The City of Winnipeg

NMS SPECIFICATIONS

TENDER NO: 396-2026B

Pan Am Pool Main Tank Renewal

August 2026

Part 1 General

1.1 CITY OF WINNIPEG OCCUPANCY

.1 Further to Part D, no City of Winnipeg Occupancy impacting construction is planned. Unless otherwise noted below and on Drawings, the City will vacate construction areas and continue to occupy non-construction areas as part of a targeted access plan shown on Drawings from commencement of Work through to Substantial Performance of the Work.

.2 A targeted access plan is established to allow specific user groups access to areas as shown on Drawings.

.1 Generally these areas include:

.1 Main Floor:

.1 North and South change Rooms,

.2 Lap/Training pool, and

.3 Associated stairs to Second Floor and emergency egress routes.

.2 Second Floor:

.1 Aquatic Hall of Fame,

.2 West Diving Training area,

.3 Running track,

.4 East fitness area and upper Lap/Training pool, and

.5 Associated stairs to Second Floor and emergency egress routes.

.2 Public access to the targeted access plan is located at the South side of the Building. Refer to Drawings. The City will remain responsible for security and public access at this location.

.3 To facilitate public access to all areas, two protected construction hoarding tunnels shall be constructed within the construction area at locations shown on Drawings.

.1 To facilitate completion of Work at the locations of the tunnels, the City will close the targeted access plan and terminate public access to the Site.

.2 The Contractor shall remove the temporary hoarding and access tunnels upon termination of the targeted access plan, and establish continuous barriers where the tunnels were located.

.3 Dates of targeted access plan closure and removal of the temporary hoarding tunnels will be confirmed through consultation with the City, user groups and the Contractor.

.1 The intent is to schedule Work at this location at the end of the project.

.3 The City will provide or be responsible for:

.1 Operation and maintenance of existing building equipment and services of the Site, including equipment and services serving active construction areas.

.2 Maintenance of existing building finishes of the Site including areas occupied by the City staff and the Public, and excluding construction areas turned over to the Contractor

.3 Secured access to the targeted access plan through the building access location shown on Drawings.

.4 Complying with Contractor safety procedures while within active construction areas.

.4 The Contractor shall provide or be responsible for the following:

.1 Protection of building services, equipment and finishes within construction areas.

.2 Safety of Contractor and Sub-contractor activities.

.3 Safety of the Site as Prime Contractor.

.4 Site and facility security other than targeted access plan access location at all times.

.5 Restricting access to the Site to authorized construction personnel and individuals approved by the City.

.6 Operation and maintenance of building equipment and services of the Site installed as work of this Contract.

1.2 WORKING HOURS

.1 No restriction on working hours. Contractor is responsible for site and facility security and access requirements for the duration of the Work to Substantial Performance.

.1 Notwithstanding the above, scheduling of site reviews by the Contract Administrator are limited to between 9:00 a.m. and 4:00 p.m. Monday through Friday excluding statutory holidays.

.2 Notwithstanding the above, complete all Work in conformance with:

.1 City of Winnipeg Neighbourhood Livability By-Law no. 1/2008.

.3 Allow for hours of work restrictions in construction progress schedule.

1.3 MAINTAINING LIFE SAFETY SYSTEMS

.1 Maintain operational life safety systems and public access to exits in occupied areas during all stages of the Work.

.2 Determine nature and exact locations of existing fire and smoke sensors prior to the commencement of the Work. Avoid direct or indirect jarring while working in adjacent areas and exercise caution to avoid triggering these devices.

.3 Be responsible for costs incurred by the City on account of false fire alarms activated as a result of the execution of the Work without adequate precautions.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Administrative and procedural requirements for unit prices further to requirements specified in Parts C and D.

.1 Measurement and payment criteria applicable to Work performed under a unit price payment method.

1.2 UNIT PRICES

.1 Description:

.1 Unit prices are an amount incorporated in the Contract for a specific product or portion of Work with a specified product on a per unit basis.

.2 Requirements:

.1 Unit prices include requirements specified in C12.2.3, and:

.1 Labour and material.

.2 Cost for delivery.

.3 Handling.

.4 Temporary storage, including insurance.

.5 Demolition, surface preparation, and installation, where specified, shown on Drawings to be included in a Unit Price.

.6 Fees for overhead and profit.

.7 Insurance, bonds and applicable taxes.

.2 Unit prices exclude the following which are to be included in the Total Price as allocated to a Lump Sum class of work on Form B: Prices:

.1 Access requirements,

.2 Site protection of existing building equipment and finishes,

.3 Barriers and enclosures for the unit price Work,

.4 Safe Work procedure preparation,

.5 Construction facilities, utilities and controls to facilitate Unit Price work.

.3 Refer to individual Sections for construction activities requiring unit prices.

.3 Measurement and Payment Procedures:

.1 Unit prices are included in the Total Bid Price incorporating the estimated quantities provided.

.1 Unit prices are part of the Total Bid Price contract amount and not to be allocated to cash allowances, if included in the Contract.

.2 Actual quantities will be identified by the Contract Administrator in the presence of and with the assistance of the Contractor. The quantity will be measured and agreed upon by the Contractor and the Contract Administrator prior to commencement of the specified Unit Price Work.

.3 If the quantity is increased over that originally measured without consultation with the Contract Administrator, the Contractor will not be paid for the increased quantity.

.4 Increases in quantities of unit prices included in the Contract will be changed by a Change Order based on the unit prices included in the Contract and as entered on Form B: Prices.

.5 Decreases in quantities of unit prices included in the Contract will be changed by a Change Order based on the unit prices included in the Contract and as entered on Form B: Prices.

1.3 SCHEDULE OF UNIT PRICES:

.1 Refer to Form B: Prices and Form I: Detailed Prices.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This section specifies administrative and procedural requirements for meetings.

1.2 PRE-CONSTRUCTION MEETING

.1 Promptly after Contract award, the Contract Administrator will establish the time and location of a pre-construction meeting to review and discuss administrative procedures and responsibilities. Contract Administrator will notify Contractor at least seven (7) Calendar Days before the meeting.

.2 The Contractor shall arrange for the following senior representatives to be in attendance:

- .1 Contractor's project manager and site superintendent.
- .2 Major Subcontractors.

.3 Contract Administrator will chair the conference and record and distribute the minutes.

.4 Agenda:

- .1 Introductions
- .2 Communications
- .3 Award of Contract
- .4 Scope of Work
- .5 Subcontractors
- .6 Commencement
- .7 Schedule
- .8 Construction Sequence
- .9 Utilities
- .10 Project Issues
- .11 Site Meetings
- .12 Status Meetings
- .13 Safety
- .14 Security
- .15 Environmental
- .16 Regulatory
- .17 Mock-ups
- .18 Other

1.3 CONSTRUCTION PROGRESS MEETINGS

.1 In accordance with Section D supplemented with the following:

- .1 Progress meetings to be scheduled every two weeks.
- .2 Contract Administrator will chair the meetings, and record and distribute the minutes.
- .3 The Contractor shall provide physical space and make arrangements for meetings.
- .4 The Contractor shall ensure that Subcontractors attend when it is appropriate to the discussion of the progress of the Work.
- .5 Agenda:
  - .1 Review of last meeting minutes and action items,
  - .2 Schedule,

.3 Progress status,
.4 Construction issues,
.5 Utilities,
.6 Project risks,
.7 Environment,
.8 Safety,
.9 Submittals,
.10 Work by others,
.11 Change control,
.12 Request for Information (RFI) log,
.13 Site security,
.14 Quality Control (QC) and Quality Assurance (QA),
.15 Other Business, and
.16 Date of Next Meeting.

1.4 PRE-INSTALLATION CONFERENCE

.1 Convene a pre-installation conference a minimum of one (1) week prior to beginning on site installation of Work or mock-up as required in individual technical sections.

.2 Establish date, time and location of conference and notify parties concerned a minimum of seven (7) Calendar days before pre-installation conference.

.3 Contractor and any Subcontractors and manufacturer's representatives involved in work and Contract Administrator to be in attendance.

.4 The Contract Administrator will be responsible for recording minutes and circulating to the attending parties and affected parties not in attendance within seven (7) Calendar days after conference.

.5 Agenda for conference:

.1 Verify project requirements, design and intent of design,
.2 Review installation and substrate conditions,
.3 Co-ordination with subtrades,
.4 Review Manufacturer's installation instructions and warranty requirements,
.5 Review compatibility of materials, and
.6 Review testing requirements.
.7 Review of facility protection.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This Section specifies Contractor's responsibilities for preparation and submission of schedules and other documentation related to tracking construction progress.

.2 The purpose of submitting progress schedules is to:

.1 Inform the City and Contract Administrator of actual progress versus planned progress, and

.2 Provide assurance that scheduling issues are being proactively identified and addressed in a timely manner, and that planned progress is being maintained as closely as possible.

1.2 SUBMITTALS

.1 Construction Schedule:

.1 Submit detailed work schedule in accordance with Section D.

.2 Submittals Schedule:

.1 Submit via e-mail in electronic PDF format.

.2 Submit initial schedule to Contract Administrator within twenty-one (21) Calendar Days after Contract award.

.3 Submit to Contract Administrator as a submission to the Contract Administrator in accordance with Section 01 33 00 Submittal Procedures.

.3 Progress Photographs:

.1 Submit photographs in electronic version via the Contract Administrator's SharePoint site as a submission to the Contract Administrator in accordance with Section 01 33 00 Submittal Procedures.

.2 Pre-Construction: Submit prior to mobilizing on site.

.3 Construction Progress:

.1 Submit monthly.

.2 Submit upon completion of key milestone activities as requested by the Contract Administrator.

.4 3D Scan: Submit result of 3D scan of existing conditions in electronic PDF form.

.1 Contractor will require the 3D scan in a form other than PDF for verification and use in locating position of existing fixtures, anchors and lane markers.

1.3 DETAILED WORK SCHEDULE

.1 In accordance with Section D.

1.4 SUBMITTALS SCHEDULE

.1 Format and Content:

.1 Prepare a tabulated schedule identifying all required items for material procurement:

.1 Shop drawings.

.2 Product data.

.3 Sample submissions.

.1 Including:

.1 Samples required for testing.

.2 Prepare schedule in electronic format.

.3 Provide a separate line for each required submittal, organized by Specifications section name and number, and further broken down by individual Products and systems as required.

.4 For each required submittal, show:

.1 Planned earliest date for initial submittal.

.2 Earliest date for return of reviewed submittal by the Contract Administrator.

.3 Latest date for return of reviewed submittal without causing delay.

.5 Allow time in schedule for resubmission of submittals, should resubmission be necessary.

.2 Contract Administrator Review:

.1 The Contract Administrator will review the format and content of the initial schedule and request necessary changes, if any, within fourteen (14) Calendar Days after receipt.

.2 If changes are required, resubmit finalized schedule within seven (7) Calendar Days after return of the Contract Administrator reviewed copy.

.3 Submit updated submittals schedule monthly to the Contract Administrator.

1.5 SCHEDULE MANAGEMENT

.1 A schedule submitted as specified and accepted by the City and Contract Administrator shall become the baseline schedule and shall be used as the baseline for updates.

.2 At each regular progress meeting, review and discuss current construction progress and submittals schedules with Contract Administrator and the City, including activities that are behind schedule and planned measures to regain schedule slippage in key areas on or near the critical path.

.3 Activities considered behind schedule are those with start or completion dates later than the dates shown on the baseline schedule.

1.6 3D LASER SCAN

.1 Conduct a 3D laser scan of the pool area and tank to record locations of:

.1 Existing fixtures and support anchors scheduled for removal and replacement.

.2 Existing lane markers.

.3 Difference in tile colour transitions.

.2 Prepare results of the 3D laser scan in a format to allow positioning of fixtures, anchors and lane markers for re-installation.

1.7 RECORDING ACTUAL SITE CONDITIONS ON AS-BUILT DRAWINGS

.1 Print a hard copy set of construction Drawings and Specifications for the purpose of creating as-built Drawings and Specifications. Record information in red ink on the hard copies, clearly identifying as-built deviations from the originally obtained construction Drawings and Specifications.

.2 Clearly label each drawing as “AS-BUILT DRAWING”. Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.3 Record actual construction including:

.1 Field changes of dimension and detail.

.2 Changes made by Change of Work Orders and Field Instructions. Reference Change of Work Order and Field Instruction number.

.3 Clarifications made in Requests for Information (RFI). Reference RFI number.

.4 References to Shop Drawings, where Shop Drawings show more detail.

.4 Do not use as-built drawings for construction purposes.

1.8 PROGRESS PHOTOGRAPHS

.1 Conduct a pre-construction inspection of the existing Site conditions in the presence of the Contract Administrator to document existing conditions using digital photography. Pre-construction photographs will be used to evaluate pre-existing damage to finishes and responsibility of repair.

.2 Arrange for periodic digital photography to document and provide a photographic record of the progress of the Work.

.1 At minimum, photographic record to include the following:

.1 Pre-demolition.

.2 Substrate conditions following demolition.

.3 Construction sequencing.

.4 Final installation.

.3 Identify each photograph by project name and date taken.

.4 Do not use progress or any other project photographs for promotional purposes without the City's written consent.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This section specifies administrative and procedural requirements for submittals.

1.2 ADMINISTRATIVE

.1 Submit specified submittals to the Contract Administrator for review.

.2 Submit with reasonable promptness and in orderly sequence so as to not cause delay in the Work.

.3 Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time or for product substitutions or other deviations from the Drawings and Specifications.

.4 Where required by authorities having jurisdiction, provide submittals to such authorities for review and approval.

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

.6 Present Shop Drawings, product data, and samples in SI metric units. Where items or information is not produced in SI Metric units, converted values are acceptable.

.7 Review submittals, provide verified field measurements where applicable, and affix Contractor’s review stamp prior to submission to the Contract Administrator. The Contractor’s review stamp represents that necessary requirements have been determined and verified, and that the submittal has been checked and coordinated with requirements of the Work and Contract Documents.

.8 Verify field measurements and that affected adjacent work is coordinated.

.9 Submittals not meeting specified requirements will be returned with comments.

.10 Reproduction of construction Drawings to serve as background for Shop Drawings is not permitted.

.11 Do not propose substitutions or deviations from the Contract Documents via Shop Drawing, product data and sample submittals.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Indicate products, methods of construction, and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work.

.2 Where products attach or connect to other products, indicate that such items have been coordinated, regardless of section under which adjacent items will be supplied and installed. Indicate cross-references to Drawings, Specifications and other already reviewed Shop Drawings.

.3 Accompany submittals with a transmittal information including:

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

.4 Shop Drawing submittals shall include:

- .1 Date and revision dates,
- .2 Project title and number,

.3 Name and address of:

.1 Subcontractor,

.2 Supplier, and

.3 Manufacturer.

.4 Contractor's stamp, date, and signature of Contractor's authorized representative responsible for Shop Drawing review, indicating that each Shop Drawing has been reviewed for compliance with Contract Documents and, where applicable, that field measurements have been verified.

.5 Details of appropriate portions of the 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, and

.10 Relationships to other parts of the Work.

.6 Contract Administrator’s review stamp: Allow sufficient space on each sheet of shop drawings for Contract Administrator’s comments and review stamp without requiring the stamp to overwrite text of the Shop Drawing.

.5 Product data submittals shall include safety data sheets (SDS) for all controlled products.

.6 Submit Shop Drawings where specified in the technical Specifications in electronic PDF format.

.7 Submit product data sheets or brochures where specified in the technical Specifications in electronic PDF format.

.8 Where a submittal includes information not applicable to the Work, clearly identify applicable information and strike out non-applicable information.

.9 Supplement standard information to include details applicable to Project.

.10 Allow fourteen (14) Calendar Days for Contract Administrator’s review of each submittal and incorporate in submittals schedule specified in Section 01 32 00 – Construction Progress Documentation.

.1 Allow additional seven (7) Calendar Days for mechanical, plumbing, electrical and architectural shop drawing reviews.

.11 If upon Contract Administrator’s review no errors or omissions are discovered, or if only minor corrections are required as indicated, submittal will be returned and fabrication or installation of Work may proceed.

.12 If upon Contract Administrator’s review significant errors or omissions are discovered, as so noted, copy will be returned for correction and resubmission. Do not commence fabrication or installation.

.13 Contract Administrator’s notations on submittals are intended to ensure compliance with the Contract Documents and are not intended to constitute a change in the Work requiring a change to the Contract Price or Contract Time. If the Contractor considers any Contract Administrator’s notation to be a change in the Work, promptly notify the Contract Administrator in writing before proceeding with the Work.

.14 Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of the Work proceeds. When resubmitting, notify the Contract

Administrator in writing of any revisions other than those requested by the Contract Administrator.

1.4 SAMPLES

.1 Submit single copy of samples for the Contract Administrator's review where specified in the technical Specifications. Label samples as to origin, Project name, and intended use.

.2 Deliver samples prepaid to Contract Administrator's business address.

.3 Notify Contract Administrator in writing of any deviations in samples from requirements of Contract Documents.

.4 Where a required colour, pattern or texture has not been specified, submit a full range of available products.

.5 The Contract Administrator's selection from samples is not intended to change the Contract Price or Contract Time. If a selection would affect the Contract Price or Contract Time, notify the Contract Administrator in writing immediately and prior to proceeding with the Work.

.6 Resubmit samples as required by Contract Administrator to comply with Contract Documents.

.7 Reviewed and accepted samples will establish the standard against which installed Work will be reviewed.

1.5 HEALTH AND SAFETY SUBMITTALS.

.1 In accordance with Section 01 35 29 – Safety Procedures.

1.6 SUBMISSIONS TO CONTRACT ADMINISTRATOR:

.1 Electronic versions via e-mail to:

.1 Contract Administrator in accordance with Section D.

.2 Contract Administration: contractadmin@crosierkilgour.com.

.2 Electronic versions via Contract Administrator's SharePoint site:

.1 Submit request to upload electronic submittals via Contract Administrator's SharePoint site via e-mail to:

.1 Contract Administrator in accordance with Section D.

.2 Contract Administration: contractadmin@crosierkilgour.com.

.2 Contract Administrator will provide an e-mail invitation and link to upload files to SharePoint site.

.3 Samples and hard copy versions to:

.1 Contract Administrator in accordance with Section D.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Province of Manitoba:

.1 The Workplace Safety and Health Act, Chapter W210 10/02 and associated regulations.

.2 Manitoba Workplace Safety and Health Regulation 217/2006.

.3 The Workers Compensation Act C.C.S.M c. W200.

1.2 PRIME CONTRACTOR

.1 Contractor shall be the Prime Contractor and serve as, and have the duties of the Prime Contractor in accordance with the Workplace Safety and Health Act (Manitoba).

.2 Without limiting the generality of D24.1, the Prime Contractor scope of services include all services indicated in The Workplace Safety and Health Act (Manitoba) and generally summarized below:

.1 Act as Safety Administrator.

.2 Conduct safety meetings for all contractors working on the Site.

.3 Conduct site safety orientations for all contractors working on the Site.

.4 Establish, implement and maintain an access control and screening method for the Site.

.5 Conduct daily toolbox meetings with all contractors on site to review planned work, job hazard assessments and control measures and safe work plans being implemented.

.6 Receive, review and return contractor safe work plans.

.7 Coordinate and organize boundaries between contractors.

.8 Ensure the facility is kept secure at all times.

.9 Schedule and manage security services.

.10 Building access control.

1.3 ACTION/INFORMATION SUBMITTALS

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

.2 Submit, by presentation to the Contract Administrator, the safety orientation for all contractor's personnel. This presentation must be made before commencement of the Work.

.3 Submit to the Contract Administrator one (1) copy of any Safety Data Sheet (SDS) as required. These sheets must be submitted before the controlled product is used on Site.

.4 Submit to the Contract Administrator:

.1 A safe work plan in accordance with Section D,

.2 Minutes of the weekly (toolbox) safety meetings,

.3 Accident investigations (if applicable),

.4 Site safety inspections, and

.5 Training records as appropriate, requested.

.6 Qualifications of the environmental practitioner.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 – Closeout Submittals.

.2 Submit as a component of the Operation and Maintenance Manual:

.1 Hazardous materials abatement completion report.

.2 Inspection and air monitoring reports of hazardous materials abatement.

1.5 SAFETY ASSESSMENT

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

.2 Safety assessment to form basis of safe work procedures and site specific site safety plan.

1.6 MEETINGS

.1 Schedule, administer and record minutes for:

.1 Safety meetings,

.2 Weekly safety (toolbox) meetings.

.2 Schedule meetings at minimum frequency required under legislation.

.3 Discuss health and safety issues at each progress meeting in accordance with Section 01 31 19 – Project Meetings.

1.7 PROJECT/SITE CONDITIONS

.1 Refer to the following reports identifying hazardous materials at the Site appended to this Section:

.1 Asbestos Inventory Control Pan Am, Prepared by The City of Winnipeg, dated [Date of Report].

.2 Pre-Construction Hazardous Materials Report for Pan Am Pool, Prepared by [Name of Consultant], dated [Date of Report].

.2 The City has classified crawlspace areas as a confined space.

1.8 GENERAL SITE RULES

.1 Follow all posted traffic control signs.

.2 Ensure that all workers comply with "NO SMOKING" regulations in effect in areas of the Site.

.3 Wear personal protective equipment (PPE) in accordance with the Safe Work Plan.

.4 Use scaffolding that complies with regulations.

.5 Obtain a valid certificate of inspection for all cranes and boom trucks before coming on Site.

.6 Immediately remove any worker found to be impaired.

.7 Immediately report all hazardous situations to the Contract Administrator.

.8 Obtain and display at the Site SDS for all controlled products before the product is allowed on Site.

1.9 FIRST AID FACILITIES AND SERVICES

.9 The Contractor shall provide first aid services at the Site, including their Subcontractors, until Substantial Performance is achieved. Provide qualified first aiders to man the first aid facilities.

.10 Provide first aid coverage for the Site at all times, including periods outside of normal work hours (evenings, weekends, and holidays) as required to support the work of Subcontractors. Coordinate with others to establish required durations and levels of first aid to support regular and non-regular work hours.

.11 Make all provisions and pay all installation, manpower, equipment, medical supplies, restocking and other costs for the first aid facilities in order to provide ongoing service for the Site in accordance with the requirements of this Specification.

.12 Locate the first aid facility in a convenient location within the Site. The Contractor shall provide and maintain unobstructed emergency vehicle access to the main door of the first aid facility, including appropriate signage as required.

.13 Arrange and supply transportation for injured workers both on and off Site.

.14 The Contract Administrator will review the Contractor's first aid facility, personnel, procedures, and safety and health program. The Contract Administrator is to have full access to the Work and the Contractor's first aid facilities and records at all times.

1.10 GENERAL REQUIREMENTS

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

.2 Keep copy of the relevant construction occupational safety and health regulations on Site at all times. Post the policies and notices for the information of workers.

.3 Ensure that workers are instructed and trained in safe and healthy working practices; take immediate action to correct any unsafe conditions and hold regular weekly safety (toolbox) meetings with all workers.

.4 Establish Job Safety and Health Procedures and provide copies for the Contract Administrator’s information.

.5 Provide Safety Orientation for all individuals accessing the site during Work of this Contract.

.1 Including, but not limited to:

.1 Contractors,

.2 Service personnel,

.3 Contract Administrator personnel,

.4 City of Winnipeg staff.

.2 All individuals accessing the Site must attend a Safety Orientation before access to the Site is granted.

.6 Ensure that the following essentials of the Workplace Hazardous Materials Information System are provided:

.1 Worker education on controlled Products.

.2 Workplace labelling and identification.

.3 Safety Data Sheets (SDS).

.7 Conduct formal safety inspections of Site. Inspections to be performed by one person from management and one person representing workers.

1.11 RESPONSIBILITY

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

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

1.12 COMPLIANCE REQUIREMENTS

.1 Comply with The Workers Compensation Act, Workplace Safety and Health Act Chapter W210 and Manitoba Workplace Safety and Health Regulation 217/2006.

1.13 HAZARDOUS BUILDING MATERIALS

.1 Refer to E3 – Hazardous Materials.

1.14 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for an employee's right to refuse work in accordance with Acts and Regulations of Province/Territory having jurisdiction and advise the Contract Administrator verbally and in writing.

1.15 CORRECTION OF NON-COMPLIANCE

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

.1 The City, and

.2 The Contract Administrator.

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

.1 The City, and

.2 The Contract Administrator.

.3 If non-compliance of health and safety regulations is not corrected, the following may issue a stop Work order until the non-compliance is corrected:

.1 The City, and

.2 The Contract Administrator.

1.16 BLASTING

.1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by the Contract Administrator.

1.17 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from the Contract Administrator.

1.18 WORK STOPPAGE

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This section specifies administrative and procedural requirements for quality.

.2 This Section describes administrative and procedural requirements for:

.1 Proactive Contractor activities to assure the quality of construction before and during execution of the Work.

.2 Reactive activities to verify that work completed conforms to the Contract Documents.

.3 Having inspection and testing agencies by the Contractor or the City does not relieve the Contractor of their responsibility to perform Work in accordance with the Contract Documents.

1.2 REFERENCE STANDARDS

.1 “Reference standards” means consensus standards, trade association standards, guides, and other publications expressly referenced in Contract Documents.

.2 Where an edition or version date is not specified, referenced standards shall be deemed to be the latest edition or revision issued by the publisher at the time of bid closing. However, if a particular edition or revision date of a specified standard is referenced in an applicable code or other regulatory requirement, the regulatory referenced edition or version shall apply.

.3 Reference standards establish minimum requirements. If the Contract Documents call for requirements that differ from a referenced standard, the more stringent requirements shall govern.

.4 If compliance with two or more reference standards is specified and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to Contract Administrator for clarification.

1.3 ACTION AND INFORMATION SUBMITTALS

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

.2 Qualification statements: Upon request, submit statements verifying qualifications specified herein.

.3 Submit schedule of testing and inspection activities to the Contract Administrator, applicable subcontractors, testing agencies, and other affected parties including the following:

.1 List each testing and inspection agency.

.2 Identify types of tests and inspections for each agency, and cross reference to applicable specification Section number-title in Contract Documents.

.3 Description of test and inspection,

.4 Identify applicable reference standard,

.5 Identify test and inspection method, and

.6 Indicate number of each test and inspection required.

.4 Test Samples: Submit test samples required for testing in accordance with submittals schedule specified in Section 01 32 00 – Construction Progress Documentation.

.5 Reports: Submit reports in electronic PDF format prepared by inspecting and testing agencies for inspection and testing required by Contract Documents or by regulatory requirements, and performed by Contractor retained inspection and testing agencies to the Contract Administrator.

.1 Submit within seven Calendar Days after completion of inspection and testing.

.2 Provide copies to:

.1 Subcontractor of work being inspected or tested.

.2 Manufacturer or fabricator of material being inspected or tested.

.6 Certificates:

.1 Submit Product certificates as requested.

1.4 QUALIFICATIONS

.1 Contractor Qualifications: Contractors shall meet the following qualifications:

.1 Engaged full time with knowledge and experience in the risks, environmental impacts, and all components of the line of work required by these Contract Documents.

.2 Demonstrated experience satisfactory to the City and Contract Administrator:

.1 Prime Contractor:

.1 Minimum of:

.1 Five (5) projects over past five (5) years as Prime Contractor as follows:

.1 Successful completion of projects of similar value as that required by these Contract Documents, and

.2 Successful completion of projects of similar nature, scope and complexity as that required by these Contract Documents.

.2 Proposed project manager:

.1 Minimum of:

.1 Five (5) projects over past five (5) years as project manager as follows:

.1 Successful completion of projects of similar value as that required by these Contract Documents, and

.2 Successful completion of projects of similar nature, scope and complexity as that required by these Contract Documents.

.3 Proposed superintendent:

.1 Minimum of:

.1 Five (5) projects over past five (5) years as superintendent as follows:

.1 Successful completion of projects of similar value as that required by these Contract Documents, and

.2 Successful completion of projects of similar nature, scope and complexity as that required by these Contract Documents.

.2 Subcontractor Qualifications: Sub-contractors shall meet the following qualifications

.1 Engaged full time with knowledge and experience in the risks, environmental impacts, and all components of the line of work required by these Contract Documents.

.2 As specified in technical sections.

.3 Installer qualifications: In accordance with Installer Qualifications of this Section.

.3 Manufacturers' Qualifications:

.1 Specializes in manufacturing the products specified in the technical sections of the Contract Documents.

.2 Successful record of performance with minimum of:

.1 Ten (10) years of documented experience.

.4 Suppliers' qualifications: Suppliers shall meet the following qualifications:

.1 Authorized to distribute manufacturer's products.

.2 Has capacity to supply required products without delaying the project.

.5 Fabricator's Qualifications: Fabricators shall meet the following qualifications:

.1 Experienced in producing products required by the Contract Documents.

.2 Successful record of in-service performance.

.3 Sufficient capacity to fabricate required products without delaying the Project.

.6 Installer Qualifications: Installers shall meet the following qualifications:

.1 Individual experienced in design and installation, application, and erection of materials to the extent required for this Project.

.1 Minimum of:

.1 Five (5) projects over past five (5) years.

.2 Successful record of in-service performance.

.7 Licenced Professionals Qualifications:

.1 Individual registered or licenced to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the Province of Manitoba.

1.5 INDEPENDENT INSPECTION AND TESTING AGENCIES

.1 Except as otherwise specified, the City will retain and pay for independent inspection and testing agencies to inspect, test, or perform other quality control reviews of parts of the Work.

.2 Retain and pay for inspection and testing that is for Contractor's own quality control or is required by regulatory requirements.

.3 Employment of the inspection and testing agencies by the Contractor or the City does not relieve the Contractor from the responsibility to perform the Work in accordance with the Contract Documents.

.4 Allow and arrange for inspection and testing agencies to have access to the Work, including access to off-site manufacturing and fabrication plants.

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

.5 For inspection and testing required by Contract Documents or by authorities having jurisdiction, provide Contract Administrator and inspection and testing agencies with timely notification in advance of required inspection and testing.

.6 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.

.7 Provide test samples required for testing in accordance with submittals schedule specified in Section 01 32 00 – Construction Progress Documentation.

.8 Provide labour, equipment and temporary facilities to obtain and handle test samples on Site.

.1 Provide sufficient space to store and cure test samples.

.9 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 the Contract Administrator at no cost to the City. Pay costs for retesting and reinspection.

1.6 INSPECTION AND TESTING AGENCY REPORTS

.1 Provide reports prepared by inspecting and testing agencies for inspection and testing required by Contract Documents or by regulatory requirements, and performed by Contractor retained inspection and testing agencies in accordance with this section Article titled “Action/Information submittals”.

.2 For inspection and testing performed by the City-retained inspection and testing agencies, copies of inspection and testing agency reports will be provided to Contractor.

1.7 TESTS

.1 Furnish test results as requested.

.2 Provide seal of professional engineer on tests as specified in the Contract Documents. Engineer to be registered within the Province of Manitoba.

.3 Cost of tests beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by the Contract Administrator and may be authorized as recoverable.

1.8 MOCK-UPS

.1 Prepare mock-ups of Work as specified in the Technical Specifications.

.1 If a mock-up location is not indicated in the Drawings or Specifications, locate where directed by the Contract Administrator.

.2 Prior to preparation and installation of mock-up, coordinate and schedule pre-installation meetings in accordance with Contract Documents.

.3 Modify mock-up as required until Contract Administrator approval is obtained.

.4 Approved mock-ups will establish an acceptable standard for the Work.

.5 Protect mock-ups from damage until the Work they represent is complete.

.6 Unless otherwise specified in the technical Specifications, approved mock-ups forming part of the Work may remain as part of the Work.

.7 Technical Specification sections specify whether mock-up may remain as part of Work or if it is to be removed and when.

.8 Prepare mock-ups for the Contract Administrator’s review with reasonable promptness and in orderly sequence, as to not cause delays in the Work.

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 TEMPORARY UTILITIES - GENERAL

.1 Provide temporary utilities as specified and as otherwise necessary to perform the Work expeditiously.

.2 Remove temporary utilities after use.

1.2 TEMPORARY WATER SUPPLY

.1 Connect to and use the City's existing water supply for temporary use during construction, subject to existing available volume and pressure.

.1 Usage at no cost to Contractor.

.2 Arrange and pay for necessary water supply connections and disconnections.

.3 Provide hoses, lines, connections, and other ancillary hardware required.

.4 Return services to their original condition at the temporary locations, or left in an altered condition only as approved by the City.

1.3 TEMPORARY HEATING AND VENTILATION

.1 Arrange and pay for temporary heating and ventilation required during construction.

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

.3 Vent construction heaters in enclosed spaces to the outside or use flameless type of construction heaters.

.4 Provide temporary heat for the Work as required to:

.1 Facilitate progress of Work.

.2 Protect the Work against dampness and cold.

.3 Prevent moisture condensation on surfaces, freezing, or other damage to finishes or stored Products.

.4 Maintain specified minimum ambient temperatures and humidity levels for storage, installation and curing of Products.

.5 Provide temporary ventilation for the Work as required to:

.1 Prevent accumulations of fumes, exhaust, vapours, gases and other hazardous, noxious, or volatile substances in enclosed spaces, as required to maintain a safe work environment meeting applicable regulatory requirements.

.2 Ensure that hazardous, noxious, or volatile substances do not migrate to the City's occupied spaces.

.3 Ventilate temporary sanitary facilities.

.6 Do not use permanent building heating and ventilation systems during construction.

1.4 TEMPORARY ELECTRICAL POWER AND LIGHTING

.1 Connect to and use the City's existing electrical supply for temporary use during construction.

.1 Usage at no cost to Contractor.

.2 Maximum power supply available for temporary use during construction is limited to existing power supply at the building.

.3 Arrange and pay for necessary connections and disconnections of temporary power and lighting in accordance with regulatory requirements.

1.5 SHUT DOWN AND START-UP OF EXISTING UTILITIES AND HVAC SYSTEMS

.1 Co-ordinate shut down and start-up of existing utilities and HVAC systems with the Contract Administrator and the City.

.2 Comply with the City facilities maintenance requirements for shut down and start-up of systems.

.1 Provide a minimum of 48 hours written notification to the City.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S269.2-16, Access scaffolding for construction purposes.

1.2 SUBMITTALS

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

.2 Scaffolding: Where Manitoba Regulation 217/2006 requires scaffolds to be designed by a professional engineer, submit Shop Drawings bearing the seal of professional engineer registered in the Province of Manitoba.

.3 Site Storage Layout Plan:

.1 Where storage of materials on the roof and floor structure are proposed, submit storage layout plan including the following:

.1 Design load of structure supporting the storage material.

.2 Load and area of each storage material.

.3 Location of each storage material in relation to supporting structure.

.4 Sequence of loading and unloading of storage material on existing structure.

.2 Site storage layout plan to be designed and sealed by a professional engineer licenced to practice in the Province of Manitoba.

1.3 CONTRUCTION FACILITIES - GENERAL

.1 Provide temporary construction facilities as necessary for performance of the Work and in compliance with applicable regulatory requirements.

.2 Maintain temporary construction facilities in good condition for the duration of the Work.

.3 Remove temporary construction facilities from place of the Work when no longer required.

1.4 CONSTRUCTION PARKING

.1 Limited parking will be permitted at the place of the Work:

.1 Construction parking shall not disrupt continuing operation of the facility.

1.5 VEHICULAR ACCESS

.1 Provide and maintain adequate access to place of the Work. Do not disrupt existing site roads.

.2 Restrict construction equipment and vehicular access to established roads on Site.

1.6 SITE OFFICES

.1 Further to Section E, provide Contractor Site office as follows:

.1 Provide a temperature controlled and ventilated office, with suitable lighting, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.2 Locate site office:

.1 Within the Contractor compound.

.2 As approved by the City as discussed at the pre-construction meeting.

1.7 SANITARY FACILITIES

.1 Provide sanitary facilities for workers.

.2 Do not use permanent washroom facilities during construction.

.3 Keep sanitary facilities clean and fully stocked with the necessary supplies.

.4 Exterior water connections are available for use by the Contractor for portable facilities.

1.8 FIRE PROTECTION

.1 Provide and maintain temporary fire protection systems and equipment during construction.

1.9 USE OF EXISTING ELEVATORS

.1 Existing elevators shall not be used for construction purposes.

1.10 SCAFFOLDING

.1 Provide and maintain scaffolding as required for access throughout duration of the Work.

.2 Design and erect scaffolding in accordance with Manitoba Regulation 217/2006 and CAN/CSA S269.2.

.3 Repair landscape and building damage caused by use of scaffolding.

1.11 AERIAL DEVICES

.1 Provide, use and maintain aerial devices in accordance with Manitoba Regulation 217/2006.

.2 Provide traffic control for use of aerial device around perimeter of building.

.3 Store aerial device within City designated area.

.4 Repair landscape damage caused by use of aerial device.

1.12 SITE STORAGE/LOADING

.1 Design site storage plan within limits of existing structure by an Engineer.

.2 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with product stockpiles.

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

1.13 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

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

1.14 CLEAN-UP

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

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

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

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 BARRIERS AND ENCLOSURES - GENERAL

.1 Provide temporary barriers and enclosures necessary to delineate Contractor construction areas.

.2 Comply with applicable regulatory requirements.

.3 Maintain temporary barriers and enclosures in good condition for the duration of the Work.

