.1 Carpet visibility of seams and joints to acceptable industry standards.

3.5 BASE INSTALLATION

.1 Install resilient base in accordance with Section 09 65 00 – Resilient Flooring.

3.6 CLEANING

.1 Vacuum carpets clean immediately after completion of installation. Protect traffic areas.

3.7 PROTECTION

.1 Prohibit traffic on carpet for a period of 24 hours until adhesive is cured.

.2 Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 This Section includes surface preparation and field painting of exposed interior items and surfaces.

.2 Provide labour, materials, tools and other equipment, services and supervision required to complete interior, including above roof, painting and decorating work.

.3 Surface preparation for this section will be limited to priming and back-priming, and specific pre-treatments noted in this section or as specified in the Master Painters Institute (MPI) Painting Specification Manual.

.2 Related Requirements:

.1 Technical sections as indicated.

1.2 REFERENCES

.1 Definitions:

.1 Gloss Levels: Standard coating terms defined by MPI Manual apply to products of this Section as follows, and are used on Drawing or as indicated in this Section to designate required gloss levels for indicated areas:

.1 G1 – Matte Finish (flat): Matte to low sheen finish with a gloss range of 0 to 10 when measured at 85° to meter and 0 to 5 when measured at 60°.

.2 G2 – Velvet: Matte to low sheen finish with a gloss range of 10 to 35 when measured at 85° to meter and 0 to 10 when measured at 60°.

.3 G3 – Eggshell: Low sheen finish with a gloss range of 10 to 35 when measured at 85° to meter and 10 to 25 when measured at 60°.

.4 G4 – Satin: Low to medium sheen with a gloss range of minimum 35 when measured at 85° to meter and 20 to 35 when measured at 60°.

.5 G5 – Semi-Gloss: Medium sheen finish with a gloss range of 35 to 70 when measured at 60° to meter.

.2 Reference Standards:

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

.1 ASTM F1869-22, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

.2 The Master Painters Institute (MPI):

.1 Approved Products List

.2 Architectural Painting Specification Manual.

.3 Maintenance Repainting/Restoration Manual.

.3 The Society for Protective Coatings (SSPC):

.1 SSPC Paint Series, Paint Guidelines.

.2 SSPC SP Series, Surface Preparation Guidelines.

.3 SSPC-PA Series, Paint Application Guidelines.

.4 Underwriters Laboratories ECOLOGO Certification Program (UL):

.1 UL 2768, Architectural Surface Coatings (formerly CCD 47).

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Comply with requirements of Section 01 11 00 – General Requirements, Submittal Procedures.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data: Submit list of all painting materials used for the Work to the Consultant for review prior to ordering materials for each paint system indicated, including block fillers and primers:

.1 Material List: An inclusive list of required coating materials indicating each material and cross reference specific coating, finish system, and application; identify each material by manufacturer's catalogue number and general classification.

.2 Base Information: Confirmation of manufacturer’s ability to supply paint in a variety of base tints, specific to the range of colours being used on this project; indicate colour of base tint used and amount of colourant added to establish Scheduled colours.

.3 Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

.2 Samples: Provide stepped samples, defining each separate coat, including block fillers and primers using representative colours required for the project; label each sample for location and application, and as follows:

.1 Samples for Verification: When requested by the Consultant, provide samples for each colour and material, with texture to simulate actual conditions, on representative samples of the actual substrate as follows:

.1 Painted Wood: 200 mm long or square samples for each colour and material on representative sample wood used for the Work.

.2 Stained or Natural Wood: 200 mm long or square samples of natural or stained wood finish on representative species of wood used for the Work.

.3 Painted Gypsum Board: 200 mm long or square samples for each colour and material.

.3 Informational Submittals: Provide the following submittals when requested by the Consultant:

.1 Certification: Submit certification reports for paint products indicating that they meet or exceed low VOC and coloured base requirements listed in this Section.

.2 Purchase Orders: Retain purchase orders, invoices and other documents for verification of compliance with specification and design requirements.

.3 Submit Workplace Hazardous Materials Information System WHMIS SDS - Safety Data Sheets acceptable to Labour Canada and Health Canada prior to commencement of work for review and for posting at job site as required.

.4 Submit work schedule for various stages of work for the Consultant's review and Owner's approval when painting occupied areas, if requested.

.5 Provide an itemized list complete with manufacturer, paint type and colour coding for all colours used for Owner's later use in maintenance for use in the operations and maintenance manual specified in Section 01 11 00 – General Requirements, Closeout Submittals.

1.4 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: Submit copies of paint manufacturer's written maintenance information for inclusion in the operations manual in accordance with Section 01 11 00 – General Requirements, Closeout Submittals including specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.

1.5 QUALITY ASSURANCE

.1 Conform to the standards contained in the MPI Maintenance Repainting/Restoration Manual or MPI Architectural Painting Specification Manual.

.2 Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in service performance, and as follows:

.1 Have a minimum of five years proven satisfactory experience and shall show proof before commencement of work that he will maintain a qualified crew of painters throughout the duration of the work.

.2 When requested provide a list of the last three comparable jobs including, name and location, specifying authority, start and completion dates and cost amount of the painting work.

.3 Only qualified journeymen who have a Tradesman Qualification Certificate of Proficiency shall be engaged in painting and decorating work.

.4 Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.

.5 Materials, preparation and workmanship shall conform to the standards contained in the latest edition of the MPI Maintenance

Repainting/Restoration Manual or MPI Architectural Painting Specification Manual.

.3 Mock-Ups:

.1 Prepare mock-ups in accordance with Section 01 11 00 – General Requirements, Quality Control.

.2 Prepare and paint a designated interior surface, area, room or item to requirements of this section using specified paint or coating to indicate selected colours, gloss, sheen, texture and workmanship to MPI Painting Manual standards for review and acceptance by Consultant.

.3 Accepted surface, area, room or items shall become the standard of finish quality and workmanship for similar on-site painting work.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver painting materials in sealed, original labelled containers bearing manufacturer's name, brand name, type of paint or coating and colour designation, standard compliance, materials content as well as mixing and/or reducing and application requirements.

.2 Store paint materials in original labelled containers in a secure (lockable), dry, heated and well ventilated single designated area meeting the minimum requirements of both paint manufacturer and authorities having jurisdiction and at a minimum ambient temperature of 7°C. Store only materials used on this project on site.

.3 Provide adequate fireproof storage lockers, take necessary precautions, and post warning signs (i.e.: no smoking) where toxic, volatile, explosive, or flammable materials are being used or stored, as follows:

.1 Take necessary precautions and safety measures to prevent fire hazards and spontaneous combustion, and to protect the environment from spills.

.2 Materials considered to constitute a fire hazard include, but are not limited to, paints, solvents, drop clothes and similar materials.

.3 Storage containers considered as adequate include but are not limited to; manufacturers original closed and rated containers.

.4 Remove empty open containers from the site on a daily basis.

.5 Provide adequate storage facilities.

.4 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.7 SITE CONDITIONS

.1 Perform interior painting work only when ambient air and substrate temperatures and humidity level is within the manufacturer’s recommended performance range.

.2 Provide continuous ventilation and sufficient heating facilities to maintain minimum ambient air and substrate temperatures for 24 hours before, during and after paint application.

.3 Provide supplemental ventilating and heating equipment where ventilation and heating from existing system is not adequate to meet minimum safety and

performance requirements; gas fired heating units will not be permitted, unless accepted in writing by the Consultant and authorities having jurisdiction.

.4 Test substrate surfaces (concrete, masonry, plaster and wood) for moisture and alkalinity using a properly calibrated electronic Moisture Meter, except that concrete floors can be tested using a cover patch test; maximum moisture shall not exceed:

.1 12% for concrete and masonry (clay and concrete brick, and concrete block), use concrete test ASTM F1869 for concrete floors.

.2 15% for wood.

.3 12% for plaster and gypsum board.

.5 Provide a minimum lighting level of 323 Lux (30 foot candles) on surfaces being painted.

.6 Apply paint only to dry, clean, and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.

Part 2 Products

2.1 MATERIALS

.1 Primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, and other painting materials shall be in accordance with the MPI Manual “Approved Product” listing and shall be from a single manufacturer for each system used.

.2 Materials such as linseed oil, shellac, and other accessory materials shall be the highest quality product of an approved manufacturer listed in the MPI Manual and shall be compatible with other coating materials.

.3 All materials and paints shall be lead and mercury free and shall have low VOC content where possible.

.4 Unless otherwise specified, all painting work shall be done in accordance with MPI Premium Grade requirements.

2.2 COLOURS

.1 Colours: as indicated on Section 09 99 99 – Materials List.

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

2.3 GLOSS/SHEEN RATINGS

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI gloss / sheen standard values:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte or Flat finish	0 to 5	10 maximum
G2	Velvet finish	10 maximum	10 to 35
G3	Eggshell finish	10 to 25	10 to 35

G4	Satin finish	20 to 35	35 minimum
G5	Semi-Gloss finish	35 to 70	
G6	Gloss finish	70 to 85	
G7	High-Gloss finish	> 85	

.2 Gloss level ratings of painted surfaces as indicated on Section 09 99 99 – Materials List.

Part 3 Execution

3.1 PREPARATION

.1 Prepare surfaces in accordance with MPI Manual requirements. Refer to the Manual for specific surface preparation requirements for each substrate material.

.2 No painting work shall commence until all such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Painting Subcontractor and Consultant.

3.2 APPLICATION

.1 Paint when substrates and environmental conditions (heating, ventilation, lighting and completion of other work) are acceptable for applications of products specified in this Section.

.2 Paint surfaces requiring paint or stain finish to Premium MPI Manual finish requirements with application methods in accordance with best trade practices for type and application of materials used.

.3 Continue paint finishes through behind wall mounted items.

.4 Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer’s recommendations.

.5 Apply a minimum of four coats of paint where deep or bright colours are used to achieve satisfactory results.

3.3 INTERIOR SURFACES

.1 Paint interior surfaces in accordance with the MPI Manual premium grade painting systems listed in this section.

.2 Plaster and Gypsum Board (gypsum board, drywall, and other sheet gypsum materials):

.1 INT 9.2B – High performance architectural latex gloss level as directed.

.3 Acoustic Panels and Tiles, touch up paint:

.1 INT 9.3A – Latex flat finish.

.4 Bituminous Coated Surfaces: (cast iron pipe, concrete, etc.)

.1 INT 10.2A Latex (over w.b rust-inhibitive primer).

3.4 MECHANICAL / ELECTRICAL EQUIPMENT AND RELATED SURFACES

.1 Unless otherwise specified or noted, paint all “unfinished” conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and texture to match adjacent surfaces, in the following areas:

.1 where exposed-to-view in all interior areas.

.2 in all interior high humidity interior areas.

.2 In 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 Paint the inside of all ductwork where visible behind louvers, grilles and diffusers for a minimum of 460 mm or beyond sight line, whichever is greater, with primer and one coat of matt black (non-reflecting) paint.

3.5 MAINTENANCE REPAINTING

.1 Paint existing interior previously finishes surfaces in accordance with the MPI Manual painting systems listed in this section.

3.6 RESTORATION

.1 Clean and re-install all hardware items that were removed before painting operations were undertaken, ensuring that tagged or labelled items are returned to the exact position from which they were removed.

.2 Clean, prime and re-paint all bolts, nuts and fasteners after torqueing or re-tightening following specified paint finish.

.3 Remove protective coverings and warning signs as soon as possible after operations cease.

.4 Protect freshly painted surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

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

3.7 FIELD QUALITY CONTROL: STANDARD OF ACCEPTANCE

.1 Where "special" painting, coating or decorating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer shall provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, review and approval of their paint or coating system application as required at no additional cost to Consultant.

.2 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Consultant.

.3 Fully cooperate at all times with the requirements of the Consultant in the performance of their duties, including providing access and assistance as required to complete review work, and as follows:

.1 All surfaces, preparation and paint applications shall be reviewed.

.2 Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the Consultant:

.1 Brush or roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.

.2 Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.

.3 Damage due to touching before paint is sufficiently dry or any other contributory cause.

.4 Damage due to application on moist surfaces or caused by inadequate protection from the weather.

.5 Damage or contamination of paint due to blown contaminants (dust, spray paint, etc.).

.3 Painted surfaces shall be considered unacceptable if any of the following are evident under final lighting source conditions:

.1 Visible defects are evident on vertical surfaces when viewed at 90° to the surface from a distance of 1000 mm.

.2 Visible defects are evident on horizontal surfaces when viewed at 45° to the surface from a distance of 1000 mm.

.3 Visible defects are evident on ceiling surfaces when viewed at 45° to the surface.

.4 When the final coat on any surface exhibits a lack of uniformity of sheen across full surface area.

.4 Painted surfaces rejected by the Consultant shall be made good at the expense of the Contractor, as follows:

.1 Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted.

.2 Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

3.8 CLEANING

.1 Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

.2 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

.3 Remove combustible rubbish materials and empty paint cans each day and safely dispose of it in accordance with requirements of authorities having jurisdiction.

.4 Clean equipment and dispose of wash water or solvents, and other cleaning and protective materials (rags, drop cloths, masking papers, etcetera), paints, thinners, paint removers and strippers in accordance with the safety requirements of authorities having jurisdiction.

3.9 PROTECTION

.1 Curing periods shall exceed the manufacturer's recommended minimum time requirements.

.2 Erect barriers or screens and post signs to warn of or limit or direct traffic away or around work area as required.

3.10 SCHEDULE

.1 Fill in schedule and submit to Consultant for review.

MASTER PAINTERS INSTITUTE PAINT SCHEDULE					
Company:			Phone:		
Contact:			Facsimile:		
			Email:		
Specified Quality:					
Master Painters Institute			**2021 Approved Paint Products**		
Substrate	MPI#	MPI Name	Manufacturer	Product	Code

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section includes for labour, materials, tools and other equipment, services and supervision required to complete all interior repainting work as indicated on the Drawings and Specifications.

.2 Work listed in this Section includes, but is not limited to, the following:

.1 Moisture testing of substrates.

.2 Surface preparation of substrates as required for acceptance of paint, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to the limits defined under MPI Repainting Manual Preparation requirements.

.3 Specific pre-treatments noted in this specification or as required by the MPI Repainting Manual.