.4 Remove temporary barriers and enclosures from Place of the Work when no longer required.

.5 Repair surface coatings, finishes which are damaged by temporary barriers and enclosures.

.6 Provide adequate signage, fencing, and other informational systems to inform the City staff of the work being undertaken.

1.2 FENCING

.1 Barricade area under construction with fencing to prevent the general public from improper access.

.1 Erect temporary site enclosure around each active Work area using 1.8 m high pre-fabricated welded galvanized steel tube and wire mesh fence panels.

.2 Provide metal bottom brackets with weights or other means to secure in place.

.3 Provide locking top pins to secure fence sections together.

.4 Secure fencing to adjacent structure for continuity of compound.

.2 Maintain site fencing in good repair until removed.

.3 Provide lockable access gates as required to facilitate construction access.

1.3 WEATHER ENCLOSURES

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

.2 Provide weather enclosures to protect floor areas where walls are not finished and to enclose work areas that require temporary heating.

.3 Design weather enclosures to withstand wind pressure and snow loading requirements.

1.4 DUST TIGHT SCREENS AND PARTITIONS

.1 Provide dust tight screens and partitions to localize interior building areas from dust generating activities.

.2 Erect, maintain, and relocate screens and partitions as required to facilitate construction operations and the City’s operational requirements.

1.5 FIRE ROUTES

.1 Maintain fire access routes, including overhead clearances, for use by emergency response vehicles.

1.6 PROTECTION OF BUILDING FINISHES

.1 Provide necessary temporary barriers and enclosures to protect existing and completed or partially completed finished surfaces from damage during performance of the Work.

1.7 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 TEMPORARY CONTROLS - GENERAL

.1 Provide temporary controls as necessary for performance of the Work and in compliance with applicable regulatory requirements.

.2 Maintain temporary controls in good condition for the duration of the Work.

.3 Remove temporary controls and Construction Equipment used to provide temporary controls from place of the Work when no longer required.

1.2 DUST AND PARTICULATE CONTROL

.1 Execute Work by methods that minimize dust from construction operations and spreading of dust and debris on site or to adjacent properties.

.2 Provide temporary enclosures to prevent:

.1 Extraneous materials resulting from sandblasting or similar operations from contaminating air beyond immediate work area.

.3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

.4 Use appropriate covers on trucks hauling fine, dusty, or loose materials.

1.3 DEWATERING

.1 Provide temporary drainage and pumping as necessary to dewater parts of the Work. Maintain such areas free of water arising from rain and surface run-off, as required to keep them stable, dry, and protected from damage due to flooding.

.2 Maintain standby equipment necessary to ensure continuous operation of dewatering system.

.3 Do not pump water containing suspended materials or other harmful substances into waterways, sewers or surface drainage systems. Treat or dispose of such water in accordance with applicable regulatory requirements

1.4 POLLUTION CONTROL

.1 Take measures to prevent contamination of soil, water, and atmosphere through uncontrolled discharge of noxious or toxic substances and other pollutants, potentially causing environmental damage.

.2 Be prepared, by maintaining appropriate materials, equipment, and trained personnel on site, to intercept, clean up, and dispose of spills or releases that may occur. Promptly report spills and releases that may occur to:

.1 Authority having jurisdiction,

.2 Person causing or having control of pollution source, if known, and

.3 The City and Contract Administrator.

.4 Contact manufacturer of pollutant, if known and applicable, to obtain safety data sheets (SDS) and ascertain hazards involved and precautions and measures required in cleanup or mitigating actions.

.5 Take immediate action to contain and mitigate harmful effects of the spill or release.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 GENERAL

.1 Provide products that are not damaged or defective, and suitable for purpose intended, subject to specified requirements. If requested by the Contract Administrator, furnish evidence as to type, source and quality of products provided.

.2 Unless otherwise specified, maintain uniformity of manufacture for like items throughout.

.3 Permanent manufacturer's markings, labels, trademarks, and nameplates on products are not acceptable in prominent locations, except where required by regulatory requirements or for operating instructions, or when located in mechanical or electrical rooms.

.4 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.

.5 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.

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

1.2 PRODUCT OPTIONS

.1 Product options are subject to the provisions of B7 - Substitutes and are to be requested during bidding stage only:

.1 Wherever a product or manufacturer is specified by a single proprietary name, provide the named product only.

.2 Wherever more than one product or manufacturer is specified by proprietary name for a single application, provide any one of the named products.

.2 Wherever a product is specified by reference to a standard only, provide any product that meets or exceeds the specified standard. If requested by the Contract Administrator, submit information verifying that the proposed product meets or exceeds the specified standard.

.3 Wherever a product is specified by descriptive or performance requirements only, provide any product that meets or exceeds the specified requirements. If requested by the Contract Administrator, submit information verifying that the proposed product meets or exceeds the specified requirements.

.4 Wherever a product is specified by descriptive or performance requirements and specific products are identified as basis of design, provide the product identified as the basis of design or any product that meets or exceeds the specified requirements. If requested by the Contract Administrator, submit information verifying that a proposed product not identified as a basis of design meets or exceeds the specified requirements.

1.3 PRODUCT AVAILABILITY AND DELIVERY TIMES

.1 Promptly upon Contract award and periodically during construction, review and confirm product availability and delivery times. Order products in sufficient time to meet the construction progress schedule and the Contract Time.

.2 If a specified product is no longer available or has become unavailable due to unforeseen circumstances, submit a substitution request in the format of an RFI, along with an

appended substitution request form located in Section 01 61 00.10 – Substitution Request Form. Product substitutions without cause and that should have been proposed during the bid stage as outlined in 1.2.1 will not be contemplated by the Contract Administrator.

.1 If the alternative product is accepted for use in the Contract for reasonable cause, the Contract Administrator will prepare a Proposed Change Notice (PCN) and associated Change Work Order (CWO) to document the product change.

.3 If delivery delays are foreseeable, for any reason, promptly notify the Contract Administrator.

.1 If a delivery delay is beyond Contractor's control, the Contract Administrator will provide direction.

.2 If a delivery delay is caused by something that was or is within Contractor's control, Contractor shall propose actions to maintain the construction progress schedule for the Contract Administrator's review and acceptance.

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

1.4 STORAGE, HANDLING, AND PROTECTION

.1 Store, handle, and protect products during transportation to place of the Work and before, during, and after installation in a manner to prevent damage, adulteration, deterioration and soiling.

.2 Comply with manufacturer's instructions for storage, handling and protection.

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

.4 Comply with the requirements of the workplace hazardous materials information system (WHMIS 2015) regarding use, handling, storage, and disposal of hazardous materials, including requirements for labeling and the provision of safety data sheets (SDS).

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

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

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

.8 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.

.9 Remove and replace damaged products.

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Submitted by (Company Name):

Date Submitted:

Submitted by (Company Address):

Submitted by (Submitter Name):

Submitted by (Company Address):

Submitted by (submitter e-mail address):

Specification Section Name:

Specification Section No.:

Manufacturer Information

Manufacturer Name:

Manufacturer Telephone No.:

Manufacturer Address:

Manufacturer Website Address:

Reason for Substitution

Product Data and Performance:

Provide side-by-side comparison of specified and substitution product data including applicable standard reference. Provide Manufacturer Technical Data Sheet for both specified and substitute product as attachment to this form.

Information	Specified Product	Substitute Product
Manufacturer Name:		
Product Name:		
Performance Data	**Results**	**Results**
e.g. Compressive Strength	55 MPa to ASTM C496	55 MPa to ASTM C496

Substitute Product Limitations:

Provide summary of limitations of substitute product and modifications required to system design to accommodate substitution request.

Project References:

Provide minimum of three project references where substitute product has successfully been used.

Project	Location	Prime Consultant	Year Constructed

The undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all aspects to the specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts as applicable is available for the proposed substitution as for specified product.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule, and will not result in any increase in costs to the City except as expressly set out herein.
- Proposed substitution does not affect dimensions and functional clearances.
- No payment to the Contractor will be made for changes to building design, including the Contract Administrator's design, detailing and construction costs caused by substitution. Contractor responsible for all costs associated with the substitution.

Submitted by (Print): e-mail address:

Submitted by (signature): Telephone No.:

Company:

Address:

Part 1 General

1.1 DESCRIPTION

.1 This section specifies the cleaning and waste management requirements to be adhered to through the course of the Work.

1.2 REGULATORY REQUIREMENTS

.1 Comply with applicable regulatory requirements when disposing of waste materials.

.2 Obtain permits from authorities having jurisdiction and pay disposal fees where required for disposal of waste materials and recyclables.

1.3 GENERAL CLEANING REQUIREMENTS

.1 Provide adequate ventilation during use of volatile or noxious substances.

.1 Do not rely on building ventilation systems for this purpose.

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

.3 Prevent cross-contamination during the cleaning process.

.4 Notify the Contract Administrator of the need for cleaning caused by the City or other contractors.

1.4 PROGRESSIVE CLEANING AND WASTE MANAGEMENT

.1 Maintain the Work in a tidy and safe condition, free from accumulation of waste materials and construction debris.

.2 Provide appropriate, clearly marked, containers for collection of waste materials and recyclables.

.1 Locate containers:

.1 Where indicated during the pre-construction meeting.

.3 Remove waste materials and recyclables from work areas, separate, and deposit in designated containers at end of each Working Day. Collect packaging materials for recycling or reuse.

.4 Remove waste materials and recyclables from place of the Work at regular intervals.

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

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

1.5 FINAL CLEANING

.1 Remove from Place of the Work surplus Products, waste materials, recyclables, temporary work, and construction equipment not required to perform any remaining work.

.2 Re-clean as necessary areas that have been accessed by Contractor’s workers.

.3 Remove stains, spots, marks, and dirt from finished surfaces, electrical and mechanical fixtures, furniture fitments, walls, floors and other surfaces within Work area.

.4 Remove dust from lighting reflectors, lenses, lamps, bulbs, and other lighting surfaces within Work area.

.5 Remove stains, spots, marks, and dirt from exterior facades within Work area.

.6 Clean exterior window glass and frames within Work area.

.7 Clean and sweep roofs and clear roof drains within Work area.

.8 Broom clean and wash exterior walks, steps and surfaces within extents of Work area.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Dispose of waste materials and recyclables at appropriate municipal landfills and recycling facilities in accordance with applicable regulatory requirements.

.2 Do not burn or bury waste materials at place of the Work.

.3 Do not dispose of volatile and other liquid waste such as mineral spirits, oil, paints and other coating materials, paint thinners, cleaners, and similar materials together with dry waste materials or on the ground, in waterways, or in storm or sanitary sewers. Collect such waste materials in appropriate covered containers, promptly remove from place of the Work, and dispose of at recycling facilities or as otherwise permitted by applicable regulatory requirements.

.4 Cover or wet down dry waste materials to prevent blowing dust and debris.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Procedures and requirements for Substantial Performance of the Work and Total Performance of the Work.

1.2 SUBMITTALS

.1 Substantial Performance:

.1 Submit a written application for review of substantial performance, including attachments specified in this section in electronic PDF format via e-mail.

.2 Submit to:

.1 The Contract Administrator:

.1 In accordance with Section D.

.2 Contract administration: contractadmin@crosierkilgour.com.

.2 The City's project manager at e-mail address identified at the pre-construction meeting.

.2 Total Performance:

.1 Submit a written application for review of Total Performance, including attachments specified in this section in electronic PDF format via e-mail.

.2 Submit to:

.1 The Contract Administrator:

.1 In accordance with Section D.

.2 Contract administration: contractadmin@crosierkilgour.com.

.2 The City's project manager at e-mail address identified at the pre-construction meeting.

1.3 SUBSTANTIAL PERFORMANCE OF THE WORK

.1 The prerequisites to, and the procedures for, attaining substantial performance of the Work, or similar such milestone as provided for in the lien legislation applicable to the Place of the Work, shall be:

.1 In accordance with the lien legislation applicable to the place of the Work.

.2 As specified in this section.

.2 Further to Section D the Contractor shall:

.1 Contractor's Inspection:

.1 Before applying for the Contract Administrator's review to establish Substantial Performance:

.1 Ensure that the specified prerequisites to Substantial Performance of the Work are completed,

.2 Conduct an inspection of the Work to identify defective, deficient, or incomplete work,

.3 Prepare a comprehensive and detailed list of items to be completed or corrected, and

.4 Provide an anticipated schedule and costs for items to be completed or corrected.

.2 Contract Administrator's Review:

.1 Submit to the Contract Administrator a written application for review of Substantial Performance.

.2 Include the following in the application:

.1 Project name and City tender number,

.2 Name of contractor submitting the request,

.3 Description of the Work Substantial Performance is being requested,

.4 Date request submitted,

.5 Date review requested, and

.6 Results of Contractor Inspection, including:

.1 List of items to be completed or corrected.

.2 Verification that items have been completed or corrected, or

.3 Schedule and costs for items to be completed or corrected.

.3 Upon receipt of the Contractor's application for review, together with the Contractor's list of items to be completed or corrected, the Contract Administrator, the City, and the Contractor shall jointly review the Work being requested for Substantial Performance.

.4 The Contract Administrator will advise the Contractor whether or not the Work is considered to have attained Substantial Performance. The Contract Administrator will add additional items, if any, to the Contractor's list of items to be completed or corrected. Provide the Contract Administrator with a copy of the revised list.

.5 Maintain the list of items to be completed or corrected and promptly correct or complete defective, deficient and incomplete work. The Contractor's inspection and Contract Administrator's review procedures specified above shall be repeated until the Work is considered to have attained Substantial Performance and no items remain on the Contractor's list of items to be completed or corrected.

.6 When the Contract Administrator determines that the Work has attained Substantial Performance, the Contract Administrator will issue a Certificate of Substantial Performance for the Work.

.3 Certificate of Substantial Performance

.1 The Certificate of Substantial Performance will:

.1 Document deadline for application of liens and release of statutory holdback requirements in accordance with lien legislation applicable to the place of the Work.

1.4 TOTAL PERFORMANCE

.1 The prerequisites to attaining Total Performance of the Work are described in Parts C - General Conditions and D – Supplementary Conditions.

.1 Completion of all close-out submittals in accordance with Section 01 78 00 – Close-out Submittals is considered a pre-requisite for Total Performance.

.2 Review Before Total Performance:

.1 Schedule a review for Total Performance as specified below upon completion of the prerequisites for Total Performance as specified in Parts C - General Conditions and D – Supplementary Conditions.

.2 Contractor's Inspection:

.1 Before applying for the Contract Administrator's review to establish Total Performance:

.1 Review any previously issued Certificates of Substantial Performance and associated lists of items for completion and correction.

.1 Ensure items on lists are now complete.

.2 Create an updated list of items to be completed or corrected.

.2 Ensure that the specified prerequisites to Total Performance are completed.

.3 Conduct an inspection of the Work to identify defective, deficient, or incomplete work.

.4 Prepare a comprehensive and detailed list of items to be completed or corrected.

.5 Provide an anticipated schedule and costs for items to be completed or corrected.

.3 Contract Administrator's Review:

.1 Submit a written application for review of Total Performance.

.2 Include the following in application:

.1 Project name and City tender number,

.2 Name of Contractor submitting the request,

.3 Date request submitted,

.4 Date review requested, and

.5 Results of Contractor Inspection, including:

.1 Updated lists from previously issued Certificates of Substantial Performance.

.2 List of items to be completed or corrected.

.3 Verification that items have been completed or corrected, or

.4 Schedule and costs for items to be completed or corrected.

.6 Verification of Contract Administrator's final review of closeout submittals in accordance with Section 01 78 00 – Closeout Submittals.

.3 Upon receipt of the Contractor's application for review, together with the Contractor's list of items to be completed or corrected and verifications of completed pre-requisites for Total Performance, the Contract Administrator, the City, and the Contractor shall jointly review the Work for Total Performance.

.4 The Contract Administrator will advise the Contractor whether or not the Work has attained Total Performance. Add additional items, if any, to the Contractor's list of items to be completed or corrected. Provide the Contract Administrator with a copy of the revised list.

.1 Include on the list verifications for the following if required by the Contract Documents:

.1 Close-out submittals.

.5 Maintain the list of items to be completed or corrected and promptly correct or complete defective, deficient and incomplete work.

.6 The Contractor's inspection and Contract Administrator's review procedures specified above shall be repeated until the Work attains Total Performance and no items remain on the Contractor's list of items to be completed or corrected.

.7 When the Contract Administrator determines that the Work has attained Total Performance, the Contract Administrator will issue a Certificate of Total Performance.

.3 Certificate of Total Performance:

.1 The Certificate of Total Performance will document the:

.1 Date of Total Performance, and

.2 Commencement of warranty period.

1.5 FINAL PAYMENT

.1 In accordance C12.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 OPERATION AND MAINTENANCE MANUAL

.1 Prepare a comprehensive operation and maintenance manual, in the English language, using personnel qualified and experienced for this task.

.2 Submissions:

.1 Draft version:

.1 Submit an initial draft of the operation and maintenance manual in electronic PDF format to:

.1 The Contract Administrator:

.1 In accordance with Section D.

.2 Contract administration: contractadmin@crosierkilgour.com.

.2 If required by Contract Administrator review comments, revise manual contents and resubmit for Contract Administrator review. If required, repeat this process until the Contract Administrator returns the submittal with no additional change comments.

.3 Schedule draft submission to Contract Administrator to allow:

.1 Minimum seven (7) Calendar days for each Contract Administrator review.

.2 Preparation and submission of the final version before the specified date of Total Performance.

.2 Final version:

.1 Upon Contract Administrator return of the draft version with no additional change comments, prepare the final version.

.2 Submit final version:

.1 In electronic PDF format to:

.2 The Contract Administrator:

.1 In accordance with Section D.

.2 Contract administration: contractadmin@crosierkilgour.com.

.3 Hard copies: Provide three (3) bound hard copy sets to the Contract Administrator in accordance with Section D.

.3 Submit before the specified date of Total Performance in the Contract.

1.2 OPERATION AND MAINTENANCE MANUAL FORMAT

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

.2 Binders: vinyl, hard covered, three D-rings, loose leaf, 216 x 279 mm (8.5” x 11”), 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 Binder cover and title sheet:

Operation and Maintenance Manual
City of Winnipeg
Pan Am Pool
Pool Renewal

.1 City of Winnipeg

.2 Contract Administrator: Crosier Kilgour

.3 Contractor: Insert name of Contractor.

.4 Date of Submission

.5 Arrange content by Section number and sequence of Table of Contents.

.6 Table of Contents:

.1 Title of project;

.2 Date of submission;

.3 Contact Information:

.1 Table 1 – Primary: names, addresses, telephone numbers and name of responsible parties for:

.1 City of Winnipeg.

.2 Contract Administrator.

.3 Contractor.

.2 Table 2 – Secondary: names, addresses, telephone numbers and name of responsible parties for:

.1 Sub-consultants, including field of expertise.

.2 Sub-contractors, including scope of work.

.4 Schedule of products indexed by specification section:

.1 Sub-divide each section with the following:

.1 Shop Drawings.

.2 Product Data/brochures.

.1 Supplement product data with typewritten text in format and style consistent with document.

.3 Permits, certificates, letters of assurance and other relevant documents issued by or required by authorities having jurisdiction.

.4 Test reports.

.5 Warranties.

.6 Manufacturer use, care and cleaning instructions.

.7 Training materials.

.7 Provide tabbed fly leaf for each separate Section, with typed description of Product and major component parts of equipment,

.8 Text: Manufacturer's printed data, or typewritten data, and

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

1.3 OPERATION AND MAINTENANCE MANUAL – GENERAL CONTENT

.1 Table of contents for each volume.

.2 Introductory information including:

.1 Date of manual submission.

.2 Complete contact information for Contract Administrator, subconsultants, other consultants, and Contractor, with names of responsible parties.

.3 Schedule of Products and systems indexed to content of volume.

.3 For each Product or system, include complete contact information for Subcontractors, Suppliers and manufacturers, including local sources for supplies and replacement parts.

.4 Product Data: mark each sheet to clearly identify specific products, options, and component parts, and data applicable to installation. Delete or strike out inapplicable information. Supplement with additional information as required.

.5 Reviewed Shop Drawings.

.6 Permits, certificates, letters of assurance and other relevant documents issued by or required by authorities having jurisdiction.

.7 Warranties.

.8 Operating and maintenance procedures, incorporating manufacturer's operating and maintenance instructions, in a logical sequence.

1.4 OPERATION AND MAINTENANCE MANUAL - WARRANTIES CONTENT

.1 Separate each warranty with index tab sheets keyed to table of contents listing.

.2 List each warrantor with complete contact information.

.3 Verify that documents are in proper form and contain full information. Ensure that warranties are for the correct duration and are in the City’s name.

1.5 SPARE PARTS, MAINTENANCE MATERIALS, AND SPECIAL TOOLS

.1 Supply spare parts, maintenance materials, and special tools in quantities specified in technical Specifications sections.

.2 Ensure spare parts and maintenance materials are new, not damaged nor defective, and of same quality, manufacturer, and batch or production run as installed Products.

.3 Provide tags for special tools identifying their function and associated Product.

.4 Deliver to and store items at a location directed by the Contract Administrator at place of the Work. Store in original packaging with manufacturer’s labels intact and in a manner to prevent damage or deterioration.

.5 Catalogue all items and submit to Contract Administrator an inventory listing organized by Specifications section. Include Contract Administrator reviewed inventory listing in operation and maintenance manual.

1.6 AS-BUILT DRAWINGS

.1 Mark-up drawings and label as “As-Built” drawings in accordance with Section 01 32 00 – Construction Progress Documentation.

.2 Scan marked-up “As-Built” drawings and submit in electronic PDF format to the Contract Administrator:

.1 In accordance with Section D.

.2 Contract administration: contractadmin@crosierkilgour.com.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Methods and procedures for deconstruction of structures and parts of structures.

1.2 REFERENCES

.1 Reference Standards:

.1 Manitoba Regulation 217/2006, Workplace Safety and Health Regulation.

1.3 MEASUREMENT PROCEDURE

.1 No measurement will be made for demolition of items to facilitate Work identified as a lump sum price component.

.2 Include demolition costs for demolition required to facilitate Work identified as a unit price component under the appropriate unit price.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Train workers and subcontractors to carry out work in accordance with appropriate deconstruction techniques.

.2 Project supervisor to have previous deconstruction experience and must be present on site throughout project.

1.5 SITE CONDITIONS

.1 Hazardous Materials:

.1 Should material resembling asbestos or other hazardous material be encountered, stop work, take preventative measures, and notify the Contract Administrator immediately.

.1 Do not proceed until written instructions have been received from the Contract Administrator.

.2 Notify the Contract Administrator before disrupting building access or services.

.2 Existing Conditions:

.1 Ensure that materials, equipment and procedures safely supporting existing structure and construction live loads; that allow work to be accomplished and that minimize risk of damage to historic and archaeological elements.

.2 Protect entrance and egresses to the building.

.3 Vehicle and barrier free access to the building entrances and exits must be maintained at all times during the course of the work.

.4 The City must be given a minimum seven days advance notice prior to commencement of repairs.

.3 Protection:

.1 Protect existing structures and services designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of the Contract Administrator and at no cost to the City.

.2 In all circumstances ensure that demolition work does not adversely affect adjacent areas and operations below Work Area.

.3 Do not dispose of waste of volatile materials such as, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm

or sanitary sewers. Ensure proper disposal procedures are maintained throughout the project.

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

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

.6 Prevent movement, settlement or damage of adjacent structures, services. Provide bracing, shoring. Repair damage caused by deconstruction.

.7 Support affected structures and, if safety of structure being deconstructed and adjacent structures appears to be endangered, take preventative measures. Cease operations and immediately notify the Contract Administrator.

.8 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems.

Part 2 Products

2.1 EQUIPMENT

.1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.

.2 Where possible use water efficient wetting equipment/attachments when minimizing dust.

.3 Protect existing items designated to remain and materials designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of the Contract Administrator and at no cost to the City.

.4 Demonstrate that tools are being used in manner which allows for salvage of materials in best condition possible.

.5 Locate and protect any utility lines which may be affected by the work and if necessary, notify utility companies before starting demolition.

.6 The parking deck has a structural live load capacity of 50 pounds per square foot; thus, equipment and stockpiling of material must not exceed this limit.

Part 3 Execution

3.1 EXAMINATION

.1 Before starting work, verify existing conditions and variations. Notify the Contract Administrator of discrepancies.

.2 Conduct inspection with the Contract Administrator to determine extent of concrete repair areas.

3.2 PREPARATION

.1 Remove items adjacent to area of demolition to provide clear workspace. Store in area designated by the Contract Administrator.

.2 Take pre-demolition photographs of Work Area prior to demolition.

3.3 DISASSEMBLY

.1 Conduct demolition to minimize interference with adjacent building areas.

.2 Maintain protected, wheelchair accessible egress and access at all times to the building entrance.

.3 Remove debris created by the execution of the Work progressively from the site to appropriate disposal grounds. Do not damage adjacent finishes or surfaces.

.4 Do not disturb adjacent items designated to remain in place.

.5 Salvage Materials:

.1 Carefully remove and store reusable site materials.

.2 Dismantle items containing materials for salvage.

.3 Stockpile salvaged materials at locations as approved by the Contract Administrator.

.6 Deconstruct in accordance with Manitoba Regulation 217/2006 and other applicable safety standards.

3.4 REMOVAL FROM SITE

.1 Transport material designated for disposal to approved facilities in accordance with applicable regulations.

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

3.5 CLEANING AND RESTORATION

.1 Keep site clean and organized throughout deconstruction.

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

.3 Upon completion of project, reinstate parking surfaces, walkways, affected by Work to condition which existed prior to beginning of Work and match condition of adjacent, undisturbed areas.

.4 In addition to the progressive removal of waste materials and debris from building and site, leave the site clean, perform the following before final inspection by the Contract Administrator.

.1 Spray-wash all exterior building finishes in construction area and any adjacent building areas soiled by the construction processes.

.2 Broom clean and wash exterior walks, steps and platforms soiled from delivery or removal materials.

.3 Remove all dirt and other disfigurations from exterior surfaces.

.4 Sweep clean all paved areas.

END OF SECTION

PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of Parts D and E and the General Conditions of the Contract.

.2 Related work specified elsewhere:

Section 02 83 10	Lead Abatement – Type 1 (Low Risk) Precautions
Section 02 83 11	Lead Abatement – Type 2 (Moderate Risk) Precautions
Section 02 84 00	Non-Liquid Polychlorinated Biphenyl Abatement
Section 02 85 11	Silica – Type 2 (Moderate Risk) Precautions

.3 Site Conditions identifies all known hazardous building materials within the Project Area.

.1 The specification fulfils the requirements of Part 36 of Manitoba Workplace Safety and Health Regulation 217/2006.

.4 The Outline of Work identifies the location, condition and quantities of hazardous building materials to be removed as part of this project.

.1 It is the intent that work prescribed this Section will result in the removal of all hazardous materials as outlined and the decontamination of all surfaces or materials which may have been or become contaminated by hazardous materials either during or prior to work of this Contract.

1.2 Site Conditions

.1 Refer to Part E for the report entitled "*Hazardous Building Materials Assessment, Pan Am Pool, 25 Poseidon Bay, Winnipeg, Manitoba*", dated December 12, 2026, prepared by Pinchin Ltd., file number 234838.667 for the locations of identified hazardous materials.

.2 General Building Conditions

.1 Heat and smoke detectors to remain live throughout work.

.2 Sprinklers to remain live throughout work.

.3 Steam and condensate pipes to remain live throughout work.

.4 Fan unit motors will remain active.

1.3 Outline of Work

.1 Coordinate the following items with the Contract Administrator, including but not limited to electrical isolations, GFI connection, water connections, HVAC and exhaust ventilation system isolation, bin placement, schedule, disconnects, etc.

.2 Refer to the Drawings for the extent of construction work and the Work Areas.

.3 Remove and dispose of the following materials as clean waste prior to hazardous materials abatement work without disturbing asbestos-containing materials:

.1 Millwork and cabinets.

.2 Doors and door hardware.

.4 Using procedures prescribed in the Section identified in Related Work, remove and dispose of the following.

.1 Removal of PCB containing grey caulking on floor expansion joints in the Pool Deck. The expansion joint extends along the entire joint, from the deck, into the tank along the tank walls and tank floor.

.2 Removal of lead-containing paints present on walls and floors located in the Basement Tank Exterior Area and Air Supply Room to facilitate Work of this Contract.

.3 Crystalline silica as a constituent of ceramic tiles, grout, mortar and concrete throughout the extent of construction areas.

.5 Refer to Specification Sections identified in the Related Work for specified personnel protective measures for the safe handling, removal, clean-up, enclosure, or repair of hazardous materials in each phase or work area.

.6 Protect surfaces, building fabrics and items remaining within the Abatement Work Area.

.7 Refer to applicable section to isolate the Abatement Work Area from adjoining Occupied and Non-Occupied Areas.

.8 Maintain emergency and fire exits from Abatement Work Area, or establish alternative exits satisfactory to Provincial Fire Marshall and local authorities having jurisdiction. Maintain extra routes from occupied areas. Place emergency exit signs at locations to clearly mark exit route. Seal emergency exit doors so as not to impede use of door during emergency evacuation.

.9 Perform selective demolition of mechanical and electrical equipment, building components, materials and items scheduled for demolition at locations required to facilitate hazardous building materials removal. Refer to Contract Documents for responsibility of demolition work and disposal.

.10 Remove and dispose of as appropriate waste, building components, materials and items contaminated by hazardous materials that cannot be effectively cleaned.

.11 Encapsulate remaining hazardous materials at locations where removal is deemed impractical by the Abatement Consultant.

.12 Final clean work area to remove visible signs of hazardous materials, other debris and settled dust.

.13 Unless otherwise specified, the handling, removal, clean-up or repair of hazardous materials or surfaces contaminated with hazardous materials is to be performed following wet removal techniques.

1.4 Schedule

.1 Provide necessary manpower, supervision, equipment and materials to maintain and complete the project on schedule.

.2 Work Hours:

.1 Coordinate all work, scheduling and phasing with the Contract Administrator.

.2 NOTE: Duration for which HVAC systems may remain shutdown to accommodate quiet hours work will vary in accordance with outside weather conditions and internal demand. Duration of quiet hours work will have to be scheduled accordingly with the Contract Administrator and in consultation with the Abatement Consultant.

.3 Provide 48 hours written notice to the Contract Administrator and Abatement Consultant of any request to work outside normal working hours. Obtain written approval before proceeding.

1.5 Definitions

.1 Abatement Consultant: Representative providing site reviews and air monitoring on behalf of City of Winnipeg.

.2 Abatement Contractor: Contractor or sub-contractor performing work of this section.

.3 Abatement Work Area: Area where work takes place which will, or may, disturb hazardous materials.

.4 Amended Water: Water with wetting agent added for the purpose of reducing surface tension to allow thorough wetting of materials.

.5 Authorized Visitors: Contract Administrator, Abatement Consultant, or designated representative, and persons representing regulatory agencies.

.6 Competent: means possessing knowledge, experience and training to perform a specific duty.

.7 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with applicable regulations and guidelines, and has knowledge of the potential or actual danger to health and safety in the work.

.8 Contaminated Waste: Material identified under Site Conditions, including fallen material, settled dust, other debris and materials or equipment deemed to be contaminated by the Abatement Consultant.

.9 Curtained Doorway: Doorway consisting of two (2) overlapping flaps of rip-proof polyethylene arranged to permit ingress and egress from one room to another while permitting minimal air movement between rooms.

.10 DOP Test: A testing method used to determine the integrity of the Negative Pressure unit or vacuum using a Dispersed Oil Particulate (DOP) or Poly Alpha Olefin (PAO) HEPA filter leak test. This test is to be conducted on site where units are to be installed. In accordance with the Environmental Abatement Council of Ontario (EACO) DOP/PAO Testing Guideline or ANSI/ASME N510-2007.

.11 HEPA Filter: High Efficiency Particulate Aerosol filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.

.12 Lead-Containing: Paints containing lead at a concentration of 0.009% (90 ppm) or greater.

.13 Lead Waste: Waste generated from removal of lead-containing materials, or the substrate and paint finish where left intact.

.14 Milestone Site Reviews: Review of the Abatement Work Area at a defined point in the abatement operation.

.15 Negative Pressure: A reduced pressure within the Abatement Work Area (> 0.02 inches of water column) established by extracting air directly from Abatement Work Area and discharging it to exterior of building.

.16 Occupied Area: Any area of the building or adjoining space outside the Abatement Work Area.

.17 Personnel: All Contractor's employees, sub-contractor's employees, supervisors.

.18 PCBs: Monochlorinated or Polychlorinated Biphenyls (or any mixture of both).

.19 PCB Material: means solid material containing PCBs at a concentration of more than fifty milligrams per kilogram (mg/kg) or 50 parts per million (ppm), or liquid with greater than 2 mg/kg or ppm.

.20 PCB Waste: PCB Equipment, PCB Material, PCB Liquids and materials or items contaminated with PCBs.

.21 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to the City).

1.6 Regulations and Guidelines

.1 Comply with Federal, Provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications, the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed.

.2 Where regulations are not present, follow accepted industry standards and applicable Guideline documents.

.3 Regulations and Guidelines include but are not limited to the following:

.1 Workplace Safety and Health Act W210.

.2 Workplace Safety and Health Regulation M.R. 217/2006

.3 The Dangerous Goods Handling and Transportation Act C.C.S.M c. D12.

.4 Hazardous Waste Regulation, M.R. 195/2015.

.5 Dangerous Goods Handling and Transportation Regulation, M.R. 55/2003.

.6 Transportation of Dangerous Goods Regulation (SOR 219/2019-101).

.7 PCB Regulations, SOR 2008-273.

.8 PCB Storage Site Regulation M.R. 474/88.

1.7 Quality Assurance

.1 Abatement contractor, workers and supervisors to comply with qualification requirements specified on Part D and Section 01 40 00 – Quality Requirements.

.2 Removal and handling of hazardous materials is to be performed by persons trained in the methods, procedures and industry practices for Abatement.

.3 Ensure work proceeds to schedule, meeting all requirements of this Specification.

.4 Complete work so that at no time airborne dust, visible debris, or water runoff contaminate areas outside the Abatement Work Area.

.5 Any contamination of surrounding area (indicated by visual review or air monitoring) shall necessitate the clean-up of affected area, and in the same manner applicable to an Abatement Work Area at no change in Contract price or time.

.6 All work of this Section involving electrical, mechanical, carpentry, glazing, etc., shall be performed by licensed persons experienced and qualified for the work required.

1.8 Supervision

.1 Provide on site for each work shift, a Shift Superintendent(s), who has authority regarding all aspects related to manpower, equipment and production.

.2 At all times during work, the Shift Superintendent(s) must be on site. Failure to comply with this requirement will result in a stoppage of all work, at no cost to the City.

.3 Replace supervisory personnel, with approved replacements, within three (3) working days of a written request from the City. The City reserves the right to request replacement of supervisory personnel without explanation.

.4 Do not replace supervisory personnel without written approval from the City.

1.9 Notification

.1 Notify Sanitary Landfill site as per local requirements.

.2 Inform all trades on site of the presence and location of hazardous materials identified in the Contract documents.

.3 Notify the Contract Administrator and Abatement Consultant, if suspected hazardous materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.

1.10 Submittals

.1 Submit in accordance with Section 01 33 00 Submittal Procedures prior to starting work:

.1 Provincial Regulator Notice of Project form.

.2 Copy of Certificate of Approval for disposal of hazardous materials waste and location of landfill.

.3 Pre-removal damage survey of the Abatement Work Area(s), waste transport routes, and bin storage areas.

.2 Submit the following information regarding personnel prior to starting work in accordance with Section 01 33 00 Submittal Procedures:

.1 Resumes of the supervisory personnel.

.2 Written statement that personnel have had instruction on hazards of exposure to hazardous materials identified within this scope, the use of respirator, protective clothing, worker and waste decontamination procedures, and all aspects of work procedures and protective measures.

.3 Proof of training for the following site specific hazards or conditions identified:

.1 Working at Heights
.2 Elevated Work Platform.
.3 Confined Space.

.4 Written statement that personnel have had instruction on hazards of exposure to hazardous materials identified within this scope, the use of respirator, protective clothing, worker and waste decontamination procedures, and all aspects of work procedures and protective measures.

.5 WHMIS training certificates for all personnel.

.6 Certificate proving that each worker on site has been fit tested in accordance with the CSA Standard Z94.4-11, for the respirator appropriate for the work being performed.

.7 Proof, satisfactory to the Abatement Consultant, that all persons involved in the transport and disposal of hazardous materials have been trained in accordance with the requirements of Federal and Provincial Transportation of Dangerous Good Acts and Regulations.

.3 Submit the following information in accordance with Section 01 33 00 Submittal Procedures regarding HEPA filtered devices prior to construction of enclosure or abatement:

.1 Performance data on HEPA filtered vacuums including DOP tests no more than 3 months old.

.2 Performance data on negative air units including DOP tests which must be no more than 3 months old if the unit is vented outdoors or which must be performed on site immediately prior to initial usage and when HEPA filters are changed if the unit is vented indoors.

.3 DOP tests to be performed by an independent testing company.