.4 Sealing and priming surfaces for repainting in accordance with MPI Repainting Manual requirements.

.5 Provision of safe and adequate ventilation as required where toxic, volatile or flammable materials are being used.

.3 Related Requirements:

.1 Technical sections as indicated.

1.2 REFERENCES

.1 Reference Standards:

.1 American Society of Testing and Materials International (ASTM):

.1 ASTM D16-19, Standard Terminology for Paint, Related Coatings, Materials, and Applications.

.2 ASTM E84-23, Standard Test Method for Surface Burning Characteristics of Building Materials.

.3 ASTM F1869-22, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

.2 Green Seal (GS):

.1 Standard GS-11, Paints, Coatings, Stains and Sealers, 2015.

.3 Master Painters Institute (MPI):

.1 Approved Products List

.2 Maintenance Repainting/Restoration Manual.

.4 Society for Protective Coatings (SSPC):

.1 SSPC Paint Series, Paint Guidelines.

.2 SSPC SP Series, Surface Preparation Guidelines.

.3 SSPC-PA Series, Paint Application Guidelines.

.5 South Coast Air Quality Management District (SCAQMD):

.1 SCAQMD Rule 1113-16, Architectural Coatings.

.6 Underwriters Laboratories ECOLOGO Certification Program (UL):

.1 UL 2768, Architectural Surface Coatings (formerly CCD-47).

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate work of this section with Section 01 11 00 – General Requirements, Temporary Utilities and Section 01 11 00 – General Requirements, Construction Facilities for provision of temporary heat and light, scaffolding and platforms and housekeeping services.

.2 Coordinate preparation of substrates with other sections of work for the correction of defects and Degree of Surface Deterioration Level DSD-4 deficiencies listed below that may adversely affect repainting work.

.2 Pre-Installation Meeting:

.1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations in accordance with Construction Progress Schedule.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Coordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.3 Scheduling:

.1 Schedule repainting operations to prevent disruption of and by other trades when applicable; do not change work schedule without written acceptance from the Consultant and Owner.

.2 Schedule repainting operations to prevent disruption of occupants in and about the building. Obtain written authorization from Consultant/Owner for changes in work schedule.

.3 Conduct repainting in occupied facilities during hours listed in Section 01 11 00 – General Requirements, Work Restrictions, and to account for the Owner's operating requirements during silent hours and on weekends.

.4 Schedule work such that painted surfaces will have dried before occupants are affected.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Comply with requirements of Section 01 11 00 – General Requirements, Submittal Procedures.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data: Submit list of all painting materials used for the Work to the Consultant for review prior to ordering materials for each paint system indicated, including block fillers and primers:

.1 Material List: An inclusive list of required coating materials indicating each material and cross reference specific coating,

finish system, and application; identify each material by manufacturer's catalogue number and general classification.

.2 Base Information: Confirmation of manufacturer’s ability to supply paint in a variety of base tints, specific to the range of colours being used on this project; indicate colour of base tint used and amount of colourant added to establish Scheduled colours.

.3 Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

.2 Samples: Provide stepped samples, defining each separate coat, including block fillers and primers using representative colours required for the project; label each sample for location and application, and as follows:

.1 Samples for Verification: When requested by the Consultant, provide samples for each colour and material, with texture to simulate actual conditions, on representative samples of the actual substrate as follows:

.1 Painted Wood: 200 mm long or square samples for each colour and material on representative sample wood used for the Work.

.2 Stained or Natural Wood: 200 mm long or square samples of natural or stained wood finish on representative species of wood used for the Work.

.3 Painted Gypsum Board: 200 mm long or square samples for each colour and material.

.3 Informational Submittals: Provide the following submittals when requested by the Consultant:

.1 Certification: Submit certification reports for paint products indicating that they meet or exceed low VOC and coloured base requirements listed in this Section.

.2 Purchase Orders: Retain purchase orders, invoices and other documents for verification of compliance with specification and design requirements.

.3 Submit two sets of Workplace Hazardous Materials Information System WHMIS SDS - Safety Data Sheets prior to commencement of work for review and for posting at job site as required.

.4 Submit work schedule for various stages of work for the Consultant’s review and Owner’s approval when repainting occupied areas, if requested.

.5 Provide an itemized list complete with manufacturer, paint type and colour coding for all colours used for Owner's later use in maintenance for use in the operations and maintenance manual specified in Section 01 11 00 – General Requirements, Closeout Submittals.

1.5 MAINTENANCE MATERIAL SUBMITALS

.1 Provide maintenance materials in accordance with Section 01 11 00 – General Requirements, Closeout Submittals.

.2 Provide a minimum of 4 litres of each type and colour of paint from same production run (batch mix) used in unopened cans, properly labelled and identified for Owner's later use in maintenance.

.3 Store where directed by the Owner.

1.6 QUALITY ASSURANCE

.1 Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in service performance, and as follows:

.1 Have a minimum of five years proven satisfactory experience and shall show proof before commencement of work that he will maintain a qualified crew of painters throughout the duration of the work.

.2 When requested provide a list of the last three comparable jobs including, name and location, specifying authority, start and completion dates and cost amount of the painting work.

.3 Only qualified journeymen who have a Tradesman Qualification Certificate of Proficiency shall be engaged in painting and decorating work.

.4 Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.

.2 Materials, preparation and workmanship shall conform to the standards contained in the latest edition of the Master Painters Institute (MPI) Maintenance Repainting/Restoration Manual.

.3 Paint manufacturer shall provide certification of all surfaces and conditions for specific paint or coating system application as well as on site supervision, review and approval of their paint or coating system application as required at no additional cost to the Owner where "special" coatings or decorating systems (i.e.: textured coatings or non-MPI listed products or systems) are used in repainting.

.4 Mock-Ups:

.1 Prepare mock-ups in accordance with Section 01 11 00 – General Requirements, Quality Control.

.2 Prepare and repaint a designated interior surface, area, room or item to requirements of this Section using specified paint or coating to indicate selected colours, gloss, sheen, texture and workmanship to MPI Maintenance Repainting/Restoration Manual lstandards for review and acceptance by Consultant.

.3 Accepted surface, area, room or items shall become the standard of finish quality and workmanship for similar on-site repainting work.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver painting materials in sealed, original labelled containers bearing manufacturer's name, brand name, type of paint or coating and colour designation, standard compliance, materials content as well as mixing and/or reducing and application requirements.

.2 Store paint materials in original labelled containers in a secure (lockable), dry, heated and well ventilated single designated area meeting the minimum requirements of both paint manufacturer and authorities having jurisdiction and at a minimum ambient temperature of 7°C. Store only materials used on this project on site.

.3 Provide adequate fireproof storage lockers, take necessary precautions, and post warning signs (i.e.: no smoking) where toxic, volatile, explosive, or flammable materials are being used or stored, as follows:

.1 Take necessary precautions and safety measures to prevent fire hazards and spontaneous combustion, and to protect the environment from spills.

.2 Materials considered to constitute a fire hazard include, but are not limited to, paints, solvents, drop clothes and similar materials.

.3 Storage containers considered as adequate include but are not limited to; manufacturers original closed and rated containers.

.4 Remove empty open containers from the site on a daily basis.

.5 Provide adequate storage facilities.

.4 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

1.8 SITE CONDITIONS

.1 Perform interior repainting work only when ambient air and substrate temperatures and humidity level is within the manufacturer's recommended performance range.

.2 Provide continuous ventilation and sufficient heating facilities to maintain minimum ambient air and substrate temperatures for 24 hours before, during and after paint application.

.3 Provide supplemental ventilating and heating equipment where ventilation and heating from existing system is not adequate to meet minimum safety and performance requirements; gas fired heating units will not be permitted, unless accepted in writing by the Consultant and authorities having jurisdiction.

.4 Test substrate surfaces (concrete, masonry, plaster and wood) for moisture and alkalinity using a properly calibrated electronic Moisture Meter, except that concrete floors can be tested using a cover patch test; maximum moisture shall not exceed:

.1 12% for concrete and masonry (clay and concrete brick, and concrete block), use concrete test ASTM F1869 for concrete floors.

.2 15% for wood.

.3 12% for plaster and gypsum board.

.5 Provide a minimum lighting level of 323 Lux (30 foot candles) on surfaces being repainted.

.6 Apply paint only to dry, clean, and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.

Part 2 Products

2.1 MATERIALS

.1 Materials used for this project shall be listed in the latest edition of the MPI Approved Product List and shall be from a single manufacturer for each system used.

.2 Materials not listed, such as linseed oil, shellac, turpentine, and similar products shall be the highest quality product of an approved manufacturer listed in the MPI Approved Product List and shall be compatible with other coating materials as required.

.3 Materials and paints shall be lead and mercury free.

.4 Only qualified products with E2 "Environmentally Friendly" ratings are acceptable for use on this project, Use E3 rated products where available.

.5 Paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes, sags, air entrapment and other effects deleterious to the final finish as noted below.

.6 Paints and coatings shall meet flame spread and smoke developed ratings designated by local Building Code requirements and authorities having jurisdiction.

2.2 EQUIPMENT

.1 Painting Equipment: to best trade standards for type of product and application.

.2 Spray-Painting Equipment: of ample capacity, suited to the type and consistency of paint or coating being applied and kept clean and in good working order at all times.

2.3 MIXING AND TINTING

.1 Paints shall be ready-mixed and pre-tinted; re-mix paint in containers prior to and during application to break-up of lumps, and provide complete dispersion of settled pigment, and provide consistent colour and gloss.

.2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

.3 Thin paint for spraying in strict accordance with paint manufacturer's instructions; where directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.

2.4 FINISH AND COLOURS

.1 Unless otherwise specified, all repainting work shall be done in accordance with MPI Premium Grade requirements.

.2 Colours shall be as indicated on Section 09 99 99 – Materials List

.3 Access doors, registers, radiators and covers, exposed piping and electrical panels shall be repainted to match adjacent surfaces (i.e. colour, texture and sheen), unless otherwise noted or where pre-finished.

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

2.5 GLOSS/SHEEN RATINGS

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI gloss / sheen standard values:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte or Flat finish	0 to 5	10 maximum
G2	Velvet finish	10 maximum	10 to 35
G3	Eggshell finish	10 to 25	10 to 35
G4	Satin finish	20 to 35	35 minimum
G5	Semi-Gloss finish	35 to 70	
G6	Gloss finish	70 to 85	
G7	High-Gloss finish	> 85	

.2 Gloss level ratings of painted surfaces as indicated on Section 09 99 99 – Materials List.

Part 3 Execution

3.1 EXAMINATION

.1 Prior to commencement of repainting work, thoroughly examine and test conditions and surfaces scheduled for repainting and report in writing to the Consultant any conditions or surfaces that will adversely affect work of this Section.

.2 The degree of surface deterioration (DSD) shall be assessed using the assessment criteria indicated in the MPI Maintenance Repainting Manual as follows:

Condition	Description
DSD-0	Sound Surface (may include visual (aesthetic) defects that do not affect film's protective properties).
DSD-1	Slightly Deteriorated Surface (may show fading; gloss reduction, slight surface contamination, minor pin holes scratches, etc.)/Minor cosmetic defects (runs, sags, etc.).
DSD-2	Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, staining, etc.).
DSD-3	Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).
DSD-4	Substrate Damage (repair or replacement of surface required by others).

.3 Other than the repair of DSD-1 to DSD-3 defects included under this scope of work, structural and DSD-4 substrate defects discovered prior to and after surface preparation or after first coat of paint shall be made good and sanded by others ready for painting, unless otherwise agreed to by the Owner and painter to be included in this Work.

.4 No repainting work shall commence until all such DSD-4 adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Painting Subcontractor. The Painting Subcontractor shall not be responsible for the condition of the substrate or for correcting defects and deficiencies in the substrate, which may adversely affect the painting work except for minimal work normally performed by the Painting Subcontractor and as, indicated herein. It shall always, however, be the responsibility of the Painting Subcontractor to see that surfaces are properly prepared before any paint or coating is applied. It shall also be the Painting Subcontractor's responsibility to paint the surface as specified providing that the owner accepts responsibility for uncorrected DSD-4 substrate conditions.

.5 No painting work shall commence until all such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Painting Subcontractor and Consultant.

3.2 PREPARATION

.1 Prepare surfaces for repainting in accordance with MPI Maintenance Repainting/Restoration Manual requirements, refer to the MPI Maintenance Repainting/Restoration Manual for specific requirements for the following:

- .1 Environmental conditions.
- .2 pH testing.
- .3 Acid etching.
- .4 Rust stain removal.
- .5 Mildew removal.
- .6 Gypsum board.
- .7 Acoustical panels and tiles.
- .8 Bituminous coated surfaces.

.2 Sand, clean, dry, etch, neutralize and/or test all surfaces under adequate illumination, ventilation and temperature requirements.

.3 Remove and securely store miscellaneous hardware, surface fittings and fastenings (i.e.: electrical plates, mechanical louvers, door and window hardware), removable rating, hazard or instruction labels, washroom accessories, light fixture trim, and similar items from wall and ceiling surfaces, and doors and frames, prior to repainting and replace upon completion:

- .1 Carefully clean and replace removed items upon completion of repainting work in each area.
- .2 Do not use solvent or reactive cleaning agents on items that will mar or remove finishes (i.e.: lacquer finishes).
- .3 Doors shall be removed before repainting to paint bottom and top edges and then re-hung.

.4 Protect adjacent surfaces and areas, including non-removable rating and instruction labels on doors, frames, equipment, piping, landscaping, walks, signage, and similar items, from repainting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.

3.3 APPLICATION

.1 Commence repainting only when substrates are acceptable and environmental conditions (i.e.: heating, ventilation, lighting and completion of other subtrade work, if applicable) are acceptable for applications of products.

.2 Apply primer, paint or stain in accordance with MPI Architectural Painting Specification Manual Premium Grade finish requirements.

.3 Apply primer, paint or stain in a workmanlike manner using skilled and trade-qualified applicators as noted under Quality Assurance.

.4 Apply primer, paint or stain within an appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or the manufacturer's paint specifications require earlier applications.

.5 Primer, paint or stain coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.

.6 Tint each coat of paint progressively lighter to enable confirmation of number of coats.