.1 DOP testing company is required to submit a detailed technical report of testing protocol, including Introduction, Methodology, Results (i.e. Air-Aerosol Mixing Uniformity test as per ASME N510-2007), Conclusions, and Recommendations.

.2 DOP testing company must also provide calibration certificates from an independent calibration firm or from the manufacturer of the testing equipment for both the aerosol photometer and the pressure gauge on the aerosol generator dated within 1 calendar year from the on-site testing date.

.3 DOP testing company must also provide the National Sanitation Foundation (NSF) certification name and number of the on-site technician performing the testing.

.4 Proof of calibration of DOP testing equipment.

.4 Submit the following prior to isolating the work area in accordance with Section 01 33 00 Submittal Procedures:

.1 Safety Data Sheets for chemicals or material used in the course of the Abatement Work of the Project.

.5 Submit the following upon completion of the work as part of the Operation and Maintenance Manual in accordance with Section 01 8 00 Closeout Submittals.

.1 Manifests, waybills, bills of ladings etc. as applicable for each type of waste.

1.11 Site Review

.1 From commencement of work until completion of clean-up operations, the Abatement Consultant is empowered by the City of Winipeg to inspect for compliance with the requirements of governing authorities, adherence to specified procedures and materials, and to inspect for final cleanliness and completion.

.2 Unless otherwise specified, costs for site reviews by the Abatement Consultant will be paid by the City and are not to be included in the General Contractor contract price.

.3 The Abatement Consultant is empowered by the City of Winipeg to order a shutdown of work when leakage of hazardous materials from the controlled work area has occurred or is likely to occur.

.4 Any deviation from the requirements of the Specifications or governing authorities that is not approved in writing may result in a stoppage of work, at no change in Contract Price or time.

.5 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no change in Contract Price or time.

.6 Site reviews performed as a result of Contractor's failure to perform satisfactorily regarding quality, safety, or schedule, shall be back-charged to the Contractor.

.7 Facilitate site reviews and provide access as necessary. Make good work disturbed by site reviews and testing at no change in Contract Price or time.

.8 Refer to the Sections identified in Related Work for specified milestone site reviews which are to take place at defined points throughout the abatement operation specific to each phase or work area.

.9 Provide 24 hours written notice to the Contract Administrator and Abatement Consultant of any request for scheduling of milestone site reviews or transportation of waste through Occupied Areas.

.10 The following Milestone Site Reviews may take place, at the City of Winnipeg's cost, as outlined in each related specification section OR which will be confirmed at the initial start-up meeting:

.1 Milestone Site Review - Clean Site Preparation

.1 Review of preparations and set-up prior to contaminated work in the Abatement Work Area.

.2 Milestone Site Review - Visual Clearance

.1 Review of Abatement Work Area after completion of all abatement, but prior to application of lock-down agents or dismantling of enclosure.

.11 Refer to the Sections identified in Related Work for specified milestone site reviews which are to take place at defined points throughout the abatement operation specific to each phase or work area.

.12 Do not proceed with next phase of work until written approval of each milestone is received from the Abatement Consultant.

1.12 Worker Protection

.1 Instruct workers before allowing entry to the Abatement Work Area. Instruction shall include training in use of respirators, dress, showering, entry and exiting from an Abatement Work Area, and all other aspects of work procedures and protective measures.

.2 Workers shall not eat, drink, chew gum or tobacco, or smoke in the Abatement Work Area.

.3 Workers shall be fully protected at all times when possibility of disturbance of hazardous materials exists.

.4 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Abatement Work Area.

.5 Respiratory Protection

.1 Refer to each particular Section of the Specification for specified type of respiratory equipment specific to each phase or work area.

.2 Respirators shall be:

.1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Provincial regulator.

.2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Abatement Work Area has facial hair which affects the seal between respirator and face.

.3 Assigned to a worker for their exclusive use.
.4 Maintained in accordance with manufacturer's specifications.
.5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.
.6 Repaired or have damaged or deteriorated parts replaced.
.7 Stored in a clean and sanitary location.
.8 Provided with new filters as necessary, according to manufacturer's instructions.
.9 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing.
.10 Instruction on proper use of respirators must be provided by a competent person as defined by the Manitoba Regulation 217/2006 Section 6.15(2).

.3 Provide protective clothing, to all personnel which:

.1 Is made of a material that does not readily retain nor permit penetration of lead/silica dust.
.2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.
.3 Once coveralls are worn, treat and dispose of as contaminated waste.
.4 Is replaced or repaired if torn or ripped.

.4 Use hard hats, safety footwear and other protective equipment and apparel required by applicable construction safety regulations.

1.13 Visitor Protection

.1 Provide clean protective clothing and equipment to Authorized Visitors.

.2 Instruct Authorized Visitors in the use of protective clothing and Abatement Work Area entry and exit procedures.

.3 Authorized visitors are required to be fit tested on respirators, prior to entering Abatement Work Area.

1.14 Signage

.1 Lead Abatement Signs: Post signs at access points to the Lead Abatement Work Area, stating at minimum, the following:

.1 There is a lead dust, fume or mist hazard.

.2 Access to the work area is restricted to authorized persons.

.3 Respirators must be worn in the work area.

.2 Silica Warning Signs: Post signs at access points to the Silica Abatement Work Area, stating at minimum, the following:

.1 There is a silica dust hazard.

.2 Access to the work area is restricted to authorized persons.

.3 Respirators must be worn in the work area.

.3 PCB Abatement Signs: Post signs at access points to the PCB Abatement Work Area, stating at minimum, the following:

.1 Access to the work area is restricted to authorized persons.

.4 Place placards in accordance with Transportation of Dangerous Goods Act.

1.15 Differential Pressure Monitoring

.1 Provide and install differential pressure monitors as specified in each section.

.2 Replace damaged or non-functional equipment at the request of the Abatement Consultant.

.3 Record at minimum twice daily, and when damage to the enclosure is identified and repaired, the following information:

.1 Name of inspector.
.2 Date and time.
.3 Pressure reading.
.4 Repairs completed, if applicable.

.4 Maintain specified differential pressure.

.5 Stop contaminated work and take corrective action if pressure differential drops below the specified level. Notify the Contractor Administrator and Abatement Consultant immediately.

1.16 Waste and Material Handling

.1 Waste bins must be placed on grade or in receiving.

.2 All bins for hazardous materials must be covered and locked when waste transfer is not being performed.

.3 Ensure redundant non-asbestos, rubble, debris, etc. removed during contaminated work are treated, packaged, transported and disposed of as appropriate waste.

.4 Clean and wash metal waste prior to removal from Abatement Work Area. Recycle metals.

.5 Clean and wash non-porous materials prior to disposal as clean waste. Obtain prior written approval from the Abatement Consultant for each individual type of material.

.6 Clean and wash equipment prior to removal from Abatement Work Area if removed prior to completion.

.7 Place all equipment, tools and unused materials that cannot be cleaned in Abatement Waste Containers.

.8 As work progresses, and at regular intervals, transport the sealed and labelled waste containers from the Abatement Work Area to waste bin.

.9 Place items in bins according to waste classification. Place lead waste, PCB waste, metals, non-asbestos waste, etc. in separate bins.

.10 Removal of waste containers and decontaminated tools and materials from the Abatement Work Area shall be performed as follows:

.1 Remove any visible contamination from the surface of non-porous or cleanable waste being removed from the Abatement Work Area. If the item can be cleaned, remove it from the site as clean waste.

.2 Place waste or item in Waste Container and seal closed.

.3 Wet wipe outside of Waste Container.

.4 Remove waste containers and transport to appropriate bin.

.11 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Contract Administrator. Use a closed, covered cart to transport through Occupied Areas.

.12 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled material in the case of a rupture of a Waste Container.

.13 Pick-up and drop off of garbage bin shall be at pre-approved times and must not interfere with the facility operations.

.14 Transport hazardous waste to landfill or waste transfer station in accordance with provincial requirements.

.15 Cooperate with inspectors from the provincial regulator and immediately carry out instructions for remedial work at dump to maintain environment, at no change in Contract Price or time.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

.1 Refer to the Sections identified in Related Work for specified materials, equipment or facilities specific to each phase or work area.

.2 Materials and equipment must be in good condition and free of debris and fibrous materials. Disposable items must be of new materials only.

.3 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.

.4 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of materials.

.5 Differential Pressure Monitor: a high precision instrument for measuring and controlling pressure differences in the low range, between the Abatement Work Area and Occupied Area. Calibrate regularly to manufacturer’s instructions.

.6 Discharge Ducting: Polyethylene Tubing. Reinforced with wire. Diameter to equal negative pressure machine discharge. Not to be longer than required, or so long that negative pressure is compromised.

.7 Ground Fault Panel: Electrical panel as follows:

.1 Ground fault circuit interrupters of sufficient capacity to power temporary electrical equipment and lights in Abatement Work Area.

.2 Interrupters to have a 5 mA ground fault protection.

.3 Necessary accessories including main switch disconnect, ground fault interrupter lights, test switch to ensure unit is working, and reset switch.

.4 Openings sealed to prevent moisture or dust penetration.

.5 Inspected by the Electrical Safety Authority.

.6 Panel uses CSA approved parts and been constructed, inspected and installed by a licensed electrician.

.7 Provide one Ground Fault Panel for each 5,000 square feet (500 square metres) of Abatement Work Area.

.8 HEPA Filtered Negative Pressure Machine: Portable air handling system which extracts air directly from the Abatement Work Area and discharges the air to the exterior of the building. Equipped as follows:

.1 Prefilter and HEPA filter. Air must pass HEPA filter before discharge.

.2 Pressure differential gauge to monitor filter loading.

.3 Auto shut off and warning system for HEPA filter failure.

.4 Separate hold down clamps to retain HEPA filter in place during change of prefilter.

.9 HEPA Vacuum: Vacuum with necessary fittings, tools and attachments. Discharged air must pass through a HEPA filter.

.10 Hose: Leak-proof, minimum busting strength of 500 PSI or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.

.11 Lead Waste Container: An impermeable container acceptable to disposal site and provincial regulator, that is:

.1 Dust tight.

.2 Suitable for the type of waste.

.3 Evaluated for leachable lead content and disposed of in accordance with applicable regulations.

.1 Where lead waste exceeds 5.0 mg/L of lead in the TCLP analysis, label as lead waste and dispose of as leachate toxic hazardous waste.

.2 Where lead waste is below 5.0 mg/L of lead in the TCLP analysis, disposed of as construction waste.

.12 PCB Waste Drums: An impermeable container acceptable to disposal site and provincial regulator, that is:

.1 Containment Drums: new, not used double bung 45 gallon No. 16 gauge cold rolled steel drums with removable steel lid, PCB resistant gasket (nitrile rubber, cork or Teflon), and 12 gauge compression type ring closure with 5/8" bolt and forged lug. Drums shall be newly painted inside and out with bright white rust-resistant enamel. Metal pail of 16 gauge steel with removal steel lid, are also acceptable for smaller quantities of waste

.2 Drum liners: clear polyethylene bag, 36" x 60", 6 mil thick. Open one 36" end.

.3 Label: appropriate PCB Labels and Placards of sufficient size to be clearly legible, for display on waste containers (bags, boxes, rolloffs or drums) which will be used to contain or transport PCB contaminated material, in accordance with TDG regulations.

.13 OSB: Oriented Strand Board.

.14 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.

.15 Protective Clothing: Disposable coveralls complete with head covering and full body covering that fits snugly at the ankles, wrists and neck.

.16 Rip-Proof Polyethylene Sheeting: 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and two (2) layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps.

.17 Shower Hose: Water lines for supply of hot & cold water to shower facilities to be rated for use at 200 PSI (1380 kPa) or twice the working pressure whichever is greater. Supply lines to be continuous and free of fittings, joints or couplings.

.18 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.

.19 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.

.20 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

PART 3 EXECUTION

.1 Refer to the Sections identified in Related Work for specified procedures for work area preparation, maintenance, site dismantlement, application of lock-down agent and all other procedures for the safe handling, removal and clean-up of hazardous materials specific to each phase or work area.

END OF SECTION

PART 1 GENERAL

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of Division 1, Parts D and E and the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 Refer to Drawings prepared by the City of Winnipeg, Project No. 2024 0660 dated 2025.0214 for the extent of the work and demolition Areas.

.3 Isolate the Lead Work Area from adjoining spaces through the installation of temporary barriers and partitions, hoardings, seals and enclosures at the perimeter of each phase or work area as specified herein.

.4 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of lead-containing materials following Type 1 (Low Risk) procedures, and City of Winnipeg specific requirements.

.5 Comply with requirements of this Section when removing grey lead-containing coating present on the through-wall light fixture frames in the basement area prior to the demolition and disposal of the frames:

.1 Removal of lead-containing paint with a chemical gel, stripper or paste.

.2 Removal of materials coating with lead-containing paints, using non-powered hand tools, where the materials remains primarily intact, and is not crumbled, pulverized or powdered.

.3 Removal of lead-containing surface coatings with a heat gun or torching using a HEPA filtered smoke collection system collection system.

.4 Welding, burning or torch cutting surfaces from which lead-containing coatings have been removed.

1.3 Instruction and Training

.1 Provide instruction and training to all workers including the following:

.1 Hazards of lead.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section including decontamination of the worker.

.5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

.1 Provide, if requested by personnel, non-powered half-face respirators with high efficiency (HEPA) cartridge filters. Respirators are not mandatory for Type 1 (Low Risk) work.

.2 Provide protective clothing, when requested by personnel, entering the Abatement Work Area, including:

.1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

.3 Provide protective clothing, to all personnel entering the Abatement Work Area, including:

.1 Dust impermeable gloves appropriate for the work being completed.

.4 Provide facilities for washing of hands and face to the personnel which shall be used by every worker when leaving the abatement work area. Lead-specific soaps and hygiene indicators are recommended to be provided for hand-wash stations.

1.5 Site Reviews

.1 Refer to Part 1.11 Site Reviews in Section 02 81 00 – General Provisions.

.2 The following Milestone Site Reviews are to be scheduled:

.1 Milestone Reviews - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation - General

.1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.

.1 Workers are to use washing facilities each time leaving the Abatement Work Area.

.2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.

.3 Shut down HVAC systems serving the Abatement Work Area.

.4 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.5 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

.6 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.

.1 Ensure safe installation of electrical lines and equipment.

.7 Do not use compressed air to clean or remove dust or debris.

.8 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.9 Frequently and at regular intervals, place all waste in waste containers.

.10 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.2 Site Preparation – No Enclosure Required

.1 Isolate Abatement Work Area with barrier tape.

.2 Protect floor surfaces covered from wall to wall with polyethylene sheets.

3.3 Maintenance of Abatement Work Area

.1 Maintain Abatement Work Area in tidy condition.

.2 Remove waste and debris frequently.

.3 Remove standing water on polyethylene/floor at the end of every shift.

.4 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.4 Lead-Containing Paint Abatement

.1 Removal methods minimizing dust generation should be used wherever possible.

.1 Wet methods are to be used to reduce dust generation.

.2 Wetting agents should be used where possible.

.3 Wet method should not be used if it creates a hazard or cause damage to equipment or to project.

.2 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.

.3 Waste water from cleaning or removal operations must be contained, for treatment or disposal.

.4 Remove lead based paint in small sections and pack as it is being removed in sealable lead waste containers.

.5 Follow manufacturer’s instructions for all use of chemical gels, strippers and pastes.

.1 Ensure agent neutralizers, where required, are applied.

.6 After completion of stripping work, use a hand tool (e.g. wire brush) and wet sponge the surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.

.7 After wire brushing and wet sponging to remove visible lead based paint, wet clean entire work area, and equipment used in process.

.1 Compressed air or dry sweeping should not be used to clean up lead-containing dust or waste.

.2 Ensure all waste is cleaned and packaged as lead waste.

.8 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside.

3.5 Bulk Lead Removal

.1 Lead-containing batteries should be removed and recycled in an appropriate recycling program.

3.6 Waste Management and Disposal

.1 Per Section 02 81 00.

3.7 Abatement Work Area Dismantling

.1 Schedule and obtain written approval of Milestone Site Review – Visual Clearance before proceeding

.2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.

.3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.

.4 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

END OF SECTION

.1 General

.2 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of Division 1 and the General Conditions of the Contract.

.3 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 Refer to Drawings prepared by the City of Winnipeg, Project No. 2024 0660 dated 2025.0214 for the extent of the work and demolition areas.

.3 Isolate the Abatement Work Area from adjoining spaces through the installation of temporary barriers and partitions, hoardings, seals and enclosures at the perimeter of each phase or work area as specified herein.

.4 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of lead-containing materials following Class 2 or Moderate Risk procedures, and City of Winnipeg specific requirements.

.5 Comply with requirements of this Section when removing beige lead-containing paint present on concrete walls and grey lead-containing paint on floors in the basement area to accommodate concrete repairs:

.1 Removal of lead containing paint using power tools with an effective dust collection system equipped with HEPA filter.

.2 Removal of lead-containing surface coatings or materials by scraping or sanding (including wet sanding) using non-powered hand tools.

1.3 Instruction and Training

.1 Provide instruction and training to all workers including the following:

.1 Hazards of lead.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section including decontamination of the worker.

.5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

.1 Provide the following respiratory protection to all personnel, at minimum:

.1 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.

.2 Provide protective clothing, to all personnel entering the Abatement Work Area, including:

.1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

.3 Provide facilities for washing of hands and face to the personnel which shall be used by every worker when leaving the abatement work area. Lead-specific soaps and hygiene indicators are recommended to be provided for shower and hand-wash stations.

1.5 Site Reviews

.1 Refer to Part 1.11 Site Review in Section 02 81 00 – General Provisions.

.2 The following Milestone Site Reviews are to be scheduled:

.1 Milestone Site Reviews - Clean Site Preparation

.2 Milestone Site Reviews - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Section 02 81 00.

2.2 Hoarding Walls

.1 Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.

2.3 Transfer Room

.1 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.

.2 Install walls as follows:

.1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.

.2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.

.3 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire Transfer Room.

.4 Install one layer rip-proof polyethylene sheeting over roof.

.5 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.

.6 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

.1 Construct as follows:

.1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.

.2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.

.3 Install weights attached to bottom edge of each door flap.

.4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

.1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.

.1 Workers are to use washing facilities each time leaving the Abatement Work Area.

.2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.

.3 Shut down HVAC systems serving the Abatement Work Area.

.4 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.5 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

.6 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.

.1 Ensure safe installation of electrical lines and equipment.

.7 Do not use compressed air to clean or remove dust or debris.

.8 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.9 Frequently and at regular intervals, place all waste in waste containers.

.10 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.2 Site Preparation –Enclosure Required

.1 Install Transfer Room where duration of work is to last longer than one 8 hour shift.

.2 Install Curtained Doorways.

.3 Install polyethylene sheeting at openings in walls (as required) and seal.

.4 Seal openings in floor using tape, caulking, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.

.5 Install polyethylene sheeting on floors of Abatement Work Area. Use sufficient layers to provide adequate protection for carpeting and equipment.

.1 Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.

.6 Install 6 mil polyethylene sheeting on walls to remain, within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.

.7 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged.

.8 Place required tools to complete the abatement with the Abatement Work Area.

.9 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.10 Establish negative pressure in Abatement Work Areas as follows:

.1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.

.2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.

.3 Operate HEPA filtered negative pressure machines continuously from first disturbance of lead containing material until completion of dismantling.

.4 Replace prefilters to maintain specified flow rate.

.5 Replace HEPA filter as required to maintain flow rate and integrity of unit.

.6 Discharge HEPA filtered negative air machines to building exterior, where possible.

.1 Direct discharge away from building access points.

.11 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of lead hazard and lead hazard where appropriate.

.12 Schedule and obtain written approval of Milestone Site Review - Clean Site Preparation before proceeding.

3.3 Site Preparation – No Enclosure Required

.1 Cover materials to remain in the Abatement Work Area with polyethylene sheeting before disturbing lead containing materials to control the spread of dust.

.2 Install caution tape around work area where existing walls are not present.

.3 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.4 Place HEPA vacuum in Abatement Work Area.

.5 Place required tools to complete the abatement with the Abatement Work Area.

.6 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of a lead dust hazard.

.7 Schedule and obtain written approval of Milestone Site Review - Clean Site Preparation before proceeding.

3.4 Maintenance of Abatement Work Area

.1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.

.3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Site Reviews must be performed by competent person.

.4 Maintain Abatement Work Area in tidy condition.

.5 Remove standing water on polyethylene/floor at the end of every shift.

.6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Lead-Containing Paint Abatement

.1 Use the procedures described above under *Site Preparation – Enclosure Required*.

.1 Removal of lead-containing paints present on concrete walls and floors in the basement area by scraping or sanding (including wet sanding) using non-powered hand tools.

.2 Wet methods are to be used to reduce dust generation.

.2 Use the procedures described above under *Site Preparation – No Enclosure Required*.

.1 Removal of lead containing paints using power tools with an effective dust collection system equipped with HEPA filter.

.3 Provide washing facilities consisting of a wash basin, clean water, soap and towels.

.1 Workers are to use washing facilities each time leaving the Abatement Work Area.

.4 Removal methods minimizing dust generation should be used wherever possible.

.1 Wet methods are to be used to reduce dust generation.

.1 Wetting agents should be used where possible.

.2 Wet method should not be used if it creates a hazard or cause damage to equipment or to project.

.5 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.

.6 Waste water from cleaning or removal operations must be contained, for treatment or disposal.

.7 Remove lead based paint in small sections and pack as it is being removed in sealable waste containers.

.8 Waste generated should be maintained wet until cleaned and packaged.

.9 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.

.10 After wire brushing and wet sponging to remove visible lead based paint, wet clean entire work area, and equipment used in process.

.1 Compressed air or dry sweeping should not be used to clean up lead-containing dust or waste.

.2 Ensure all waste is cleaned and packaged.

.11 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.

.12 Schedule and obtain written approval of Milestone Site Review – Visual Clearance before proceeding

3.6 Waste Management and Disposal

.1 Per Section 02 81 00.

3.7 Final Cleaning

.1 Remove polyethylene sheet by rolling it away from walls to centre of work area. Clean visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.

.2 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and seal. Dispose of in accordance with waste materials generated.

.3 Clean Work areas and Transfer Room, where present.

.4 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.

.5 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

END OF SECTION

PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of Division 1 and the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Unless otherwise shown or specified it is the intent that work performed per this section will result in the removal and destruction of:

.1 PCB-containing grey caulking present on control joints on the ceramic floor along with the first row of ceramic tiles and mortar bed substrate on either side of the caulking.

.2 All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent shall apply.

1.3 Quality Assurance

.1 Ensure the removal and handling of PCBs is performed by persons experienced in the methods, procedures and industry practices.

.2 Complete work so that at no time do PCBs contaminate the building or environment.

1.4 Instruction and Training

.1 Instruction and training must be provided to all workers and supervisors. Instruction and training include the following:

.1 Hazards of PCBs.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section.

.2 Instruction and training must be provided by a competent, qualified person.

1.5 Personal Protection

.1 Workers handling PCB-containing materials are advised to avoid skin and eye contact.

.2 During removal of PCBs, personnel are to wear personal protective equipment appropriate to the task.

.3 During removal of PCB caulking, personnel are to wear, at minimum:

.1 Provide workers, at a minimum, with non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.

.2 Provide workers, with protective eye wear.

.3 Provide protective clothing, to all personnel entering the Abatement Work Area.

.4 Provide disposable gloves (nitrile), to all personnel entering the Abatement Work Area.

1.6 Site Review

.1 Refer to Part 1.11 Site Reviews in Section 02 81 00 – General Provisions.

.2 The following Milestone Site Review are to be scheduled:

.1 Milestone Site Review - Clean Site Preparation

.2 Milestone Site Review - Visual Clearance

PART 2 PRODUCTS

2.1 Materials

.1 Containment Drums: new, not used double bung 45 gallon No. 16 gauge cold rolled steel drums with removable steel lid, PCB resistant gasket (nitrile rubber, cork or Teflon), and 12 gauge compression type ring closure with 5/8" bolt and forged lug. Drums shall be newly painted inside and out with bright white rust-resistant enamel. Metal pail of 16 gauge steel with removal steel lid, are also acceptable for smaller quantities of waste.

.2 Decontamination Area: An established area for the purpose of decontaminating personnel and equipment.

.1 Of sufficient size to accommodate cleaning of equipment and removing personal protective equipment.

.2 Install PCB warning signs / tape at the entrance to the decontamination area.

.3 The floor shall be covered with polyethylene sheeting.

.4 Include a hand washing station complete with soap and towels and 6 mil polyethylene bags for disposal of PCB-contaminated items such as gloves, disposable suits, rags etc.

.5 All personnel must enter and exit the Abatement Work Area through the decontamination area.

.6 All equipment and surfaces of waste containers must be cleaned prior to removing them from the decontamination room or area.

.7 Work clothing must be cleaned with a HEPA vacuum before it is removed.

.3 Drum liners: clear polyethylene bag, 36" x 60", 6 mil thick. Open one 36" end.

.4 Label: appropriate PCB Labels and Placards of sufficient size to be clearly legible, for display on waste containers (bags, boxes, rolloffs or drums) which will be used to contain or transport PCB contaminated material, in accordance with TDG regulations.

.5 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints. New materials only.

PART 3 EXECUTION

3.1 General

.1 Do not contaminate building surfaces with PCBs.

.2 Should visible PCB debris be observed outside the Work Area, immediately stop Work notify the Contract Administrator and Abatement Consultant; institute emergency procedures as directed. All costs incurred in decontaminating such non-Work Areas and the contents thereof shall be borne by the Contractor, at no change in Contract price or time.

.3 Notify Contract Administrator and Abatement Consultant of any spills immediately.

.1 Any spills of PCBs are to be cleaned to the satisfaction of the Abatement Consultant at the contractor's cost. This includes removal and replacement of building materials as required.

.4 Conduct PCB removal operations in a matter that fully protects Contractor's and Subcontractor's employees, the general public, other building occupants and the environment from exposure to PCB.

.5 Non-PCB items remaining such as windows, doors, masonry, and all other building construction and components from which PCB materials are removed shall be decontaminated by physical or chemical means such that no visible residue remains. The removal of the PCB materials may require the use of scrapers, solvents, mastic removal chemicals, or other methods/procedures to ensure complete removal.

.6 Use hand tools that generate the least amount of dust and will still complete the PCB caulk removal.

.1 Grinding electromechanical tools (e.g. angle grinders, masonry groove cutters, circular saws, and slot mills, etc.) are not allowed.

3.2 Work Area Preparation - Interior Removal

.1 Isolate all HVAC equipment, including installing polyethylene sheeting on all air returns and exhausts. Turn off all HVAC systems serving work area when feasible.

.2 All floor areas adjacent to the work area shall have a layer of polyethylene sheeting, attached to the interior wall and laid down on the surfaces below the abatement work area, at least 5 feet wide or to the furthest point of gravity fall for dislodged debris by methods used, whichever is further.

.3 All movable objects shall be removed from the immediate work area. All non-movable objects shall be covered with one layer of polyethylene sheeting and sealed at the edges.

.4 Preparation and removal should be in conjunction with Section 02 85 11 -Silica Type 2 (Moderate Risk) Precautions

.5 Schedule and obtain written approval of Milestone Site Review – Clean Site Preparation before proceeding contaminated work.

3.3 Equipment and Area Decontamination

.1 When removal of PCB materials is completed, the decontamination process shall consist of HEPA vacuuming, wet wiping/mopping and a repeated HEPA vacuuming of the entire work area. All surfaces in and around the work area must be free of dust generated during the work.

.2 Decontaminate all tools and equipment before removal from the work area.

.3 If dust or debris has migrated to areas of the building other than the immediate work area, those areas shall be incorporated into the work area and thoroughly decontaminated to ensure all visible dust generated by the activity is eliminated.

.4 Uncontaminated dust barriers and other protective sheeting shall be placed in disposable construction bags and disposed of as normal trash.

.5 Visually inspect the area for any remaining dust or debris. HEPA vacuum and wet wipe until space is clean. Dispose of vacuum contents as PCB waste.

.6 Schedule and obtain written approval of Milestone Site Review – Visual Clearance upon completion of PCB removal.

.7 Failure of any visual review by the Abatement Consultant, the Contractor will clean the affected areas at no change in Contract price or time.

3.4 Transportation and Reporting

.1 All waste containers shall be fully enclosed and lockable (i.e. enclosed dumpster, trailer, etc.).

.1 While on-site, the container shall be labelled with PCB Warning Labels and as required by Federal and Provincial regulations.

.2 All waste generated as part of the PCB project shall be removed from the site within ten (10) calendar days after successful completion of all PCB abatement work.

.3 The Hauler, with the Abatement Contractor and the Abatement Consultant, shall inspect the transport container prior to the Hauler taking possession and signing the Hazardous Waste Manifests.

.4 A Hazardous Waste Manifest shall be utilized solely as the waste Manifest for transportation. A hauler billing form or bill of lading may be used if the hauler needs an independent record but shall not be used as a shipping document.

.1 The Manifest shall be completed by the Abatement Contractor and verified by the Consultant that all the information and amounts are accurate and the proper signatures are in place.

.2 The Manifest shall have the appropriate signatures of the City of Winnipeg (the Generator) and the Hauler representative prior to any waste being removed from the site.

.3 Upon arrival at the Disposal Site, the Manifest shall be signed by the Disposal Facility operator to certify receipt of PCB materials covered by the manifest.

.4 The Disposal Facility operator shall return the original Manifest to the City's Representative (the Generator) as required by the Environment and Climate Change Canada.

.5 Provide a copy of the completed waste manifest proving receipt of the PCB waste by the Disposal Facility.

.5 Transport materials following Transportation of Dangerous Goods Act.

.1 Transport PCBs to approved incineration site for destruction and ensure materials are destroyed.

.6 The facility used to process the PCBs shall be approved by the Environment and Climate Change Canada and shall have valid Certificates of Approval to carry out the work outlined herein.

.1 The facility must issue a Certificate of Destruction identifying types and quantities of PCBs generated from the project.

END OF SECTION

PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of Division 1 and the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 Read this section in conjunction with Section 02 84 00 - Non-Liquid Polychlorinated Biphenyl Abatement.

.3 Refer to Drawings prepared by the City of Winnipeg, Project No. 2024 0660 dated 2025.0214 for the extent of the work and demolition areas.

.4 Isolate the Silica Work Area from adjoining spaces through the installation of temporary barriers and partitions, hoardings, seals and enclosures at the perimeter of each phase or work area as specified herein.

.5 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of silica-containing materials following Type 2 (Moderate Risk procedures), and City of Winnipeg specific requirements.

.6 Comply with requirements of this Section when performing following Work:

.1 Use of power tool to remove ceramic tiles and mortar bed present in the Main Tank Area.

.2 Use of power tool to remove concrete to facilitate concrete repairs in the Main Tank and Basement Area.

.3 Sandblasting of concrete surfaces during concrete repairs and prior to application of new mortar bed.

1.3 Instruction and Training

.1 Provide instruction and training to all workers including the following:

.1 Hazards of silica.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section including decontamination of the worker.

.5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

.1 Provide the following respiratory protection to all personnel, at minimum:

.1 Non-powered full-face respirators with P100 high efficiency (HEPA) cartridge filters.

.2 Use Type CE abrasive-blast supplied air respirator operated in positive pressure mode with a tight-fitting half-mask face piece, or full-face piece supplied-air respirator operated in pressure demand or other positive pressure mode, for abrasive blasting.

.2 Provide protective clothing, to all personnel entering the Abatement Work Area, including:

.1 Disposable protective clothing that does not readily retain dust or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

1.5 Site Reviews

.1 Refer to Part 1.11 Site Review in Section 02 81 00 – General Provisions.

.2 The following Milestone Site Reviews are to be scheduled:

.1 Milestone Site Reviews - Clean Site Preparation

.2 Milestone Site Reviews - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Part 2 Section 02 81 00 – General Provisions for related materials and equipment.

.2 Refer to Section 1.12 Worker Protection Section 02 81 00 – General Provisions for wash station requirements.

2.2 Hoarding Walls

.1 Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, framing or other suitable methods.

2.3 Transfer Room

.1 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.

.2 Install walls as follows:

.1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.

.2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.

.3 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire Transfer Room.

.4 Install one layer rip-proof polyethylene sheeting over roof.

.5 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.

.6 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

.1 Construct as follows:

.1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.

.2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.

.3 Install weights attached to bottom edge of each door flap.

.4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

.1 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.

.2 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.3 Provide amended water for wetting, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

.4 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.

.1 Ensure safe installation of electrical lines and equipment.

.5 Do not use compressed air to clean or remove dust or debris.

.6 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

.1 Remove standing water on polyethylene/floor at the end of every shift.

.2 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.2 Site Preparation

.1 Install Curtained Doorways.

.2 Install polyethylene sheeting at openings in walls (as required) and seal.

.3 Seal openings in floor using tape, caulking, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.

.4 Install 6 mil polyethylene sheeting on walls to remain, within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.

.5 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged.

.6 Place required tools to complete the abatement within the Abatement Work Area.

.7 Establish negative pressure in Abatement Work Areas as follows:

.1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.

.2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.

.3 Operate HEPA filtered negative pressure machines continuously from first disturbance of silica until completion of dismantling.

.4 Replace prefilters to maintain specified flow rate.

.5 Replace HEPA filter as required to maintain flow rate and integrity of unit.

.6 Discharge HEPA filtered negative air machines to building exterior, where possible.

.1 Direct discharge away from building access points.

.8 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of a silica dust hazard.

.9 Schedule and obtain written approval of Milestone Site Reviews - Clean Site Preparation before proceeding.

3.3 Maintenance of Abatement Work Area

.1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.

.3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. The inspection must be performed by the shift superintendent.

3.4 Silica Handling

.1 Construct an enclosure around Abatement Work Area and use the procedures described above under *Site Preparation –Enclosure Required*.

.2 Provide washing facilities consisting of a wash basin, clean water, soap and towels.

.1 Workers are to use washing facilities each time leaving the Abatement Work Area.

.3 Removal methods minimizing dust generation should be used wherever possible.

.1 Wet methods are to be used to reduce dust generation.

.1 Wetting agents should be used where possible.

.2 Wet methods should not be used if it creates a hazard or cause damage to equipment or to project.

.2 Power tools to be equipped with a shroud, and to be kept flush with surface.

.4 Waste generated should be maintained wet until cleaned.

.5 Remove visible dust and debris from Abatement Work Area using HEPA vacuums or wet cleaning methods.

.6 Proceed with the dismantlement of all barricades, etc. following receipt of authorization to proceed from the Abatement Consultant.

.7 Schedule and obtain written approval of Milestone Site Reviews – Visual Clearance before proceeding.

3.5 Abatement Work Area Dismantling

.1 Do not commence site dismantlement until authorized by the Abatement Consultant.

.2 Wash or HEPA vacuum equipment and tools prior to being removed from Abatement Work Area.

.3 Remove polyethylene sheet by rolling it away from walls to centre of work area. Clean visible dust and debris observed during cleanup, immediately, using HEPA vacuums or wet cleaning methods.

.4 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and seal. Dispose of in accordance with waste materials generated.

.5 Clean Work areas and Transfer Room, where present.

.6 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.

.7 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

- .1 CSA-A23.1-09/A23.2-19, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-O86S1-19 Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
- .3 CSA O121-17, Douglas Fir Plywood.
- .4 CSA O153-13, Poplar Plywood.
- .5 CSA O437 Series-93, Standards for OSB and Waferboard.
- .6 CSA S269.1-16, Falsework for Construction Purposes.
- .7 CAN/CSA-S269.3-M92, Concrete Formwork, National Standard of Canada.

1.2 MEASUREMENT PROCEDURES

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

Part 2 Products

2.1 MATERIALS

.1 Formwork materials:

- .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121, CAN/CSA-O86, CSA O437 Series, and CSA-O153.
- .2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.

.2 Form ties:

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

.3 Form release agent: non-toxic, biodegradable, low VOC.

.4 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene.

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

Part 3 Execution

3.1 FABRICATION AND ERECTION

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

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

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

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

.5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.

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

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

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

.9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.

.1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

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

3.2 REMOVAL AND RESHORING

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

.1 Structural slab repairs: Three (3) days or the time it takes to reach 70% of the 28 day design strength, whichever is greater.

.2 Through-slab repairs: Three (3) days or the time it takes to reach 70% of the 28 day design strength, whichever is greater.

.3 Vertical grouting repairs: Three (3) or the time it takes to reach 20 MPa, whichever is greater.

.4 Vertical Form and Pour repairs: Three (3) or the time it takes to reach 20 MPa, whichever is greater.

.5 Miscellaneous curbs, pads, etc.: One (1) day.]

.2 Remove formwork when concrete has reached 70% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.

.3 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

.4 Space reshoring in each principal direction at not more than 3000 mm apart.

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

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Concrete reinforcing and dowels to complete concrete repairs as shown on Drawings and as supplemental to that shown on Drawings as directed by the Contract Administrator under Unit Price components.

1.2 REFERENCES

.1 ASTM International

.1 ASTM A1064/A1064M-24, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 ASTM A143/A143M-07 (2020), Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

.3 ASTM A775/A775M-22, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

.2 CSA International

.1 CSA-A23.1-19/A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A23.3-19, Design of Concrete Structures.

.3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.4 CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.5 CAN/CSA-G164-18 (R2023), Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CSA W186-21, Welding of Reinforcing Bars in Reinforced Concrete Construction.