.7 The number of coats and film thickness required are the same regardless of application method, except that dark tinted colours will require a minimum of four coats with an additional clear urethane or water based light industrial coating type of coating applied in high traffic areas.

.8 Sand and dust between each coat to provide an anchor for next coat and to remove defects in previous coat (runs, sags, etc.) visible from a distance up to 1000 mm.

.9 Do not apply finishes on surfaces that are not sufficiently dry unless manufacturer's directions state otherwise; each coat shall be sufficiently dry and hard before a following coat is applied.

.10 Apply materials in strict accordance with manufacturer’s spread rates and application requirements to avoid air entrapment in applied coats.

3.4 MPI INTERIOR REFINISHING SYSTEMS

.1 Paint interior surfaces in accordance with MPI Maintenance Repainting/Restoration Manual premium requirements and the systems listed in this Article.

.2 Plaster and Gypsum Board Surfaces: (gypsum board and textured finishes):

.1 RIN 9.2B – High performance architectural latex, gloss level as directed.

3.5 MECHANICAL AND ELECTRICAL EQUIPMENT

.1 Repainting of mechanical and electrical work shall include exposed to view, previously painted mechanical and electrical equipment and components including, but not limited to, panels, conduits, piping, hangers, ductwork, and similar items.

.2 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour, and sheen finish to match existing unless otherwise noted or scheduled.

.3 Do not paint over nameplates or instruction labels.

.4 Leave unfinished exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish.

.5 Keep repainted sprinkler heads free of paint.

.6 Do not paint interior transformers and substation equipment.

3.6 FIELD QUALITY CONTROL: STANDARD OF ACCEPTANCE

.1 Where "special" painting, coating or decorating system applications (i.e. elastomeric coatings) or non-MPI Approved Product List or systems are to be used, paint or coating manufacturer shall provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, review, and approval of their paint or coating system application as required at no additional cost to Consultant.

.2 Fully cooperate at all times with the requirements of the Consultant in the performance of their duties, including providing access and assistance as required to complete review work, and as follows:

.1 All surfaces, preparation and paint applications shall be reviewed.

.2 Repainted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the Consultant:

.1 Brush or roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.

.2 Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.

.3 Damage due to touching before paint is sufficiently dry or any other contributory cause.

.4 Damage due to application on moist surfaces or caused by inadequate protection from the weather.

.5 Damage or contamination of paint due to blown contaminants (dust, spray paint, etc.).

.3 Repainted surfaces shall be considered unacceptable if any of the following are evident under final lighting source conditions:

.1 Visible defects are evident on vertical surfaces when viewed at 90° to the surface from a distance of 1000 mm.

.2 Visible defects are evident on horizontal surfaces when viewed at 45° to the surface from a distance of 1000 mm.

.3 Visible defects are evident on ceiling surfaces when viewed at 45° to the surface.

.4 When the final coat on any surface exhibits a lack of uniformity of sheen across full surface area.

.4 Repainted surfaces rejected by the Consultant shall be made good at the expense of the Contractor, as follows:

.1 Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted.

.2 Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

3.7 CLEANING

.1 Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

.2 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

.3 Remove combustible rubbish materials and empty paint cans each day and safely dispose of it in accordance with requirements of authorities having jurisdiction.

.4 Clean equipment and dispose of wash water/solvents as well as all other cleaning and protective materials (i.e.: rags, drop cloths, masking papers, etc.), paints, thinners, paint removers/strippers in accordance with the safety requirements of authorities having jurisdiction.

.5 Waste Management

.1 Comply with requirements of Section 01 11 00 – General Requirements, Waste Management and Disposal.

.2 The following procedures shall be followed to reduce the amount of contaminants entering waterways, sanitary or storm drain systems or into the ground:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil-soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated, fire-safe area at moderate temperature.

.3 Collect waste paint by type and provide for delivery to recycling or collection facility where paint recycling is available.

.4 Comply with requirements of authorities having jurisdiction, to the use, handling, storage and disposal of hazardous materials.

3.8 PROTECTION

.1 Curing periods shall exceed the manufacturer's recommended minimum time requirements.

.2 Erect barriers or screens and post signs to warn, limit or direct traffic away or around work area as required.

3.9 SCHEDULE

.1 Fill in schedule and submit to Consultant for review.

MASTER PAINTERS INSTITUTE PAINT SCHEDULE					
Company:			Phone:		
Contact:			Facsimile:		
			Email:		
Specified Quality:					
Master Painters Institute			**2021 Approved Paint Products**		
Substrate	MPI#	MPI Name	Manufacturer	Product	Code

END OF SECTION

Finish Code		Material	Manufacturer & Product	Colour	Remarks	
Floor						
	VT1	Vinyl Plank Flooring	Manufacturer: Polyflor Colour: 2572 Honey Wild Oak	2572 Honey Wild Oak	Location: Varsity Lounge throughout	
	CP1	Carpet Tile	Maunfacturer: Interface Collection: Stree Smart SS218 & SS217 Size: 250mm x 1000mm	105010 Alley	Refer to finish plan for pattern. Location: office	
	SF1	Seamless Flooring	Manufacturer: Tarkett Material: Vinyl Sheet Colour: Caramel Infusion	Caramel Infusion	Match existing corridor flooring Location: Corridor	
	TS1	Transition Strip	Schluter, stainless steel		Carpet tile to vinyl plank flooring	
	TS2	Transition Strip	Schluter, stainless steel		Vinyl plank flooring to Vinyl Sheet	
Wall						
	PT1	Paint(Field)	Manufacturer: Benjamin Moore Colour: Chantilly Lace 2121-70 Gloss Level - G3 (walls); G1(ceilings)	White	All walls PT1 U.N.O	
	RB1	Rubber Base	Manufacturer: Tarkett Series: Traditional Duracove Thermoplastic rubber 1/8" with toe colour: white sand w (TDC 68)	white		
Ceiling						
	C1	Acoustic Ceilign Tile	Manufacturer: CertainTeed Series: Symphony m, 1220-75-1M Size: 600mm X 1200mm x 19mm Grid: Trim 15/16 suspension system	white	Refer to ceiling plans	
	C2	Gypsum Board, Painted	Painted PT1	white	Refer to ceiling plans	
Millwork						
	PL1	Plastic Laminate	Manufacturer: Formica Colour: Millennium Oak - 5887	Millennium Oak	Kitchenette millwork and Floating Shelving	
	QZ-1	Mineral Countertop	Manufacturer: Caesarstone Colour: Piatra Grey - 5003	Piatra Grey	Apply both to kitchen countertop & backsplash	
	Bracket	Inwall Metal Support Bracket	Manufacturer: Richelieu Number: 6802121290 Projection: 12" Length: 12"	black	Support Floating Shelving	

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Marker boards.

.2 Accessories such as marker trays, joint reinforcements, and anchor clips.

.2 Related Requirements:

.1 Section 06 10 00 – Rough Carpentry

.2 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCES

.1 Reference Standards:

.1 Aluminum Association (AA):

.1 AA DAF 45-03(2009), Designation System for Aluminum Finishes.

.2 American National Standards Institute (ANSI) / National Particleboard Association (NPA):

.1 NPA A208.1-2009, Particleboard.

.2 NAP A208.2-2009, Medium Density Fiberboard (MDF) for Interior Applications.

.3 American Society for Testing and Materials International (ASTM):

.1 ASTM E84-23, Standard Test Method for Surface Burning Characteristics of Building Materials.

.4 Canadian General Standards Board (CGSB):

.1 CAN/CGSB 11.3-M87, Hardboard (Withdrawn).

.5 Canadian Standards Association (CSA Group):

.1 CSA O151-17 (R2022), Canadian Softwood Plywood.

.6 Porcelain Enamel Institute (PEI):

.1 PEI 501, Electrostatic Porcelain Enamel Powder Application.

.2 PEI 502, Dipping and Flow Coating for Porcelain Enamel.

.7 South Coast Air Quality Management District (SCAQMD):

.1 SCAQMD Rule 1168-22, Adhesives and Sealants Applications.

.8 Underwriters' Laboratories of Canada (ULC):

.1 ULC 102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies. (ULC S102)

.2 ULC 706, Standard for Wood Fibre Insulating Boards for Buildings. (CAN/ULC-S706-09)

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Submit manufacturer's printed product literature, specifications and data sheets.

.2 Submit Workplace Hazardous Materials Information System WHMIS SDS - Safety Data Sheets. WHMIS SDS acceptable to Labour Canada and Health and Welfare Canada. Indicate VOC content. Indicate VOC's:

.1 For caulking materials during application and curing.

.2 For adhesives.

.2 Submit shop drawings in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Indicate location, type, size, panel arrangement, backing, hardware, anchor or mounting details, frames or trim and accessories.

.3 Submit samples in accordance with Section 01 11 00 – General Requirements, Submittal Procedures.

.1 Marker Boards: Submit minimum 305 mm x 305 mm sample of porcelain enamel finish for each type of marker board required.

.2 Submit 300 mm long sample of trim in each finish type and colour.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.4 CLOSEOUT SUBMITTALS

.1 Submit closeout data in accordance with Section 01 11 00 – General Requirements, Closeout Submittals.

.1 Provide manufacturer's printed recommendations for general maintenance, including cleaning instructions.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Surface burning characteristics of materials: listed and labelled by an organization accredited by Standards Council of Canada.

.2 Engage an experienced installer who is an authorized representative of visual display board manufacturer for both installation and maintenance of the type of products required for this Project.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 11 00 – General Requirements, Waste Management and Disposal.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers: Subject to compliance with requirements specified in this Section, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:

.1 Access SMT.

.2 Architectural School Products Ltd.

.3 Claridge Products and Equipment Inc.

.4 Clarus Glassboards.

.5 C.P. Distributors Ltd.

.6 Crestway Systems Ltd.

.7 Egan Visual Inc.

.8 Malem Architectural Specialties Ltd.

2.2 MATERIALS

.1 Extruded aluminum: Aluminum Association alloy AA6063-T5. Minimum 1.5 mm wall thickness.

2.3 MARKER BOARDS

.1 Face Sheet: Minimum 0.62 mm enamelling grade steel specifically processed for temperatures used in coating porcelain on steel to manufacturers standard process, and as follows:

.1 Coat exposed face and edges with a three-coat process consisting of primer, ground coat, and colour cover coat.

.2 Coat concealed face with a two-coat process consisting of primer and ground coat.

.2 Cover Coats: Provide manufacturer's standard, light coloured, special writing surface with gloss finish intended for use with erasable dry markers.

.3 Core: Use any one of the following core materials to the manufacturer’s standard:

.1 10 mm thick, particleboard core material complying with requirements of ANSI/NPA A208.1, Grade 1 M 1.

.2 6 mm thick, tempered hardboard.

.3 13 mm gypsum board.

.4 Backing Sheet: Use any one of the following backing materials to the manufacturer’s standard:

.1 0.38 mm thick, aluminum sheet backing.

.2 0.127 mm thick, aluminum foil sheet backing.

.3 0.45 mm thick, galvanized steel sheet backing.

.5 Laminating Adhesive: Manufacturer's standard, moisture resistant, thermoplastic type adhesive meeting requirements of SCAQMD Rule #1168.

.6 Trim and Framing: Extruded aluminum to profiles indicated using manufacturer’s standard sections appropriate for installation conditions.

2.4 FABRICATION

.1 Shop fabricated display boards in one piece for lengths 3600 mm or less, for longer sections colour match adjacent pieces.

.2 Laminate display board and backing sheet to the core in accordance with the display board manufacturer's recommendations.

.3 Install trim on panels in factory. Make mitres and joints to hair-line fit, free of rough edges with concealed brackets to reinforce and hold joints tight and flush. No exposed fasteners permitted.

.4 Overlap trim 6 mm onto panels. Provide closed ends for chalk troughs and open-end extrusions.

.5 Factory fit assemblies too large for shipment to site in one piece, disassemble for delivery and site assembly.

2.5 FINISHES

.1 Aluminum trim finishes:

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.

.1 Clear anodic finish: designation AA-M12C22A31.

2.6 ACCESSORIES

.1 Marker Tray: Manufacturer's standard, plate type, continuous for full length of each installation, complete with end closures and matching trim and frame materials.

.2 Joint reinforcement: concealed mechanical jointing system to provide straight, rigid, continuously supported, tight butt, flush joints at surface.

.3 Anchor clips, brackets and fasteners: concealed type recommended by manufacturer for fixed.

Part 3 Execution

3.1 INSTALLATION

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

.2 Install display boards in accordance with manufacturer's instructions, parallel to floor, plumb and level, to provide rigid, secure surface.

.3 Install trim and framing around display boards panels. Make mitres and joints to hair-line fit, free of rough edges. Use concealed brackets to reinforce and hold joints tight and flush. No exposed fasteners permitted.

.4 Mechanical attachment:

.1 To concrete or solid masonry use lag screw and expansion bolts or screws and fibre plugs as appropriate for stresses involved.

.2 To hollow masonry use toggle bolts or equivalent.

.3 To wood or sheet metal use screws. Secure into framing members in stud walls.

3.2 CLEANING

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

.2 Clean surfaces after installation using manufacturer's recommended cleaning procedures.

.3 Clean aluminum with damp rag and approved non-abrasive cleaner.

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

END OF SECTION

MCW Consultants Ltd.

A member of the MCW Group of Companies
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ELECTRICAL SPECIFICATIONS

FOR

GBC-CASA LOMA ATHLETICS VARSITY LOUNGE AND SHOWERS RENOVATION

TO

GEC ARCHITECTURE

DATED

NOVEMBER 21, 2023

ISSUED FOR CONSTRUCTION

Contact Person: Denise Neutel
Phone: 416-598-2920 Ext. 486
Email: DNeutel@mcw.com

CONTENTS

INCLUDE CASH ALLOWANCE TO SUPPLY AND INSTALL TWO EXTRA EXIT LIGHTS AND EMERGENCY LIGHTS COMPLETE WITH REQUIRED CONDUITS AND CABLES, ACCORDING TO BUILDING INSPECTORS DIRECTION AT THE TIME OF INSPECTION.

2.13 FIRE ALARM
2.14 COMMUNICATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

.1 Codes & standards

.1 The project shall be constructed in accordance with all codes in affect including all authorized agencies having jurisdiction over the work including, but not restricted to the Canadian Electrical Safety Code, Ontario Electric Safety Code, Ontario Building Code, , and all other building codes in effect at the time of construction.