.3 Reinforcing Steel Institute of Canada (RSIC)

.4 RSIC-2020, Reinforcing Steel Manual of Standard Practice.

1.3 MEASUREMENT PROCEDURES

.1 No measurements for reinforcing steel will be made for concrete reinforcing and dowel installation identified as stipulated price work on Drawings. Include reinforcing steel costs in the lump sum price components of the work to which they correspond.

.2 No measurements for reinforcing steel will be made for concrete reinforcing and dowel installation identified as unit price work on Drawings. Include reinforcing steel costs shown on unit price repair details in the unit price repair type to which they correspond.

.3 Where the Contract Administrator directs supplemental reinforcing in addition to that shown on Drawings, the supplemental reinforcing unit price will apply in accordance with Section 01 22 00 – Unit Prices.

.4 Where the Contract Administrator directs supplemental reinforcing in addition to that shown on Drawings, the supplemental dowels unit price will apply in accordance with Section 01 22 00 – Unit Prices.

1.4 SUBMITTALS

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

.2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba.

.1 Indicate placing of reinforcement and:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by the Contract Administrator, with identifying code marks to permit correct placement without reference to structural drawings.

.5 Indicate sizes, spacings and locations of chairs, spacers and hangers.

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

Part 2 Products

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by the Contract Administrator.

.2 Reinforcing steel: All reinforcing steel to be CAN/CSA-G30.18M grade 400R deformed bars except column ties and beam stirrups which shall be grade 400W.

.3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.

.4 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.

.5 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M.

.6 Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m².

.1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.

.2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.

.1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.

.3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.

.1 In this case, no restriction applies to temperature of solution.

.1 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2. All accessories to be non-corroding.

.2 Mechanical splices: subject to approval of the Contract Administrator.

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

.4 Dowel adhesive: Acceptable products:

.1 Hilti HIT HY-200 by Hilti Canada.

.2 Sikadur AnchorFix 3001 by Sika Canada Inc.

2.2 FABRICATION

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

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

.3 Upon approval of the Contract Administrator, weld reinforcement in accordance with CSA W186.

2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide the Contract Administrator with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.

.2 Upon request inform the Contract Administrator of proposed source of material to be supplied.

Part 3 Execution

3.1 PREPARATION

.1 Galvanizing to include chromate treatment.

.1 Duration of treatment to be 1 hour per 25 mm of bar diameter.

.2 Upon request, conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.2 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by the Contract Administrator.

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

.3 Replace bars, which develop cracks or splits.

3.3 PLACING REINFORCEMENT

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

.2 Prior to placing concrete, obtain the Contract Administrator's approval of reinforcing material and placement.

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

3.4 DOWELING PROCEDURES

.1 For bars that are indicated as being dowelled, drill in and grout bars into slab as follows:

.1 10M bars, 150 mm.

.2 15M bars, 200 mm.

.3 20M bars, 300 mm.

.2 Use only approved adhesive to manufacturer's instructions.

.3 Clean hole thoroughly prior to application of adhesive. Use injection or caulking gun to ensure that the adhesive fills the bottom of the hole prior to embedment of bar.

3.5 FIELD TOUCH-UP

.1 Touch up damaged and cut ends of galvanized reinforcing steel with compatible finish to provide continuous coating.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section covers the removal of deteriorated concrete and surface preparation for the repair of deteriorated concrete resulting from reinforcing steel corrosion and is applicable to horizontal, vertical, and overhead repairs. Work in this Section includes:

.1 Removal geometry and configuration.
.2 Removal process.
.3 Edge preparation.
.4 Reinforcement repair.
.5 Surface preparation of the removal cavity prior to placing a repair material.

1.2 RELATED SECTIONS

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

.2 Section 03 20 00 – Concrete Reinforcing.

.3 Section 03 92 12 – Top Surface Repairs with Rapid Setting Mortar

.4 Section 03 92 20 – Scaling Repairs

.5 Section 03 93 10 – Hand Patching

.6 Section 03 93 20 – Pressure Grouting

.7 Section 03 93 30 – Form and Pour

1.3 MEASUREMENT PROCEDURES

.1 No measurement of surface preparation of concrete delamination repair will be made for lump sum identified concrete repairs. Include costs for surface preparation in the appropriate lump sum concrete repair work.

.2 Concrete areas of repair as unit price repair will be identified and quantified in accordance with Section 01 22 00 – Unit Prices.

.3 Refer to applicable Sections for measurement procedures for each type of repair.

.4 Concrete direct pull-out tensile testing will be measured and handled as a cash allowance as specified in Part E.

.5 Scanning of concrete for reinforcing steel to accommodate concrete testing will be measured and handled as a cash allowance as specified in Part E.

1.4 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA- A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
.2 CSA A283-19, Qualification Code for Concrete Testing Laboratories.

.2 International Concrete Repair Institute (ICRI)

.1 ICRI Guideline No. 310.2R–2013, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

1.5 DEFINITIONS

.1 Delamination: A separation along a plane parallel to a surface as in the separation of a coating from a substrate or the layers of a coating from each other, or in the case of a concrete slab, a horizontal splitting, cracking, or separation of a slab in a plane roughly parallel to, and generally near, the upper surface.

.2 Laitance: A weak layer of cement and aggregate fines on a concrete surface that is usually caused by an overwet mixture, overworking the mixture or excessive finishing, underwater concrete placement, or combinations thereof.

.3 Sounding: A technique to evaluate the condition of hardened concrete by striking the surface with a hammer; sound concrete will exhibit a clear ringing sound, whereas dull or hollow sounds indicate delaminated areas.

.4 Spall: A fragment, usually in the shape of a flake, detached from a larger mass by a blow, by the action of weather, by pressure, or by expansion within the larger mass; a small spall involves a roughly circular depression not greater than 120 mm in depth and 150 mm in any dimension; a large spall, may be roughly circular or oval or in some cases elongated, is more than 20 mm in depth and 150 mm in greatest dimension

.5 Substrate: The layer immediately under a layer of different material to which it is typically bonded; an existing concrete surface that receives an overlay, partial-depth repair, protective coating, or some other maintenance or repair procedure.

.6 Surface Preparation: The process whereby a method or combination of methods is used to remove deteriorated or contaminated concrete and roughen and clean a substrate to enhance bond of a repair material or protective coating.

.7 Surface Profile: The topographic contour of the exposed surface of a material or substrate.

1.6 SUBMITTALS

.1 Qualification Statements:

.1 General:

.1 Submit the following information for each qualification statement project example:

.1 Name and location of project.

.2 Name and contact information for the:

.1 Building owner.

.2 Prime consultant.

.3 Name of prime contractor and site superintendent.

.4 Total contract value.

.5 Name of concrete restoration contractor and superintendent.

.6 Concrete restoration contract value.

.7 Date of construction.

.8 Description of prime project.

.9 Description of types of concrete restoration.

.2 Upon request by the Contract Administrator submit the following:

.1 Prime Contractor:

.1 Prime Contractor Qualification Statements:

.1 Minimum three project examples as prime contractor completed in the past five years demonstrating successful performance of the specified qualifications.

.2 Superintendent Qualification Statements:

.1 Minimum three project examples as a prime contractor site superintendent completed in the past five years demonstrating successful performance of the specified qualifications.

.2 Concrete Restoration Subcontractor:

.1 Concrete Restoration Subcontractor Qualification Statements:

.1 Minimum five examples of local projects as a concrete restoration subcontractor completed in the past three years demonstrating successful performance of the specified qualifications.

.2 Concrete Restoration Subcontractor Superintendent Qualification Statements:

.1 Minimum five examples of local projects as a concrete restoration subcontractor superintendent completed in the past three years demonstrating successful performance of the specified qualifications.

.3 Testing Agency:

.1 Certification confirming member in good standing with the Canadian Council of Independent Laboratories for the specified testing procedure(s).

1.7 QUALITY ASSURANCE

.1 Prime Contractor Qualifications:

.1 Prime Contractor:

.1 Engaged full time as a prime contractor with knowledge and experience in the risks, safety and environmental impacts involved in managing a concrete restoration subcontractor completing concrete restoration as required by these Contract Documents.

.2 Prime Contractor Superintendent:

.1 Experienced as a prime contractor site superintendent with knowledge and experience in the risks, safety and environmental impacts involved in supervising and coordinating a concrete restoration contractor completing concrete restoration as specified by these Contract Documents.

.2 Concrete Restoration Subcontractor Qualifications:

.1 Concrete Restoration Subcontractor:

.1 Engaged full time as a specialty concrete restoration subcontractor with knowledge and experience in the risks, technical, safety and environmental impacts involved in concrete restoration as required by these Contract Documents.

.2 Concrete Restoration Superintendent:

.1 Experienced as a specialty concrete restoration subcontractor site superintendent with knowledge and experience in the risks, technical, safety and environmental impacts involved in supervising and coordinating concrete restoration as specified by these contract documents.

.2 Successful completion of the Concrete Surface Repair Technician (CSRT) – Grade 1 Certification Program administered by the International Concrete Repair Institute (ICRI).

.3 Ensure all personnel involved with concrete restoration are adequately trained and familiar with the requirements of this and related concrete restoration sections.

.3 Testing agency Qualifications:

.1 Independent third party testing agency certified:

.1 In accordance with CSA A283, and

.2 By the Canadian Council of Independent Laboratories (CCIL) for the testing procedures specified in related concrete sections.

.4 Field Mock-ups:

.1 Complete a field mock-up for each type of repair. Locations to be site determined.

.2 Field mock-up shall be a minimum of $0.2m^2$ and incorporate all aspects of the concrete surface preparation described in this Section. Trial repairs areas shall be chosen to include exposure of embedded reinforcing steel.

.3 Field mock-up areas shall be used as a standard against which subsequent work shall be judged.

1.8 PRE-INSTALLATION CONFERENCE

.1 In accordance with Section 01 31 19 – Project Meetings.

.2 Convene pre-installation conference for concrete restoration as specified by the following sections:

.1 Section 03 10 00 – Concrete Forming and accessories.
.2 Section 03 20 00 – Concrete Reinforcing.
.3 Section 03 92 12 – Top Surface Repairs with Rapid Setting Mortar.
.4 Section 03 92 20 –Scaling Repairs.
.5 Section 03 93 10 – Hand Patching.
.6 Section 03 93 20 – Pressure Grouting.
.7 Section 03 93 30 – Form and Pour.
.8 Section 03 98 10 – Embedded Galvanic Anodes.

Part 2 Products

2.1 EQUIPMENT

.1 Electric or pneumatic chipping hammers are to be used for demolition within the following limits:

.1 Initial bulk removal of delaminated concrete above corroded reinforcing steel: maximum 14 kg electric or pneumatic chipping hammers.

.2 Final removal and undercutting of reinforcing steel: maximum 1kg electric chipping hammers.

.3 Bulk removal of full depth repairs: electric or pneumatic jack hammers with weight ratings above 14kg may be used upon approval by the Contract Administrator.

.4 Chisel-type blades are to be used for removal only. Do not use pointed chisels for removal.

.2 Sandblast equipment shall consist of:

.1 Air compressor of sufficient capacity to drive the equipment and blast media selected.

.2 Blast media hopper (meters the media into the air stream passing through the hose and nozzle).

.3 Moisture and oil separators to insure clean, dry air supply.

.4 Blast nozzle and hose.

.5 Materials. The blast medium consistent with equipment, site conditions, and capable of obtaining specified surface profile.

.3 High pressure waterblast: capable of maintaining a sustained pressure of not less than 27,600 Kpa (4,000 psi).

Part 3 Execution

3.1 EXAMINATION

.1 The location number and extent of unit price repairs shown on Drawings are indicative only. Repairs areas will be identified on-site by the Contract Administrator in the presence of and with the assistance of the Contractor. The approximately periphery of the repair will be marked on the surface of the member and the location and extent recorded on drawings.

.2 Right-angle geometry avoiding re-entrant corners and obtain uniformity of depth.

.3 Allow time in the Schedule for survey and inspection work carried out by the Contract Administrator ahead of repairs. Provide sufficient safe access to enable review of all areas designated for repairs.

.4 Make available as required throughout the Contract labour to carry out the following under the direction of the Contract Administrator:

.1 Identification of repairs.

.2 Sample chipping and/or drilling.

.3 Operators for access equipment.

.5 Make available as required throughout the Contract equipment for the use of the Contract Administrator:

.1 Marking paint and chalk.

.2 Hammer and chain for sounding surveys.

.3 Tape measure.

3.2 PREPARATION

.1 All necessary measures shall be taken to provide protection to the general public, occupants of the building.

.2 Remove or protect all surface attachments (e.g. signs, notices, electrical fittings) from the areas to be repaired or from positions that obstruct access or which may be damaged from Work.

.3 Carefully store items removed during the course of the works. Reinstall when restoration work is complete.

.4 The Contractor shall make good or rectify any damage caused as a result of insufficient protection.

.5 Provide temporary access required to facilitate Work.

.6 The perimeter of the through-slab must be adequately shored. The Contractor is responsible for confirmation of shoring requirements prior to commencement of, and during demolition.

.1 Costs of shoring to be included in the unit price.

3.3 CONCRETE DELAMINATION REMOVAL

.1 Refer Drawing details.

.2 Remove all loose and or delaminated concrete above corroded reinforcing steel.

.3 Do not operate hammers or mechanical chipping tools at an angle in excess of 45° measured from the surface of the slab.

.4 Use chipping to extend concrete removal along reinforcing bars and ensure bars are completely free of corrosion and well bonded to the surrounding concrete. Notify the Contract Administrator of increases in areas.

.5 Where the bond between existing concrete and reinforcing steel or mesh has been destroyed (either by the concrete's deterioration or corrosion of the reinforcing steel) or if the chipping operation has caused more than 1/3 the periphery of a bar to be exposed for a distance of 150 mm or more, the concrete adjacent to the bar shall be removed by maximum 7kg electric chipping hammers to provide sufficient clearance between the reinforcement and concrete.

.1 Provide a minimum 20 mm clearance, or 6 mm larger than the largest aggregate in the repair material, whichever is greater.

.6 If non-corroded reinforcing steel is exposed, do not damage the bar’s bond to the surrounding concrete. If bond between the bar and concrete is destroyed, exposing the bar will be required.

.7 The perimeter of the areas marked as delaminated are to be saw cut to a depth of 12 mm). Feather edging is not permitted. If reinforcing steel is encountered, the saw depth must be immediately reduced as required. Check depth of the cut regularly.

.8 Ensure sawcut encompasses the boundaries of corrosion that have been established.

.9 Ensure the entire area within the saw cut is removed to a depth consistent with the type of repair and repair material specified in other Sections.

.10 Chip patch edges to provide a clean vertical edge along the patch perimeter to the required minimum depth.

.11 Conduct soundings to determine if any further unsound or delaminated concrete is present, which must be removed.

.12 After all delaminated, unsound, or loose material is removed, the Contractor shall request an inspection from the Contract Administrator. This inspection is to be completed in the presence of the Contractor and if any further Work is required, the Contractor is to complete it immediately. The purpose of this inspection is to provide assurance to the Contract Administrator that all loose material has been removed and the substrate is sound.

3.4 SURFACE PREPARATION OF CONCRETE AND REINFORCING STEEL

.1 Refer to Drawing details.

.2 Within 24 hours prior to infilling, remove loose and deteriorated concrete, laitance, dust, dirt, oil, and any other material that could interfere with the bond of the new concrete from the substrate by combination of the following methods:

- .1 Wire brush and vacuum,
- .2 Sandblast,
- .3 High pressure waterblast at a minimum 4,000 psi.

.3 Provide a uniform surface profile of ICRI-CSP-5 or better unless otherwise indicated on Drawings. Sample surfaces are available for inspection in the Contract Administrator's office. These samples will be used as the standard of acceptance.

.4 Surface preparation applies equally to any horizontal or vertical concrete surfaces to which the concrete is to bond.

.5 Exposed reinforcing steel to be cleaned to near white metal and totally free of rust for the full circumference of the bar.

.6 Secure any reinforcement which is loose by tying to other secured bars or by other methods approved by the Contract Administrator.

.7 Vacuum clean surface and/or air blast with oil free compressed air to remove residue and spent media created by surface preparation.

.8 Maintain substrate in a clean condition using polyethylene film until the patch material is ready to be placed.

.9 After all surface preparation is complete the Contractor shall request an inspection from the Contract Administrator to review the existing reinforcing steel. The purpose of this inspection is to provide assurance that all heavy corrosion and scale is removed from the bar. At that time, the Contract Administrator will review the condition of the reinforcing steel and determine if the addition of supplemental reinforcing steel will be required. At locations identified by the Contract Administrator, provide supplemental reinforcing steel to Section 03 20 00.

.10 Upon direction by the Contract Administrator, final clean the concrete substrate by high pressure waterblast at minimum 4,000 psi to remove any residual dust and dirt.

.11 Maintain substrate in a saturated condition for a period of not less than 8 hours prior to infilling. Do not allow the concrete surface to dry. If the concrete surface becomes wet and subsequently dries, the surface preparation and cleaning procedure must be repeated.

3.5 FIELD QUALITY CONTROL

.1 Coordinate site work and inspections with the Contract Administrator. Provide minimum 24 hours notice prior to each phase of the work.

.2 The Contract Administrator inspection to be completed at the following times:

- .1 Prior to demolition to identify and quantify repair locations and types.
- .2 Following initial demolition to confirm all loose, deteriorated, or unsound concrete has been removed from the substrate.
- .3 Following concrete substrate preparation to review concrete surface profile and condition of reinforcing steel.

.3 Direct pull-out tensile tests:

.1 Direct pull-out tensile tests of the substrate will be completed in accordance with CSA-A23.2-6B, Procedure A.

.2 Costs for direct pull-out tensile tests as a cash allowance as specified in Part E.

.3 Testing agency conducting direct pull-out tensile tests to be certified for CSA A23.2-6B (Procedure A) by the Canadian Council of Independent Laboratories (CCIL).

.4 Coordinate testing throughout the course of the work but not less than the following:

.1 Prior to demolition:

.1 Minimum of three (3) direct tensile tests from each of the following locations within the extents of work area:

.1 Top surface,

.2 Under slab (soffit),

.3 Tank side of tank walls, and

.4 Crawlspace side of tank walls.

.2 The purpose of the testing is to provide an estimate of the insitu tensile strength of the concrete substrate.

.3 Test locations will be chosen by the Contract Administrator which will correspond to locations which appear sound as determined by hammer and chain drag soundings.

.2 After demolition:

.1 Minimum of three (3) direct tensile tests from each of the following locations within the extents of work area:

.1 Top surface,

.2 Under slab (soffit),

.3 Tank side of tank walls, and

.4 Crawlspace side of tank walls.

.2 Where possible, test locations will be completed within a 16,400mm radius of the pre-demolition samples for comparison. Otherwise, test locations will be chosen by the Contract Administrator.

.3 After infilling:

.1 Refer to associated technical sections of each type of repair for requirements for direct pull-out tensile testing after infilling of repair.

.5 Prior to coring for direct pull-out tensile testing, scan substrate to ensure existing reinforcing will not be severed by the testing procedure.

.1 Contractor will be responsible for the following where existing reinforcing is severed by the test procedure at no additional cost to the City:

.1 Design repair and re-establishment of reinforcing procedure by a professional engineer licenced in the Province of Manitoba.

.2 Repair and re-establishment of reinforcing in accordance with the repair procedure.

.3 Submit repair procedure to the Contract Administrator for review prior to repair work proceeding.

.6 The tensile strength after completion of the surface preparation must be within 70% of the tests prior to demolition but not less than 1.0 MPa.

.7 The Contract Administrator reserves the right to take additional tests if concrete substrate is suspect.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 The top surface of slabs exhibiting extensive spalling and/or delamination are to be repaired by mechanical removal of the deteriorated concrete and infilling with a rapid-setting mortar.

.2 All spalling and/or delaminated concrete must be removed down to sound concrete in accordance with Section 03 91 10.

1.2 RELATED SECTIONS

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

.2 Section 03 20 00 – Concrete Reinforcing.

.3 Section 03 91 10 – Surface Preparation of Concrete Delamination Repair.

.4 Section 03 93 10 – Hand Patching.

.5 Section 03 98 10 – Embedded Galvanic Anodes.

.6 Section 09 30 13 – Ceramic Tiling.

.7 Section 22 05 00 – Common Work Results for Plumbing.

.8 Section 26 05 26 – Grounding and Bonding.

1.3 MEASUREMENT PROCEDURES

.1 No measurements will be conducted for top surface concrete repairs shown on Drawings as Stipulated Price work. Include concrete restoration costs in the lump sum price component of the work to which they correspond.

.2 Top surface and through slab repairs identified as a unit price, will be measured and handled in accordance with Section 01 22 00 – Unit Prices.

.3 Concrete testing will be measured and handled as a cash allowance as specified in Part E.

.4 Concrete direct pull-out tensile testing will be measured and handled as a cash allowance as specified in Part E.

.5 Scanning of concrete for reinforcing steel to accommodate concrete testing will be measured and handled as a cash allowance as specified in Part E.

1.4 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA- A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM C39/C39M-24, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

.2 ASTM C109/C109M-23, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. (50-mm) Cube Specimens).

.3 ASTM C191-21, Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle.

.4 ASTM C309-19, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.5 ASTM C496/C496M-17, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.

.6 ASTM C666/C666M-15, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.

.7 ASTM C672/C672M-12, Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.

.8 ASTM C928/C928M-20a, Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs.

.9 ASTM C1202-22e1, Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration.

1.5 QUALITY ASSURANCE

.1 Qualifications: In accordance with Section 03 91 10 – Surface Preparation of Concrete Delamination Repair.

.2 Field Mock-up:

.1 Install field mock-up at Project site or pre-selected area of building or location approved by the Contract Administrator. Install material in accordance with this Section.

.2 Field mock-up will be standard for judging workmanship on remainder of Project.

.3 Manufacturer's representative or designated representative will review technical aspects; surface preparation, repair, and workmanship.

1.6 PRE-INSTALLATION CONFERENCE

.1 In accordance with Section 01 31 19 – Project Meetings.

.2 Convene and coordinate pre-installation conference for concrete restoration including the following sections:

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

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

.3 Section 03 20 00 – Concrete Reinforcing.

.4 Section 03 98 10 – Embedded Galvanic Anodes.

.5 Section 09 30 13 – Ceramic Tiling.

.6 Section 22 05 00 – Common Work Results for Plumbing.

.7 Section 26 05 26 – Grounding and Bonding.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Comply with Section 01 61 00.

.2 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.3 Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures.

.4 Keep materials in manufacturer's original, unopened containers and packaging until installation.

.5 Protect materials during storage, handling, and application to prevent contamination or damage.

1.8 PROJECT CONDITIONS

.1 Environmental Requirements:

.1 Ensure that substrate surface and ambient air temperature are minimum of 4°C and rising at application time and remain above 4°C for at least 24 hours after application. Ensure that frost or frozen surfaces are thawed and dry.

.2 Ensure that substrate surface and ambient air temperature are below of 32°C and remain below 32°C for at least 8 hours after application.

.3 Do not apply material if snow, rain, fog, and mist are anticipated within 12 hours after application. Allow surfaces to attain temperature and conditions specified before proceeding with application.

Part 2 Products

2.1 MATERIALS

.1 Rapid Setting Repair Mortar: One-component, shrinkage-compensated, cement-based mortar with extended working time for repairing horizontal concrete surfaces.

.1 Provide mortar material complying with the following requirements:

.1 Compliance: ASTM C928.

.2 Compressive Strength, ASTM C109, 2-inch (51-mm) cubes:

.1 3 Hours: 3,000 psi (21 MPa).

.2 1 Day: 6,000 psi (41 MPa).

.3 28 Days: 8,000 psi (55 MPa).

.3 Compressive Strength, ASTM C39, 3-inch by 6-inch (76-mm by 152-mm) cylinders:

.1 28 Days: 7,400 psi (51 MPa).

.4 Set Time, ASTM C191, 72 degrees F (22 degrees C):

.1 Initial: 50 minutes.

.2 Final: 80 minutes.

.5 Splitting Tensile Strength, ASTM C496:

.1 1 Day: 400 psi (3 MPa).

.2 28 Days: 450 psi (3 MPa).

.6 Freeze-Thaw Resistance, ASTM C666, Procedure A, at 300 cycles:

.1 100 percent relative dynamic modulus.

.7 Scaling Resistance, ASTM C672, at 25 cycles:

.1 Zero rating; no scaling.

.8 Length Change, ASTM C928:

.1 Drying Shrinkage: Minus 0.05 percent.

.2 Wetting Expansion: Plus 0.03 percent.

.9 Rapid Chloride Permeability, ASTM C1202:

.1 Less than 300 Coulombs.

.10 Coefficient of Thermal Expansion, CRD C39:

.1 6.8 x 10^{-6} in/in/degree F (12.6 x 10^{-6} cm/cm/degree C).

.2 Acceptable Product:

.1 MasterEmaco T 1061 by Sika.

2.2 ACCESSORIES

.1 Aggregate Extension: extend mortar material with washed, graded, 3/8 inch (10 mm), low-absorption, saturated surface-dry aggregate at mortar manufacturers recommended rates.

.1 For repair areas 50 – 100 mm in depth, the minimum recommended addition is 6.8 – 11.4 kg of 10 mm washed, graded, rounded, SSD, low-absorption, high-density aggregate per 22.7 kg bag.

.2 For areas greater than 100 mm in depth, the minimum recommended addition is 11.4 – 22.7 kg of 10 mm washed, graded, rounded, SSD, low-absorption, high-density aggregate per 22.7 kg bag.

.3 The maximum aggregate extension is 22.7 kg of pea gravel per bag.

.2 Evaporation retardant: Acceptable Product:

.1 Sikagard ER50 by Sika (formerly MasterKure ER 50 by BASF Building Systems) at an application rate in accordance with manufacturer's written directions.

.3 Cure and sealing compound: to ASTM C309, Type 1.

.1 Acceptable product(s):

.1 Florseal WB by Sika Canada Inc. at an application rate in accordance with manufacturer's written directions.

Part 3 Execution

3.1 PREPARATION

.1 Protection: Protect adjacent Work areas and finish surfaces from damage during repair mortar application.

.2 Coordinate with the following sections for incorporating surface mounted fixtures and anchors, waterproofing, plumbing, grounding, and galvanic anode installation into the repair as shown on Drawings:

.1 Section 03 98 10 – Embedded Galvanic Anodes.

.2 Section 09 30 13 – Ceramic Tiling.

.3 Section 22 05 00 – Common Work Results for Plumbing.

.4 Section 26 05 26 – Grounding and Bonding.

.3 Surface Preparation:

.1 Complete concrete delamination repairs to 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

.4 The repair area must be thoroughly cleaned and well soaked prior to infilling. The surface should be thoroughly wetted for a period of not less than two (2) hours. The repair areas shall be kept continuously wet until just before infilling. Any standing water must be removed prior to grouting.

.5 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.6 Obtain the Contract Administrator's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

.7 Through slab repair forming:

.1 Provide formwork in accordance with Section 03 10 00 – Concrete Forming and Accessories to match existing profiles.

.2 Design and install formwork and shoring to accommodate the mass and pressure of the repair material.

.3 Securely anchor formwork to substrate. Size and space anchors to prevent deflection of the forms placement and curing.

.4 Construct forms to fit tightly against existing concrete surfaces. Seal around edge of formwork with sealant to prevent leakage during grouting.

.5 Anchors:

.1 Completely removable,

.2 Patch anchor holes with grout mixed to dry pack consistency, and

.3 Completely fill all anchor holes.

.6 A minimum of 30mm concrete cover over the primary reinforcing steel will be required, thus, an adjustment of the formwork such as a notch may be required to ensure sufficient cover.

.7 Provide drainage outlets in formwork for presoaking and, if beneath a soffit, provide air venting. Provide suitable access points to pour mixed repair mortar into place.

.8 Use form-release agent to facilitate removal of forms from cast material.

.9 Within two (2) hours immediately prior to placement of repair material, test formwork to determine watertightness. Completely fill formwork with clean water and let stand for not less than 15 minutes. Seal areas of leakage prior to placement of repair material. Re-test as required.

3.2 INFILLING PROCEDURES

.1 Obtain Contract Administrator's approval before placing repair material. Provide minimum 24 hours notice.

.2 Maintain the substrate in a saturated surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.3 Mixing of rapid-setting horizontal extended mortar:

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

.2 Ensure repair mortar is thoroughly mixed.

.3 Do not use free-fall mixers.

.4 Never mix partial bags.

.4 Bonding Slurry Application:

.1 Apply the bonding slurry consisting of neat rapid-setting mortar to a saturated surface dry (SSD) substrate with no standing water and dry to the touch. A SSD substrate typically exhibits a colour change of dark grey to light grey. Remove standing water by vacuuming.

.2 Scrub plastic slurry into substrate with stiff bristled broom or brush to produce a uniform thickness of 3mm over entire area.

.3 Place repair material while the bonding slurry is still plastic. Do not apply more slurry than can be covered with concrete before it dries. Do not retemper. If the bond slurry dries prior to placement of the concrete, removal of the dried slurry

will be required. The concrete substrate will then be cleaned and prepared in accordance with the requirements described in the previous sections.

.5 Immediately place repair material, into the prepared patch area from one side to the other. Work the repair material firmly into the bottom and sides of the patch, and underneath reinforcing steel, to assure good bond.

.6 Ensure that rate of placing is sufficient to complete proposed placing, finishing and curing operations within scheduled time. Limit batch sizes as required if placing procedures are slower than anticipated.

.7 Continuously consolidate and finish to matching elevations, ensuring patch thickness and required elevations are maintained.

.8 Ensure reinforcement, floor drains, inserts, etc. are not disturbed during concrete placement.

3.3 FINISHING

.1 Following consolidation and screeding, the surface shall be immediately bull-floated to close and smooth the surface.

.2 Apply evaporation retardant at manufacturers recommended coverage rate immediately following final finishing. Do not apply evaporation retardant during any finishing operation nor should it be worked into the surface.

.3 Protect freshly placed concrete from exposure to dust, debris and precipitation.

3.4 CURING

.1 Concrete repairs to be cured for a minimum of 3 days at 10°C.

.2 Immediately after final finishing, apply evaporation retardant to prevent drying shrinkage until the concrete has enough strength to support the placement of the wet burlap.

.3 Burlap to be thoroughly presoaked by immersing it in water for a period of at least 24 hours immediately prior to placement.

.4 Commence wet curing as soon as the surface will support the weight of the wetted burlap without deformation. Burlap to be applied in one layer with strips overlapping at least 75mm and be securely held in place without marring the concrete surface.

.5 Wet curing with burlap and water must be maintained throughout entire curing period.

.6 Workers shall not be allowed on the overlay for 12 hours after placement. Do not place load upon new concrete until curing period is over.

3.5 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Contract Administrator in accordance with CSA-A23.1 and Section 01 40 00 - Quality Requirements and as described herein.

.2 The Contractor will pay for costs of tests as a cash allowance as specified in Part E.

.3 Inspection or testing by the Contract Administrator will not augment or replace Contractor quality control nor relieve contractual responsibility.

.4 Flowable Grout Properties Testing:

.1 In accordance with CSA-A23.2-1B.

.2 Costs for tests as a unit price in accordance with Section 01 22 00 – Unit Prices and Form B – Prices.

.3 Testing agency conducting tests:

.1 To be certified for CSA A23.2-1B by the Canadian Council of Independent Laboratories (CCIL).

.2 To prepare test samples in accordance with ASTM C109.

.4 Frequency of tests:

.1 Not less than one test per 4m^2 of patching material placed and not less than one test for each day of placement.

.5 Direct pull-out tensile tests:

.1 Direct pull-out tensile (bond) tests of the substrate will be completed in accordance with CSA-A23.2-6B, Procedure A.

.2 Costs for direct pull-out tensile tests as a cash allowance as specified in Part E.

.3 Testing agency conducting direct pull-out tensile tests to be certified for CSA A23.2-6B (Procedure A) by the Canadian Council of Independent Laboratories (CCIL).

.4 Frequency of tests:

.1 Divide extent of work area into three equally sized areas and label as Phase 1, 2 and 3.

.2 Minimum three (3) tests within the first phase of repairs.

.3 Not less than one (1) bond test for each subsequent phase.

.4 The Contract Administrator reserves the right to direct additional bond tests to be conducted if concrete or bonding system is suspect.

.5 Prior to coring for direct pull-out tensile testing, scan substrate to ensure existing reinforcing will not be severed by the testing procedure.

.1 Scanning will be measured and paid as a Unit Price.

.2 Contractor will be responsible for the following where existing reinforcing is severed by the test procedure at no additional cost to the City:

.1 Design repair and re-establishment of reinforcing procedure by a professional engineer licenced in the Province of Manitoba.

.2 Repair and re-establishment of reinforcing in accordance with the repair procedure.

.3 Submit repair procedure to the Contract Administrator for review prior to repair work proceeding.

.6 Infilling of the core hole will be the responsibility of the Contractor. Unless otherwise directed by the Contract Administrator, repair in accordance with this Section or Section 03 93 10.

3.6 DEFECTIVE CONCRETE

.1 Defective concrete: bond strengths below minimum specified value, cracking, spalling, scaling and concrete not conforming to required lines, details, dimensions, tolerances, finishes or specified requirements.

.2 Repair or replacement of defective concrete will be determined by the Contract Administrator, based on the specifications and the above guidelines.

.3 Do not patch, fill, touch up, repair or replace exposed concrete except upon express direction of the Contract Administrator for each individual use.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This section covers the removal and replacement of scaled surface areas of the structural deck to provide a smooth surface.

.2 The scaling will be removed with a bush hammer and subsequently infilled with thin patching compound. Topping shall be removed and replaced using the same material, extended with aggregate.

1.2 RELATED SECTIONS

.1 Section 03 91 10 – Surface Preparation of Concrete Delamination Repair.

.2 Section 03 93 10 – Hand Patching.

.3 Section 03 98 10 – Embedded Galvanic Anodes.

.4 Section 09 30 13 – Ceramic Tiling.

.5 Section 22 05 00 – Common Work Results for Plumbing.

.6 Section 26 05 26 – Grounding and Bonding.

1.3 MEASUREMENT PROCEDURES

.1 No measurements will be conducted for scaling concrete repairs shown on Drawings as Stipulated Price work. Include concrete restoration costs in the lump sum price component of the work to which they correspond.

.2 Scaling repairs identified as a unit price, will be measured and handled in accordance with Section 01 22 00 – Unit Prices.

.3 Concrete testing will be measured and handled as a cash allowance as specified in Part E.

.4 Concrete direct pull-out tensile testing will be measured and handled as a cash allowance as specified in Part E.

.5 Scanning of concrete for reinforcing steel to accommodate concrete testing will be measured and handled as a cash allowance as specified in Part E.

1.4 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C109/C109M-23, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. (50-mm) Cube Specimens).

.2 ASTM C266-21, Standard Test Method for Time of Setting of Hydraulic-Cement Paste by Gillmore Needles.

.3 ASTM C309-19, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.4 ASTM C348-21, Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.

.5 ASTM C469/C469M-22, Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression.

.6 ASTM C496/C496M-17, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.

.7 ASTM C666/C666M-15, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.

.8 ASTM C672/C672M-12, Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.

.9 ASTM C882/C882M-23, Standard Test Method for Bond Strength of Bonding Systems Used With Concrete By Slant Shear.

.10 ASTM C928/C928M-20a, Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs.

.11 ASTM C1202-22e1, Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration.

.2 Canadian Standards Association (CSA)

.1 CSA A23.1/A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.3 International Concrete Repair Institute

.1 ICRI Guideline No. 310.2R–2013, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

1.5 QUALITY ASSURANCE

.1 Qualifications: In accordance with Section 03 91 10 – Surface Preparation of Concrete Delamination Repair.

.2 Field Mock-up:

.1 Install field mock-up at Project site or pre-selected area of building or location approved by the Contract Administrator. Install material in accordance with this Section.

.2 Field mock-up will be standard for judging workmanship on remainder of Project.

.3 Manufacturer's representative or designated representative will review technical aspects; surface preparation, repair, and workmanship.

1.6 PRE-INSTALLATION CONFERENCE

.1 In accordance with Section 01 31 19 – Project Meetings.

.2 Convene and coordinate pre-installation conference for concrete restoration including the following sections:

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

.2 Section 03 98 10 – Embedded Galvanic Anodes.

.3 Section 09 30 13 – Ceramic Tiling.

.4 Section 22 05 00 – Common Work Results for Plumbing.

.5 Section 26 05 26 – Grounding and Bonding.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Comply with Section 01 61 00.

.2 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.3 Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures.

.4 Keep materials in manufacturer's original, unopened containers and packaging until installation.

.5 Protect materials during storage, handling, and application to prevent contamination or damage.

1.8 PROJECT CONDITIONS

.1 Environmental Requirements:

.1 Ensure that substrate surface and ambient air temperature are minimum of 4°C and rising at application time and remain above 4°C for at least 24 hours after application. Ensure that frost or frozen surfaces are thawed and dry.

.2 Ensure that substrate surface and ambient air temperature are below of 32°C and remain below 32°C for at least 8 hours after application.

.3 Do not apply material if snow, rain, fog, and mist are anticipated within 12 hours after application. Allow surfaces to attain temperature and conditions specified before proceeding with application.