1.02 DEFINITIONS

.1 The term "this sub-contractor means the firm having a subcontract with the "contractor" to perform, supervise and co-ordinate all work of this division.

.2 The term "install" (and tenses of "install") means install and connect complete.

.3 The term "supply" means supply only.

.4 The term "provide" or “provision of" are used in relationship to equipment and other materials specified it means “supply, install and connect". Wherever the terms “provide" or “provision of" are used in connection with services such as testing, start-up and commissioning for any part of the work, it means procure, supervise, take responsibility and pay for these services.

.5 "Drawings and Specifications" means "The Contract Documents".

.6 The term "work" means all equipment, permits, materials and labor to provide a complete electrical installation as required and detailed in the drawings and specifications.

.7 The term “means acceptable to the consultant.

1.03 SUBMITTALS

.1 Submit shop drawings for all material and as further identified herein.

1.04 PERMITS, FEES AND INSPECTIONS

.1 Apply for, obtain, and pay for all permits, licenses, inspections, examinations and fees required for the work and obtain all permits as required.

.2 Arrange for inspection of all work by the authorities having jurisdiction over the work. On completion of the work, present to the consultant the final unconditional certificate of approval of the inspecting authorities.

.3 In case of conflict, the codes take precedence over the contract documents. In no instance reduce the standard or scope of work or intent established by the drawings and specifications by applying any of the codes referred to herein.

1.05 CONTRACT DRAWINGS

.1 The drawings for electrical work are performance drawings, diagrammatic, intended to convey the scope of work and indicate general arrangement and approximate location of apparatus, fixtures and conduit runs. The drawings do not intend to show architectural, interior design and structural details. Be responsible for a thorough knowledge of same before proceeding with the work.

.2 Do not scale drawings. Obtain information involving accurate dimensions from dimensions shown on architectural and structural drawings, and by site measurement.

.3 Make, at no additional cost, any changes or additions to materials, and/or equipment necessary to accommodate structural conditions (conduits around beams, columns, etc.)

.4 Alter, at no additional cost, the locations of materials and/or equipment as directed that do not necessitate additional material.

.5 Install ceiling mounted components (e.g., light fixtures, speakers, heat or smoke detectors) in accordance with reflected ceiling drawings.

.6 Confirm on the site the exact location and mounting elevation of outlets and fixtures as related to architectural and structural details.

1.06 EXAMINATION OF SITE AND DOCUMENTATION

.1 Prior to submitting tender, carefully examine conditions at the site which could affect the work. Refer to and examine all contract documents.

.2 Be responsible for any damage done to existing underground services caused by neglect to determine and mark out the location of such services prior to excavation work commencing.

.3 Ensure that materials and equipment are delivered to the site at the proper time and in such assemblies and sizes so as to enter into the building and to be moved into the spaces where they are to be located without difficulty. Be responsible for any cutting and patching involved in getting assemblies into place.

.4 Review all work of other contract packages where interface with this contract will occur as noted in scope of work section above. Inspection and accept conditions, or notify the consultant immediately of any work required to be rectified prior to accepting the work to comply with the required scope of this contractor. Failure to advise the consultant prior to accepting the site conditions will indicate acceptance of the conditions as they are.

1.07 PHASING AND SCHEDULING OF WORK

.1 Prior to commencing any work, refer to scope of work for a detailed description of the phasing and scheduling of the work. Execute work in accordance with the phasing and construction schedule. Provide all necessary temporary connections and equipment to provide functional, operational systems during construction period when part of the building will be occupied and construction is still continuing in other portions.

1.08 COORDINATION DRAWINGS

.1 Prepare drawings in conjunction with all trades concerned, showing sleeves and openings for passage through structure, and all inserts, equipment bases, and supports, and relate these to suitable grid lines and elevation datum.

.2 When requested, provide weights of major items of equipment.

.3 Prepare interference and co-ordination drawings for all areas where the work of this division could conflict with and/or obstruct the work of other trades and/or other sections of this division. Submit drawings for review by the consultant.

1.09 COORDINATION

.1 Co-ordinate arrangement, mounting, and support of electrical equipment:

.1 To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
.2 To provide for ease of disconnecting the equipment with minimum interference to other installations.
.3 To allow right of way for piping and conduit installed at required slope.
.4 So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

.2 Co-ordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

.3 Co-ordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Provide access doors and panels to suit the finish that it will be installed onto.

.4 Co-ordinate sleeve selection and application with selection and application of firestopping.

.5 Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly.

.6 Co-ordinate sizes and locations of required concrete pads and bases to support electrical equipment.

1.10 PRODUCT STANDARDS AND ALTERNATIVES

.1 Provide new material and equipment as specified and to the acceptance of the consultant. Manufacturer's names are listed to set a standard of quality, performance, capacity, appearance and serviceability.

.2 Where no other acceptable manufacturers are indicated, provide the exact make specified. Requests for acceptance of manufacturers not listed must be submitted not less than seven working days prior to closing date of the tender and submissions must bear proof of acceptance by the consultant if used in the tender.

.3 Assume full responsibility for ensuring that when providing other acceptable manufacturers all space, weight, connections, power and wiring requirements, etc., are considered, and costs therefore included in the tender. Equipment requiring greater than specified energy requirements or unduly limiting service space requirement will not be accepted.

1.11 RIGHTS RESERVED

.1 Rights are reserved to furnish any additional detail drawings, which in the judgement of the consultant may be necessary to clarify the work, and such drawings shall form a part of this contract.

1.12 EXPEDITING AND DELIVERY

.1 Continuously check and expedite delivery of equipment and materials. Where necessary, inspect at the source of manufacture.

.2 Continuously check and expedite the flow of necessary information to and from all parties involved.

.3 Immediately inform the consultant in case information is required.

1.13 SUPERINTENDENCE

.1 Maintain at the job site, at all times, qualified personnel and supporting staff, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.

1.14 WORKMANSHIP

.1 Install equipment, conduit and cables in a workmanlike manner to present a neat appearance to function properly to the satisfaction of the consultant. Install runs parallel and perpendicular to building lines, in chases, behind furring or above ceilings, where such concealment is possible. In areas where systems are to be exposed install neatly and group to present a tidy appearance.

.2 Install equipment and apparatus requiring maintenance, adjustment or eventual replacement with due allowance therefore.

.3 Include in the work all requirements of manufacturers shown on the shop drawings or manufacturers installation instructions.

.4 Replace work unsatisfactory to the consultant without extra cost.

.5 Make provision to accommodate future plant and equipment indicated on drawings.

.6 Protect from damage all equipment delivered to the site and during installation. Any damage or marking of finished surfaces shall be made good to the satisfaction of the consultant.

1.15 TRIAL USAGE AND TESTS

.1 The owner has the privilege of the trial usage of electrical systems or parts thereof for the purpose of testing and learning the operational procedures.

.2 Assist in trial usage over a length of time as deemed reasonable by the consultant and do not waive any responsibility because of trial usage.

.3 Trial usage shall not be construed as substantial completion of the work, or acceptance by the owner.

.4 Provide and pay for all testing required on the system components where, in the opinion of the consultant, manufacturer’s ratings or specified performance is not being achieved.

1.16 NOISE AND VIBRATION

.1 Electrical equipment is to operate without objectionable noise or vibration. If, in the opinion of the consultant, the equipment operates with excessive noise or vibration, then the equipment must be replaced or noise or vibration eliminated.

.2 Connections to noise-producing and vibrating equipment must be made with liquid-tight flexible conduit and associated connectors. This includes transformers, dimming equipment racks, and motors. Use a minimum of 3ft of flexible cable with slack at each device.

.3 Vibration isolators are to be provided where indicated or required. Transformers to be isolated from the structure, with spring and rubber isolators when wall mounted or suspended and 1/2" high density neoprene sandwich pads (type MWP) when floor mounted.

1.17 INTERRUPTION OF SERVICES

.1 Where disruptions of existing services are required co-ordinate the shut-downs with the Owner and carry out the work at a time and in a manner acceptable to them. Carefully schedule all disruptions and/or shut-downs and ensure that the duration of same is kept to the absolute minimum. Submit for approval a written concise schedule of each disruption at least 72 hours in advance of performing work and obtain Owner's written consent prior to implementing.

.2 Where disruptions of life safety systems are required comply with paragraph .1 above Provide continuous monitoring during shut-down period and ensure all systems are reactivated prior to leaving the site at the end of each working day.

.3 Interruptions shall only occur during premium time periods; all allowances for this shall be included in the price submitted.

.4 Assume full responsibility for any disruption or damage to existing services or systems. Should any temporary connections be required to maintain services during work in the existing building, supply and install all necessary material and equipment and provide all labour at no extra cost. Should this Division damage any existing system or device in the course of work, make full repairs without extra cost and to the satisfaction of the Owner.

1.18 DEMOLITION

.1 Visit the site, examine the existing conditions and become familiar with the extent of the necessary removal, relocation, reconnecting, and rerouting of electrical equipment and wiring as necessary for the completion of the project.

.2 Review and confirm with the architect/designer's drawings for the complete extent of demolition and alteration.

.3 Make safe and disconnect all power and systems, as and when, and to the extent required to facilitate with the demolition.

.4 Ensure that all electrical, life safety services, and services for existing equipment, in areas outside the areas of this work, that are required to remain in service, shall do so.

.5 Relocate any electrical feeders or equipment that are required to remain in service, that are secured to existing walls, floors or ceilings to be demolished or that are buried and required to be excavated for new work.

.6 Remove and replace any electrical equipment on walls or ceilings that will be demolished and rebuilt.

.7 When deleting and/or making safe existing electrical work, ensure that it includes all conduit and wiring back to the associated panelboards or control panel. Where floor boxes are being removed, ensure under-floor conduit is removed back to source and fill all core holes, in floors and in walls, with appropriate concrete.

.8 Disconnect and remove existing light fixtures, devices, outlets, etc. which are not to be reused. Such items shall be boxed and turn over to the owner at a place designated by the owner. Cut back and cap unused raceway and outlets and removed unused wiring back to panelboard in approved manner.

.9 Include in demolition work for removal of all communication devices, outlets, cables, conduits, etc., which are not to be reused. All redundant cabling and conduit shall be removed in its entirety from tenant space back to base building riser rooms. Remove all unnecessary tables and equipment in hub rooms and/or telephone rooms with extreme care to avoid any accidental shutdown to existing services serving other parts of the building.

.10 Provide blank cover plate where outlets are removed from existing walls to remain.

.11 All existing electrical equipment which is no longer required shall be removed and disposed of, off site.

.12 Return to landlord any unused owner supplied equipment and materials; exit signs, light fixtures, speakers, speaker/strobes.

.13 Be responsible and pay for any damage to the base building incurred by work of this division, or repair to the satisfaction of the consultant.

.14 Carry out the work with minimum of noise, dust and disturbance.

.15 Ensure that all existing equipment which are to be reused and/or relocated is thoroughly inspected and refurbished to ensure correct operation when put back into service and meets the local electrical safety authority's approval. Outlet boxes and wiring and for conduit which are corroded or damaged are to be replaced.

1.19 CLEANING

.1 Before energizing any systems, inspect and clean the inside of panel boards, switchgear and cabinets to ensure that they are completely free from dust and debris.

.2 Clean all polished, painted and plated work bright. Clean all lighting fixtures.

.3 Remove all debris, surplus material and all tools.

.4 Carry out additional cleaning operating of systems as specified in other sections of the specification.

1.20 COMPLETION

.1 All equipment must be cleaned and tested before final acceptance by consultant.

.2 Leave electrical work in specified working order.

1.21 INSTRUCTION TO OWNER

.1 Instruct the owner's representatives in all aspects of the operation of systems and equipment.

.2 Arrange for and pay for services of service engineers and other manufacturers' representatives required for instruction on specialized portions of the installation.

.3 Submit to the consultant at the time of final inspection a complete list of systems stating for each system:

.1 Date instructions were given to the owner's staff.
.2 Duration of instruction.
.3 Name of persons instructed.
.4 Other parties present (manufacturer's representative, consultants, etc.).

.4 Signatures of the owner's staff stating that they properly understood the system installation, operation and maintenance requirements.

1.22 ADDITIONAL WORK

.1 In case where extra work of any kind is required, obtain written instruction from the architect / design consultant before proceeding. Payments will be made for authorized changes only.

.2 Quotation with breakdown of material, labour, overhead, profit, etc., shall be submitted for each change. Labour units shall be based on the latest National Electrical Contractors Association (NECA) labour column one for the complete duration of the project. Material prices shall be based on the current National Price System with trade discounts. Hourly labour rate shall include all rated changes for supervision, Hydro inspection, hand tools, parking, clean-up, as-built drawings and additional bonding.

1.23 TENANT'S EQUIPMENT

.1 Where specified, install all equipment provided by the tenant. Receive, store and install equipment and accept full responsibility for its correct operation. Provide conduit, wire, boxes, switches, outlets, devices, flex connections, etc., as required.

1.24 MATERIALS AND CONNECTIONS TO EQUIPMENT FURNISHED BY OTHERS

.1 Where materials are furnished by others for installation under this division, the sub-contractor shall notify the supplier of dates they will be ready for delivery as specified in the general conditions. The sub-contractor shall receive, unload, handle, store, protect and insure the material until ready for actual installation. Upon receipt of material furnished by others, the sub-contractor shall spot-check or check the entire shipment and promptly advise the consultant in writing of any damage and/or missing components. Any material which is subsequently lost or damaged due to negligence on the part of the sub-contractor shall be promptly replaced (or repaired to the satisfaction of the owner) at the sub-contractor's expense.

.2 Where the drawings indicated equipment to be furnished by others, provide electrical rough-in for each unit pursuant to its shop drawings, and make final connections, disconnect switches and other electrical facilities for a complete installation.

1.25 INSERTS, HANGERS AND SLEEVES

.1 Sleeves are to be of a type suitable for the application and be sealed and made watertight.

.2 Provide hangers, inserts, sleeves and supports as required.

.3 Steel pipe sleeve shall be ASTM a 53/a 53/a 53m, type e, grade b, schedule 40, galvanized steel, plain ends.

.4 Sleeves for rectangular openings shall be galvanized sheet steel. Minimum metal thickness:

.1 For sleeve cross-section rectangle perimeter less than 6" and no side more than 16", thickness shall be 1/16".
.2 For sleeve cross-section rectangle perimeter equal to or more than 4’-0" and 1 or more sides equal to or more than 16", thickness shall be 1/8".

.5 Provide a concrete base 4" high at all sleeve locations and conduits penetrating the floor slab. Concrete base to extend 4" beyond the edge of the sleeve or conduit. All concrete work to be included in this division.

.6 Inserts are to be of a lead shield type.

.7 Hangers must not be welded to structural steel members and burning of holes in structural steel is prohibited.

.8 Do not use any base building supports or equipment, including ceiling support system.

1.26 CUTTING AND PATCHING

.1 All cutting and patching required to the existing building structure for the work shall be included under this contract and be acceptable to the landlord. Obtain written approval from landlord before any cutting is carried out.

.2 Where conduits pass through fire rated walls or floors, provide fire stopping material and maintain same fire rating of building component through which penetration occurs. Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1.27 PLYWOOD

.1 All surface mounted electrical distribution equipment shall be mounted on plywood backboards. Provide all plywood backboards required for the work of this division. Plywood backboards shall be (3/4" thick, of highest quality fire retardant fir. Prime and paint backboards with fire retardant paint equal to CGSB spec. #1-gp-151 m, of a colour as selected by the design consultant/architect.

1.28 CORE DRILLING

.1 Before core drilling floor slab or structural walls, x-ray slab or walls and have the locations accepted by the landlord in writing.

.2 Any existing building service damaged by core drilling must be repaired immediately at no cost to landlord or Tenant.

.3 Floor drilling to be carried out after normal working hours and at a time acceptable to landlord and allowances for this work shall be included in bid price submitted.

1.29 METERING

.1 Provide digital meters to match the base building standard except where noted otherwise. Carry the costs of the base building metering contractor for all meter installations.

.2 Provide all required potential transformers, current transformers, reference voltages, breakers, conduit, wire, etc. for a complete installation as per the manufacturer's recommendations.

1.30 IDENTIFICATION

.1 Provide identification on all panels, disconnect switches, splitters, etc., showing the size, name of equipment, serial number and all information usually provided, which also includes voltage, cycle, phase, horsepower of motors and the name and address of the manufacturer. Nameplate shall be mechanically attached to equipment by means of rivets or soft tapping screws.

.2 Nameplates shall generally be black-white-black with bevelled edges, secured to apparatus with stainless steel screws. Generally lettering shall be 6mm high but equipment in the main electrical room shall be provided with lettering 13mm high.

.3 Warning signs, if and when required, shall be red with white lettering.

.4 Equip large multiple cell or component apparatus such as switchboards and distribution panels with main nameplates identifying the equipment, voltage characteristics and capacity, and with sub-nameplates clearly identifying each cell or component and its service.

.5 Panelboard nameplates shall identify the panelboard numbers designated on the drawings, unless otherwise instructed. Nameplates for disconnect switches, control panels and cabinets shall outline their service.

.6 Motor starters, magnetic and manual, shall identify the piece of motorized equipment being serviced.

.7 Exact nameplate wording and sizes must be approved by and confirmed by the Consultant prior to manufacture.

.8 Directories for branch circuit panelboards shall be clearly and neatly typewritten, accurately identifying the type, location and wattage of the connected load for each circuit breaker. Directories shall be secured to the rear of the cabinet door under protective plastic. Incorporate copies of all panel board directories in each copy of operating and instruction manuals.

.9 Clearly identify each branch circuit breaker in a permanent manner to correspond with directories. Glued paper identification will not be acceptable.

.10 Clearly identify main pull or junction boxes (excluding obvious outlet boxes) by painting the outside of the covers. Paint colours shall be in accordance with the following schedule:

Lighting	-	Yellow
Power	-	Blue
Emergency Power	-	Orange
Fire Alarm	-	Red
Telephone	-	Cream
Miscellaneous Signals	-	Brown

.11 In addition to painting miscellaneous signal boxes clearly identify the specific system in which the box is installed.

.12 Colour code empty conduit capped and terminated for future use as specified above and clearly identify its intended use by means of securely attached tags.

.13 Colour code conductors throughout, to identify phases, neutrals and grounds, by means of coloured conductor insulation. Colours shall be as follows:

Phase A	-	Red
Phase B	-	Black
Phase C	-	Blue
Ground	-	Green
Neutral	-	White

.14 Control conductors, in addition, shall be numbered with Brady Ltd., or Electrovert Ltd., Z-type markers. Colour code conductors, for special component per manufacturer's recommendations.

.15 Use dymo tape to label each receptacle with its circuit number (e.g., UA-27).

1.31 DOCUMENTATION AND SYSTEMS ACCEPTANCE

.1 Assemble three copies of operating and instruction manuals in three ring binders with index tabs each containing this subcontractor's and suppliers names and telephone numbers.

.2 Each manual shall contain the following data:

- A set of as-built prints
- Letters of Owner’s Instructions
- Final Hydro certificate.
- A copy of each "reviewed" shop drawing.
- Complete explanation of operation principles and sequences.
- Complete part lists with numbers.
- Recommended maintenance practices and precautions.
- Complete wiring and connections diagrams.
- Certificate of warranty.
- Representative certificates for Fire Alarm System

.3 Ensure that operating and maintenance instructions are specific and apply to the models and types of equipment provided.

1.32 TESTING AND COMMISSIONING

.1 Perform, in conjunction with the consultant, testing and verification of all following systems as discussed hereinafter. This testing and verification shall be provided after, and in addition to, the standard manufacturers' testing and verification procedures.

- Major distribution equipment and components;
- Wiring;
- Emergency lighting;
- Fire alarm system;
- Lighting control system.
- Dimming system.

.2 Test and verify that all equipment is installed within and operating within manufactures' guidelines and in accordance with the contract document requirements, to ensure the systems can be safely energized and operated.

.3 Obtain and have available the necessary reference document for review during the testing period.

.4 Execute Work of this section only by personnel that have taken part in the construction program of this project and manufacturer appointed qualified technical staff capable of setting-up, adjusting, balancing and calibrating all equipment, components and systems.

PART 2 - MATERIAL

2.01 MATERIALS AND INSTALLATION

.1 Wiring Methods:

.2 All building wires and cables shall be copper thermoplastic type TWH 90 degrees C rated and installed in conduit. Minimum size shall be #12 AWG. For final connections to lighting fixtures use type GTF wire. For final connections to heating equipment use silicone insulated type wire, suited for this purpose. All conduit shall be EMT type galvanized steel utilizing set screw fittings, insulated throat connection and couplings. All conduit shall be concealed except in unfinished areas.

.3 Branch circuit wiring exceeding 100 feet to the furthest outlet from a panelboard shall be #10 AWG.

.4 Armoured cable (BX) may be used for fixture tails and wall mounted outlets maximum length 10 feet.

.5 All conduit shall be run parallel to walls and ceilings. Provide a nylon fish wire in all empty conduit. All connectors shall be Ideal wing nut type.

.6 Support all conduit independent of ceiling system

2.02 RACEWAYS

.1 Rigid steel conduit (RSC) shall be zinc-coated steel that conforms to industry standards. Lock nuts shall be steel/zinc plated. Connectors and couplings shall be steel. Insulated bushings shall be iron/zinc plated. Fittings shall be threaded with insulated bushings.

.2 Electrical metallic tubing (EMT) shall be zinc-coated steel that conforms to industry standards. Fittings shall be steel with set screw connectors and couplings.

.3 Rigid non-metallic conduit (RNMC) shall be type epc-40-pvc, db-120 and epc-80-pvc. Conduit shall be 100% virgin polyvinyl chloride (PVC), 90°c ul-rated that conforms to industry standards.

2.03 BOXES

.1 Support all boxes independent of conduit.

.2 In areas with drywall ceilings, contractor shall locate/relocate all new/existing junction boxes, pull boxes, disconnects, etc. to accessible areas; as required by the Canadian Electrical Code. Where it is no possible to relocate/install existing/new services in accessible areas, Contractor shall provide access panels c/w fire ratings as required. Exact location of access panels shall be co-ordinated with the Architect.

.3 Outlet boxes

.1 Provide an outlet box for each lighting fixture, wiring device, data outlet, telephone outlet, etc. Outlet boxes for various systems and components shall be as required by manufacturer and suitable for the application

.2 Outlet boxes on concealed work shall be 4” square or octagonal, galvanized pressed steel with plaster rings as required. Outlet boxes for exposed conduit work shall be cast aluminum alloy with cast aluminum alloy covers.

.3 Where installed in plaster, boxes shall be fitted with galvanized steel plaster covers of required depth to finish flush with finished wall or ceiling.

.4 Switch boxes, receptacle boxes and other outlet boxes shall be standard 4" square with plaster rings or gang cover as required.

.5 Weatherproof boxes shall be condulet cast boxes with weatherproof devices and covers. Provide hot-dipped galvanized corrosion-resistant epoxy enamel finish or PVC-coated products, where noted on drawings.

.6 Provide screw-joint outlet boxes, with gasketed weatherproof covers in exterior locations, where exposed to moisture, at kitchen and cafeteria equipment with or next to water or steam connections, and where indicated as weatherproof on drawings.

.7 Provide only enough conduit openings to accommodate conduits at individual location. Each box shall be large enough to accommodate number and sizes of conduits, wires and splices to meet NEC requirements, but shall be at least size shown or specified. Necessary volume shall be obtained by using boxes of proper dimensions. Box depths greater than 2" shall not be used to obtain necessary volume, but may be used with architect's approval to facilitate installation. Standard concrete boxes may be 6" deep where necessary to permit entrance of conduits into sides of boxes without interference with reinforcing bars. Octagonal hung ceiling boxes with suspension bars may be 31/2" deep. Rectangular boxes for inter-connection of branch circuit conduits may be 21/2" deep.

.4 Junction boxes, pull boxes and cable troughs

.1 Provide code gauge galvanized steel junction and pull boxes for conduit 1-1/4" trade size and larger, where indicated and as necessary to facilitate installation, of required dimensions, with accessible, removable screw-on covers. Provide junction and pull boxes in special sizes and shapes determined in field where

.2 Necessary junction boxes for exposed conduit work in finished areas shall be cast aluminum alloy with cast aluminum alloy covers.

.3 Provide cable troughs of special shapes, design and construction required to install, support and enclose feeder cable throughout indicated routing. Troughs shall be as specified above for junction and pull boxes, with reinforcing, insulating supports and clamping for cable installation. Cables shall be continuous throughout troughs, and shall be racked in distributed phase groupings arranged with phase cables surrounding neutral conductors.

.4 All boxes shall be installed, so as to be accessible after work is complete. Provide pull boxes on all conduit runs on the basis of no more than two (2) - 90 deg bends or their equivalent, or a distance not to exceed 100 feet between boxes.

2.04 FLOOR BOXES

.1 Floor outlet boxes shall be steel, concrete tight adjustable type Legrand Evolution series, EFB45S, 4 or 5 gang as required to suit devices and depth of concrete. Provide applicable floor plate assembly and wiring device to suit the power, communication and A/V requirements as indicated on the plans. (Alternate Manufacturers: Hubbell, Wellmark)

.2 All floor plates shall be complete with cover and finishing flanges as required to suit floor finish and application as noted.

2.05 GROUNDING

.1 Install green insulated equipment grounding conductors with all feeders and branch circuits.

.2 Signal and communication equipment: for telephone, alarm, voice and data, and other communication equipment, provide no. #2 awg minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

.1 Service and central equipment locations and wiring closets: terminate grounding conductor on a 1/8" x 2" x 12" grounding bus.
.2 Terminal cabinets: terminate grounding conductor on cabinet grounding terminal.

.3 Conductors: install solid conductor for #4awg and smaller, and stranded conductors for #3awg and larger, unless otherwise indicated.

.4 Underground grounding conductors: install bare tinned-copper conductor, 2/0 awg minimum.

.1 Bury at least 24" below grade.
.2 Duct bank grounding conductor: bury 12" above duct bank when indicated as part of duct-bank installation.

.5 Isolated grounding conductors: green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

.6 Size all wire for maximum 2% voltage drop.

.7 All home runs to be in conduit.

2.06 WALL PLATES

.1 Faceplates of flush-mounted toggle switches and receptacles shall be as follows:

.1 Finished areas: Nylon White finish each supplied individually wrapped in a sealed protective envelope. Manufacturer to match receptacle and switch manufacturer.
.2 Unfinished and surface areas: galvanized steel.
.3 Wet location, weather-proof cover plates.

2.07 LINE VOLTAGE SWITCHES

.1 Decorator switches (15A, 120/277V max.) shall be Pass & Seymour #2601 (Single Pole), #2603 (Three Way), mounted 4’-0” AFF

.2 Decorator exhaust fan switches (20A max.) shall be Pass & Seymour Cat. #2629, illuminated when on.

.3 Decorator variable speed exhaust fan switches shall be Pass & Seymour Lumaspec non-preset series, wattage as required.

.4 Wall mounted lighting dimmers shall be white, Lutron NT series, wattage as required.

.5 Variable speed exhaust fan switches shall be Lutron NTF Series, wattage as required.

.6 Pilot light switches, 20 A: single pole, with neon-lighted handle, illuminated when switch is "on."

.7 Alternate Manufacturers: Leviton, Lutron, Hubbell

2.08 RECEPTACLES

.1 Devices shall be white in colour, unless otherwise specified.

.2 Decora duplex receptacles shall be Pass & Seymour Cat# 26242 Heavy-Duty Decorator Spec Grade or equivalent from Leviton or Hubbell. 15A, Nema 5-15R

.3 Isolated ground receptacles shall be Pass & Seymour Cat. #IG26262-HG.

.4 All other receptacle types shall be as scheduled on the drawings.

.5 Receptacles located in all rooms containing personal washing facilities such as washbasins bath tubs, showers, kitchen sinks or similar devices and located within 3 metres of such devices shall provide GFCI protection. Pass & Seymour #1595.

.6 Receptacles located in kitchens and installed within 1.5 metre of kitchen sink along the wall behind counter work surfaces shall be protected by ground fault interrupter.