Part 2 Products

2.1 MATERIALS

1. One-component high-performance, cementitious mortar that produces high-early strength and contains modified cement, aggregate, and additives meeting the following performance requirements:
   1. Properties
      .1 Complies with ASTM C928.
      .2 Compressive Strength, ASTM C109:
         .1 3 Hour: minimum 6 MPa
         .2 1 Day: minimum 30 MPa.
         .3 7 Days: minimum 50 MPa.
      .3 Set Time, ASTM C266, minimum 21°C:
         .1 Initial: 75 minutes or less
         .2 Final: 90 minutes or less.
      .4 Flexural Strength, ASTM C348:
         .1 1 Day: minimum 4 MPa.
         .2 7 Days: minimum 6 MPa.
      .5 Modulus of Elasticity at 28 days, ASTM C469: 35 ± 5 GPa.
      .6 Splitting Tensile Strength, ASTM C496:
         .1 1 Day: minimum 3.5 MPa.
         .2 7 Days: minimum 7.5 MPa.
      .7 Slant Shear Bond Strength, ASTM C882 Modified:
         .1 1 Day: minimum 12 MPa.
         .2 7 Days: minimum 20 MPa.
      .8 Rapid chloride permeability, AASHTO-T277/ASTM C1202: less than 1,000 coulombs.
      .9 Scaling Resistance (weight loss, lb/ft²), ASTM C672:
         .1 25 cycles: CaCl2: 0.003, NaCl: 0.067
         .2 50 cycles: CaCl2: 0.005, NaCl: 0.084
      .10 Freeze-Thaw Resistance, ASTM C666, (Procedure A) 100% Relative Dynamic Modulus at 300 cycles: 98.5.

2. Acceptable product:
   .1 MasterEmaco T 430, by Sika.

2.2 ACCESSORIES

.1 Evaporation retardant: Acceptable Product:

.1 Sikagard ER50 by Sika (formerly MasterKure ER 50 by BASF Building Systems) at an application rate in accordance with manufacturer's written directions.

.2 Cure and sealing compound: to ASTM C309, Type 1.

.1 Acceptable product(s):

.1 Florseal WB by Sika Canada Inc. at an application rate in accordance with manufacturer's written directions.

Part 3 Execution

3.1 EXAMINATION

.1 Coordinate with the following sections for incorporating surface mounted fixtures and anchors, waterproofing, plumbing, grounding, and galvanic anode installation into the repair as shown on Drawings:

.1 Section 03 98 10 – Embedded Galvanic Anodes.

.2 Section 09 30 13 – Ceramic Tiling.

.3 Section 22 05 00 – Common Work Results for Plumbing.

.4 Section 26 05 26 – Grounding and Bonding.

3.2 SCALING REMOVAL PROCEDURES

.1 The Contract Administrator will mark out the perimeter of the scaled or debonded areas, which are to be removed as specified herein.

.2 The Contractor must saw-cut the perimeter of the scaled repair area to 6mm using wet cut methods. Removal of the scaled material shall be accomplished by the use of a short stroke electric chipping hammer with a sharp bush hammer bit to remove the surface scaling within the marked-out areas.

.3 Minimum depth of removal will be 6mm, and maximum depth will be 25mm for scaling repairs.

.4 Once the areas have been bush hammered, the Contractor must chain drag all areas to determine if any further unsound material is present, which must be removed.

.5 Once the areas are determined by the Contractor to be sound, request a final inspection from the Contract Administrator. This inspection shall be done in the presence of the Contractor, who shall complete any further work at the time of the inspection.

.6 Within 24 hours prior to infilling, remove loose and deteriorated concrete, laitance, dust, dirt, oil, and any other material that could interfere with the bond of the new concrete from the substrate by combination of the following methods:

.1 Wire brush and vacuum,

.2 Sandblast,

.3 High pressure waterblast at a minimum 4,000 psi.

.7 Provide a uniform surface profile of ICRI-CSP-5 or better unless otherwise indicated on Drawings. Sample surfaces are available for inspection in the Contract Administrator's office. These samples will be used as the standard of acceptance.

.8 Vacuum clean surface and/or air blast with oil free compressed air to remove residue and spent media created by surface preparation.

.9 Maintain substrate in a clean condition using polyethylene film until the overlay is ready to be placed.

3.3 INFILL PROCEDURE

.1 Obtain the Contract Administrator's approval before placing repair material. Provide minimum 24 hours notice.

.2 Maintain the substrate in a saturated surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.3 Mixing of rapid-setting horizontal mortar:

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

.2 Ensure repair mortar is thoroughly mixed.

.3 Do not use free-fall mixers.

.4 Never mix partial bags.

.4 Bonding Slurry Application:

.1 Apply the bonding slurry consisting of neat rapid-setting mortar to a saturated surface dry (SSD) substrate with no standing water and dry to the touch. A SSD substrate typically exhibits a colour change of dark grey to light grey. Remove standing water by vacuuming.

.2 Scrub plastic slurry into substrate with stiff bristled broom or brush to produce a uniform thickness of 3mm over entire area.

.3 Place repair material while the bonding slurry is still plastic. Do not apply more slurry than can be covered with concrete before it dries. Do not re-temper. If the bond slurry dries prior to placement of the concrete, removal of the dried slurry will be required. The concrete substrate will then be cleaned and prepared in accordance with the requirements described in the previous sections.

.5 Immediately place repair material, into the prepared patch area from one side to the other. Work the repair material firmly into the bottom and sides of the patch, and underneath reinforcing steel, to assure good bond.

.6 Ensure that rate of placing is sufficient to complete proposed placing, finishing and curing operations within scheduled time. Limit batch sizes as required if placing procedures are slower than anticipated.

.7 Continuously consolidate and finish to matching elevations, ensuring patch thickness and required elevations are maintained.

.8 Ensure reinforcement, floor drains, inserts, etc. are not disturbed during concrete placement.

3.4 FINISHING

.1 Following consolidation and screeding, the surface shall be immediately bull-floated to close and smooth the surface.

.2 Texture surface with a soft bristled broom to provide a non-slip broomed finish.

.3 Apply evaporation retardant at manufacturers recommended coverage rate immediately following final finishing. Do not apply evaporation retardant during any finishing operation nor should it be worked into the surface.

.4 Protect freshly placed concrete from exposure to dust, debris and precipitation.

3.5 CURING

.1 Concrete repairs to be cured for a minimum of 3 days at 10°C. Provide supplemental heat and hoarding as required throughout curing period.

.2 Immediately after final finishing, apply evaporation retardant to prevent drying shrinkage until the concrete has enough strength to support the placement of the wet burlap.

.3 Burlap to be thoroughly presoaked by immersing it in water for a period of at least 24 hours immediately prior to placement.

.4 Commence wet curing as soon as the surface will support the weight of the wetted burlap without deformation. Burlap to be applied in one layer with strips overlapping at least 75mm and be securely held in place without marring the concrete surface.

.5 Wet curing with burlap and water must be maintained throughout entire curing period.

.6 Workers shall not be allowed on the overlay for 12 hours after placement. Do not place load upon new concrete until curing period is over.

3.6 FIELD QUALITY CONTROL

.1 The Contractor will pay for costs of tests as a as a cash allowance as specified in Part E.

.2 Inspection or testing by the Contract Administrator will not augment or replace Contractor quality control nor relieve contractual responsibility.

.3 Flowable Grout Properties Testing:

.1 In accordance with CSA-A23.2-1B.

.2 Costs for tests as a unit price in accordance with Section 01 22 00 – Unit Prices and Form B – Prices.

.3 Testing agency conducting tests:

.1 To be certified for CSA A23.2-1B by the Canadian Council of Independent Laboratories (CCIL).

.2 To prepare test samples in accordance with ASTM C109.

.4 Frequency of tests:

.1 Not less than one test per 4m^2 of patching material placed and not less than one test for each day of placement.

.4 Direct pull-out tensile tests:

.1 Direct pull-out tensile (bond) tests of the substrate will be completed in accordance with CSA-A23.2-6B, Procedure A.

.2 Costs for direct pull-out tensile tests as a cash allowance as specified in Part E.

.3 Testing agency conducting direct pull-out tensile tests to be certified for CSA A23.2-6B (Procedure A) by the Canadian Council of Independent Laboratories (CCIL).

.4 Frequency of tests:

.1 Divide extent of work area into three equally sized areas and label as Phase 1, 2 and 3.

.2 Minimum three (3) tests within the first phase of repairs.

.3 Not less than one (1) bond test for each subsequent phase.

.4 The Contract Administrator reserves the right to direct additional bond tests to be conducted if concrete or bonding system is suspect.

.5 Prior to coring for direct pull-out tensile testing, scan substrate to ensure existing reinforcing will not be severed by the testing procedure.

.1 Scanning will be measured and paid as a cash allowance as specified in Part E.

.2 Contractor will be responsible for the following where existing reinforcing is severed by the test procedure at no additional cost to the City:

.1 Design repair and re-establishment of reinforcing procedure by a professional engineer licenced in the Province of Manitoba.

.2 Repair and re-establishment of reinforcing in accordance with the repair procedure.

.3 Submit repair procedure to the Contract Administrator for review prior to repair work proceeding.

.6 Infilling of the core hole will be the responsibility of the Contractor. Unless otherwise directed by the Contract Administrator, repair in accordance with this Section or Section 03 93 10.

3.7 DEFECTIVE CONCRETE

.1 Defective concrete: bond strengths below minimum specified value, cracking, spalling, scaling and concrete not conforming to required lines, details, dimensions, tolerances, finishes or specified requirements.

.2 Repair or replacement of defective concrete will be determined by the Contract Administrator, based on the specifications and the above guidelines.

.3 Do not patch, fill, touch up, repair or replace exposed concrete except upon express direction of the Contract Administrator for each individual use.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Slab soffit areas, beams, columns, and walls exhibiting extensive spalling and/or delamination requiring localized repairs less than 50 mm in depth will be repaired by removing the deteriorated concrete, cleaning and preparing the substrate, and patching the area with a cementitious patching material

1.2 RELATED SECTIONS

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

.2 Section 03 93 20 – Pressure Grouting.

.3 Section 03 98 10 – Embedded Galvanic Anodes.

.4 Section 09 30 13 – Ceramic Tiling.

.5 Section 22 05 00 – Common Work Results for Plumbing.

.6 Section 26 05 26 – Grounding and Bonding.

1.3 MEASUREMENT PROCEDURES

.1 No measurements will be conducted for hand patching concrete repairs shown on Drawings as Stipulated Price work. Include concrete restoration costs in the lump sum price component of the work to which they correspond.

.2 Hand patching repairs identified as a unit price, will be measured and handled in accordance with Section 01 22 00 – Unit Prices.

.3 Concrete testing will be measured and handled as a cash allowance as specified in Part E.

.4 Concrete direct pull-out tensile testing will be measured and handled as a cash allowance as specified in Part E.

.5 Scanning of concrete for reinforcing steel to accommodate concrete testing will be measured and handled as a cash allowance as specified in Part E.

1.4 REFERENCES

.1 American Concrete Institute (ACI)

.1 ACI 546-04, Concrete Repair Guide.

.2 ACI RAP-6, Vertical and Overhead Spall Repair by Hand Application.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM C109/C109M-23, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. (50-mm) Cube Specimens).

.1 ASTM C157/C157M-17, Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

.2 ASTM C309-19, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 ASTM C469/C469M-22, Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression.

.4 ASTM C666/C666M-15, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.

.5 ASTM C672/C672M-12, Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.

.3 Canadian Standards Association (CSA)

.1 CSA A23.1/A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

1.5 QUALITY ASSURANCE

.1 Qualifications: In accordance with Section 03 91 10 – Surface Preparation of Concrete Delamination Repair.

.2 Field Mock-up:

.1 Install field mock-up at Project site or pre-selected area of building or location approved by the Contract Administrator. Install material in accordance with this Section.

.2 Field mock-up will be standard for judging workmanship on remainder of Project.

.3 Manufacturer’s representative or designated representative will review technical aspects; surface preparation, repair, and workmanship.

.4 aspects; surface preparation, repair, and workmanship.

1.6 PRE-INSTALLATION CONFERENCE

.1 In accordance with Section 01 31 19 – Project Meetings.

.2 Convene and coordinate pre-installation conference for concrete restoration including the following sections:

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

.2 Section 03 98 10 – Embedded Galvanic Anodes.

.3 Section 09 30 13 – Ceramic Tiling.

.4 Section 22 05 00 – Common Work Results for Plumbing.

.5 Section 26 05 26 – Grounding and Bonding.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Comply with Section 01 61 00.

.2 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.3 Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures.

.4 Keep materials in manufacturer’s original, unopened containers and packaging until installation.

.5 Protect materials during storage, handling, and application to prevent contamination or damage.

1.8 PROJECT CONDITIONS

.1 Environmental Requirements:

.1 Ensure that substrate surface and ambient air temperature are minimum of 4°C and rising at application time and remain above 4°C for at least 24 hours after application. Ensure that frost or frozen surfaces are thawed and dry.

.2 Ensure that substrate surface and ambient air temperature are below of 32°C and remain below 32°C for at least 8 hours after application.

.3 Do not apply material if snow, rain, fog, and mist are anticipated within 12 hours after application. Allow surfaces to attain temperature and conditions specified before proceeding with application.

Part 2 Products

2.1 MATERIALS

.1 Patching Mortar: Infilling with a one-component, thixotropic, rheoplastic, cement-based, fiber-reinforced, shrinkage-compensated, sulfate-resistant structural repair mortar.

.1 Drying shrinkage to ASTM C157:

.1 less than 0.10% at 28 days.

.2 Compressive Strength to ASTM C109:

.1 Minimum 7 MPa at 3 hours.

.2 Minimum 21 MPa at 1 day.

.3 Minimum 28 MPa at 7 days.

.3 Modulus of elasticity to ASTM C469:

.1 $25x10^3$ MPa ± $10x10^3$ MPa.

.4 Freeze/Thaw Resistance to ASTM C 666, Procedure A:

.1 Minimum 96.0% RDM at 300 cycles.

.5 Salt Scale Resistance to ASTM C672:

.1 Less than 0.05 kg/m² at 50 cycles.

.2 Acceptable product(s):

.1 MasterEmaco S 488 CI by Sika.

.2 Planitop X by Mapei.

2.2 ACCESSORIES

.1 Evaporation retardant: Acceptable Product:

.1 Sikagard ER50 by Sika (formerly MasterKure ER 50 by BASF Building Systems) at an application rate in accordance with manufacturer's written directions.

.2 Cure and sealing compound: to ASTM C309, Type 1.

.1 Acceptable product(s):

.1 Florseal WB by Sika Canada Inc. at an application rate in accordance with manufacturer's written directions.

Part 3 Execution

3.1 PREPARATION

.1 Protection: Protect adjacent Work areas and finish surfaces from damage during repair mortar application.

.2 Coordinate with the following sections for incorporating surface mounted fixtures and anchors, waterproofing, plumbing, grounding, and galvanic anode installation into the repair as shown on Drawings:

.1 Section 03 98 10 – Embedded Galvanic Anodes.

.2 Section 09 30 13 – Ceramic Tiling.

.3 Section 22 05 00 – Common Work Results for Plumbing.

.4 Section 26 05 26 – Grounding and Bonding.

.3 Surface Preparation:

.1 Complete concrete delamination repairs to 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

.4 The repair area must be thoroughly cleaned and well soaked prior to infilling. The surface should be thoroughly wetted for a period of not less than two (2) hours. The repair areas shall be kept continuously wet until just before infilling. Any standing water must be removed prior to grouting.

.5 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

3.2 APPLICATION PROCEDURES

.1 Obtain the Contract Administrator's approval before placing repair material. Provide minimum 24 hours notice.

.2 The patch material must be installed and cured in strict accordance with manufacturer's specifications.

.3 Apply repair mortar to a saturated surface dry (SSD) substrate with no standing water and dry to the touch. A SSD substrate typically exhibits a colour change of dark grey to light grey.

.4 Apply a bond slurry, consisting of neat patching mortar, to the prepared surface. Thoroughly scrub a thin layer of normal consistency mortar into the saturated surface with a stiff bristle brush to produce a uniform thickness of approximately 3mm over entire area.

.5 Apply repair mortar by hand towelling on vertical or overhead surfaces in depths ranging from 12mm to 50mm.

.1 Vertical Applications: Repair mortar can be applied on vertical applications up to a 50mm depth per lift.

.2 Overhead Applications: Do not exceed 38mm thickness per lift. For depths greater than 38mm, limit succeeding lifts to 25mm thickness.

.3 Multiple Passes: Place succeeding lifts after repair mortar has developed initial set. Scarify the surface of the first lift to ensure integral bond between successive layers.

3.3 FINISHING

.1 Level surface of repair mortar using a float or screed.

.2 Apply final finish when mortar has begun to stiffen using a wooden, plastic, or synthetic sponge float or trowel.

.3 Spray apply undiluted evaporation reducer lightly to aid in finishing.

.4 Trim or shape to the desired profile if required.

3.4 CURING

.1 Apply two coats of curing compound in accordance with manufacturer's specifications. Apply the first coat immediately after completing finishing operations. Apply the second coat about 24 hours later.

3.5 CURING

.1 Protect fresh mortar from premature evaporation.

.2 Concrete repairs to be cured for a minimum of 7 days at 10°C. Provide supplemental heat and hoarding as required throughout curing period.

.3 Apply two coats curing compound in accordance with manufacturer's specifications. Apply the first coat immediately upon removal of forms. Apply the second coat about 24 hours later.

3.6 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Contract Administrator in accordance with CSA-A23.1 and Section 01 40 00 - Quality Requirements and as described herein.

.2 The Contractor will pay for costs of tests as a cash allowance as specified in Part E.

.3 Inspection or testing by the Contract Administrator will not augment or replace Contractor quality control nor relieve contractual responsibility.

.4 Flowable Grout Properties Testing:

- .1 In accordance with CSA-A23.2-1B.
- .2 Costs for tests as a cash allowance as specified in Part E.
- .3 Testing agency conducting tests:
  - .1 To be certified for CSA A23.2-1B by the Canadian Council of Independent Laboratories (CCIL).
  - .2 To prepare test samples in accordance with ASTM C109.
- .4 Frequency of tests:
  - .1 Not less than one test per 4m^2 of patching material placed and not less than one test for each day of placement.

.5 Direct pull-out tensile tests:

- .1 Direct pull-out tensile (bond) tests of the substrate will be completed in accordance with CSA-A23.2-6B, Procedure A.
- .2 Costs for direct pull-out tensile tests as a cash allowance as specified in Part E.
- .3 Testing agency conducting direct pull-out tensile tests to be certified for CSA A23.2-6B (Procedure A) by the Canadian Council of Independent Laboratories (CCIL).
- .4 Frequency of tests:
  - .1 Divide extent of work area into three equally sized areas and label as Phase 1, 2 and 3.
  - .2 Minimum three (3) tests within the first phase of repairs.
  - .3 Not less than one (1) bond test for each subsequent phase.
  - .4 The Contract Administrator reserves the right to direct additional bond tests to be conducted if concrete or bonding system is suspect.

.5 Prior to coring for direct pull-out tensile testing, scan substrate to ensure existing reinforcing will not be severed by the testing procedure.

.1 Contractor will be responsible for the following where existing reinforcing is severed by the test procedure at no additional cost to the City:

.1 Design repair and re-establishment of reinforcing procedure by a professional engineer licenced in the Province of Manitoba.

.2 Repair and re-establishment of reinforcing in accordance with the repair procedure.

.3 Submit repair procedure to the Contract Administrator for review prior to repair work proceeding.

.6 Infilling of the core hole will be the responsibility of the Contractor. Unless otherwise directed by the Contract Administrator, repair in accordance with this Section.

3.7 DEFECTIVE CONCRETE

.1 Defective concrete: bond strengths below minimum specified value, cracking, spalling, scaling and concrete not conforming to required lines, details, dimensions, tolerances, finishes or specified requirements.

.2 Repair or replacement of defective concrete will be determined by the Contract Administrator, based on the specifications and the above guidelines.

.3 Do not patch, fill, touch up, repair or replace exposed concrete except upon express direction of the Contract Administrator for each individual use.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Slab soffit areas, beams, columns and walls exhibiting extensive spalling and/or delamination in which patching would be uneconomical are to be repaired by mechanical removal of the deteriorated concrete and replacement with a pumpable grout.

.2 All spalling and/or delaminated concrete must be removed down to sound concrete in accordance with Section 03 91 10.

1.2 RELATED SECTIONS

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

.2 Section 03 20 00 – Concrete Reinforcing.

.3 Section 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

.4 Section 03 93 10 – Hand Patching.

.5 Section 03 98 10 – Embedded Galvanic Anodes.

.6 Section 09 30 13 – Ceramic Tiling.

.7 Section 22 05 00 – Common Work Results for Plumbing.

.8 Section 26 05 26 – Grounding and Bonding.

1.3 MEASUREMENT PROCEDURES

.1 No measurements will be conducted for pressure grouting concrete repairs shown on Drawings as Stipulated Price work. Include concrete restoration costs in the lump sum price component of the work to which they correspond.

.2 Pressure grouting repairs identified as a unit price, will be measured and handled in accordance with Section 01 22 00 – Unit Prices.

.3 Concrete testing will be measured and handled as a cash allowance as specified in Part E.

.4 Concrete direct pull-out tensile testing will be measured and handled as a cash allowance as specified in Part E.

.5 Scanning of concrete for reinforcing steel to accommodate concrete testing will be measured and handled as a cash allowance as specified in Part E.

1.4 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C109/C109M-23, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. (50-mm) Cube Specimens).

.2 ASTM C157/C157M-17, Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

.3 ASTM C309-19, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.4 ASTM C496-17, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.

.5 ASTM C531-18 (2023), Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

.6 ASTM C666-15, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.

.7 ASTM C882/C882M-23, Standard Test Method for Bond Strength of Bonding Systems Used With Concrete By Slant Shear.

.8 ASTM C1202-22e1, Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration.

.2 Canadian Standards Association (CSA)

.1 CSA- A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

1.5 QUALITY ASSURANCE

.1 Qualifications: In accordance with Section 03 91 10 – Surface Preparation of Concrete Delamination Repair.

.2 Field Mock-up:

.1 Install field mock-up at Project site or pre-selected area of building or location approved by the Contract Administrator. Install material in accordance with this Section.

.2 Field mock-up will be standard for judging workmanship on remainder of Project.

.3 Manufacturer's representative or designated representative will review technical aspects; surface preparation, repair, and workmanship.

1.6 PRE-INSTALLATION CONFERENCE

.1 In accordance with Section 01 31 19 – Project Meetings.

.2 Convene pre-installation conference for concrete restoration as specified by the following sections:

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

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

.3 Section 03 20 00 – Concrete Reinforcing.

.4 Section 03 98 10 – Embedded Galvanic Anodes.

.5 Section 09 30 13 – Ceramic Tiling.

.6 Section 22 05 00 – Common Work Results for Plumbing.

.7 Section 26 05 26 – Grounding and Bonding.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Comply with Section 01 61 00.

.2 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.3 Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures.

.4 Keep materials in manufacturer's original, unopened containers and packaging until installation.

.5 Protect materials during storage, handling, and application to prevent contamination or damage.

1.8 PROJECT CONDITIONS

.1 Environmental Requirements:

.1 Ensure that substrate surface and ambient air temperature are minimum of 4°C and rising at application time and remain above 4°C for at least 24 hours after application. Ensure that frost or frozen surfaces are thawed and dry.

.2 Ensure that substrate surface and ambient air temperature are below of 32°C and remain below 32°C for at least 8 hours after application.

.3 Do not apply material if snow, rain, fog, and mist are anticipated within 12 hours after application. Allow surfaces to attain temperature and conditions specified before proceeding with application.

Part 2 Products

2.1 MATERIALS

.1 One-component, shrinkage-compensated, micro concrete consisting of cement, graded aggregate, shrinkage-compensating agents, and additives complying with the following performance requirements:

.1 Compressive Strength, ASTM C109:
- .1 1 day: minimum 17.0 MPa.
- .2 7 days: minimum 34.5 MPa.
- .3 28 days: minimum 41.0 MPa.

.2 Slant Sheer Bond Strength, ASTM C 882:
- .1 1 Day: minimum 5.0 MPa.
- .2 7 Days: minimum 10.0 MPa.
- .3 28 days: minimum 16.0 MPa.

.3 Drying Shrinkage, ASTM C157, Unmodified, 1-inch (25-mm) prisms:
- .1 28 Days: less than 350 µstrain.

.4 Drying Shrinkage, ASTM C157, Modified, 3-inch (76-mm) prisms, air cured at 73 degrees F (23 degrees C), 50 percent relative humidity:
- .1 7 Days: less than 225 µstrain.
- .2 28 Days: lest than 500 µstrain.

.5 Coefficient of Thermal Expansion, ASTM C531:
- .1 28 days: $10 \pm 0.1 \times 10^{-6}$ cm/cm per degree C.

.6 Freeze/Thaw Resistance, ASTM C666 at 300 cycles:
- .1 minimum 96% relative dynamic modulus.

.7 Splitting Tensile Strength, ASTM C496:
- .1 28 days: minimum 4.0 MPa.

.8 Rapid Chloride Permeability, ASTM C1202:
- .1 Less than 1,000 Coulombs

.2 Acceptable product is:

.1 MasterEmaco S 440 MC, by Sika Canada.

.2 Sikacrete-211 Flow Plus by Sika Canada.

.3 Sikacrete 08-SCC by Sika Canada.

2.2 EQUIPMENT

.1 Pumping equipment: Mono-type, piston/ball valve, or hydraulic/swing valve pumps capable of pumping specified grout. Pumping equipment must have adequate controls to regulate flow rates and pressures

2.3 ACCESSORIES

.1 Cure and sealing compound: to ASTM C309, Type 1.

.1 Acceptable product(s):

.1 Florseal WB by Sika Canada Inc. at an application rate in accordance with manufacturer's written directions.

Part 3 Execution

3.1 PREPARATION

.1 Protection: Protect adjacent Work areas and finish surfaces from damage during repair mortar application.

.2 Coordinate with the following sections for incorporating surface mounted fixtures and anchors, waterproofing, plumbing, grounding, and galvanic anode installation into the repair as shown on Drawings:

.1 Section 03 98 10 – Embedded Galvanic Anodes.

.2 Section 09 30 13 – Ceramic Tiling.

.3 Section 22 05 00 – Common Work Results for Plumbing.

.4 Section 26 05 26 – Grounding and Bonding.

.3 Surface Preparation:

.1 Complete concrete delamination repairs to 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

.4 The repair area must be thoroughly cleaned and well soaked prior to infilling. The surface should be thoroughly wetted for a period of not less than two (2) hours. The repair areas shall be kept continuously wet until just before infilling. Any standing water must be removed prior to grouting.

.5 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.6 Forming:

.1 Unless otherwise indicated provide plywood formwork to match existing profiles.

.2 Install chamfers at outside corners and filets at inside corners in accordance with Section 03 10 00 or to match existing profiles.

.3 Design formwork to accommodate the mass and pressure of the repair material but not less than 100 kPa.

.4 Securely anchor formwork to substrate. Anchors to be sized and space to prevent deflection of the forms during pressure grouting.

.5 Construct forms to fit tightly against existing concrete surfaces. Seal around edge of formwork with sealant to prevent leakage during grouting.

.6 Anchors shall be completely removable. All anchor holes shall be patched with same grout utilized for the repairs but mixed to dry pack consistency. Completely fill all anchor holes.

.7 A minimum of 20 mm concrete cover over the primary reinforcing steel will be required, thus, an adjustment of the formwork such as a notch may be required to ensure sufficient cover.

.8 Provide drainage outlets in formwork for presoaking and, if beneath a soffit, provide air venting. Provide suitable access points to pump mixed repair mortar into place.

.9 Space ports for pump line attached in a grid pattern.

.10 Use form-release agent to facilitate removal of forms from cast material.

.11 Within two (2) hours immediately prior to grouting, pressure test formwork to determine watertightness. Completely fill formwork with clean water and let stand for not less than 15 minutes. Any areas of leakage are to be sealed prior to grouting. Re-test as required.

3.2 INFILLING PROCEDURES

.1 Obtain the Contract Administrator's approval before placing repair material. Provide minimum 24 hours notice.

.2 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.3 Mixing:

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

.2 Ensure repair mortar is thoroughly mixed.

.3 Do not use free-fall mixers.

.4 Never mix partial bags.

.4 Within 15 minutes of mixing, pump the grout into the prepared form. Work in a manner to avoid air entrapment with a variable pressure pump.

.5 Start pumping at one corner for horizontal surfaces, or at the lowest point for vertical surfaces, continue filling in a manner that prevents air entrapment.

.6 Continue pumping until material flows from adjacent ports and all air is expelled. After all air is expelled, temporarily stop pumping, close off port, and begin pumping from next port that has seen material flow. Repeat sequence until the cavity is completely filled.

.7 Monitor pump-line pressure to prevent excessive back-pressure when pumping long distances.

.8 Vibrate the form while pumping, as required, to achieve flow and compaction. Flowable grout must be confined in either the horizontal or vertical direction, leaving a minimum of exposed surface.

3.3 CURING

.1 Concrete repairs to be cured for a minimum of 3 days at 10°C. Provide supplemental heat and hoarding as required throughout curing period.

.2 Leave formwork in place until repair mortar reaches compressive strength of 20 MPa.

.3 Upon removal of forms, apply two coats curing compound in accordance with manufacturer's specifications. Apply the first coat immediately upon removal of forms. Apply the second coat about 24 hours later.

3.4 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Contract Administrator in accordance with CSA-A23.1 and Section 01 40 00 - Quality Requirements and as described herein.

.2 The Contractor will pay for costs of tests as a cash allowance as specified in Part E.

.3 Inspection or testing by the Contract Administrator will not augment or replace Contractor quality control nor relieve contractual responsibility.

.4 Flowable Grout Properties Testing:

- .1 In accordance with CSA-A23.2-1B.
- .2 Costs for tests as a cash allowance as specified in Part E.
- .3 Testing agency conducting tests:
  - .1 To be certified for CSA A23.2-1B by the Canadian Council of Independent Laboratories (CCIL).
  - .2 To prepare test samples in accordance with ASTM C109.
- .4 Frequency of tests:
  - .1 Not less than one test per 4m^2 of patching material placed and not less than one test for each day of placement.

.5 Direct pull-out tensile tests:

- .1 Direct pull-out tensile (bond) tests of the substrate will be completed in accordance with CSA-A23.2-6B, Procedure A.
- .2 Costs for direct pull-out tensile tests as a cash allowance as specified in Part E.
- .3 Testing agency conducting direct pull-out tensile tests to be certified for CSA A23.2-6B (Procedure A) by the Canadian Council of Independent Laboratories (CCIL).
- .4 Frequency of tests:
  - .1 Divide extent of work area into three equally sized areas and label as Phase 1, 2 and 3.
  - .2 Minimum three (3) tests within the first phase of repairs.
  - .3 Not less than one (1) bond test for each subsequent phase.
  - .4 The Contract Administrator reserves the right to direct additional bond tests to be conducted if concrete or bonding system is suspect.
- .5 Prior to coring for direct pull-out tensile testing, scan substrate to ensure existing reinforcing will not be severed by the testing procedure.
  - .1 Scanning will be measured and paid as a Unit Price.
  - .2 Contractor will be responsible for the following where existing reinforcing is severed by the test procedure at no additional cost to the City:
    - .1 Design repair and re-establishment of reinforcing procedure by a professional engineer licenced in the Province of Manitoba.
    - .2 Repair and re-establishment of reinforcing in accordance with the repair procedure.
    - .3 Submit repair procedure to the Contract Administrator for review prior to repair work proceeding.
- .6 Infilling of the core hole will be the responsibility of the Contractor. Unless otherwise directed by the Contract Administrator, repair in accordance with this Section or Section 03 93 10.

3.5 DEFECTIVE CONCRETE

.1 Defective concrete: bond strengths below minimum specified value, cracking, spalling, scaling and concrete not conforming to required lines, details, dimensions, tolerances, finishes or specified requirements.

.2 Repair or replacement of defective concrete will be determined by the Contract Administrator, based on the specifications and the above guidelines.

.3 Do not patch, fill, touch up, repair or replace exposed concrete except upon express direction of the Contract Administrator for each individual use.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Slab soffit areas, beams, columns and walls exhibiting extensive spalling and/or delamination in which patching would be uneconomical are to be repaired by mechanical removal of the deteriorated concrete and replacement using the form and pour method.

.2 All spalling and/or delaminated concrete must be removed down to sound concrete in accordance with Section 03 91 10.

1.2 RELATED SECTIONS

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

.2 Section 03 20 00 – Concrete Reinforcing.

.3 Section 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

.4 Section 03 93 10 – Hand Patching.

.5 Section 03 98 10 – Embedded Galvanic Anodes.

.6 Section 09 30 13 – Ceramic Tiling.

.7 Section 22 05 00 – Common Work Results for Plumbing.

.8 Section 26 05 26 – Grounding and Bonding.

1.3 MEASUREMENT PROCEDURES

.1 No measurements will be conducted for form and pour concrete repairs shown on Drawings as Stipulated Price work. Include concrete restoration costs in the lump sum price component of the work to which they correspond.

.2 Form and pour repairs identified as a unit price, will be measured and handled in accordance with Section 01 22 00 – Unit Prices.

.3 Concrete testing will be measured and handled as a cash allowance as specified in Part E.

.4 Concrete direct pull-out tensile testing will be measured and handled as a cash allowance as specified in Part E.

.5 Scanning of concrete for reinforcing steel to accommodate concrete testing will be measured and handled as a cash allowance as specified in Part E.

1.4 REFERENCES

.1 American Concrete Institute (ACI)

.1 ACI 546-04, Concrete Repair Guide.

.2 ACI RAP-4, Surface Repair Using Form-and-Pour Techniques.

.2 American Society for Testing and Materials (ASTM)

.1 C109/C109M-23, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. (50-mm) Cube Specimens).

.2 ASTM C157/C157M-17, Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

.3 ASTM C309-19, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.4 ASTM C531-18 (2023), Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

.5 ASTM C666-15, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.

.3 Canadian Standards Association (CSA)

.1 CSA- A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

1.5 QUALITY ASSURANCE

.1 Qualifications: In accordance with Section 03 91 10 – Surface Preparation of Concrete Delamination Repair.

.2 Field Mock-up:

.1 Install field mock-up at Project site or pre-selected area of building or location approved by the Contract Administrator. Install material in accordance with this Section.

.2 Field mock-up will be standard for judging workmanship on remainder of Project.

.3 Manufacturer’s representative or designated representative will review technical aspects; surface preparation, repair, and workmanship.

1.6 PRE-INSTALLATION CONFERENCE

.1 In accordance with Section 01 31 19 – Project Meetings.

.2 Convene pre-installation conference for concrete restoration as specified by the following sections:

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

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

.3 Section 03 20 00 – Concrete Reinforcing.

.4 Section 03 98 10 – Embedded Galvanic Anodes.

.5 Section 09 30 13 – Ceramic Tiling.

.6 Section 22 05 00 – Common Work Results for Plumbing.

.7 Section 26 05 26 – Grounding and Bonding.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Comply with Section 01 61 00.

.2 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.3 Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures.

.4 Keep materials in manufacturer’s original, unopened containers and packaging until installation.

.5 Protect materials during storage, handling, and application to prevent contamination or damage.

1.8 PROJECT CONDITIONS

.1 Environmental Requirements:

.1 Ensure that substrate surface and ambient air temperature are minimum of 4°C and rising at application time and remain above 4°C for at least 24 hours after application. Ensure that frost or frozen surfaces are thawed and dry.

.2 Ensure that substrate surface and ambient air temperature are below of 32°C and remain below 32°C for at least 8 hours after application.

.3 Do not apply material if snow, rain, fog, and mist are anticipated within 12 hours after application. Allow surfaces to attain temperature and conditions specified before proceeding with application.

Part 2 Products

2.1 MATERIALS

.1 The repair mortar shall cement-based, one-component, self-consolidating with the following properties:

.1 Drying shrinkage to ASTM C157:

.1 less than 0.10% at 28 days.

.2 Compressive Strength, ASTM C109:

.1 1 day: minimum 10.0 MPa.

.2 7 days: minimum 28.0 MPa.

.3 28 days: minimum 35.0 MPa.

.3 Freeze/Thaw Resistance, ASTM C666 at 300 cycles:

.1 minimum 98% relative dynamic modulus.

.4 Coefficient of Thermal Expansion, ASTM C531:

.1 28 days: $10 \pm 1.0 \times 10^{-6}$ cm/cm per degree C.

.2 Acceptable product is:

.1 MasterEmaco S 440 by Sika Canada.

.2 Sikacrete-08 SCC by Sika Canada.

2.2 ACCESSORIES

.1 Cure and sealing compound: to ASTM C309, Type 1.

.1 Acceptable product(s):

.1 Florseal WB by Sika Canada Inc. at an application rate in accordance with manufacturer's written directions.

Part 3 Execution

3.1 PREPARATION

.1 Protection: Protect adjacent Work areas and finish surfaces from damage during repair mortar application.