.7 All receptacles designated 'WP' (weatherproof) on the drawings shall be G.F.I. protected and provided with "in use" weatherproof covers.

.8 Alternate Manufacturers: Leviton, Hubbell

2.09 MECHANICAL TRADES WIRING

.1 Unless otherwise noted, all starters and control wiring to be provided by division 15. Division 16 to receive, install starters and provide all line-side and load-side power wiring and required isolating disconnect switches.

.2 Confirm electrical requirements and exact locations of all mechanical equipment with division 15 prior to installation.

2.10 LUMINAIRES

.1 Provide all luminaires as shown on the drawings and as specified in the luminaire schedule.

.2 Provide new lighting fixtures complete with mounting accessories, junction boxes, trims, and lamps as specified and per attached fixture cut sheets.

.3 All products of a specified type are to be from the same manufacturer.

.4 Fixture type catalogue numbers do not necessarily denote required mounting equipment or accessories. Provide complete mounting accessories appropriate for each mounting condition.

.5 All new and relocated fixtures in scope of work shall be supported independent of the ceiling system to the approval of the Canadian Electrical Code.

.6 All fixtures shall be installed with a frame or canopy that is compatible with the ceiling type specified by the consultant.

.7 Provide appropriate accessories for proper mounting of all fixtures. Include plaster frames for plaster ceiling and firestop protection for fixtures in rated ceiling. For fixtures suspended from ceiling, provide pendants or air craft cables complete with accessories to complete the installation as indicated on the drawings.

.8 Where light fixture or light fixture suspension apparatus penetrates metal pan or sheet metal ceiling or canopies, an approved copy of the shop drawings of those fixtures shall be provided to the ceiling manufacturer. Apertures in the ceiling or openings for suspension cables shall be pre-cut by the ceiling manufacturer to suit light fixtures. Instruct the manufacturer accordingly.

.9 If the words “equivalent" or “approved equal" are not indicated after light fixture manufacturer and catalog number in the fixture schedule, no other manufacturer will be acceptable for that particular type.

.10 With just emergency lighting in operation, and at night, the electrical contractor is to measure the "average" illumination on the floor (by establishing the maximum and the minimum level) in the principal routes providing access to exits. Plot all lighting results on a cad disk or on a set of reproducible sepia drawings for review by the consultant. Submission to the building inspection authorities to be by the electrical contractor.

.11 All fluorescent lamps shall be T8 cool white unless noted otherwise on drawings.

.12 Fluorescent ballasts shall be electronic type, energy saving rapid start high power factor "A" sound rated and complete with automatic reset thermal protection.

2.11 SERVICE EQUIPMENT

.1 All new panelboards, disconnect switches, meters, transformers, etc., to be copper windings/bus-bars, same manufacture, rating and type as base building equipment unless otherwise noted. Molded case circuit breakers to be bolt-on and same manufacturer, rating and type at base building breakers. All ATS’s and surface mounted panelboards to be sprinkler proof.

.2 All new panelboards shall be complete with neutral bus rated 200 percent of phase bus and ul listed as suitable for nonlinear loads and panelboards fed from “K" rated transformers.

.3 All main breakers shall be separately mounted on top or bottom of panel to suit cable entry.

.4 Provide breaker locks for all new and existing breakers serving exit lights, emergency lighting and emergency battery packs.

.5 All floor mounted distribution equipment, including transformers, panelboards and/or ups modules shall be installed on a 100mm (4") high concrete base to extend (2") on all sides with chamfered corners.

.6 Manual starters shall be Allan Bradley Bulletin 600, with pilot light and on/off toggle switch.

.7 Fuses shall be Gould Shawmut HRC 1, Class J series CJ for constant running equipment and series AJT for equipment that cycles on and off.

.8 Extend and modify the existing base building distribution system as indicated on the drawings.

.9 Provide new switches and breakers in existing distribution equipment as detailed. New equipment shall, in all respects, be compatible with existing equipment.

.10 Balance the loading on feeders so that unbalanced load is less than 10%.

2.12 EXIT AND EMERGENCY LIGHTING

.1 Provide a new emergency and exit lighting system as detailed on the drawings.

.2 All self contained equipment shall comply with C22.2.141.

.3 Battery units shall be as specified with 10 year design life, integral high/low charger with indicating and pilot light, load transfer meters and test switch, low voltage cut out, overload protection, 10 min time delay off, AUTO test and 120 volt cord and plug.

.4 Exit lights shall be as specified on the drawings. Provide directional arrows as shown and to suit the local authorities. Connect 3rd socket to battery unit.

.5 Wiring shall conform to the manufacturer's recommendations.

INCLUDE CASH ALLOWANCE TO SUPPLY AND INSTALL TWO EXTRA EXIT LIGHTS AND EMERGENCY LIGHTS COMPLETE WITH REQUIRED CONDUITS AND CABLES, ACCORDING TO BUILDING INSPECTORS DIRECTION AT THE TIME OF INSPECTION.

2.13 FIRE ALARM

.1 Provide fire alarm system service and devices as required to expand the existing building system to suit the needs of the new tenant space. The fire alarm system shall be of the same manufacturer and compatible in all aspects. Obtain the services of the base building authorized fire alarm installation contractor to complete all the necessary work as part of the electrical contractor's cost.

.2 All wiring for the system shall be installed within conduit and shall comply with requirements of the system manufacturer.

.3 Relocate existing fire alarm devices as indicated on drawing. Extend wiring and conduits to suit.

.4 Provide fire alarm signal connection for muting the audio system upon activation of fire alarm system.

.5 Initiating and signaling devices

.1 Provide pull-stations, EVAC speakers and smoke detectors to match existing base building devices.

.2 All smoke dampers shall be connected to the nearest available 120v life safety emergency circuit. Tie device into fire alarm system, provide all required end switches and accessories for appropriate monitoring and control. Coordinate all work with mechanical contractor prior to rough-in.

.3 Fire alarm pull stations shall be mounted at 48" to centre of device above finished floor and maximum 24" from door latch.

.4 Provide tie-in to base building maglock system to ensure that all maglocks drop in the event of a fire alarm. Maglocks shall also reset with maglock key switch override. Coordinate installation with base building fire alarm contractor and provide all necessary components for a complete installation.

.5 Upon completion of fire alarm audibility testing, provide the consultant a drawing outlining audibility results throughout the renovated areas. Include for a re-visit to site to allow for adjustments to speaker tap settings as directed by the consultant. Incorporate any re-verification costs within the tender. Cost and include all speaker tap settings on as-built drawings.

.6 Visual output devices

.1 System connections for initiating and signaling line circuits shall be class "a" and notification appliance circuits shall also be class "a".

.2 Circuit supervision: circuit faults shall be indicated by a trouble signal at the FACP. Provide a distinctive indicating audible tone and alphanumeric annunciation.

.3 Visual device to be compatible with existing fire alarm system. Contractor to provide all associated drivers power supplies, conduit, wire and accessories for a complete and operational system.

.4 Strobe shall be suitable for operation with existing fire alarm system. The v/o shall consist of a xenon flash tube and associated lens/reflector system. The v/o enclosure shall mount directly to standard single gang, double gang or 4" square electrical box, without the use of special adapters or trim rings. V/o appliances shall be provided with different minimum adjustable flash intensities of 15cd, 30cd, 75cd and 110cd. Provide a label inside the strobe lens to indicate the listed candela rating of the specific visible/only appliance. When multiple strobes and their reflections can be seen from one location provide strobe flash synchronization.

.7 Fire Alarm System Commissioning

.1 Provide fire alarm verification and submit verification reports to the consultant for record.

2.14 COMMUNICATIONS

.1 Telephone:

.1 Provide a system of empty conduits (grommets on the ends of all conduits that terminate at the outlet boxes and cable tray), pull wires, and outlet boxes as indicated on the drawings.

.2 Outlet boxes shall be 4 11/16" square. Flush mounted boxes shall be complete with plaster rings and stainless steel covers. Run ¾" empty conduit with pull string from each outlet box to cable tray.

.3 See communication cabling specifications for cabling requirements.

.2 Data Communications:

.1 Provide a system of empty conduits (grommets on the ends of all conduits that terminate at the outlet boxes and cable tray), pull wires and outlet boxes as indicated on the drawings.

.2 Outlet boxes shall be 4 11/16" square. Flush mounted boxes shall be complete with plaster rings and stainless steel covers. Run ¾" empty conduit with string from each outlet box to cable tray.

.3 All horizontal and backbone conduits must not have more than two ninety degree bends before installing a pull box. If entering a pull box from the bottom the conduit must be installed in the top of the pull box. If entering from the left side the outgoing conduit must leave from the right side. No changing of direction within the pull box.

.4 See communication cabling specifications for cabling requirements.

MCW Consultants Ltd.

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MECHANICAL SPECIFICATIONS

FOR

GBC-CASA LOMA ATHLETICS VARSITY LOUNGE AND SHOWERS RENOVATION

TO

GEC ARCHITECTURE

DATED

NOVEMBER 21TH, 2023

ISSUED FOR CONSTRUCTION

Contact Person: Denise Neutel
Phone: 416-598-2920 Ext. 486
Email: DNeutel@mcw.com

MCW Project No. 23183

MECHANICAL SPECIFICATIONS

1. General Provisions

1.1. Apply, obtain and pay for all required permits, licenses and inspections.

1.2. Conform to requirements of the Ontario Building Code, City of Toronto and authorities having jurisdiction.

1.3. Visit site to determine suitability of design for existing site conditions. Additional payments will not be made for extra labour or material necessary due to location or nature of beams, joists, walls, furred ceilings, or finishes with which Contractor should be familiar. Determine exact dimensions and other restrictive conditions on site, not from drawings.

1.4. New equipment and materials to match and be of an equivalent standard to materials and equipment provided under base building installation.

1.5. The word "provide" shall mean "supply, install and connect".

1.6. On completion of work, present to the Landlord a final unconditional certificate of approval by authorities having jurisdiction.

1.7. Verify exact location of core drilling to check for existence of any services (ie: electrical conduit, structural bar) with Landlord and Landlord's structural engineer. X-ray floor if required by Landlord or Landlord's structural engineer and furnish prints of x-ray's to Landlord.

1.8. Return all unused equipment and material being removed to the Landlord.

1.9. Submit shop drawings, unless otherwise specified, for each major item of equipment such as plumbing fixtures, pumps, air handling units, radiation, coils and special systems.

1.10. All equipment to be as specified. Substitution of any product other than specified must assure no deviation below the stated capacities, air flow rate, heat transfer rate, filtration efficiency and air mixing quality. Power requirements must not be exceeded and, where specifically defined, sound power levels must not be exceeded. Applications for "equal" or "alternate" must address these factors.

1.11. Submit written guarantee to Owner covering remedy of defects in work at completion of work. Submit similar written guarantee for one year from date of acceptance for any part of work accepted by Owner.

1.12. During the Defects Liability Period, the Sub-contractor shall have facilities of 24 hours "call out" whereby at any time of day or night to attend to all fault and complaint, remedy all defects, replace all malfunctioning items and maintain the complete installation in a clean and tidy condition to the satisfaction of the Consulting Engineer.

1.13. Contractor provides commissioning and report for all the new equipment, as well as on-site training to landlord’s site staff for a minimum of 8-hour sessions.

1.14. Arrange with Owner for necessary shutdowns of all systems and include all overtime costs in the tender for tie-ins and work within other tenant spaces to be done on weekends and at other times suitable to Owner and other tenants.

1.15. Record set of drawings to be kept on site at all times and changes to piping, ductwork and equipment shall be recorded on same. After completion of work provide Owner with one set of

sepia and AutoCAD (2002) "as-built" drawings and disks to show final location of piping, ductwork and equipment.

1.16. Documentation and systems acceptance: Provide the following on substantial performance of the work:

1.16.1. As constructed drawings.

1.16.2. Assemble three manuals in three ring binders with index tabs, each containing this Subcontractor's and supplier's names and telephone numbers, data sheets, valve charts, brochures, operating, maintenance, and lubricating instructions as well as number coded wiring diagrams and a complete set of checked shop drawings. Present one copy to the Consultant for review.

1.16.3. Letter itemizing pressure piping tests (domestic water, fire protection), indicating system tested, pressure held, time of test and date and certified by the Consultant.

1.16.4. Air balancing report.

The Work of Division 15 will not be considered totally performed until completion of air balancing even if undertaken by separate contract from the Work of Division 15.

1.17. Perform cutting and patching for mechanical services and include for work in Tender.

1.18. Co-ordinate installation of new ductwork, sprinkler and plumbing lines to suit installation of all other components being installed in ceiling space or extending into ceiling space. Review mechanical, electrical and architectural drawings to become familiar with installation requirements of these components. Problems with installation of these components due to installation of new ductwork, sprinkler and plumbing lines will result in Contractor having to relocate new ductwork, sprinkler and plumbing lines at his own cost.

1.19. All new penetrations through floors to be sealed with approved non-shrink, waterproof and fire proof sealant.

1.20. All existing mechanical equipment (VAV boxes, dampers, heat pumps, valves, etc) to be relocated out of new drywall ceiling areas.

1.21. The Contractor and all sub-trades are responsible to repair or replace any item damaged while performing work outlined in this contract.

1.22. Provide hinged access doors as manufactured by Lehage, Milcor or Acudor equal to fire rating of wall or ceiling in which installed. Provide to the appropriate trade for installation co-ordinate exact location with other trades and architect.

1.22.1. Lay-in type ceiling tiles, properly marked, may serve as access panels. Provide stick-on circular tab (approximately ¼"ø), located on a tee supporting ceiling tile used as access panel, for all new equipment located in ceiling space. (eg. VAV terminals)

1.22.2. Provide for plaster surfaces, recessed 16 ga prime painted steel door and welded metal lath, ready to take plaster. Provide with concealed hinge and stainless steel studs with brass sleeves.

1.22.3. Provide to suit wall surface or type of construction, other factory prime coated access doors of welded 12 gauge steel, flush type with concealed hinges, lock and anchor straps.

1.22.4. Provide all doors 300mm x 300mm (12"x12"). Provide 600mm x 460mm (24"x18") only where personnel entry is required.

1.23. Existing and new services penetrating floor slab or fire rated walls to be sealed with ULC listed and labelled 3.0 hr "F" rated fire retardant sealant.