.2 Coordinate with the following sections for incorporating surface mounted fixtures and anchors, waterproofing, plumbing, grounding, and galvanic anode installation into the repair as shown on Drawings:

.1 Section 03 98 10 – Embedded Galvanic Anodes.

.2 Section 09 30 13 – Ceramic Tiling.

.3 Section 22 05 00 – Common Work Results for Plumbing.

.4 Section 26 05 26 – Grounding and Bonding.

.3 Surface Preparation:

.1 Complete concrete delamination repairs to 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

.4 The repair area must be thoroughly cleaned and well soaked prior to infilling. The surface should be thoroughly wetted for a period of not less than two (2) hours. The repair areas shall be kept continuously wet until just before infilling. Any standing water must be removed prior to grouting.

.5 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.6 Forming:

.1 Unless otherwise indicated provide plywood formwork to match existing profiles.

.2 Install chamfers at outside corners and filets at inside corners in accordance with Section 03 10 00 or to match existing profiles.

.3 Design formwork to accommodate the mass and pressure of the repair material.

.4 Securely anchor formwork to substrate. Anchors to be sized and space to prevent deflection of the forms placement and curing.

.5 Construct forms to fit tightly against existing concrete surfaces. Seal around edge of formwork with sealant to prevent leakage during grouting.

.6 Anchors shall be completely removable. All anchor holes shall be patched with grout mixed to dry pack consistency. Completely fill all anchor holes.

.7 Placement openings or chutes are required to place the repair material behind vertical forms. Chutes should be constructed to permit development of a hydraulic head above the prepared upper edges of the concrete surface. This will provide for repair material supply into these upper horizontal zones after concrete is consolidated.

.8 For large, vertical surfaces exceeding 3 m in height, multiple lifts should be considered to reduce free-fall segregation and excessive formwork pressures.

.9 Formwork for overhead surfaces does not require openings for placement of repair materials. Place repair materials through openings in the slab from above. Size and location of openings to be approved by the Contract Administrator. Do not remove or cause damage to existing reinforcing steel in order to install placement openings.

.10 A minimum of 20 mm concrete cover over the primary reinforcing steel will be required, thus, an adjustment of the formwork such as a notch may be required to ensure sufficient cover.

.11 Provide drainage outlets in formwork for presoaking and, if beneath a soffit, provide air venting. Provide suitable access points to pour mixed repair mortar into place.

.12 Use form-release agent to facilitate removal of forms from cast material.

.13 Within two (2) hours immediately prior to placement of repair material, test formwork to determine watertightness. Completely fill formwork with clean water and let stand for not less than 15 minutes. Any areas of leakage are to be sealed prior to placement of repair material. Re-test as required.

3.2 INFILLING PROCEDURES

.1 Obtain the Contract Administrator's approval before placing repair material. Provide minimum 24 hours notice.

.2 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.3 Mixing:

- .1 Mix materials in accordance with manufacturer's instructions.
- .2 Ensure repair mortar is thoroughly mixed.
- .3 Do not use free-fall mixers.
- .4 Never mix partial bags.

.4 Within 15 minutes of mixing, pour repair material into the prepared form. Work in a manner to avoid air entrapment with a variable pressure pump.

.5 Vibrate the form while pumping, as required, to achieve flow and compaction.

.6 Ensure that the uppermost surfaces are filled adjacent to the chute or opening where placement occurs. Rod or tamp material to ensure proper filling.

3.3 CURING

.1 Concrete repairs to be cured for a minimum of 3 days at 10°C. Provide supplemental heat and hoarding as required throughout curing period.

.2 Leave formwork in place until repair mortar reaches compressive strength of 20 MPa.

.3 Upon removal of forms, apply two coats curing compound in accordance with manufacturer's specifications. Apply the first coat immediately upon removal of forms. Apply the second coat about 24 hours later.

3.4 FINISHING

.1 After stripping of formwork, any spaces not filled should be trimmed, cleaned, and dry-packed with grout to the desired profile. Do not proceed with repairs without the Contract Administrator's written approval.

3.5 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Contract Administrator in accordance with CSA-A23.1 and Section 01 40 00 - Quality Requirements and as described herein.

.2 The Contractor will pay for costs of tests as a unit price as a cash allowance as specified in Part E.

.3 Inspection or testing by the Contract Administrator will not augment or replace Contractor quality control nor relieve contractual responsibility.

.4 Flowable Grout Properties Testing:

- .1 In accordance with CSA-A23.2-1B.
- .2 Costs for tests as a cash allowance as specified in Part E.
- .3 Testing agency conducting tests:

.1 To be certified for CSA A23.2-1B by the Canadian Council of Independent Laboratories (CCIL).

.2 To prepare test samples in accordance with ASTM C109.

.4 Frequency of tests:

.1 Not less than one test per 4m^2 of patching material placed and not less than one test for each day of placement.

.5 Direct pull-out tensile tests:

.1 Direct pull-out tensile (bond) tests of the substrate will be completed in accordance with CSA-A23.2-6B, Procedure A.

.2 Costs for direct pull-out tensile tests as a cash allowance as specified in Part E.

.3 Testing agency conducting direct pull-out tensile tests to be certified for CSA A23.2-6B (Procedure A) by the Canadian Council of Independent Laboratories (CCIL).

.4 Frequency of tests:

.1 Divide extent of work area into three equally sized areas and label as Phase 1, 2 and 3.

.2 Minimum three (3) tests within the first phase of repairs.

.3 Not less than one (1) bond test for each subsequent phase.

.4 The Contract Administrator reserves the right to direct additional bond tests to be conducted if concrete or bonding system is suspect.

.5 Prior to coring for direct pull-out tensile testing, scan substrate to ensure existing reinforcing will not be severed by the testing procedure.

.1 Scanning will be measured and paid as a Unit Price.

.2 Contractor will be responsible for the following where existing reinforcing is severed by the test procedure at no additional cost to the City:

.1 Design repair and re-establishment of reinforcing procedure by a professional engineer licenced in the Province of Manitoba.

.2 Repair and re-establishment of reinforcing in accordance with the repair procedure.

.3 Submit repair procedure to the Contract Administrator for review prior to repair work proceeding.

.6 Infilling of the core hole will be the responsibility of the Contractor. Unless otherwise directed by the Contract Administrator, repair in accordance with this Section or Section 03 93 10.

3.6 DEFECTIVE CONCRETE

.1 Defective concrete: bond strengths below minimum specified value, cracking, spalling, scaling and concrete not conforming to required lines, details, dimensions, tolerances, finishes or specified requirements.

.2 Repair or replacement of defective concrete will be determined by the Contract Administrator, based on the specifications and the above guidelines.

.3 Do not patch, fill, touch up, repair or replace exposed concrete except upon express direction of the Contract Administrator for each individual use.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes furnishing all labor, tools, materials, equipment and services necessary to properly install embedded galvanic anodes.

.2 Embedded galvanic anodes are designed to provide localized corrosion protection. When placed at the appropriate spacing along the perimeter of concrete patches or along the interface between new/existing concrete, the anodes mitigate active corrosion and the formation of new corrosion sites in the existing concrete in adjacent areas.

1.2 RELATED SECTIONS

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

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

.3 Section 03 20 00 – Concrete Reinforcing.

.4 Section 03 92 12 – Top Surface Concrete Repairs with Rapid Setting Mortar.

.5 Section 03 92 20 – Scaling Repairs.

.6 Section 03 93 10 – Hand Patching.

.7 Section 03 93 20 – Pressure Grouting.

.8 Section 03 93 30 – Form and Pour with Repair Mortar.

1.3 MEASUREMENT PROCEDURES

.1 Embedded galvanic anodes will be measured and handled in accordance with Section 01 22 00 – Unit Prices.

1.4 REFERENCES

.1 American Concrete Institute (ACI)

.1 ACI 546-04, Concrete Repair Guide.

.2 ACI 562-12, Code Requirements for Evaluation, Repair and Rehabilitation of Concrete Buildings

.3 ACI RAP-8, Installation of Embedded Galvanic Anodes.

.2 Canadian Standards Association (CSA)

.1 CSA- S448.1-10, Repair of Reinforced Concrete in Buildings.

.3 International Concrete Repair Institute (ICRI)

.1 ICRI concrete Repair Terminology (2010 Edition).

.2 ICRI Guideline No. 120.1–2009, Guidelines and Recommendations for Safety in the Concrete Repair Industry.

.3 ICRI Guideline No. 130.1R–2009, Guide for Methods of Measurement and Contract Types for Concrete Repair Work (formerly No. 03735).

.4 ICRI Guideline No. 310.1R–2008, Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion (formerly No. 03730).

.5 ICRI Guideline No. 310.2–1997, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays (formerly No. 03732).

1.5 QUALITY ASSURANCE

.1 Qualifications: In accordance with Section 03 91 10 – Surface Preparation of Concrete Delamination Repair.

.2 Field Mock-up:

.1 Install field mock-up at Project site or pre-selected area of building or location approved by the Contract Administrator. Install material in accordance with this Section.

.2 Field mock-up will be standard for judging workmanship on remainder of Project.

.3 Manufacturer's representative or designated representative will review technical aspects; surface preparation, repair, and workmanship.

1.6 PRE-INSTALLATION CONFERENCE

.1 In accordance with Section 01 31 19 – Project Meetings.

.2 Convene and coordinate pre-installation conference for concrete restoration including attendance by the following sections:

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

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

.3 Section 03 20 00 – Concrete Reinforcing.

.4 Section 03 92 12 – Top Surface Concrete Repairs with Rapid Setting Mortar.

.5 Section 03 92 20 – Scaling Repairs.

.6 Section 03 93 10 – Hand Patching.

.7 Section 03 93 20 – Pressure Grouting.

.8 Section 03 93 30 – Form and Pour with Repair Mortar.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Comply with Section 01 61 00.

.2 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.3 Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures.

.4 Keep materials in manufacturer's original, unopened containers and packaging until installation.

.5 Protect materials during storage, handling, and application to prevent contamination or damage.

Part 2 Products

2.1 MATERIALS

.1 Embedded galvanic anodes shall meet the following requirements:

.1 A highly alkaline cementitious shell with a pH of 14 or greater

.2 Contain no added constituents corrosive to reinforcing steel or detrimental to concrete, e.g. chloride, bromide, sulfates, etc.

.3 Anode units shall be alkali-activated and supplied with solid zinc core cast around integral unspliced, uncoated, non-galvanized double loop steel tie wires.

.4 Anode units shall be supplied with integral non-galvanised, unspliced tie wires such that the zinc anode is connected to the reinforcement with a continuous, unspliced wire

.2 Repair materials:

.1 Concrete and bonding agents shall be Portland cement-based materials. Non-conductive repair materials such as epoxy, urethane, or magnesium phosphate shall not be permitted. Insulating materials such as epoxy bonding agents shall not be used unless otherwise noted.

.2 Anodes used with repair materials having saturated bulk resistivity of 50,000 ohm-cm or greater, shall be embedded in manufacturer approved mortar to create a conductive bridge to the substrate prior to repair material installation.

.3 Acceptable Product: Galvashield XP4 by Vector Corrosion Technologies.

Part 3 Execution

3.1 PREPARATION

.1 Complete concrete delamination repairs and surface preparation to Section 03 91 10.

.2 Coordinate installation of galvanic anodes with concrete repairs as specified in the following sections:

.1 Section 03 20 00 – Concrete Reinforcing.
.2 Section 03 92 12 – Top Surface Concrete Repairs with Rapid Setting Mortar.
.3 Section 03 92 20 – Scaling Repairs.
.4 Section 03 93 10 – Hand Patching.
.5 Section 03 93 20 – Pressure Grouting.
.6 Section 03 93 30 – Form and Pour with Repair Mortar.

3.2 INSTALLATION

.1 Install anode units and repair material immediately following preparation and cleaning of the steel reinforcement.

.2 Install galvanic anodes in patch repair locations identified by the Contract Administrator. Install along the perimeter of the repair or interface as follows:

.1 Typical column section: approximately 10” on-centre.
.2 Lap locations for vertical reinforcing steel: approximately 6” on-centre.
.3 Anode spacing will vary with changes in the reinforcing steel density, the level of chloride in the structure and the corrosively of the local environment, etc.

.3 Provide sufficient clearance between anodes and substrate to allow repair material to encase anode.

.4 Secure the galvanic anodes as close as possible to the patch edge using the anode tie wires.

.5 The tie wires shall be wrapped around the cleaned reinforcing steel and twisted tight to allow little or no free movement.

.1 If less than 1 inch (25 mm) of concrete cover is expected, place anode beside or beneath the bar and secure to clean reinforcing steel.

.2 If sufficient concrete cover exists, the anode may be placed along a single bar or at the intersection between two bars and secured to each clean bar.

.6 If repair materials with resistivity greater than 50,000 ohm-cm are to be used or the resistivity is unknown, create a conductive grout bridge between the anode and the substrate. Pack manufacturer approved mortar to cover minimum area of 4 in (100mm) in diameter between the anode and the substrate concrete ensuring no voids exist.

.7 Electrical Continuity

.1 Confirm electrical connection between anode tie wire and reinforcing steel by measuring DC resistance (ohm,Ω) or potential (mV) with a multi-meter.

.2 Electrical connection is acceptable if the DC resistance measured with multi-meter is less than 1 Ω or the DC potential is less than 1 mV.

.3 Confirm electrical continuity of the exposed reinforcing steel within the repair area. If necessary, electrical continuity shall be established with steel tie wire.

.4 Electrical continuity between test areas is acceptable if the DC resistance measured with multi-meter is less than 1 Ω or the potential is less than 1 mV.

3.3 CONCRETE OR MORTAR REPLACEMENT

.1 Pre-wet the concrete surface and the anode units to achieve a saturated surface dry condition, and then complete the repair according to the appropriate Section.

.2 Do not soak the anode units for greater than 20 minutes.

.3 Repair materials with significant polymer modification and/or silica fume content may have high resistivity. Similarly, if bonding agents are used, they shall have suitable conductivity. Do not use insulating materials such as epoxy bonding agents.

.4 Following normal concrete repair procedures complete the repair with the repair material, taking care not to create any air voids around the anode.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Fabrication and installation of stainless-steel diving platform and tank stair railings as shown on Drawings.

1.2 RELATED REQUIREMENTS

.1 Section 03 92 12 – Top Surface Concrete Repairs with Rapid-Setting Mortar.

.2 Section 26 05 26 – Grounding and Bonding.

1.3 REFERENCES

.1 ASTM International

.1 ASTM A307-21 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

.2 ASTM A554-26, Standard Specification for Welded Stainless Steel Mechanical Tubing.

.2 Canadian Standards (CSA International)

.1 CSA W48-23, Filler Metals and Allied Materials for Metal Arc Welding.

.2 CSA W59-24, Welded Steel Construction (Metal Arc Welding).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages and other items that are to be embedded in concrete. Deliver such items to Project site in time for installation.

.2 Coordinate with Section 03 92 12 – Top Surface Concrete Repairs with Rapid-Setting Mortar for installation of railings.

.3 Coordinate installation, wiring and connection of grounding and bonding as specified in Section 26 05 26 – Grounding and Bonding.

1.5 SUBMITTALS

.1 Shop Drawings:

.1 Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

.2 Indicate welded connections using standard welding symbols. Indicate net weld lengths.

.3 For items specified to conform to structural performance requirements, prepare Shop Drawings under direct supervision of a professional engineer responsible for their preparation.

.1 Include component structural and physical characteristics, calculations, dimensional limitations.

.2 Each shop drawing to bear seal and signature of the professional engineer registered in the Province of Manitoba.

1.6 QUALITY ASSURANCE

.1 Fabricator Qualifications: Company specializing in performing work of this Section.

.2 Professional Engineer Qualifications: Structural engineer experienced in design and installation of work indicated, licensed in the Province where the Project is located.

.3 Welders' Certificates: Certifying welders employed on the Work, verifying qualification within the previous 12 months to CSA standards.

.4 Welded Steel Construction: CSA-W59.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

.1 Design the following and similar items required to withstand loads, including comprehensive engineering analysis by a professional engineer, using performance requirements and design criteria specified or indicated, as required by applicable code:

2.2 MATERIALS

.1 Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

.2 Stainless Steel Tubing and Hollow Structural Sections: To ASTM A554, Grade MT-316, seamless welded.

.3 Welding Materials: to CSA W59.

.4 Welding Electrodes: to CSA W48 Series.

.5 Bolts, Nuts, and Washers: ASTM A307.

2.3 FABRICATION

.1 General: Fabricate items to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish and anchorage, but not less that that required to support structural loads.

.2 Fit and shop assemble items in largest practical sections, for delivery to site.

.3 Fabricate items with joints tightly fitted and secured.

.4 Fabricate ladder with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

.5 Cut, drill and punch metals cleanly and accurately.

.6 Continuously seal joined members by intermittent welds and plastic filler in concealed locations; provide continuous welded in exposed locations.

.7 Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

.8 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

.9 Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

.10 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

.11 Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

.12 Provide connection of grounding and bonding as specified in Section 26 05 26 – Grounding and Bonding.

2.4 FINISH

.1 Remove or blend tool and die marks and stretch lines into finish.

.2 Grind and polish surfaces to produce uniform directional textured polished finish, free of cross scratches. Run grain with long dimension of each piece.

.1 Bright, directional polish: AISI No. 4 finish.

.2 When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.5 DIVING AND SPRINGBOARD PLATFORM GUARD RAILS

.1 Rectangular stainless steel fabricated to profiles shown on Drawings.

.2 Railing anchors: Embed railing posts into concrete as shown on Drawings.

.3 Submit shop drawings sealed by an engineer registered in the Province of Manitoba.

2.6 POOL TANK STAIR RAILING

.1 Round stainless steel fabricated to profiles shown on Drawings.

.1 Pipe diameter: 1.90”.

.2 Wall thickness: 0.145”.

.3 Material: 316 Stainless steel.

.4 Base plate: 316 Stainless steel.

.5 Welding materials: to CSA W59.

.2 Railing anchors:

.1 Stainless steel threaded bolt inserts embedded into mortar bed.

.2 Quantity, spacing, and length by railing manufacturer.

.3 Designed for continuous immersion in pool tank water.

.4 Basis of Design:

.1 Anchor: Hilti-HS-RN 316 SS.

.1 Diameter: to match existing.

.2 Adhesive: Hilti HIT RE 500 V3.

.3 Submit shop drawings sealed by an engineer registered in the Province of Manitoba.

Part 3 Execution

3.1 EXAMINATION

.1 Verify existing conditions before starting work.

.2 Verify that field conditions are acceptable and are ready to receive work.

.3 Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

.1 Supply steel items required to be cast into concrete with setting templates to appropriate sections.

3.3 INSTALLATION

.1 Install items plumb and level, accurately fitted, free from distortion or defects.

.2 Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

.3 Field weld components indicated on Shop Drawings. Perform field welding to CSA requirements.

.4 Obtain approval prior to site cutting or making adjustments not scheduled.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 This Section specifies fire stop and smoke seal systems and materials intended to fill gaps between fire separations, between fire separations and other construction assemblies, or used in or around items which fully or partially penetrate a fire separation, to restrict the spread of fire and smoke thus maintaining the integrity of a fire separation.

.2 This Section includes requirements for:

.1 Through-penetration fire stops:

.1 For openings created to allow a penetrating item such as piping, conduits, raceways, ducts, cable trays, cables, tubing or structural components to pass completely through a fire separation or fire-resistance rated assembly.

.2 Membrane penetration fire stops:

.1 For openings where penetrating items such as piping, conduits, raceways, ducts, cable trays, cables, tubing, recessed components (e.g., panels, electric boxes, devices) or structural components pass through only one membrane of a fire separation or fire-resistance rated assembly.

.3 Blank opening fire stops:

.1 For openings created in a fire separation where the penetrating item has not yet been installed or has been removed.

.4 Construction joint fire stops:

.1 For locations where adjacent fire separations or components of fire separations meet. Locations include: ceiling/wall and roof/wall joints, wall/wall joints at corners or in the same plane, wall/floor joints, floor/floor joints and ceiling/ceiling joints.

.2 Includes fire stops for seismic joints, vertical control joints, expansion joints, and joints which occur at the tops and bottoms of fire separation walls.

.3 This Section includes fire stopping and smoke seal work for the entire Project including selection, installation and inspection of all required fire stops.

1.2 RELATED SECTIONS

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

.2 Mechanical and Electrical specification

1.3 DEFINTIONS

.1 Fire Blocking: materials, components or system installed in a concealed space in the building to restrict the spread of fire and smoke in that concealed space or from that concealed space to an adjacent space 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.

.2 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.

.3 Fire-Resistance Rating: 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-S101 or as determined by formal testing of material or assembly of materials, meeting requirements of CAN/ULC-S115, or an interpretation of information derived from formal testing in accordance with requirements of the Building Code and acceptable to the Authority Having Jurisdiction (AHJ).

.4 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 loadbearing walls and partitions.

.2 Penetration-Type Fire Stop systems located within non-loadbearing 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.

.5 Fire Stop: material, component or system, and its means of support, used to protect gaps between fire separations, between fire separations and other construction assemblies, or used in openings where penetrating items wholly or partially penetrate fire separations, to restrict the spread of fire and smoke thus maintaining the fire-resistance continuity of a fire separation.

.6 Fire Stop System: a specific site erected construction consisting of the assembly, fire stop materials, any penetrating items and their means of support which have met the requirements for an F, FT, FH, FTH and/or L rating when tested in a fire-resistance rated assembly in accordance with CAN/ULC-S115.

.1 F-Rating: the amount of time a fire stop system can remain in place without the passage of flame through the opening or the occurrence of flaming on the unexposed face of the fire stop.

.2 FT-Rating: a fire stop system with an F-Rating for the required time period which can also resists the transmission of heat through the fire stop during the same period and limit the rise in temperature on the unexposed face and/or penetrating item of the fire stop

.3 FH-Rating: a fire stop system with an F-Rating for the required time period which can also resist the force of a hose stream without developing openings for a prescribed period.

.4 FTH-Rating: a fire stop system with an FT-Rating for the required time period which also passes the hose stream test for a prescribed period.

.5 L-Rating: largest test sample leakage rate, determined in accordance with the optional air leakage test in CAN/ULC-S115.

.7 Multi-penetration: two or more service penetrations through an opening in the fire separation.

.8 Non-rated Fire Separation: fire separation acting as a barrier to the spread of smoke until a response is initiated such as the activation of a fire suppression system.

.9 Single-penetration: single service penetration through an opening in the fire separation.

.10 System Design Listing: document providing proof of testing with technical details, specifications and requirements that leads to the application of a specific listed fire stop system.

1.4 REFERENCE STANDARDS

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

.1 ASTM A1008/A1008M-13 Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable

.2 ASTM C719-14, Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)

.3 ASTM C920-14, Standard Specification for Elastomeric Joint Sealants

.4 ASTM E84-21, Standard Test Method for Surface Burning Characteristics of Building Materials

.5 ASTM E119-20, Standard Test Methods for Fire Tests of Building Construction and Materials

.6 ASTM E136-19A, Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 degrees

.7 ASTM E595-15, Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment

.8 ASTM E814-13a, Standard Test Method for Fire Tests of Penetration Firestop Systems

.9 ASTM E1966 15, Standard Test Method for Fire Resistive Joint Systems

.10 ASTM E2032-09, Standard Guide for Extension of Data From Fire Resistance Tests Conducted in Accordance with ASTM E 119.

.11 ASTM E2174-20A, Standard Practice for On-Site Inspection of Installed Firestops.

.12 ASTM E2393-20A, Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers

.2 Firestop Contractors International Association (FCIA):

.1 FCIA Firestop Manual of Practice, 6th Edition 2015

.3 Factory Mutual Approvals (FM):

.1 FM 4990-2009, Approval Standard for Fire stopping

.2 FM 4991-2013, Approval Standard for Firestop Contractors

.4 International Accreditation Service (IAS):

.1 IAS AC291-19, Accreditation Criteria for Special Inspection Agencies

.5 International Firestop Council (IFC)

.1 IFC Guidelines for Evaluating Engineering Judgments

.2 IFC Guidelines for Evaluating Engineering Judgments-Perimeter Fire Barrier Systems

.3 IFC Inspection Guidelines for Penetration Firestop Systems and Fire Resistive Joint Systems in Fire Resistance Rated Construction, 5th Edition

.6 National Fire Protection Agency (NFPA):

.1 NFPA 251-2006, Standard Methods of Tests of Fire Endurance of Building Construction and Materials

.7 National Research Council Canada (NRC):

.1 National Building Code of Canada (NBC) 2015

.2 Best Practice Guide on Fire Stops and Fire Blocks and Their Impact on Sound Transmission 2007

.8 ULC Standards (ULC):

.1 CAN/ULC-S101-14, Standard Method of Fire Endurance Tests of Building Construction and Materials

.2 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

.3 CAN/ULC-S114-05, Standard Method of Test for Determination of Non-Combustibility in Building Materials

.4 CAN/ULC-S115-11, Standard Method of Fire Tests of Firestop Systems

.9 Underwriters Laboratories Inc. (UL):

.1 UL 1479-2015, Fire Tests of Penetration Firestops

.2 UL Qualified Firestop Contractor Program.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Hold pre-installation meeting one week before beginning Work of this Section, with Contractor, Subcontractor, Contract Administrator in accordance with Section 01 31 19 – Project Meetings to:

.1 Verify Project requirements.

.2 Review sustainable requirements.

.3 Review installation and substrate conditions.

.4 Discuss coordination with other Subcontractors.

.5 Review system design listings, manufacturer's installation instructions and warranty requirements.

.6 Review quantity and location of mock-ups.

.2 Hold pre-installation meetings with other trades to review:

.1 Installation procedures and precautions.

.2 Location, scheduling and sequencing of other work around fire stops that can affect the outcome of the installation.

.3 Requirements for annular opening sizes.

.4 Requirements and preparations for wall/floor single and multi-penetrations.

.5 Requirements for construction and perimeter joints.

.6 Mock-up requirements.

.3 Submit copies of applicable listed fire stop system details to each trade for opening preparation. Include installation details required for the listed system.

.4 Meeting minutes: Contractor to take minutes of pre-installation meetings and distribute to Contract Administrator and each affected trade.

.2 Sequencing:

.1 Proceed with installation only when submittals have been reviewed by Contract Administrator.

.2 Pipe and duct insulation: Certified fire stop system component.

.1 Ensure pipe and duct insulation installation precedes fire stopping

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Qualification Statement:

.1 Submit contractor qualification statements and certificates demonstrating compliance with the qualification requirements of this Section, as described in PART 1-QUALITY ASSURANCE, within Ten working days after award of contract and before starting Work.

.3 Product Data:

.1 Submit manufacturer's product data for each type of fire stopping and smoke seal. Submit complete product data for each individual component and include:

.1 Product name and product number

.2 Product characteristics and performance criteria

.3 Physical size, finish and limitations

.4 Technical data on out-gassing, off-gassing and age testing

.5 Curing time

.6 Chemical compatibility to other construction materials

.7 Shelf life

.8 Life expectancy

.9 Temperature range for installation

.10 Humidity range for installation

.11 Sound attenuation STC-Rating

.2 Manufacture Product Certification:

.1 Submit manufacturer certification certifying products supplied comply with local regulations controlling use of Volatile Organic Compounds (VOC's) and are non-toxic to building occupants.

.2 Submit test reports showing compliance to ASTM E595.

.3 Submit one copy of WHMIS Safety Data Sheets (SDS) for each individual component

.4 Submit a comprehensive list of all products and components included in submittal

.4 Shop Drawings:

.1 . Submit shop drawings showing system design listings for Project including proposed materials, reinforcement, anchorage, fastenings and method of installation.

.2 Construction details to accurately reflect actual job conditions for each product and assembly.

.3 Submit details for materials and prefabricated devices.

.4 Submit electronic copy of shop drawings and include:

.1 Title page, labelled "Fire and Smoke Stop System Listings". Include project name, date and the names of the installation company and the manufacturer of proposed products. Insert title in front and spine of binder.

.2 Table of Contents at front of each binder.

.3 List of each proposed listed fire stop system and corresponding service penetration type or joint type in a matrix spreadsheet schedule, indicating floor and wall system, including rating for each.

.4 Location of penetrations:

.1 Drawings showing the location of each penetration with a unique penetration identification number and associated listing number.

.2 Schedules listing each penetration with a unique identification number, their associated listing number, organized by floor, wall and ceiling area and indicating each room number.

.5 System Design Listings:

.1 Submit design listings for each listed fire stop system and each application identified in accordance with CAN/ULC-S115

.2 When more than one product is specified for the listed fire stop system or more than one packing/damming material is indicated, identify the item that will be used on this Project.

.6 Certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical proper

.5 Manufacturer's Instructions: Submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures:

.6 Quality Assurance Submittals: Submit the following in accordance with Section 01 40 00 – Quality Requirements:

.1 Test reports in accordance with CAN/ULC-S101, CAN/ULC-S102, and CAN/ULC-S115.

.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-S115 and the EJ guidelines provided by the National Research Council, Best Practice Guide on Fire Stops and Fire Blocks and Their Impact on Sound Transmission.

.3 Certificates: Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.4 Manufacturer's Instructions: Submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

.5 Manufacturer's Site Reports: Submit manufacturer's reports within three days of review, verifying compliance of Work, as described in SITE QUALITY CONTROL in Part 3 of this Section

.7 Engineering Judgements (EJ):

.1 Where there is no specific tested listed fire stop system available from the manufacturer for a particular fire stop configuration, review systems from other manufacturers to obtain a listed fire stop system.

.2 Submit an EJ from the system manufacturer if there are no listed systems available from other manufacturers.

.3 Prepare and submit an EJ in accordance with best practices established in the following documents:

.1 IFC Guidelines for Evaluating Engineering Judgments.

.2 IFC Guidelines for Evaluating Engineering Judgments-Perimeter Fire Barrier Systems.

.4 For each EJ submitted, include:

.1 Project name, number and location.

.2 A description of the proposed system with detailed drawing.

.3 Installation instructions.

.4 Complete descriptions of critical elements for the fire stop configuration.

.5 Copies of all referenced system design listings which EJ is based on.

.6 EJ issuer name and contact information.

.7 Date of issue of EJ with authorization signature of issuer.

.5 EJ shall only be issued by fire stop manufacturer's qualified technical personnel or in collaboration with the manufacturer by a knowledgeable registered Professional Engineer, a Fire Protection Engineer or an independent testing agency that provides testing and listing services for fire stop systems similar to the EJ being contemplated.

.6 EJ shall be based upon interpolations of previously tested fire stop systems that are either sufficiently similar in nature or clearly bracket the conditions upon which the EJ is to be given. Additional knowledge and technical interpretations based upon accepted engineering principles, fire science and fire testing guidelines (e.g., ASTM E2032) may also be used as further support data.

.7 EJ shall be based upon knowledge of the elements of the construction to be protected and understanding of the probable behaviour of that construction and the recommended fire stop system protecting it were they to be subjected to the adequate standard fire test method for the required fire rating duration.

.8 EJ shall be limited to the specific conditions and configurations for which it was created and should be based upon reasonable performance expectations for the recommended fire stop system under those conditions.

.9 EJ shall be accepted only for a single specific job and location and should not be transferred to any other job or location without thorough and appropriate review of all aspects of the next job or location's circumstances.

.1 Manufacturer letter stating their opinion, with supporting justification, that the EJ will perform as a fire stop system when subjected to the appropriate standard fire test method for the required fire rating duration.

.10 Once the EJ has been reviewed, submit to the AHJ for final approval

.8 Sustainable Design Submittals:

.1 Low-Emitting Materials: submit listing of paints and coatings to comply with VOC and chemical component limits or restrictions requirements

.9 Closeout Submittals:

.1 Submit in accordance with Section 01 78 00 – Closeout Submittals.

.10 Operation and Maintenance Data: Submit maintenance data for incorporation into manual, including:

.1 WHMIS Safety Data Sheets (SDS),

.2 product data and manufacturer's installation and maintenance instructions for each product/system used on this project,

.3 approved system design listings and EJs, and

.4 matrix schedule listing all system design listings and EJs with a description of their penetration or joint type.

.5 Certifications:

.1 Provide proof of training for each worker that performed installation on the Project.

.2 Provide proof of company installing fire stopping and smoke sealsis a Member in Good Standing with FCIA.

.3 Certification of company as a ULC Qualified or FM 4991 Approved Firestop Contractor, including the Designated Responsible Individual (DRI) certificate.

.4 Accreditation of third-party inspection firm

.6 Manufacturer's field reports.

.7 Warranty information on fire stop installations.

.8 Life expectancy of each product installed as part of Project. For each system, list the installation date of products and the expected expiration date (month/year)

.11 Record Documentation

.1 Maintain a daily log of all activities on site during the course of construction. Submit a copy of all daily logs after completion of fire stopping work.

.2 As-built Drawings:

.1 Submit a marked-up set of Drawings to provide referencing system identifying the location of each fire stop.

.2 Identify each penetration type fire stop with their penetration identification number.

.3 Provide detailed Drawings of system design listings for each type of fire stop (i.e., through-penetration, membrane penetration, blank opening, construction joint, building perimeter).

.4 Fire Stop Schedules:

.1 Submit complete fire stop schedules for floors, walls and ceilings.

.2 Indicate all penetration fire stops and joint fire stops through each reference wall, floor and ceiling in the schedules.

.3 Cross-reference firestop schedules with as-built drawings and indicate design listing numbers associated to each penetration fire stop and joint fire stop.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: Use materials and methods of determining required thickness of application that have the full acceptance of AHJ and that are tested in accordance with CAN/ULC-S115, and form a part of a ULC or cUL listed system, Engineered Judgement or Equivalent Fire Resistance Rated Assembly.

.2 Provide systems selection and analysis, installation and inspection of fire stop systems in accordance with the recommended practices detailed in the following guides:

.1 FCIA Firestop Manual of Practice (MOP).

.3 Qualifications:

.1 Contractor specializing in selection and installation of fire stops with five years documented experience. Submit a list of five successfully completed projects of similar scale and type.

.2 The installers are recognized as a Member in Good Standing with the Firestop Contractors International Association (FCIA). Submit proof of current membership.

.3 Training: Workers, including site supervisor, to complete:

.1 Manufacturers training on the products/systems installed as part of this Section.

.2 Training under the FCIA Firestop Containment Worker Education Program.

.4 Certified Firestop Contractor: company certified with one of the following programs:

.1 ULC Qualified Firestop Contractor Program. Submit signed copy of certificate.

.2 FM 4991 Approved Firestop Contractor. Submit signed copy of FM Approval certificate.

.5 Third-Party Inspection Firm: IAS AC291 Accredited inspection agency with inspectors who have passed the ULC Firestop Exam or FM Firestop Exam.

.2 Mock-ups:

.1 Construct mock-up of fire stop systems in accordance with Section 01 40 00 – Quality Requirements.

.2 Before beginning construction, provide mock-up of each proposed listed fire stop system for review by Contract Administrator. Mock-up shall include work by other trades to demonstrate the required finish work, such as steel stud/gypsum board trade framing out multi-penetration openings.

.3 Install proposed identification labels for each penetration.

.4 Locations for mock-ups as directed by the Contract Administrator

.5 After mock-up completion and adequate curing time for materials, provide a minimum of 48 hours notification to Contract Administrator to conduct review.

.6 Correct mock-up deficiencies as directed by Contract Administrator. Mock-up may remain as part of finished work.

.7 Contract Administrator may perform destructive tests to each mock-up to ensure the system meets or exceeds the approved system design listing

1.8 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Perform in accordance with Section 01 61 00 – Common Product Requirements.

.2 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings, manufacturing date, shelf life expiry date.

.2 Storage and Protection:

.1 Store materials in a well-ventilated, dry indoor location and in accordance with manufacturer's instructions.

.2 Coordinate delivery of materials with scheduled installation dates to allow minimum storage time on site.

.3 Comply with recommended procedures, precautions and measures described in WHMIS Safety Data Sheets (SDS).

1.9 AMBIENT CONDITIONS

.1 Ambient Conditions:

.1 Install fire stops and smoke seals when ambient and substrate temperatures are within the limits prescribed by the manufacturer and when the substrate is dry and without risk of condensation.

.2 Maintain manufacturer's recommended ambient and substrate temperatures for 48 hours before and 72 hours after installation.

.2 Ventilate fire stops and smoke seals in accordance with manufacturers' instructions by natural means or, where this is inadequate or not available, use forced air circulation.

1.10 WARRANTY

.1 Extend 12 month warranty period to 24 months for Work of this Section.

.2 Manufacturers shall warrant work of this Section against defects and deficiencies in the product material for a period of 24 months. Promptly correct any defects or deficiencies which become apparent within warranty period at no expense.

.3 Contractor warrants workmanship on materials and installation for a period of 24 months. Promptly correct any defects or deficiencies which become apparent within warranty period at no expense

Part 2 Products

2.1 MANUFACTURERS

.1 Provide products from a single manufacturer, to the greatest extent possible, to perform all fire stopping work. Materials of different manufacturers will not be permitted without authorization from Contract Administrator.

.2 Provide a listed system from an alternative where there is no specific tested listed fire stop system available from the manufacturer for a particular fire stopping application to avoid providing an Engineering Judgment.

2.2 PERFORMANCE / DESIGN CRITERIA

.1 Fire stop and smoke seal systems consisting of a material or combination of materials installed to maintain the integrity of the fire-resistance rating of a fire separation in accordance with the requirements of the NBC.