1.24. Visit the site prior to tender and verify all conditions. Prior to submitting price, the mechanical contractor is to review all discrepancies with the Consultant and verify the locations of all existing services that are being extended and the routing of new services. Also report all ambiguities, discrepancies, departures from building by-laws and/or from good practice. Failure to do so will result in all additional costs being the responsibility of the Mechanical Contractor. Include for any alternate routing of new or rerouting of existing services to accommodate all site conditions in the tender price.

1.25. Apply for, obtain and pay for all permits and inspections required prior to commencement of construction. Include all sales taxes and the GST.

1.26. Provide the Landlord and Tenant with a written warranty for all labour, materials, and equipment provided in this contract, for a period of one year commencing at such time that the Consultant deems the work acceptable.

1.27. Include the cost of premium time in the Tender Price for work provided during nights, weekends or other times outside normal working hours, necessary to maintain all mechanical services in operation and to meet the project schedule.

1.28. Alternate equipment may be proposed during the Tender period, provided that the space requirements, quality and performance characteristics, power characteristics, air and fluid flow requirements and weights are equal to the specified products. Acceptance of alternate equipment shall be at the discretion of the Consultant and will only be after review of properly submitted shop drawings. Assume responsibility and pay for all additional installation costs incurred by all related trades resulting from alternates and/or substitutes. Make revisions to Record Drawings, incorporating alternates and/or substitutes and all related changes. Alternate equipment will not be considered subsequent to tender closing.

1.29. Reuse existing materials and equipment wherever possible. Provide new materials and equipment as required to ensure a complete installation. All existing equipment, materials and associated controls not used in this contract shall be packaged and turned-over to the Landlord. Include in the tender for all shipping and placement in a designated on-site storage location. Remove any equipment or material not wanted by the Landlord from the site.

1.30. Provide sleeves for all new piping passing through floor and roof slabs, beams, concrete walls and slab to slab partitions, etc.

1.31. Seal to be air-tight around all ductwork and piping penetrations through partitions, baffles above ceilings, and through floors that are not fire rated.

1.32. Request in writing for a completed rough-in and final inspection of the mechanical systems. When the final inspection request is made all deficiencies must be complete, balancing reports submitted, systems ready for operation, equipment has been commissioned, operating and maintenance manuals submitted, all tags, charts and nameplates completed, all fixtures and equipment cleaned, spare parts provided, record drawings complete, control systems operational and the Landlord’s staff instructed in all phases of the system operation.

1.33. All power wiring and equipment starters for mechanical equipment and associated devices including connections shall be provided under the Electrical Contract, Division 16, unless noted

otherwise in the specification. Confirm the power characteristics on site prior to processing shop drawings and ordering equipment. All control wiring, line or low voltage, shall be by this contractor.

1.34. Provide temporary filters, 1in. thick disposable media type, over all return air openings in the base building H.V.A.C. systems that remain in operation during construction. Maintain and replace the temporary filter media as required to prevent construction dust from fouling the base building equipment. Remove same at the completion i.e., Air Handling Units, Induction Units, Fan Coil Units, etc., shall be replaced after construction is completed.

1.35. Prior to operating any existing or new equipment during any stage of construction, approval from the Landlord and Consultant must be received in writing.

1.36. Provide all rigging as may be required for all system materials and equipment. Provide all required supplementary steel supports necessary for mounting or hanging equipment. Equipment being suspended from the floor structure, or supported from or on the roof, with a weight greater than 500 pounds, shall have supports reviewed by a structural consultant. All required structure as recommended by the Consultant, shall be included in the tender.

1.37. All new and relocated existing services and equipment must be supported from the building structure. All drilling, approved type inserts and hangers shall be included.

- Auxiliary structural members shall be included and installed where required to accommodate hangers.
- All supports shall be connected to the top of joists and beams where applicable.
- Suspension from metal deck is not allowed.
- Suspending one hanger from another is not permitted.

1.38. Provide a complete itemized cost breakdown of all materials, equipment and labour costs associated with each submission for additional or deleted work.

2. Heating, Ventilating and Air Conditioning

2.1. Provide ductwork in accordance with SMACNA and ASHRAE standards. Seal all transverse joints in supply, return and exhaust ductwork with high velocity duct sealer (Bakelite 530-09 or equivalent). Duct tape not acceptable.

2.2. Flexible Ductwork: To have a maximum length of 1.5 m (5'). Connect ductwork to diffusers and rigid ductwork with a minimum of 3 self-tapping screws, seal with duct sealer and wrap with glass fab tape. Flexible ductwork to be supported from building structure where it is not self-supporting and must not be allowed to lie on ceiling or other equipment.

2.2.1. Externally insulated flex duct to be Thermaflex type M-KE, Flexmaster Low Pressure Acoustic or approved equal.

2.2.2. Uninsulated flex duct to be Flexmaster T/L spun aluminum or approved equal. Ducting such as aluminum foil, PVC, Mylar, fibreglass mesh and other fibre type will not be accepted.

2.3. Diffuser Branch Ducts: Provide spin-on connectors complete with balancing damper at take-off from main duct.

2.4. New diffusers and grilles to be as manufactured by E.H. Price. Refer to schedule on plan.

2.5. Flexible connections: ULC listed and labelled, neoprene coated, glass fabric, factory fabricated as approved by local authorities. Connection must not be under tension.

2.6. Provide internally lined ductwork where indicated on the drawings. Lining to be 25 mm (1") thick, 25 kg/m3 (1.5 lb/ft3) density fibreglass with neoprene coating. Seal all cut edges of insulation with Bakelite 200-32 or equivalent to ensure fibreglass does not come into contact with air stream. Duct sizes to increase accordingly to maintain equivalent free area.

2.6.1. All exhaust duct intake and discharge to be internally lined.

2.6.2. All transfer air ductwork to be internally lined.

2.7. Fire Dampers: Provide fire dampers as per wall type layout requirements. ULC listed and labelled type B or C, non-asbestos. Provide latched access doors in ductwork for access to all fire dampers. Minimum 300mm x 300mm (12"x12") access required.

2.8. Ceiling Dampers: ULC listed and labeled, Model # CFS as manufactured by Controlled Air. For diffusers, damper to be complete with thermal blanket, Model # CK-2000 as manufactured by Controlled Air.

2.9. Provide air balancing damper for each tee-off branch duct.

2.10. New VAV Terminals:

2.10.1. Install new VAV terminals with a minimum of four duct diameters of straight ductwork upstream of terminal.

2.11. All services above return air grilles to be painted flat black.

2.12. Cover open end of registers or active return or exhaust air ducts with 25 mm (1") thick filter media secured by metal band pulled tight around duct. Maintain this condition until plastering, drywall and other finishing operations are complete.

2.13. Provide splitter dampers as shown on drawings Construct of not less than 22 gauge material. Where installed in ducts up to 300 mm deep, provide single blade, and in ducts greater than 300 mm provide multi-blade with linkages, each blade being not wider than 228 mm.All dissimilar piping connections to have dielectric isolators.

2.14. Existing Equipment: Verify with building property manager that existing equipment and controls are maintained and operating as originally designed.

2.14.1. VAV Boxes: Verify that dampers, actuators and thermostats are operating, etc.

2.15. All existing external duct insulation to be inspected and repaired as required.

2.16. Thermostats:

2.16.1. Thermostats to be located at same mounting height as light switches.

2.16.2. Thermostats to be located a minimum 300 mm (12") away from, but never above, dimmer switches.

2.16.3. Thermostats to be complete with locking covers.

2.16.4. Final mounting height and location of the thermostat to be coordinated on site with Interior Designer.

2.16.5. New thermostats must be submitted for approval to the consultant.

2.17. Exhaust fans: Fans to be suspended from structure c/w vibration isolation and flexible connections. Fan wiring and controls installation by div. 16. Refer to schedule for manufacturer and model.

2.18. Lead baffles to be installed in induction units where partitions join into window mullions.

2.19. Provide removable drywall access panel in wall abutting window mullion where access to induction unit valves is required.

3. Insulation

3.1. Qualifications: Execute work of this section only by skilled tradesmen regularly employed in the application of insulation of mechanical systems.

3.2. Provide pipe and ductwork insulation with maximum flame spread rating of 25 and smoke development classification of 50.

3.3. The word "exposed" where used in this section means any work which is not concealed in wall, shaft, or ceiling cavities or spaces. Work behind doors in closets or cupboards or under counters is considered exposed.

3.4. Concealed insulated items require no further finish than provided in factory applied jacket. Cover exposed insulation and all insulated equipment with canvas, field applied, adhered and lap sealed and finished off by a brush coat of approved sizing. Paint and label canvas as noted in specifications or drawings.

3.5. Ductwork Insulation:

3.5.1. Provide external ductwork insulation in thickness as listed below:

3.5.2. ALL supply air ductwork from unit outlet of air handling systems delivering air at temperatures less than 18°C (64°F) and greater than 30°C (86°F). This includes supply air ductwork connected to fan coil units, heat pumps and VAV terminals and air handling systems with cooling and/or heating coils and direct or indirect fired burner sections.

3.5.3. Provide 25 mm (1") thick for systems with 18°C (64°F) or less air supply temperature.

3.5.4. Provide 40 mm (1-1/2") thick for systems with 30°C (86°F) or greater air supply temperature.

3.5.5. Outdoor intake ductwork, ductwork conveying mixed outdoor/return air and mixed air plenums: 25mm (1”) thick.

3.5.6. Return air ductwork located outdoors: 50mm (2”) thick.

3.5.7. Exhaust ductwork located outdoors: 50mm (2”) thick.

3.5.8. Exhaust ductwork located indoors for a minimum of 3 m (10 ft.) from the discharge point to outdoors: 25 mm (1") thick.

3.5.9. Where specifically noted on drawings that could be an exception to the foregoing

3.6. Exceptions; external duct insulation is not required where:

3.6.1. Supply air ductwork installed exposed within conditioned space.

NOTE: Supply air ductwork installed concealed in ceiling spaces, whether used as return air plenums or not, is to be totally insulated.

3.6.2. Ductwork is internally insulated.

3.6.3. Acoustic type flexible ductwork is used.

3.6.4. Duct silencers are installed.

3.7. Drains and water supplies for Barrier-Free lavatories and sinks: Provide non-premolded pipe insulation on exposed water supplies and drain under lavatory and finish with canvas. Non-premolded insulation to be 25 kg/m3 (1.5 lb/ft3), 20mm (3/4") thick fibreglass flexible blanket with open mesh glass fibre reinforced aluminum foil face.

3.8. Premolded pipe insulation:

3.8.1. Sectional fibreglass in premolded sections 900 mm (36") long split and ready for application with maximum K factor of 0.035 at 24(C (75(F) mean temperature and capable of use on service from -40(C (-40(F) to 260(C (500(F) and with factory applied vapour seal jacket of vinyl coated foil craft laminate with reinforcing of open mesh glass fibre.

3.8.2. Application schedule on Piping:

Item	Insulation Thickness & Type
Domestic hot water	25mm (1") premolded for pipe up to and including 50mm (2"). 40 mm (12") for 65mm (22") pipe and greater.
Domestic cold water	12mm (2") premolded
Domestic hot water recirc.	25mm (1") premolded. 40mm (1 ½") for 65mm (2 ½") pipe and greater.
Traced piping (where indicated)	Indoors: 25mm (1") minimum for applications not listed in this table. Outdoors: 50mm (2").
Condensate, horizontal drains from fan coil units, heat pumps and cooling coils, suspended horizontal drains receiving cooling coil condensate e, suspended horizontal drains from urinals and water closets and roof drain receptors and horizontal rainwater leaders and fittings	
	20mm (:") non premolded or 12mm (2") premolded
Heating system Piping	40mm (1 ½") premolded
Glycol Circuits	40mm (1 ½") premolded.
Heat Pump Piping	Not required for standard water to air type. 50mm (2") for ground source water to air and water to water type, to be applies as specified for chilled water piping. This applies to the heat sink (ie ground source) side. Supply side within the building to be insulated as specified for chilled water.
Condenser water piping for systems that operate summer and winter	50mm (2") premolded outdoors

Item	Insulation Thickness & Type
	25mm (1”) premolded indoors
Chilled water piping	20mm (3/4”) premolded for 25mm (1”) pipe and less. 25mm (1”) premolded for pipe 32mm (1 ¼”) and greater.

4. Plumbing

4.1. Domestic Water: Type L copper marked certified for compliance with ASTM B88-83 standard with wrought copper or cast bronze pressure solder fittings to ANSI B22.18-1973 and ANSI B16.18-73 respectively. (Buried piping: Soft temper type K with soldered fittings).

4.2. Soldered fittings in potable water systems: Provide lead, antimony, cadmium and zinc free solders composed of tin/copper/silver or nickel components.

Acceptable manufacturers:

Johnson Matthey	(416) 763-5111 "Mattisol 430"
Englehard Canada Ltd.	(416) 733-6771 "Silvabrite 100"
X-Ergon Corp.	(416) 452-5718 "Steelbond #281"

4.3. Sanitary Drainage - Internal Suspended:

4.3.1. Cast iron pipe and fittings to CSA B70-M1978.

4.3.2. DWV copper to ASTM B306-76 with 50-50 soldered cast brass drainage fittings to CSA B158.1-1976 or wrought copper fittings to ANSI B16-29-1973.

4.4. Sanitary Drainage - Below Grade:

4.4.1. Cast iron pipe and fittings to CSA B70-M1978.

4.4.2. Buried: Cast iron pipe and fittings, vitrified clay and fittings or PVC or ABS pipe and fittings.

4.5. Vent Piping: DWV Grade copper to ASTM B306-76 with 50-50 soldered cast brass or wrought copper drainage fittings to CSA B158.1-1976 and ANSI B16-29-1973 respectively or cast iron pipe and fittings to CSA B70-M1978.

4.6. Valves: All valves to have minimum certified rating of 1380 kPa (200 psi) WOG.

4.7. Ball Valves: Full port bronze or brass body with S.S. ball, blow-out proof stem rated at 400 WOG.

4.8. Hangers and riser supports: Provide adjustable Clevis type. Use rod sizes as recommended by the manufacturer.

4.9. On copper piping, provide copper plated type hanger or separate piping from hanger with an approved insulating tape or plastic coating.