.2 Performance Requirements: Manufacturer shall design proprietary assemblies to withstand the listed ratings in accordance with the NBC, ULC Standards, and AHJ, and as follows:

.1 Non-rated fire separations: Provide L-Rated smoke protection fire stop system for application on both sides of separation.

.2 Provide through-penetration fire stop 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 penetrated assembly, such as:

.1 Fire-resistance rated loadbearing walls, including partitions, with fire protection rated openings.

.2 Fire-resistance rated non-loadbearing walls, including partitions with fire protection rated openings.

.3 Fire resistance rated floor assemblies

.3 “F” Rated Systems: Provide through-penetration fire stop systems with F-ratings indicated, as determined by CAN/ULC-S115 or ASTM E814, and equal to or

exceeding the fire-resistance rating of the penetrations created during construction.

.4 "T" Rated Systems: Where fire stop systems protect penetrating items from potential contact with adjacent materials, provide through-penetration fire stop systems with T-ratings and F-ratings indicated, as determined by CAN/ULC-S115 or ASTM E814, for the following conditions:

.1 Penetrations located outside wall cavities.

.2 Penetrations located outside fire resistive shaft enclosures.

.3 Penetrations located in a construction containing fire protection rated openings.

.4 Penetrating items larger than a 100-mm-diameter nominal pipe or 100 cm^2 in overall cross-sectional area.

.5 Fire stopping and Smoke Seal Systems Exposed to View: Provide products that after curing do not deteriorate when exposed to view, traffic, moisture, and physical damage both during and after construction, and as follows:

.1 Provide moisture resistant through-penetration fire stop systems for piping penetrations for plumbing and wet pipe sprinkler systems.

.2 Provide fire stopping and smoke seal systems capable of supporting anticipated floor loads 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 fire stopping and smoke seal 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 fire stopping, smoke seal, and joint systems exposed to view.

.5 Architectural considerations: When fire stop system is exposed to view, consider architectural finish, potential traffic, and exposure to moisture and heat.

.6 Fire Resistance of Joint Systems: Assembly ratings and movement capabilities shall be as indicated with assembly ratings equal to or exceeding the fire-resistance rating of constructions in which joints are located.

.3 Acoustic insulation properties as indicated on drawings.

.4 Dynamic Joints: Where required, design fire stop and smoke seal systems to accommodate a defined amount of movement in structural elements, construction joints and mechanical piping caused by expansion or contraction. Systems should also accommodate movement and sound and vibration control in mechanical installations.

.5 Insulated Pipes and Ducts: Design and test listed fire stop system with the actual insulation materials penetrating the fire separation, as indicated on the system design listing.

.6 Use in Wet Areas: water-based products are unacceptable in wet areas or areas that may be subject to occasional water exposure or flooding during and after construction.

.7 Environment Considerations: Select materials taking into consideration the environment in which they will be used during and after curing, as well as the intended use of the space. Confirm compatibility of the proposed materials/products with fire stop manufacturer for the following situations:

.1 Spaces requiring resistance to infection and biological spread through assemblies.

.2 Spaces containing sensitive electronic equipment.

.3 Preventing contamination of laboratory and manufacturing environments.

2.3 MATERIALS

.1 Compatibility: Under conditions of service and application, provide fire stopping and smoke seal systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating the systems, as demonstrated by fire stopping and smoke seal system manufacturer based on testing and site experience, and as follows:

.1 Asbestos-free materials and systems capable of maintaining an effective barrier against the passage of flame, smoke and water and the transmission of heat in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended, as indicated on System Design Listing.

.2 Fire Stop System Rating: To match fire-resistance rating of fire separation as indicated on Drawings.

.3 Service penetration assemblies and fire stop components: Certified by testing laboratory to CAN/ULC-S115.

.4 Provide elastomeric seal or non-shrink foam cement mortar for fire and smoke stop systems at openings intended for re-entry, such as cables. Do not use cementitious or rigid seal at such locations.

.5 Provide elastomeric protection for fire and smoke stop systems at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control. Do not use a cementitious or rigid seal at such locations. Exemption for fire dampers.

.6 Provide elastomeric seal for fire and smoke seals behind and around mechanical and electrical boxes within wall, floor, and ceiling assemblies.

2.4 FILL MATERIALS

.1 General:

.1 Provide fire stopping and smoke seal systems containing the types of fill materials indicated in SCHEDULE in Part 3 of this Section 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 Fire stopping and smoke seal systems shall be tested in accordance with CAN/ULC-S115 and be comprised of asbestos free materials and systems capable of maintaining an effective barrier against flame, smoke and gases. Fire stopping and smoke seal systems not to exceed opening sizes for which they are intended for the ratings as indicated on Drawings.

.2 Cast-in-Place Fire Stopping and Smoke Seal 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 curing do not re-emulsify during exposure to moisture.

.4 Fire Stopping and Smoke Seal 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

.2 Pre-manufactured sleeves, consisting of an adjustable core

.3 Pre-manufactured cable management system, consisting of a system of intumescent inserts and adjustable cores

.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 Intumescent, Latex Sealant: Single-component, intumescent, latex formulation.

.11 Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce a paintable compound, passing ASTM E136, with flame-spread and smoke-developed ratings of zero per ASTM E84.

.12 Solvent-Release-Curing Intumescent Sealant: Solvent-release-curing, single-component, synthetic-polymer-based sealant of grade indicated below:

.1 Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces. Non-sag formulation for openings in vertical and other surfaces requiring a non-slumping/gunnable sealant, unless indicated fire stop system limits use non-sag grade.

.13 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.

.14 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.

.15 Silicone Foams: Multi-component, silicone based liquid elastomers that, when mixed, expand and cure in-place to produce a flexible, non-shrinking foam.

.16 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.

.17 Ceramic-Fibre and Mastic Coating: Ceramic fibres in bulk form formulated for use with mastic coating, and ceramic fibre manufacturer's mastic coating.

.18 Ceramic -Fibre Sealant: Single-component formulation of ceramic fibres and inorganic binders.

2.5 MIXING

.1 For those products requiring mixing before application, comply with fire stopping and smoke seal system manufacturer's 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.

2.6 FIRE RESISITICE ELASTOMERIC JOINT SEALANTS

.1 Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer that comply with ASTM C920 requirements,

including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.

.2 Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.

.1 Additional Movement Capability: When tested for adhesion and cohesion under maximum cyclic movement per ASTM C719, provide sealant with the capability to withstand the changes in joint width existing at the time of installation, and remain in compliance with other requirements of ASTM C920.

.3 Multicomponent, Non-sag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.

.1 Additional Movement Capability: When tested for adhesion and cohesion under maximum cyclic movement per ASTM C719, provide sealant with the capability to withstand the change in joint width existing at the time of installation, and remain in compliance with other requirements of ASTM C920.

.4 Single -Component, Non-sag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.

2.7 FIRE STOP IDENTIFICATION

.1 Identification Labels and Markings: Permanent for the expected service life of the installation.

.2 Fire Stopped Penetrations:

.1 Provide identification labels at each penetration.

.2 Identification labels: adhesive plastic stickers with the following information:

.1 penetration number

.2 floor number

.3 room number

.4 product name and number

.5 system design number

.6 fire rating required in hours.

.7 fire stop contractor's name and phone number

.8 installer's name

.9 date of installation

.10 re-penetrated by: company, installer and date

.3 Indicate on label that fill material around the penetration is a fire stop system and shall not be disturbed except by authorized personnel.

.3 Fire Separation (Barrier) Markings:

.1 Provide identification for all vertical fire separations.

.2 Identification markings: adhesive, tamper evident stickers with lettering at least 75 mm in height with a minimum 10-mm stroke in contrasting colour.

.3 Incorporate assembly's fire-resistance rating and the following suggested wording, "FIRE AND/OR SMOKE BARRIER-PROTECT ALL OPENINGS", or other accepted wording.

.4 Include horizontal red painted line, 75 mm in width, between identification markings

2.8 ACCESSORIES

.1 Provide components for each fire stopping and smoke seal system needed to install fill materials. Use only components specified by fire stopping and smoke seal system manufacturer and approved by the qualified testing and inspecting agency for fire stopping and smoke seal systems indicated on Drawings.

.2 Primers: To manufacturer's recommendation for specific material, substrate, and end use.

.3 Water (if applicable): Potable, clean and free from harmful amounts of deleterious substances.

.4 Metal Fire Stop: Commercial galvanized steel, to ASTM A1008/A1008M, zinc coating 260 g/m^2, minimum metal core thickness 0.912 mm.

.5 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

.6 Packing/Damming Materials, Supports and Anchoring Devices: To manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to AHJ.

.7 Fire Stop Insulation: Pre-formed, semi-rigid, non-combustible mineral wool, pre-cut in 1220-mm lengths to required depth and width.

.8 Junction Box/Outlet Sealing Putty: Intumescent putty, pre-formed in pads.

.9 Sealants: Good adhesion without use of primer, high visibility safety colours.

.1 Flame-spread rating: Maximum 25

.2 Smoke development classification: Maximum 50

.3 For vertical joints: Non-sagging

.4 For horizontal joints: Single component, self-levelling

Part 3 Execution

3.1 MANUFACTURE'S INSTRUCTIONS

.1 Compliance: comply with manufacturers written recommendations or specifications including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXAMINATION

.1 Verify that conditions of substrates previously installed are acceptable for product installation in accordance with manufacturer's instructions and approved system design listings for each condition.

.2 Verify each opening/annular space to ensure it does not exceed the maximum and minimum dimensions indicated on the approved system design listing.

.3 Verify that all joints, service penetrating elements and supporting devices/hangers have been properly installed as indicated on approved system design listings. Remove all temporary lines and markings to meet the approved system design listings.

.4 Verify that proposed fire stop system consists of components that are compatible with each other, with substrates forming the openings, and with items, if any, penetrating the fire stop under conditions of application and service, as demonstrated by the fire stop manufacturer based on testing and site experience.

.5 Pipe and Duct Insulation: Confirm that proposed fire stop system has been tested with the actual insulation penetrating the fire separation on site, as indicated in the approved

system design listing. Maintain insulation around pipes and ducts penetrating the fire separation.

.6 Ensure no additional items have been installed through opening that does not appear on the approved system design listing.

.7 Ensure fire stopped areas are accessible for proper application and that conditions are suitable for installation of the fire stop system. Areas to remain accessible for inspection.

.8 Report in writing to Contract Administrator any defective surfaces or conditions affecting the fire stop system installation immediately and before commencing any installations.

.9 Proceed only once defected surfaces or conditions have been corrected.

.10 Proceed with installation only after unacceptable conditions have been remedied.

3.3 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 Ensure substrates and surfaces are free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.

.2 Prepare surfaces in contact with fire stop and smoke stop materials to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

.5 Protect adjacent work areas and finish surfaces from damage during product installation.

.6 Prime surfaces as required.

.7 Ensure multi-penetration openings have been framed and boarded out around annular openings, as indicated in the system design listing before prepping the opening.

3.4 INSTALLATION

.1 Install fire stop and smoke seal materials and components in accordance with manufacturer's certified tested system listing.

.2 Coordinate with other sub-trades to ensure that all pipes, conduits, cables, and other items, which penetrate fire separations, have been permanently installed before installation of fire stop systems.

.3 Schedule work to ensure that fire separations and all other construction that conceals penetrations are not erected before installation of fire and smoke seal systems

.4 Seal holes or voids made by through-penetrations, poke-through termination devices, and un-penetrated openings or joints to ensure that both 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 per manufacturer's instructions.

.6 Tool or trowel exposed surfaces to neat finish.

.7 Remove excess compound promptly as work progresses and upon completion.

.8 Protect gaps around recessed components (e.g., panels, electrical boxes, outlets) with sealing putty in accordance with manufacturer's instructions.

.9 Do not use damaged or expired material.

3.5 INSTALLATION – JOINT FIRE STOPS

.1 For sealant applications, install joint fillers to support fire stop materials during application. Position joint fillers to ensure fire stop material cross-sectional shape and thickness relative to the joint width allows for optimum sealant movement, while developing the required fire-resistance rating.

.2 Install fire stops using techniques recommended by the manufacturer:

.1 Fully wetting joint substrates to optimize adhesion.

.2 Completely filling recesses provided for each joint configuration.

.3 Tool non-sag fire stop materials immediately after their application and before the time skinning begins. Form smooth, uniform beads of configuration indicated or required to

.1 provide required fire-resistance rating,

.2 eliminate air pockets, and

.3 ensure contact and adhesion with sides of joint.

.4 Joint Systems and Perimeter Fire Containment Systems:

.1 For systems with dynamic joints, ensure movement capabilities of the installation meet or exceed the movement expectations of the system design listing and manufacturer's installation instructions.

3.6 INSTALLATION – THROUGH PENETRATION JOINT SEALANTS

.1 Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position required to achieve fire ratings of designated through-penetration fire stop systems.

.2 Install fill materials for through-penetration fire stop systems by techniques recommended by the manufacturer to produce the following results:

.1 Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.

.2 Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

.3 For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

.3 Remove combustible forming materials and other accessories not indicated as permanent components of fire stop systems.

3.7 IDENTIFICATION

.1 General:

.1 Clean substrate before applying identification.

.2 Determine final location of identification on site.

.3 Identification is not required on both sides of the fire separation.

.4 Refer to Drawings for locations of fire separations and rating required.

.2 Fire Stopped Penetrations:

.1 Install identification label adjacent to each fire stopped wall/floor service penetration. Provide one identification label per single opening or per grouping cluster.

.2 Securely apply identification to substrate by providing adequate adhesive

.3 Secure tags with metal fasteners or hang with metal chain or wire.

.4 Identification Identification shall be completely filled out and installed before requesting substantial performance.

3.8 REPAIRS AND MODIFICATIONS

.1 Identify damaged or re-entered seals requiring repair or modification.

.2 Remove loose or damaged materials. If adding penetrating items, remove sufficient material to insert new elements and to avoid damaging the balance of the seal.

.3 Ensure sealed surfaces are clean and dry.

.4 Use only only materials that are suitable for repair of original seal, as approved by manufacturer. Do not mix products from different manufacturers.

3.9 SITE QUALITY CONTROL

.1 Inspections: Notify Contract Administrator when ready for inspection and before concealing or enclosing fire stop materials and service penetration assemblies.

.2 Manufacturer's Field Services :

.1 Mock-ups: Manufacturer to provide confirmation that the fire stop system installed meets or exceeds the system design listing requirements for each mock-up application.

.2 Obtain report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Site Reports as described in SUBMITTALS in Part 1 of this Section.

.3 Provide manufacturer's site services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.10 INSPECTIONS

.1 Contract Administrator to conduct random inspections and direct exploratory review (i.e., destructive testing) during the course of construction and before closing off any concealed areas. Perform inspections and destructive testing in compliance with ASTM E2174 and ASTM E2393.

.1 Perform exploratory review as directed by Contract Administrator. Cut out fire stop and remove to ensure fire stop system installation meets or exceeds the system design listing as identified.

.2 Upon completion of construction and before requesting substantial performance review, fire stop contractor and manufacturer's representative shall inspect all fire stopping work and prepare a deficiency list. Submit deficiency list to Contract Administrator for review. Repair any deficiencies and re-inspect work to ensure that all deficiencies have been completed.

.3 Submit formal request for substantial performance review of work once all work is completed, quality control has been performed and all fire stop installations have been inspected and identified with the approved fire stop identification labels.

.3 Contract Administrator will conduct the substantial performance review in the presence of the fire stop Contractor and the manufacturer's representative

.4 Contract Administrator will conduct the substantial performance review in the presence of the fire stop Contractor and the manufacturer's representative.

3.11 CLEANING

.1 Perform cleaning in accordance with Section 01 74 00 – Cleaning and Waste Management.

.2 Remove equipment, excess materials and debris and clean adjacent surfaces immediately after application. Use methods and cleaning materials approved by manufacturer.

.3 Protect fire stops during and after curing period from contact with contaminating substances

.4 Remove temporary dams after initial set of fire stop and smoke seal materials

3.12 SCHEDULE

.1 Provide fire stop and smoke seal at:

.1 Fire stop and smoke seals are required only at:

.1 New penetrations that are formed as part of the scope of work for this project

.2 Existing penetrations that will be utilized as part of the scope of work for this project (not at existing penetrations that are not utilized for this project)

.2 All penetrations through walls including plaster, masonry, gypsum board partitions identified at fire separations

.3 All penetrations through floor slabs

.4 Openings and sleeves for future use through fire separations

.5 Around mechanical and electrical assemblies penetrating fire separations

.2 Provide smoke seal and acoustic seal:

.1 Us elastometric sealant (fire stop caulking) to provide smoke seals in smoke separations

.1 Penetrations (pipe, ducts, conduit, wiring and other penetrations)

.3 Design and provide through-penetration fire stopping and smoke seals as follows:

.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 foam blocks or boards

.5 intumescent spray foam

.4 Re-enterable and cable managed systems for electrical, and data and communications cables:

.1 prefabricated fire stop 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 fire stop 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 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

.7 Systems for groupings of penetrations, select one or more of the following fill materials:

.1 latex sealant

.2 intumescent wrap strips

.3 fire stopping and smoke seal device

.4 intumescent composite sheet

.5 intumescent foam blocks or boards

.6 intumescent spray foam

.4 Design and provide joint fire stopping and smoke seals 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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 05 50 00 – Metal Fabrications

1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM C542-05 , Standard Specification for Lock-Strip Gaskets.

.2 ASTM D790-17 , Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

.3 ASTM D1003-13 , Standard Test Method for Haze and Luminous Transmittance of Plastics.

.4 ASTM D1929-20 , Standard Test Method for Determining Ignition Temperature of Plastics.

.5 ASTM D2240-15e1 , Standard Test Method for Rubber Property - Durometer Hardness.

.6 ASTM E84-20 , Standard Test Method for Surface Burning Characteristics of Building Materials.

.7 ASTM E330-02 , Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.8 ASTM F1233-08 , Standard Test Method for Security Glazing Materials and Systems.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-12.1-M90 , Tempered or Laminated Safety Glass.

.3 Glass Association of North American (GANA)

.1 GANA Glazing Manual - 2008 .

.2 GANA Laminated Glazing Reference Manual - 2009 .

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Hold pre-installation meeting one week before beginning Work of this Section, with Contractor, Subcontractor, Contract Administrator in accordance with Section 01 31 19 – Project Meetings to:

.1 Verify Project requirements.

.2 Review installation and substrate conditions.

.3 Discuss coordination with other Subcontractors.

.4 Review system design listings, manufacturer's installation instructions and warranty requirements.

.5 Review quantity and location of mock-ups.

.2 Sequencing:

.1 Proceed with installation only when submittals have been reviewed by Contract Administrator.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's product literature and data sheets for glass, sealants and glazing accessories and include product characteristics. Performance criteria, physical size, finish and limitations

.2 Submit WHMIS SDS

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licenced in the Province of Manitoba

.4 Samples:

.1 Submit for review and acceptance of each type of unit.

.1 Samples to be one 300mm by 300mm unit.

.2 Sample to be tempered, laminated and include polished edges

.3 Samples will not be returned for inclusion into work.

.5 Certifications:

.1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00- Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for glazing for incorporation into manual.

1.6 QUALITY ASSURANCE

.1 Perform work in accordance with FGMA Glazing Manual for glazing installation methods.

.2 Mock-up: Construct Mock-ups in accordance with Section 01 40 00 – Quality Requirements

.1 Mock-up will be used:

.1 To judge quality of work, substrate preparations and material application

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and 01 61 00- Common Product Requirements.

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

.3 Storage and Handling Requirements:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect glazing and frames from nicks, scratches, and blemishes.

.3 Protect prefinished aluminum surfaces with strippable coating.

.4 Replace defective or damaged materials with new.

1.8 AMBIENT CONDITIONS

.1 Ambient Conditions:

.1 Install glazing when ambient temperature is 10 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.

Part 2 Products

2.1 MATERIALS

.1 Design Criteria

.1 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to design pressure to ASTM E330

.2 Flat Glass

.1 Tempered Safety Glass: to CAN/CGSB-12,1, transparent

.1 Type 2-tempered

.2 Class B Float

.3 Category 2

.4 Polished edges

.5 Thickness as indicated.

.2 Laminated Safety Glass: to CAN/CGSB-12,1, transparent

.1 Two layer of glazing

.2 SGP (ionoplast) interlayer

.1 To be clear and distortion free

.3 Polished edges

.4 Thickness as indicated.

2.2 ACCESSORIES

.1 Setting blocks: Per manufacturer’s standard type, 80-90 Shore A durometer hardness to ASTM D2240, to suit glazing method.

.2 Spacer shims: Per manufacturer’s standard type, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.

.3 Glazing tape:

.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper;

.4 Glazing Spines: resilient silicone, extruded shape to suit glazing channel retaining slot.

.5 Glazing Standoff:

.1 To be stainless steel appropriate for wet environments

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for glazing installation in accordance with manufacturer's written instructions.

.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 Visually inspect substrate.

.4 Inform Contract Administrator of unacceptable conditions immediately upon discovery.

.5 Proceed with installation only after unacceptable conditions have been remedied

3.2 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

.4 All surfaces receiving glazing material shall be thoroughly wiped with a clen cloth, dampened with the appropriate cleaner, as approved by the sealant/glazing tape manufacturer.

3.3 INSTALLATION: INTERIOR WET/DRY METHOD (TAPE AND SEALANT)

.1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.

.2 Cut glazing tape to length and install against permanent stops, projecting 1.6 mm above sight line.

.3 Place setting blocks at 1/3 points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of light or unit.

.5 Install removable stops, with spacer shims inserted between glazing and applied stops at 600 mm intervals, 6 mm below sight line.

.6 Fill gaps between light and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.

.7 Trim protruding tape edge.

3.4 INSTALLATION: INTERIOR DRY METHOD (TAPE AND SEALANT)

.1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.

.3 Place setting blocks at 1/3 points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.

.5 Place glazing tape on free perimeter of glazing in same manner described.

.6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

.7 Knife trim protruding tape

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning and Waste Management.

.1 Leave Work area clean at end of each day.

.1 Remove traces of primer, caulking.

.2 Remove glazing materials from finish surfaces.

.3 Remove labels.

.4 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning and Waste Management

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 After installation, mark each light with an "X" by using removable plastic tape or paste.

.1 Do not mark heat absorbing or reflective glass units.

.3 Repair damage to adjacent materials caused by glazing installation.

3.7 SCHEDULE

.1 Guardrails:

.1 Glazing to be Tempered and laminated glazing

.1 Thickness of glazing: as determined by professional engineer stamping and sealing the drawing.

.2 Laminations: quantity of laminations as determined by professional engineer stamping and sealing the drawing.

.3 Thickness of ionoplast interlayer: as determined by professional engineer stamping and sealing the drawing.

.2 Glazing Standoff:

.1 Quantity and spacing: as determined by professional engineer stamping and sealing the drawing.

.2 Fastening to guardrail: as determined by professional engineer stamping and sealing the drawing.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Ceramic tile, backing and installation at locations shown on Drawings.

1.2 RELATED SECTIONS

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

.2 Section 13 11 46 – Swimming Pool Accessories.

.3 Section 22 05 00 – Common Work Results for Plumbing.

.4 Section 26 05 26 – Grounding and Bonding.

1.3 MEASUREMENT PROCEDURES

.1 No measurement will be made under this section for preparation and installation tiles and associated items.

.2 Repair of cracks in concrete substrate exposed by removal of existing ceramic tiles and mortar bed will be a Unit Price in accordance with Section 01 22 00 – Unit Prices.

.3 Direct pull-out tensile testing of mortar bed will be measured and handled as a cash allowance as specified in Part E.

.4 Scanning of concrete for reinforcing steel to accommodate concrete testing will be measured and handled as a cash allowance as specified in Part E.

1.4 REFERENCES

.1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI).

.1 ANSI A108/A118/A136.1:2024, Specification for the Installation of Ceramic Tile.

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

.1 ASTM D1056-20, Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.

.2 ASTM F1869-23, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

.3 Canadian Standards Association (CSA)

.1 CSA- A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA A283-19, Qualification Code for Concrete Testing Laboratories.

.4 Public Health Act C.C.S.M.

.1 Manitoba Regulation 132/97 – Swimming Pools and Other Water Recreational Facilities Regulation.

.1 Manitoba Health, Seniors and Active Living Best Recommended Practices for the Construction and Design of Swimming Pools and Other Water Recreational Facilities – February 2017.

.5 Terrazzo Tile and Marble Association of Canada (TTMAC)

.1 Tile Specification Guide 09 30 00 2019/2021, Tile Installation Manual.

1.5 SUBMITTALS

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

.2 Product data: Submit product data showing:

.1 Each tile type, size, and shape required, including slip resistance and frost resistance where applicable.

.2 Tile chemical resistance to mortar and grout.

.3 Bonding agent characteristics

.4 Repair mortar and mortar bed

.5 Accessories specified including waterproofing membrane and reinforcing fabric.

.6 High performance, marine-grade sealants

.7 Tile setting mortar characteristics

.8 Each grout type, colour, and characteristics

.9 Grout sealer

.10 Cleaning compounds

.3 Manufacturer's technical information: Submit manufacturers standard technical information and colour charts for each product specified.

.4 Samples: Submit samples as follows:

.1 Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each tile colour, texture, size and pattern, including related trims and profiles at edges, corners, transition. Make samples at least 300mm square. Use grout of type and in colour or colours approved for completed Work. Adhere tile samples to 11mm thick plywood.

.2 Full-size units of each type of trim and accessory for each colour and finish required.

.5 Tiling Plans: Submit tiling plans giving all details of special fittings, expansion joints, joint layouts, etc. These plans and details must be submitted in sufficient time to allow for review & ordering of tiles so as not to cause a delay in the work.

.6 Qualification Statements:

.1 General:

.1 Submit the following information for each qualification statement project example:

.1 Name and location of project.

.2 Name and contact information for the:

.1 Building owner.

.2 Prime consultant.

.3 Name of prime contractor and site superintendent.

.4 Total contract value.

.5 Name of concrete restoration contractor and superintendent.

.6 Concrete restoration contract value.

.7 Date of construction.

.8 Description of prime project.

.9 Description of types of concrete restoration.

.2 Upon request by the Contract Administrator submit the following:

.1 Prime Contractor:

.1 Prime Contractor Qualification Statements:

.1 Minimum three project examples as prime contractor completed in the past five years demonstrating successful performance of the specified qualifications.

.2 Superintendent Qualification Statements:

.1 Minimum three project examples as a prime contractor site superintendent completed in the past five years

demonstrating successful performance of the specified qualifications.

.2 Ceramic Tiling Subcontractor:

.1 Ceramic Tiling Subcontractor Qualification Statements:

.1 Minimum three examples of local projects as a ceramic tiling subcontractor completed in the past ten years demonstrating successful performance of the specified qualifications.

.2 Ceramic Tiling Subcontractor Superintendent Qualification Statements:

.1 Minimum three examples of local projects as a ceramic tiling subcontractor superintendent completed in the past ten years demonstrating successful performance of the specified qualifications.

.3 Ceramic Tiling Manufacturer:

.1 Ceramic Tiling Manufacturer Qualification Statements:

.1 Minimum three examples of local projects as a ceramic tiling manufacturer completed in the past ten years demonstrating successful performance of the specified qualifications.

.4 Testing Agency:

.1 Certification confirming member in good standing with the Canadian Council of Independent Laboratories for the specified testing procedure(s).

1.6 CLOSEOUT SUBMITTALS

.1 Provide in accordance with Section 01 78 00 - Closeout Submittals.

.2 Maintenance data: submit maintenance data for incorporation into Operations and Maintenance Manual. Include:

.1 Cleaning and maintenance recommendations for The City's use.

.2 TTMAC Maintenance Guide. Provide specific warning of any maintenance practice or materials that may damage or disfigure finished work.

.3 Warranty: Submit final executed warranty.

.4 Extra materials:

.1 Provide minimum 5% of each type and colour of tile required for project for maintenance use. Store where directed.

.2 Maintenance material same production run as installed material.

1.7 QUALITY ASSURANCE

.1 Conform to TTMAC Manual, latest edition.

.2 Maintain one (1) copy of each document on site.

.3 Prime Contractor Qualifications:

.1 Prime Contractor:

.1 Engaged full time as a prime contractor with knowledge and experience in the risks, safety and environmental impacts involved in managing a ceramic tiling subcontractor completing ceramic tiling removal, preparation and installation as required by these Contract Documents.

.2 Prime Contractor Superintendent:

.1 Experienced as a prime contractor site superintendent with knowledge and experience in the risks, safety and environmental impacts involved in

supervising and coordinating a ceramic tiling subcontractor completing ceramic tiling removal, preparation and installation as specified by these Contract Documents.

.4 Ceramic Tiling Subcontractor Qualifications:

.1 Ceramic Tiling Subcontractor:

.1 Engaged full time as a ceramic tiling subcontractor with knowledge and experience in the risks, technical, safety and environmental impacts involved in ceramic tiling removal, preparation and installation as required by these Contract Documents.

.2 Ceramic Tiling Superintendent:

.1 Experienced as a ceramic tiling subcontractor site superintendent with knowledge and experience in the risks, technical, safety and environmental impacts involved in supervising and coordinating ceramic tiling removal, preparation and installation as specified by these contract documents.

.3 Ensure all personnel involved with ceramic tiling are adequately trained and familiar with the requirements of this and related ceramic tiling sections.

.5 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.

.6 Testing agency Qualifications:

.1 Independent third party testing agency certified:

.1 In accordance with CSA A283, and

.2 By the Canadian Council of Independent Laboratories (CCIL) for the testing procedures specified in related concrete sections.

1.8 MOCK-UP

.1 General:

.1 Locate where directed by the Contract Administrator and The City.

.2 Approved mock-up may remain as part of the Work.

.3 Approved mock-up will form standard of acceptance for remaining work.

.2 Field tile installation:

.1 Provide 3,000mm long by 6,000mm wide mock-up, with finish grout, and specified accessories.

.2 Mock-up to include control joints.

.3 Conduct minimum three direct pull-out tensile (bond) tests of mock-up.

.1 Measurement and payment of bond tests in accordance with Section 01 22 00 – Unit Prices.

.3 Tank deck lettering:

.1 Provide minimum 300mm wide by 3,000mm long mock-up of minimum two types of lettering.

.4 Tank deck/wall contrasting band:

.1 Provide minimum 1,500mm wide by 3,000mm long by 1,000mm high mock-up of ceramic tile installation with contracting colour bands.

1.9 PRE-INSTALLATION MEETING

.1 In accordance with Section 01 31 19 – Project Meetings.

.2 Convene and coordinate pre-installation conference for concrete restoration including the following sections:

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

.2 Section 13 11 46 – Swimming Pool Accessories.

.3 Section 22 05 00 – Common Work Results for Plumbing.

.4 Section 26 05 26 – Grounding and Bonding.

1.10 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

1.11 AMBIENT CONDITIONS

.1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 degrees C for 48 hours before, during, and after, installation.

.2 Do not install tiles at temperatures less than 12 degrees C or above 38 degrees C.

.3 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.

1.12 EXISTING CONDITIONS

.1 Coordinate with Section 01 32 00 – Construction Progress Documentation for the preparation and use of a 3D laser scan of the pool area and tank to record locations of:

.1 Existing fixtures and support anchors scheduled for removal and replacement.

.2 Existing lane markers.

.3 Difference in tile colour transitions.

1.13 WARRANTY

.1 Provide setting material Manufacturer's 10-year basic materials and labour warranty against breakdown or deterioration of the waterproof membrane and setting materials.

Part 2 Products

2.1 TILES

.1 Refer to Architectural Drawings.

2.2 CRACK SEALER

.1 Epoxy crack sealer: Sikadur 52 SLV by Sika.

2.3 MORTAR BED – POOL DECK FLOOR AND TANK FLOOR

.1 Two-component, shrinkage-compensated, polymer-modified, fast-setting cementitious repair mortar with corrosion inhibitor.

.2 Application thickness:

.1 As required to achieve finished tile thickness to match existing tile finished thickness.

.2 6mm to 50mm: Standard mix.

.3 50mm to 150mm: Extend with 10mm thoroughly washed sound, saturated surface-dry (SSD) pea gravel.

.3 Bonding agent: as recommended by manufacturer.

.4 Acceptable Products:

.1 Topcem Premix by Mapei with Planicrete AC by Mapei.

2.4 MORTAR BED – TANK WALLS:

.1 Two component, fast setting, polymer-modified, thixotropic, fibre reinforced cementitious repair mortar with corrosion-inhibitor.

.2 Application thickness:

.1 As required to achieve finished tile thickness to match existing tile finished thickness.

.2 Maximum thickness of 50mm.

.3 Bonding agent:

.1 As recommended by system manufacturer.

.2 Apply surface saturated dry (SSD) to substrate profile of CSP 5-7.

.4 Acceptable Product:

.1 Planitop 12 SR by Mapei.

2.5 BONDING AGENT

.1 In accordance with tile system manufacturer written directions.

2.6 WATERPROOFING MEMBRANE

.1 Membrane: Fast setting, flexible, thin, load bearing, premium latex-based waterproofing and crack isolation membrane complying with ANSI A118.10 and ANSI A118.12.

.2 Reinforcing fabric: Flexible, alkali-resistant, nonwoven polyester fabric.

.3 Acceptable Products:

.1 Membrane: Aquadefense by Mapei.

.2 Reinforcing fabric: Reinforcing fabric by Mapei.

2.7 TILE SETTING MORTAR

.1 Single component, polymer-modified premium thin-set mortar, complying with ANSI A118.4.

.2 Acceptable Product:

.1 Keraflex Super (grey) by Mapei.

2.8 GROUT MATERIALS

.1 Fine-aggregate. Fast-setting, polymer-modified, colour-resistant, non-shrinking, efflorescence-free grout.

.2 Colour: By The City based on manufacturer standard colour range.

.3 Acceptable Product:

.1 Ultracolor Plus by Mapei.

2.9 JOINT SEALANT/JOINT BACKING

.1 Type 1:

.1 Locations: Pool deck and other non-submersed locations within tile assembly.

.2 Joint Sealant: Mapesil T by Mapei.

.3 Joint Backing (ASTM D1056): round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.

.4 Teflon tape bond breaker tape for control joints.

.2 Type 2:

.1 Locations: Tank walls and floor and other fully submersed locations within tile assembly.

.2 Joint Sealant: Latisil by Laticrete.

.3 Primer: Latisil 9118 Primer by Laticrete.

.4 Joint Backing (ASTM D1056): round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.

.5 Teflon tape bond breaker tape for control joints.

2.10 ACCESSORIES

.1 No-Diving Symbol:

.1 Universal “No-Diving” symbol meeting requirements of:

.1 Manitoba Regulation 132/97, and

.2 Manitoba Health, Seniors and Active Living Best Recommended Practices for the Construction and Design of Swimming Pools and Other Water Recreational Facilities.

2.11 TRIM SHAPES

.1 Conform to applicable requirements of adjoining floor and wall tile.

.2 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.

.3 Internal and External Corners: provide trim shapes as follows where indicated.

.1 Bullnose shapes for external corners including edges.

.2 Coved shapes for internal corners.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance:

.1 Comply with manufacturer's written recommendations, instructions and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

.2 Proportion and mix materials in accordance with manufacturer’s most current written instructions and applicable ANSI standards.

3.2 DEMOLITION

.1 Demolish existing materials as shown on Drawings to allow preparation of surfaces for ceramic tiling installation.

3.3 EXAMINATION

.1 Prior to disassembly, measure and record existing locations of fixtures, components, anchors, and layout of lane and other pool markers. Coordinate with 3D scan specified in Section 01 32 00 – Construction Progress Documentation.

.1 Measure and record locations to within tolerances required by World Aquatics standards.

.2 Verify that surfaces are ready to receive work.

.3 Tile installation contractor to inspect substrate.

.1 Commencement of installation shall be considered acceptance of substrate.

.4 General Contractor shall be responsible for ensuring that the substrate, the overlay and underlayment meet the specification requirements or surface flatness tolerances.

.5 Contractor to verify surface conditions in structural slab comply with TTMAC.

.6 Conduct Calcium Chloride moisture emission testing of concrete substrate:

.1 In accordance with ASTM F1869.

.2 Frequency: minimum three independent floor test locations at each tank.

.3 Acceptable conditions: moisture emission not to exceed 2,26 kg/92m^2 per 24 hours (5 lbs per 1000 S.F. per 24 hours).

3.4 PREPARATION

.1 Disassemble and remove existing materials as shown on Drawings.

.2 Protect surrounding work from damage or disfiguration.

.3 Ensure that any contaminants, including but not limited to oils and solvents which may impact the bond of the thin-set are removed. The removal of such stains shall be included in the fixed price of the tile installation.

.4 Vacuum clean surfaces and damp clean.

3.5 CRACK SEALING WITH EPOXYCRACK SEALER

.1 At locations of cracks requiring repair identified by the Contract Administrator:

.1 Sawcut with 3mm blade along length of crack identified.

.2 Clean crack with vacuum.

.3 Infill crack with epoxy crack sealer.

.4 Top crack repair with silica sand to saturation.

.5 Remove loose sand.