4.10. Provide oversized hangers to pass over insulation on all insulated heat traced piping. Refer to detail in specifications.

4.11. Provide backflow preventer for the coffee maker and humidifier unit.

4.12. Clean-up: Leave systems operating with work areas clean to acceptance of the Owner.

4.13. Piping system tests: Do not insulate piping systems until completed, perfected, and proven tight. Should leaks develop in any part of the piping system, remove and replace defective sections, fittings, etc.

4.13.1. Test piping system in sections as required by the progress of work.

4.13.2. Test all hot and chilled water, condenser water and domestic water piping hydraulically to a pressure of 1100 kPa (150 psi) and prove tight for a period of 8 hours. Testing with nitrogen is also acceptable provided a pressure of 1380 kPa (200 psi) is used. Test natural gas piping as required by codes and authorities.

4.13.3. All tests must be recorded. Submit recorded data to the Consultant.

4.13.4. Test gas piping in accordance to CGA standard and authorities having jurisdiction. Provide record data of test results to consultant for review.

4.13.5. Include a copy of all the test results in the maintenance manuals.

4.14. Trap seal primers: Enpoco Fig. TSP-1 cast bronze with 1/2" copper to copper connections or 3/8" soft copper connected to nearest w.c.-flush valve flush tube. Connect at back of flush tube with c.p. exposed piping. Unit to be connected to existing supply piping with backflow preventer in washroom and to serve elevator machine room and sump pump pit prime line.

4.15. Water hammer arrestors: Enpoco "Hammertrol" series "HT" with pre-charged stainless steel bellows in a stainless steel casing sized according to manufacturer's recommendations in washroom supply piping.

4.16. Backflow preventers: Provide on sump pump and floor drain prime lines. Acceptable Manufacturers: Watts, Singer, Honeywell, Braukmann, Wilkins.

4.17. All plumbing fixtures, where indicated on plan, shall be supplied and installed by this division unless otherwise indicated on the drawings. Fixtures shall be piped with all necessary appurtenances (i.e. vents, sanitary, hot and cold connections). Install all components in strict accordance with the manufacturer's recommendations. Install shock arrestors.

4.18. Single compartement, undermount sink (S-1): KINDRED QSUA1820-8, Without faucet ledge,Grade 18-8 20 gauge Type 304 Stainless steel Polished to satin finish, Silk finish, Center back waste location, 89 mm (3-1/2") basket strainer waste fittings included, Sink is fully undercoated, Bowl Dimension: 457 mm (18") long, 406 mm (16") wide, 203 mm (8") deep, Overall Dimension: 502 mm (19-3/4") long, 451 mm (17-3/4") wide, 203 mm (8") high.

C/W Chicago Faucets 434-ABCP, Counter mounted, Manual, Single handle, Sink faucet, Polished chrome finish, Single hole centerset, , Ceramic cartridge with volume control, 5.7 LPM (1.5 GPM) maximum flowrate, Spray outlet, Gooseneck spout, Pull down, 210 mm (8-1/4") spout reach, 432 mm (17") high, Lever handle; Lawler 570-86820, Thermostatic water mixing control valve; McGuire Supply LFBV170; McGuire P-Trap 8912CB

4.19. Floor Drains to be as follows:

4.20. Floor Drain (FD-1): WATTS “FD-100-C-A5-1” epoxy coated, cast iron body, vandal proof with primer connection with plug.

4.21. Cleanouts to be as follows:

4.21.1. Line Cleanouts: Smith Series 4420, in cast iron pipe with taper thread cover secured to body and with full size pipe opening.

4.21.2. Stack Cleanout: Smith Series 4510, in base of cast iron stacks with neoprene gasketted secured cover.

4.21.3. Where cleanouts are concealed behind tiled walls or finishes; use Smith Series 4530 round stainless steel plate and slotted flat head s.s. screws.

4.21.4. Floor Cleanouts:

4.21.4.1. In unfinished and outside areas: Smith Series 4220, duco coated cast iron body with integral clamp device, and removable positive seal closure plug and heavy duty 6" (150mm) adjustable cover secured with stainless steel screws.

4.21.4.2. In tiled areas: Smith Series 4140, same as above with square nickel bronze cover recessed for tile. Cover can be adjusted to suit floor lines when installing finished floor.

4.21.4.3. In terrazzo areas: Smith Series 4180, same as above with nickel bronze cover recessed for terrazzo. Cover can be adjusted to suit floor lines when installing finished floor.

4.22. On water services, install drain valves with hose thread end adjacent to and downstream of shut-off valves. Slope water piping to drain points.

4.23. Provide PRV's to match base building standard, where required at new domestic water connections.

4.24. Provide shut-off valves on supply and return piping connections to all fixtures and pieces of equipment.

4.25. Domestic cold water meter: Kent Meters Inc ((416)-746-2930) model C-700 positive displacement cold water meter complete with remote readout. Unit to be bronze with suitable adaptors to fit piping as shown on drawing. Meter capacity up to 150 GPM. Include self powered 2 wire generator with wall unit remote readout and 100 ft (30m) of wire as provided by manufacturer. Provide lockable valved bypass to allow for meter maintenance.

4.26. Fixture installation: Install all fixtures, drains, cleanouts, brass and specialties to manufacturer's requirements.

4.26.1. Connect fixtures, complete with supplies and drains, separately trapped, supported level and square. Provide chrome plated piping for all exposed water supply, waste and vent connections complete with C.P. escutcheons.

4.26.2. Provide supports to set fixtures square and level.

4.26.3. Obtain Architects acceptance of mounting heights of all wall mounted fixtures.

4.26.4. Fixtures mounted on glazed tile surfaces: Provide ground faces to finished surfaces.

4.26.5. Install water hammer arrestors for each fixture or group of fixtures.

4.27. Pipe installation: Install straight, parallel and close to walls and ceilings, with specified pitch. Use standard fittings for direction changes.

4.27.1. Install groups of piping parallel to each other on trapeze hangers; Space piping to permit application of insulation, identification and service access.

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

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

4.27.4. Install brass and copper pipe and tubing free from surface damage. Replace damaged pipe or tubing.

4.27.5. Lay copper tubing so that it is not in contact with dissimilar metal and will not be kinked or collapsed.

4.27.6. Use non toxic lubricant or teflon tape applied to male thread.

4.27.7. Clean ends of pipes or tubing and recesses of fittings to be brazed or soldered. Assemble joints without binding.

4.27.8. Sanitary and storm drainage: Run piping to main sewers with uniform grade.

4.27.9. Jointing of pipe: Compatible with type of pipe used.

4.27.10. Water piping: Run water piping from service connection to fixtures and equipment. At lavatories install supplies as high as possible.

4.28. Provide washroom groups and branch take-offs from mains with isolating valves. Install stop valve in each fixture supply.

4.29. Provide all parts of the plumbing system including all required venting in accordance with the Plumbing Code under the Ontario Water Resources Act, Ontario Regulation 160/93 to current amendments to the Provincial Plumbing Code (Ontario Building code Part 7).

4.30. Specialties installation:

4.30.1. Cleanouts: Install accessible cleanouts at traps and where required.

4.30.2. Floor drains: Provide with trap primers connected to nearest cold water flush valve, or to automatic primer. Prime all floor drain traps and sump pump pits.

4.31. Sump Pump (P-1): As manufactured by Ontor, “Little Giant Drainosour Jr.” model WRS-5. Pump to discharge 690 gph (11.5 gpm) at 10 ft of head. Pump to be 5-ASP automatic submersible type c/w 5 gallon polypropylene tank with 1 ½”ø top vent port. Elec: 115/60/1, 1/6 HP.

4.32. Snake and camera drain inspection: On projects with existing sanitary piping that will be utilized, provided snaking of pipework and camera drain inspections as necessary to ensure a functional system.

5. Fire Protection

5.1. Modifications to sprinkler system must be provided by a Fire Protection Contractor approved by George Brown College. Modifications to be compatible with the base building sprinkler system, and in accordance with all applicable by-law requirements including requirements of NFPA Standard #13.

5.2. Provide new sprinkler heads and relocate existing sprinkler heads as shown on plan. Verify sprinkler pipe sizes on site and make required pipe size changes to suit hydraulic design for new sprinkler layout.

5.3. Provide new sprinkler distribution system.

5.4. New Sprinkler Heads: To match existing.

5.4.1. Pendant: Gem #F980 Bulb Type with escutcheon [white][chrome].

5.4.2. Recessed: Gem #F985 Bulb Type with escutcheon [white][chrome].

5.4.3. Concealed: Gem #FR946 Cleanline [white][chrome].

5.5. Provide portable filled and tested 3A-10BC fire extinguishers as manufactured by National Fire Equipment. Provide wall brackets as required. CFH and Stelpro are also acceptable.

5.6. Fire Service Piping (Standpipe systems): Pipe, fittings, hangers and accessories to NFPA 14.

5.7. New fire hose cabinets: As manufactured by National Fire Equipment, to match existing. Mount new fire hose cabinets at same height as existing. Also include in new cabinet one new portable filled and tested 2A-10BC fire extinguisher as manufactured by National Fire Equipment. CFH and Stelpro are also acceptable

5.8. Submit one copy of all fire protection test results to each ; Landlord, Engineer.

6. Air & Water Balancing

6.1. Air Balance Report: Air balancing shall be performed by an independent company normally employed in this field. All air quantities to be balanced with a tolerance of +10%. Issue a report and certificate covering the following:

6.1.1. Nameplate and actual motor loading in amperes at actual voltage and installed overload heater size and manufacturer.

6.1.2. Specified and achieved air quantities per outlet complete with supporting schematic diagram.

6.1.3. Specified and actual fan total static pressures with breakdown showing inlet and discharge pressures.

6.1.4. Temperature at diffuser farthest from source of air supply.

6.1.5. Supply air quantity and temperature where main duct enters space.

6.1.6. Return air quantity and temperature where air leaves space

6.2. The mechanical contractor shall carry the cost of the Air and Water Balancing Company in their tender submission.

6.3. Balance all supply, exhaust and fresh air quantities noted on drawing or in specification.

6.4. Balance VAV terminals at 25% of the maximum level.

6.4.1. Provide pump curves indicating the operating point with superimposed power draw, r.p.m, impeller size, etc.

6.4.2. Instruct piping system installers on proper locations of flow measurement ports.

6.4.3. Report any required pump impeller adjustments to achieve specified performance.

6.5. Provide assistance to the Consultant for on site spot verifications of air and water balance report.

6.6. Submit one copy of report to each; Landlord, Tenant, Engineer.

7. Identification of Equipment and Piping

7.1. Identify all automatic control devices and motor driven equipment with 3 mm (1/8") lamacoid plastic plates with bevelled edges having engraved white letter on black background giving the nature of equipment service and its number, ie. "Washroom Exhaust E1", etc.. Fix to equipment using sheet metal screws.

7.2. Provide plates with 6 mm (1/4") lettering for motor starters and 12 mm (1/2") lettering for equipment.

7.3. Where equipment is locally switched (e.g. Room exhaust fans) provide suitable label at switch. Co-ordinate with architect on site for labling the switches in an aesthetically pleasing manner.

7.4. Coordinate with controls subcontractor and obtain list of automatically operated equipment and provide warning identification on lamacoid plate for each item as follows:

"Warning: This equipment may start at any time. Do not service without disconnecting power."

7.5. Provide all major valves with brass or plated plastic numbered tags, 16 mm (5/8") diameter with stamped numbers. Secure by brass chains to the valve. Valves adjacent to plumbing fixtures, convectors, unit heaters and entrance heaters need not be tagged. Prepare an approved list detailing the valve location, tag numbers and purpose it serves. Mount one (1) copy of this list in a glazed frame where advised by the Landlord and provide additional copies for the manuals.

7.6. Identify the following piping as to service and direction of flow using stencils and black lettering behind each access door, in each room, and/or every 12 m (40 ft.)

- Domestic hot, cold, recirculation
- Sprinkler system.
- Standpipe system
- Supply air
- Return air

8. Trial Usage and Tests

8.1. The Owner has the privilege of trial usage of Mechanical Systems or parts thereof for the purpose of testing and learning operational procedures.

8.2. Assist in trial usage over a length of time as deemed reasonable by the Consultant at no extra cost, and do not waive any responsibility because of trial usage.

8.3. Trial usage shall not be construed as Substantial Completion of the Work.

8.4. Provide and pay for all testing required on the system components where, in the opinion of the Consultant the manufacturer's ratings or specified performance is not being achieved.

8.5. Test and demonstrate all automatic equipment is operating as per sequence of operation. (ie. Test boiler controls package and circ pump interface, etc.)

8.6. Piping system tests: Do not insulate piping systems until completed, perfected, and proven tight. Should leaks develop in any part of the piping system, remove and replace defective sections, fittings, etc.

8.7. Test piping system in sections as required by the progress of work.

8.8. Test all hot and chilled water, condenser water and domestic water piping hydraulically to a pressure of 1100 kPa (150 psi) and prove tight for a period of 8 hours with nitrogen is also acceptable provided a pressure of 1380 kPa (200 psi) is used. Test natural gas piping as required by codes and authorities.

8.9. All tests must be recorded. Submit recorded data to the Consultant.

8.10. Test gas piping in accordance to CGA standard and authorities having jurisdiction. Provide record data of test results to consultant for review.

8.11. Include a copy of all the test results in the maintenance manuals.

9. Controls

9.1. All modifications to control equipment to be provided by base building control vendor.

9.2. Add and relocate thermostats and revise control wiring as indicated on drawing.

9.3. The mechanical contractor shall carry the cost of the controls contractor in their tender submission.

9.4. Provide all interlocks, safeties, sensors and all materials required to achieve the sequence of operation described below.

9.5. Program existing automation system to accommodate new VAV terminals, and any other changes, in a manner similar to existing. EMCS to sense and control supply air temperature, space temperature, valve position and damper position for all VAV terminals.

9.6. Sequence of operation:

9.6.1. VAV terminals, interior zones: A space sensor/ VAV TUX controller will modulate the VAV from minimum to 100% air flow on space temperature rise. As the space temperature rises above the cooling set point, the TUX will modulate the VAV damper open to maximum setting by pulsing the VAV box motor open.