3.6 INSTALLATION: MORTAR BED – POOL DECK FLOOR AND TANK FLOOR

.1 Examination:

.1 Once existing tiles and mortar bed have been removed to expose existing concrete substrate, surfaces will be reviewed by the Contract Administrator in the presence of and with the assistance of the Contractor to identify concrete repairs.

.2 Concrete repairs to be completed in accordance with applicable concrete repair specifications.

.3 Once concrete repairs are complete, ensure concrete repairs have acceptable cured.

.2 Preparation:

.1 Treat existing cracks in concrete with crack sealer as shown on Drawings.

.2 Shotblast and sandblast surface of concrete and repair areas prior to installation of mortar bed.

.1 Surface preparation to ICRI CSP-3 to 5.

.3 Vacuum clean surfaces and damp clean.

.4 Thoroughly wet surfaces for a period of not less than two (2) hours.

.5 Remove standing water prior to installation of mortar bed.

.6 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.3 Installation:

.1 Bonding Agent:

.1 After the concrete surface has been prepared and cleaned, mix and apply bonding agent in accordance with manufacturer's directions and application rates.

.2 Apply one coat of bonding agent:

.1 Brush scrub into surface.

.2 If scrub coat dries prior to application of mortar bed, re-coat bonding agent.

.2 Mortar Bed:

.3 Mix and apply mortar bed materials in accordance with manufacturer's directions and application rates.

.4 While bonding agent is still wet, spread thin layer of mortar bed materials onto the floor surface with a flat trowel.

.1 Work mortar bed materials into bonding agent with wood or magnesium float.

.5 Immediately follow with more mortar bed material to desired height.

.1 Compact and close surface.

.6 Provide slopes and contours as shown on Drawings.

.7 Allow mortar bed to cure for at least 48 hours per 12mm thickness based at 21° C and 50% relative humidity, plus or minus 10% prior to application of waterproofing.

3.7 INSTALLATION: MORTAR BED – TANK WALLS

.1 Examination:

.1 Once existing tiles and mortar bed have been removed to expose the existing concrete substrate, surfaces will be reviewed by the Contract Administrator in the presence of and with the assistance of the Contractor for concrete repairs.

.2 Preparation:

.1 Shotblast and sandblast surface of concrete prior to installation of mortar bed.

.1 Surface preparation to ICRI CSP-7.

.2 Vacuum clean surfaces and damp clean.

.3 Thoroughly wet surfaces for a period of not less than two (2) hours.

.4 Remove standing water prior to installation of mortar bed.

.5 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.3 Application

.1 Mix and apply repair mortar material in accordance with manufacturer's directions and application rates.

.2 Apply scrub coat of repair mortar with pressure into prepared surface.

.3 Prior to scrub coat drying, quickly apply repair mortar by trowel or spray.

.4 Allow repair mortar to cure for at least 24 hours based at 23° C and 50% relative humidity prior to application of waterproofing.

3.8 WATERPROOFING INSTALLATION

.1 Preparation:

.1 Shotblast surface of concrete and repair areas prior to installation of mortar bed.

.1 Surface preparation to ICRI CSP-2.

.2 Vacuum clean surfaces and damp clean.

.3 Pre-treat cracks, floor-to-wall interfaces, inside corners and drains as shown on Drawings and in accordance with manufacturer directions.

.4 Maintain surface temperature of concrete slab at least 3°C above the dew point.

.2 Installation:

.1 Mix and apply waterproofing membrane material accordance with manufacturer's directions and application rates.

.2 Apply membrane into corners, coves, drains and penetrations.

.1 Immediately embed reinforcing fabric into membrane to 100% and remove excess membrane material.

.2 Immediately re-cover fabric with another coat of membrane.

.3 Ensure reinforcing fabric is installed at 90° angle in corners.

.4 Overlap reinforcing fabric minimum 2".

.3 Apply membrane material on areas to be waterproofed using 3/8" nap roller.

.4 Allow membrane to cure for minimum 24 hours.

.5 Apply second coat of membrane over entire application area.

3.9 CERAMIC TILE INSTALLATION

.1 Lay-out installation as shown on Drawings and according to pre-disassembly 3D scan as specified in Section 01 32 00 – Construction Progress Documentation. Ensure lay-out and installation comply with tolerances specified in World Aquatics standards.

.2 Install in accordance with TTMAC and manufacturer's written instructions.

.3 Tile setting Mortar

.1 Mix and apply tile setting mortar in accordance with manufacturer's directions and application rates.

.2 Apply mortar with a notched trowel of sufficient depth to achieve more than 95% mortar contact to both the tile and substrate.

.3 Backbutter tiles.

.4 With pressure, apply a coat using the trowel's flat side to key mortar into substrate.

.5 Apply additional mortar, combing in single direction with trowel's notched side.

.6 Spread only as much mortar as can be tiled before mortar skins over.

.7 Place tiles firmly into wet mortar.

.8 Remove excess mortar from joint so that at least 2/3 of the tile depth is available for grouting.

.4 Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

.5 Place thresholds, edge strips at exposed tile edges at locations indicated.

.6 Cut and fit tile tight to penetrations through tile. Form corners, bases neatly. Align floor, base and wall joints.

.7 Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

.8 Lippage: To TTMAC tolerances; 2 mm maximum.

.9 Sound tile after setting. Replace hollow sounding units.

.10 Grouting:

.1 Remove tile spacers, pegs, ropes and strings.

.2 Grout joints to be clean and free of standing water, dust, dirt, and foreign matter.

.3 Remove excess mortar from joints to maintain 2/3 of the depth of tile is available for grouting.

.4 Mix and apply grout in accordance with manufacturer's directions.

.5 Use hard-rubber floats with sharp edge to force grout into joints in continuous manner. Leave flush with tile edge.

.6 Compact grout in joints and maintain free of voids and gaps.

.1 Fill joints with maximum amount of grout.

.7 Remove excess grout from the face of tile.

.8 Clean tiles immediately following application of grout.

.9 Grout and clean in small areas.

.11 Grout joint width:

.1 In accordance with manufacturer's direction to suit tile size.

.2 All grout widths to be uniform throughout installation.

.12 Control joints:

.1 Spacing:

.1 Minimum: 4 875 mm (16'-0").

.2 Maximum: 6 100 mm (20'-0").

.2 Width: Minimum 6 mm.

.3 Show locations on tiling plans to be submitted.

.4 Keep control joints free of adhesive or grout.

.5 Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.

.6 Apply sealant to joints.

.13 Allow tile to set for a minimum of 48 hours prior to grouting.

.14 Grout tile joints.

.15 Tile installation not to impede operation of swing of doors. Check all thresholds prior to installation.

.16 Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.10 POOL TANK FILLING

.1 Fill pool tank in accordance with tile, waterproofing, and setting bed manufacturers' directions.

.2 Rate of tank filling and draining: not to exceed 75 cm per 24 hours.

.3 Water temperature: Difference in water temperature and tiled surface temperature not to exceed 10°C.

3.11 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Co-ordinate with mortar bed, waterproofing and tile setting material Manufacturer's representative to inspect prepared conditions and installations as required to satisfy warranty requirements.

.2 Do not take instructions directly from the manufacturer's representative unless approved by the Contract Administrator.

.2 Mortar Bed Direct Pull-out Tensile (Bond) Tests:

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Contract Administrator in accordance with CSA-A23.1 and Section 01 40 00 - Quality Requirements and as described herein.

.2 Inspection or testing by the Contract Administrator will not augment or replace Contractor quality control nor relieve contractual responsibility.

.3 Direct pull-out tensile (bond) tests of the mortar bed will be completed to determine bond strength of mortar bed to the concrete substrate in accordance with CSA-A23.2-6B, Procedure A.

.1 Schedule testing following minimum 72-hour cure of mortar bed, but prior to installation of waterproofing membrane.

.4 Costs for direct pull-out tensile tests as a cash allowance as specified in Part E.

.5 Testing agency conducting direct pull-out tensile tests to be certified for CSA A23.2-6B (Procedure A) by the Canadian Council of Independent Laboratories (CCIL).

.6 Frequency of tests:

.1 Pool deck floors: Minimum three locations.

.2 Tank floors: Minimum three locations.

.3 Tank walls: Minimum three locations.

.4 The Contract Administrator reserves the right to direct additional bond tests to be conducted if concrete or bonding system is suspect.

.7 Prior to coring for direct pull-out tensile testing, scan substrate to ensure existing reinforcing will not be severed by the testing procedure.

.1 Scanning will be measured and paid as a cash allowance as specified in Part E.

.2 Contractor will be responsible for the following where existing reinforcing is severed by the test procedure at no additional cost to the City:

.1 Design repair and re-establishment of reinforcing procedure by a professional engineer licenced in the Province of Manitoba.

.2 Repair and re-establishment of reinforcing in accordance with the repair procedure.

.3 Submit repair procedure to the Contract Administrator for review prior to repair work proceeding.

.8 Infilling of the core hole will be the responsibility of the Contractor. Unless otherwise directed by the Contract Administrator, repair in accordance with this Section or Section 03 93 10.

.9 Submit test results in accordance with Section 01 33 00 – Submittal Procedures.

.3 Post waterproofing application flood test:

.1 Following application of waterproofing membrane, conduct flood testing of membrane as follows:

.1 Erect scaffolding and platform in middle of tank.

.1 Provide protection of membrane at locations of scaffolding supports in contact with membrane.

.2 Elevation of scaffold platform to be 150mm below pool water elevation.

.2 Place plastic 18L pail on top of scaffold platform.

.3 Sequentially fill pool in accordance with waterproofing membrane manufacturer directions.

.4 Fill 18L pail with water. Elevation of water in pail to match elevation of pool tank water level.

.5 Over next 72 hours:

.1 Observe pool and pail water levels.

.2 Observe leaks in tank walls and floor from underside of tank.

.6 Record difference in pool and pail water levels.

.2 Where no difference in pool to pail water levels observed and no leaks observed at underside of tank, membrane is acceptable.

.1 Empty pool water at rate in accordance with manufacturer's directions and proceed with ceramic tiling.

.3 Where a difference in pool to pail water levels are observed or where leaks are observed at underside of tank:

.1 Empty pool water at rate in accordance with manufacturer's directions.

.2 Visually review waterproofing application with Contract Administrator and manufacturer representative.

.3 Repair defects observed in waterproofing membrane in accordance with manufacturer's directions.

.4 Apply another coat of waterproofing membrane.

.5 Re-test.

3.12 CLEANING

.1 Clean tile and grout surfaces.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Resilient Sheet Flooring

1.2 RELATED SECTIONS

.1 Section 02 41 19 – Selective Demolition

1.3 REFERENCE STANDARDS

.1 ASTM International (ASTM):

.1 ASTM E96/E96M-16, Standard Test Methods for Water Vapor Transmission of Materials

.2 ASTM F710-22, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

.3 ASTM F1860-21a, Standard Specification for Rubber Sheet Floor Covering With Backing

.4 ASTM F1869-22, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

.5 ASTM F2170-19a, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

.2 CSA Group (CSA):

.1 CSA B651-18, Accessible design for the built environment

.3 National Floor Covering Association of Canada (NFCA):

.1 NFCA Floor Covering Reference Manual

.4 National Floor Safety Institute (NFSI):

.1 ANSI/NFSI B101.1-2022, Test Method for Measuring the Wet SCOF of Hard-Surface Walkways

.2 ANSI/NFSI B101.3-2022, Test Method for Measuring the Wet DCOF of Hard Surface Walkways

.5 ULC Standards (ULC):

.1 CAN/ULC-S102.2:2018, Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Upon request, Contract Administrator will provide a digital drawing file of the floor finish plan illustrating complex patterns and seams.

.2 Pre-Installation Meeting:

.1 Conduct a site meeting in accordance with Section 01 31 19 – Project Meetings, attended by Contract Administrator, and related Subcontractors to:

.1 verify project requirements,

.2 review delivery, storage, and handling requirements,

.3 review installation and substrate conditions,

.4 confirm complex flooring patterns,

.5 coordinate with other Subcontractors,

.6 review manufacturer's instructions and warranty requirements, and

.7 review NFCA Quality Assurance Program (QAP) inspection procedures and reporting, including timing of reports for multi-phase projects.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit the following action submittals before starting work of this Section:

.1 Product Data: Product literature and data sheets, including product characteristics, performance criteria, physical sizes, finishes, and limitations.

.2 Shop Drawings: Show layout and locations of seams, edges, and cut-outs.

.3 Selection Samples: Full range of samples for each Product specified, representing available colours, patterns, textures, profiles, and finishes.

.1 610mm x 610mm manufacturer's standard size samples of each type of resilient sheet flooring.

.4 Verification Samples: To verify specified colours, patterns, textures, profiles, and finishes.

.1 610mm x 610mm sample of each type of resilient sheet flooring.

.5 Site Quality Control Submittals: In accordance with NFCA QAP procedures and requirements.

.1 Submit floor pre-installation test results prior to beginning flooring installation. Compare tested moisture vapour emission rates and alkalinity with manufacturer's requirements for each flooring type.

.2 Submit manufacturer's recommended corrective actions when pre-installation test results deviate from manufacturer's installation requirements.

1.6 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 – Closeout Submittals.

.2 Operation and Maintenance Data: Include the following in the operation and maintenance manual:

.1 Manufacturer’s maintenance instructions.

.2 Recommended cleaning materials and methods.

.3 Warranty Documentation: Submit manufacturer's warranties.

1.7 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Stock Materials: In accordance with Section 01 78 00 - Closeout Submittals.

.2 Supply a minimum 5% of each colour, pattern, texture, and type of resilient sheet flooring material in full roll width. Also supply sheet flooring off-cuts where size is 450 mm x 450 mm or larger.

.1 Label each roll of sheet flooring matching designations indicated on Drawings.

.3 Supply a minimum 4 L of each adhesive. Store in sealed, labelled containers.

1.8 QUALITY ASSURANCE

.1 Perform work of this Section in accordance with NFCA QAP requirements.

.2 Qualifications:

.1 Installers: Experienced in resilient sheet flooring, with three years documented successful installations, with manufacturer's training or certification program.

.3 Mock-Ups: Install mock-ups in accordance with Section 01 40 00 – Quality Requirements.

.1 Install mock-up of resilient sheet flooring; include flooring seam.

.2 Location: Dive Platform.

.3 Acceptable mock-ups may remain as part of the Work.

1.9 DELIVERY, STORAGE, AND HANDLING

.1 Perform in accordance with Section 01 61 00 - Common Product Requirements.

.1 Protect adhesives, fillers, and sealants from freezing.

1.10 SITE CONDITIONS

.1 Ambient Conditions: Maintain specified ambient conditions, or more stringent manufacturer requirements, for 72 hours before installation, continuously during installation, and 72 hours after installation.

.1 Ambient room temperature: 18°C to 29°C.

.2 Floor substrate temperature: Minimum 15°C.

.3 Relative humidity: 40% to 60%

1.11 WARRANTY

.1 Provide manufacturer's standard limited warranty for wear, defect, bond and conductivity.

Part 2 Products

2.1 REGULATORY REQUIREMENTS

.1 Comply with CAN/ULC-S102.2 for required flame-spread ratings labelled and listed by ULC Standards or another agency acceptable to the authority having jurisdiction.

2.2 RESILIENT SHEET FLOORING MATERIALS

.1 Rubber Sheet Flooring with Backing: To ASTM F1860, and as follows:

.1 Type: RM-1.

.2 Construction: Styrene-butadiene

.3 Backing: Nylon, moisture-resistant

.4 Width: 1.5m

.5 Length: Available in 1m increments

.6 Thickness: 6.5 mm nominal.

.7 Texture: Anti-Slip.

.8 Colour: Black.

.9 Basis of Design: Malmsten, Rough-Tex 2-Ply Anti-Slip Surface C 2PB

North American Suppliers: Springboards and More

Aquam Aquatic Specialist Inc.

2.3 ACCESSORIES

.1 Primer: As recommended by resilient sheet flooring manufacturer for site conditions and application.

.2 Adhesives:

.1 Flooring Adhesives: Mondo PU105.

.3 Resilient Transition and Edge Strips: In accordance with CSA B651 for height and slope, extruded rubber.

.1 Colour: Black.

Part 3 Execution

3.1 EXAMINATION

.1 Verify conditions as follows:

.1 Verify substrates are clean, and free of cracks, ridges, depressions, scale, and foreign materials, and dust.

.2 Verify painting and ceiling work is complete.

.2 Pre-Installation Testing:

.1 Test to verify concrete floors are dry, with low moisture vapour emission rates and acceptable alkalinity. Test to ASTM F2170, or more stringently as recommended or required by the resilient sheet flooring manufacturer. Notify the Contract Administrator at least five days before testing.

.1 Adhesive bond test: 1.0 m x 1.0 m, allow to cure for 72 hours before evaluating bond strength.

3.2 PREPARATION

.1 Demolition: Remove existing flooring materials in accordance with Section 02 41 19 – Selective Demolition.

.2 Prepare concrete floor substrates in accordance with ASTM F710.

.1 Prepare concrete floor substrates exceeding manufacturer's vapour emission recommendations in accordance with ASTM F3010.

.3 Clean floor of dust, mould, mildew, alkaline salts, laitance, concrete film-forming curing compounds, paint, solvents, wax, oil, grease, residual adhesive, adhesive removing compounds, sealants, soap, and other foreign material.

.4 Fill low spots, cracks, joints, holes, and other defects with subfloor filler. Trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler is dry and cured.

.5 Prime the concrete surfaces with a diluted glue to bind the dust..

.6 Do not use permanent markers on floor substrates.

3.3 RESILIENT SHEET FLOORING INSTALLATION

.1 Apply adhesive uniformly using manufacturer's recommended trowel, followed by a roller or similar tool to knock down trowel ridges and eliminate them from telegraphing through finished flooring. Avoid spreading more adhesive than can be covered by resilient sheet flooring before initial adhesive sets. Applying adhesive only at perimeter is not acceptable.

.2 Lay with seams in-line (parallel) with the length of the diving platform (the seam of the roll should be perpendicular with front edge of diving platform) to ensure proper anti-slip properties are achieved, refer to manufacturer's installation instructions and Architectural Drawings for flooring layout.

.3 Roll resilient sheet flooring, as installation progresses and after installation, to remove air bubbles and promote full adhesion. Use a minimum 45 kg roller, or other weight in accordance with manufacturer's instructions.

.4 Promptly remove excess adhesive.

.5 Cut flooring neatly around fixed objects.

.6 When made necessary by material width or roll length, locate cross-seams and seams at doors and pivot points in accordance with reviewed shop drawings.

.7 Terminate flooring under centre line of door in openings where adjacent floor finish materials or colours are dissimilar.

3.4 SITE QUALITY CONTROL

.1 Site Inspections:

.2 Manufacturer's Site Services:

.1 Provide manufacturer's site services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions and warranty requirements.

.2 Schedule site visits to review work of this Section:

.1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.

.2 After mock-up construction.

.3 During progress of Work at approximately 30% completion.

.4 Upon completion of the work of this Section.

3.5 PROTECTION

.1 Prohibit traffic on resilient sheet flooring for a minimum 72 hours after installation.

.2 Protect resilient sheet flooring until Total Performance.

.3 Protect floors under heavy traffic, rolling loads, or pallet jacks with minimum 6 mm thick temporary hardboard panels. Sweep or vacuum resilient sheet flooring before installing panels.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This section includes the surface preparation, supply, and application of interior pre-catalyzed water-borne acrylic epoxy paint at locations where concrete repairs have been completed to existing painted surfaces.

1.2 MEASUREMENT PROCEDURES

.1 Work of this section will be measured and handled in accordance with Section 01 22 00 – Unit Prices.

1.3 REFERENCES

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

.1 Material Safety Data Sheets (MSDS).

.2 Master Painters Institute (MPI)

.1 MPI Architectural Painting Specifications Manual.

.2 MPI - Maintenance Repainting Manual.

.3 ASTM International

.1 ASTM D3960-25, Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.

.2 ASTM D2794-93 (2024), Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

.3 ASTM D4366-16(2021), Standard Test Methods for Hardness of Organic Coatings by Pendulum Damping Tests.

.4 ASTM D3359-23, Standard Test Methods for Rating Adhesion by Tape Test.

1.4 SUBMITTALS

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

.2 Product Data:

.1 Submit product data and instructions for each paint and coating product to be used.

.2 Submit product data for the use and application of paint thinner.

.3 Upon request, submit Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

.4 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Submit manufacturer's surface preparation, installation and application instructions.

.3 Samples:

.1 Submit manufacturer colour sample for review and approval by the Contract Administrator.

1.5 CLOSEOUT SUBMITTALS

.1 Provide in accordance with Section 01 78 00 - Closeout Submittals.

.2 Maintenance data: submit maintenance data for incorporation into Operations and Maintenance Manual. Include:

.1 Cleaning and maintenance recommendations for The City's use.

.2 Manufacturer directions for patching and repairing.

.3 Warranty: Submit final executed warranty.

.4 Extra materials:

.1 Provide minimum 5% by volume of paint required for project for maintenance use. Store where directed for Contract Administrator.

1.6 QUALITY ASSURANCE

.1 Painting Subcontractor Qualifications:

.1 Painting Subcontractor:

.1 Engaged full time as a paint and coating application subcontractor with knowledge and experience in the risks, technical, safety and environmental impacts involved in water-borne epoxy paint preparation and application as required by these Contract Documents.

.2 Painting Superintendent:

.1 Experienced as a paint and coating application subcontractor site superintendent with knowledge and experience in the risks, technical, safety and environmental impacts involved in supervising and coordinating water-borne epoxy paint preparation and application as specified by these contract documents.

.3 Ensure all personnel involved with painting and coating are adequately trained and familiar with the requirements of this and related concrete restoration sections.

1.7 MOCK-UP

.1 General:

.1 Locate where directed by the Contract Administrator and The City.

.2 Approved mock-up may remain as part of the Work.

.3 Approved mock-up will form standard of acceptance for remaining work.

.2 Coordinate with the Contract Administrator for the following milestone site reviews of mock-up at the first installed-on-site application of paint to concrete repair:

.1 Concrete repair surface preparation

.2 Completed paint application.

1.8 STORAGE AND HANDLING

.1 Storage and Protection:

.1 Provide and maintain dry, temperature controlled, secure storage.

.2 Store materials and supplies away from heat generating devices.

.3 Store materials and equipment in well ventilated area within temperature as recommended by manufacturer.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

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

.3 Place materials defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

.4 Paint finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

1.10 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces in accordance with other sections.

.2 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.

.2 Test concrete surfaces for alkalinity as required.

.3 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.

.3 Additional application requirements:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

1.11 WARRANTY

.1 Provide interior pre-catalyzed water-borne acrylic epoxy paint manufacturer standard manufacturer warranty.

Part 2 Products

2.1 MATERIALS

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

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

.3 Conform to latest MPI requirements for all painting work including preparation and priming.

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

2.2 COLOURS

.1 Colour to match existing white coating.

.2 Submit proposed Colour Schedule to Contract Administrator for review.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site, in accordance with manufacturer's written instructions. Obtain written approval from the Contract Administrator for tinting of painting materials.

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

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

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

2.4 PAINT

.1 One component acrylic epoxy eggshell coating:

- .1 Performance requirements:
  - .1 Solids (21°C, +/- 2%):
    - .1 By volume: 38%.
    - .2 By weight: 49%.
  - .2 Volatile Organic Compounds (VOC):
    - .1 To ASTM D3960: <100 g/L.
    - .2 To Canadian regulations: <150 g/L.
  - .3 Gloss level: Gloss @ 60°: 10-25%.
  - .4 Resin type: Acrylic epoxy.
  - .5 Impact resistance to ASTM D2794:
    - .1 Forward – inch pounds: >100.
    - .2 Reverse – inch pounds: >100.
  - .6 Hardness to ASTM D4366: >25.
  - .7 Adhesion to ASTM D3359: 5A.
- .2 Certification: Approved to MPI – Category #151, Ligh Industrial Coating, Interior, Water Based (MPI Gloss Level 3).
- .3 Film Thickness:
  - .1 To match existing and as recommended by manufacturer. Minimum:
    - .1 Wet: 4.0 to 8.0 mils.
    - .2 Dry: 1.5 to 3.0 mils.
- .4 Acceptable Product:
  - .1 Pitt-Glaze WB1 Interior Pre-Catalyzed Water-Borne Acrylic Epoxy 16-310C by PPG.

2.5 ACCESSORIES

.1 Primer and block filler as recommended by paint manufacturer.

Part 3 Execution

3.1 GENERAL

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

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

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to the Contract Administrator damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

3.3 PREPARATION

.1 Protection:

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by the Contract Administrator.

.2 Surface Preparation:

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

.2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of the Contract Administrator.

.3 Clean and prepare surfaces in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual specific requirements and coating manufacturer's recommendations.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.

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

.8 Do not apply paint until prepared surfaces have been accepted by the Contract Administrator

3.4 APPLICATION

.1 Method of application to be as approved by the Contract Administrator. Conform to manufacturer's application instructions unless specified otherwise.

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

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

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

.5 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Non-mechanical and non-electrical furnishings, fixtures, sockets and anchors for swimming pool rehabilitation as shown on Drawings.

.1 Refer to Divisions 22 and 26 for swimming pool accessories related to mechanical and electrical.

1.2 RELATED SECTIONS

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

.2 Section 05 50 00 – Metal Fabrications.

.3 Section 09 30 13 – Ceramic Tiling.

.4 Section 26 05 26 – Grounding and Bonding.

1.3 MEASUREMENT PROCEDURES

.1 No measurement will be made under this section for preparation and installation of swimming pool accessories. Include costs in the lump sum price component.

1.4 REFERENCES

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

.1 ASTM A269/A269M-25, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

1.5 SUBMITTALS

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

.2 Shop Drawings:

.1 Anchor sockets and rope cup anchors:

.1 Submit shop drawings showing:

.1 Plan and elevation views complete with dimensions.

.2 Section details.

.3 Depth of embedment.

.4 Attachment method to bonding and grounding system.

.5 Type of metal and finish.

.3 Product data: For each type of furnishing, fixture and anchor specified, submit product data showing:

.1 Material of component.

.2 Dimensions including:

.1 Length,

.2 Inside diameter, and

.3 Outside diameter.

.3 Methods of attaching grounding and bonding.

.4 Qualification Statements:

.1 General:

.1 Submit the following information for each qualification statement project example:

.1 Name and location of project.
.2 Name and contact information for the:
.1 Building owner.
.2 Prime consultant.
.3 Name of prime contractor and site superintendent.
.4 Total contract value.
.5 Name of swimming pool accessories contractor and superintendent.
.6 swimming pool accessories contract value.
.7 Date of construction.
.8 Description of prime project.

.2 Upon request by the Contract Administrator submit the following:
.1 Swimming Pool Accessories Subcontractor:
.1 Swimming Pool Accessories Subcontractor Qualification Statements:
.1 Minimum three examples of local projects as a swimming pool accessories subcontractor completed in the past ten years demonstrating successful performance of the specified qualifications.

1.6 CLOSEOUT SUBMITTALS

.1 Provide in accordance with Section 01 78 00 - Closeout Submittals.

.2 Maintenance data: submit maintenance data for incorporation into Operations and Maintenance Manual. Include:

.1 Cleaning and maintenance recommendations for The City's use.

.3 Warranty: Submit final executed warranty.

1.7 QUALITY ASSURANCE

.1 Swimming Pool Accessories Subcontractor Qualifications:

.1 Swimming Pool Accessories Subcontractor:
.1 Engaged full time as a swimming pool accessories subcontractor with knowledge and experience in the risks, technical, safety and environmental impacts involved in swimming pool accessories as required by these Contract Documents.
.2 Knowledge and experience with the methods and procedures to install swimming pool accessories into a public commercial swimming pool meeting the requirements and tolerances of:
.1 Public health regulations,
.2 World Aquatics standards.

.2 Ensure all personnel involved with swimming pool accessories are adequately trained and familiar with the requirements of this and related sections.

1.8 PRE-INSTALLATION MEETING

.1 In accordance with Section 01 31 19 – Project Meetings.

.2 Convene and coordinate pre-installation conference for swimming pool accessories including the following sections:

.1 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.
.2 Section 09 30 13 – Ceramic Tiling.
.3 Section 26 05 26 – Grounding and Bonding.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

1.10 EXISTING CONDITIONS

.1 Coordinate with Section 01 32 00 – Construction Progress Documentation for the preparation and use of a 3D laser scan of the pool area and tank to record locations of:

.1 Existing fixtures and support anchors scheduled for removal and replacement.

.2 Existing lane markers.

.3 Difference in tile colour transitions.

Part 2 Products

2.1 MATERIALS

.1 Stainless steel: 316L, low carbon, corrosion resistant allow for all structural components. Wall thickness as indicated.

.2 Stainless steel square sections and plates: To ASTM A269, Type 316.

2.2 LADDER – TYPE 1

.1 Stainless steel ladder grab rails at inset ladder locations.

.1 Grab rails will be removed, salvaged, and re-installed by the City.

.2 Anchor Socket:

.1 Type: Wedge.

.2 Material: 316 Stainless steel.

.3 Depth: As specified by manufacturer to suit application and loading.

.4 Inside diameter: To match existing salvaged grab rails.

.5 Grounding/bonding: Include connection method to grounding and bonding system.

.3 Escutcheon:

.1 Material: 316 Stainless steel.

.2 Inside diameter: To match existing salvaged grab rails.

.3 Outside diameter: Sufficient to cover wedge anchor.

.4 Quantity: One for each anchor socket.

2.3 LADDER – TYPE 2

.1 Stainless steel ladder with composite rungs.

.2 One existing ladder will be removed, salvaged, and re-installed by the City.

.3 Stainless steel pre-manufactured five-rung ladder at locations shown on Drawings:

.1 Pipe diameter: 1.90”.

.2 Wall thickness: 0.065”.

.3 Material: 316 Stainless steel.

.4 Width: 20” on centre.

.5 Treads:

.1 Quantity: 5.

.2 Material: HDPE with permanent non-skid surface.

.6 Set-back from pool wall: 18”.

.4 Escutcheons:

.1 Material: 316 Stainless steel.

.2 Inside diameter: To match existing salvaged grab rails.

.3 Outside diameter: Sufficient to cover wedge anchor.

.4 Quantity: One for each anchor socket.

.5 Anchor Socket:

.1 Type: Wedge.

.2 Material: 316 Stainless steel.

.3 Depth: As specified by manufacturer to suit application and loading.

.4 Inside diameter: To match ladder railings.

.5 Grounding/bonding: Include connection method to grounding and bonding system.

2.4 DIVING PLATFORM GUARD RAILS

.1 Fabricated stainless-steel sections as shown on Drawings and specified in Section 05 50 00 – Metal Fabrications.

.2 Rails and posts: Stainless steel sections to sizes and dimensions shown on Drawings.

.3 Grounding/bonding: Include connection method to grounding and bonding system.

.4 Submit shop drawings sealed by an engineer registered in the Province of Manitoba.

2.5 ANCHOR SOCKETS

.1 Stanchion Post:

.1 Type: Non-wedge.

.2 Material: 316 Stainless steel.

.3 Depth: 6”.

.4 Inside diameter: 3”.

.5 Cap: Capped. Threaded cap complete with removal tool.

.6 Grounding/bonding: Include connection method to grounding and bonding system.

.2 Flagpole:

.1 Type: Non-wedge.

.2 Material: 316 Stainless steel.

.3 Depth: 6”.

.4 Inside diameter: 3.5”.

.5 Cap: Capped. Threaded cap complete with removal tool.

.6 Grounding/bonding: Include connection method to grounding and bonding system.

.3 Rope Anchor:

.1 316 Stainless steel rope cup anchor embedded into tank wall for use with tank lane lines.

.2 Cast 316 stainless steel with integral bar.

.3 Grounding/bonding: Include connection method to grounding and bonding system.

.4 Bulkhead pin anchor socket:

.1 Type: Non-wedge.

.2 Material: 316 Stainless steel.

.3 Depth: 6”.

.4 Inside diameter: 2.25”.

.5 Cap: Capped. Threaded cap complete with removal tool.

.6 Grounding/bonding: Include connection method to grounding and bonding system.

.7 Designed to suit existing bulkhead and bulkhead anchor pins.

.5 Single bolt threaded anchor:

.1 For installation of deck fixtures removed and salvaged for re-installation.

.1 Anchor: Hilti-HS-RN 316 SS.

.1 Diameter: to match existing.

.2 Adhesive: Hilti HIT RE 500 V3.

2.6 ACCESSIBLE CHAIR LIFT (NEPTUNE)

.1 The accessible chair lifts: Neptune accessible chair lift manufactured by Aqua Creek Products.

.1 Will be removed, salvaged, and re-installed by the City.

.2 Accessible chair lift anchor socket: Kit as recommended by the manufacturer of the accessible chair lift.

2.7 POOL TANK STAIR

.1 Existing pre-manufactured stairs installed into the tank.

.1 Contractor to remove, salvage and re-install.

.2 Support angle: Remove, salvage and re-install angle and bolts.

.3 Tank floor bolt anchor insert: Stainless steel internally threaded rod insert.

.1 Anchor: Hilti-HS-RN 316 SS.

.1 Diameter: to match existing.

.2 Adhesive: Hilti HIT RE 500 V3.

2.8 POOL TANK STAIR RAILING

.1 Fabricated stainless-steel sections as shown on Drawings and specified in Section 05 50 00 – Metal Fabrications.

2.9 SPRINGBOARD - REFURBISHMENT

.1 Springboard Support: Existing stainless steel section support. Contractor to remove, salvage and re-install.

.1 Springboard support bolt anchor insert: Stainless steel internally threaded rod insert.

.1 Anchor: Hilti-HS-RN 316 SS.

.1 Diameter: to match existing.

.2 Adhesive: Hilti HIT RE 500 V3.

.2 Springboard and associated components:

.1 Existing manufacturer: Duraflex.

.2 Contractor to remove, salvage and re-install.

.3 Refurbish foot wheel, stand box, and stand anchor as follows:

.1 Prepare surfaces to SP-2.

.2 Protect, cover or mask surfaces to prevent overspray of coating.

.3 Apply first coat of epoxy coating and broadcast sand.

.4 Remove excess sand and apply second coat of epoxy coating.

2.10 PORTABLE SPRINGBOARD

.1 Portable Spring board: Will be removed, salvaged, and re-installed by the City.

.2 Portable springboard bolt anchor insert: Stainless steel internally threaded rod insert.

.1 Anchor: Hilti-HS-RN 316 SS.

.1 Diameter: to match existing.

.2 Adhesive: Hilti HIT RE 500 V3.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance:

.1 Comply with manufacturer's written recommendations, instructions and specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 DISASSEMBLY

.1 Prior to disassembly, measure and record existing locations of fixtures, components and anchors. Coordinate with 3D scan specified in Section 01 32 00 – Construction Progress Documentation.

.1 Measure and record locations to within tolerances required by World Aquatics standards.

.2 Disassemble and remove existing materials as shown on Drawings.

3.3 EXAMINATION

.1 Verify that surfaces are ready to receive work.

3.4 PREPARATION

.1 Protect surrounding work from damage or disfiguration.

.2 Ensure that any contaminants, including but not limited to oils and solvents which may impact the bond of the thin-set are removed. The removal of such stains shall be included in the fixed price of the tile installation.

.3 Vacuum clean surfaces and damp clean.

.4 Lay-out installation as shown on Drawings and according to the 3D scan as specified in Section 01 32 00 – Construction Progress Documentation. Ensure lay-out and installation comply with tolerances specified in World Aquatics standards.

3.5 INSTALLATION

.1 Ensure locations of components being installed comply with World Aquatics tolerance standards.

.2 Install in accordance with manufacturer directions.

.3 Coordinate installation with Section 26 05 26 – Grounding and Bonding.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Related Sections

.2 Words and Terms

.3 Complimentary Documents

.4 Description of the work

.5 Contract Method

.6 Permits, inspection and testing

.7 Examination

.8 Closeout submittals

.9 Operation and maintenance manual

.10 Recording actual site conditions.

.11 Record documents.

.12 Warranties and bonds.

.13 Fabrication and workmanship

.14 Quality Assurance.

.15 Demonstration and Training

.16 Conditions for Demonstrations

.17 Shop drawings – Administrative requirements

.18 Shop drawings and product data submissions

.19 Product changes and substitutions.

.20 Samples.

.21 Mock-ups

.22 Progress Payment Submissions

.23 Certificates and transcripts.

.24 Products Supplied: Quality, Availability, Storage, Handling, Protection, and Transportation.

.25 Sustainable and low impact requirements

.26 Special Cleaning

.27 Existing Utilities

.28 Manufacturer's instructions.

.29 Quality of Work, Accessibility, Coordination and Fastenings.

.30 Work for other trades

.31 Electrical requirements

.32 Concealment

.33 Access panels

.34 Remedial work

.35 Alteration work

.36 Location of fixtures

.37 Temporary use of equipment

.38 Protection of work in progress

.39 Equipment start up and verification reports

1.2 WORDS AND TERMS

.1 Conform to definitions and their defined meanings as in Section .

.2 Refer to Section for Specification Grammar.

.3 Conform to the following definitions and their defined meanings in addition to those referenced in Section]:

.1 **Install:** To remove from site storage, move or transport to intended location, install in position, connect to utilities, repair site caused damage, and make ready for use.

.2 **Supply:** To acquire or purchase, ship or transport to the site, unload, remove packaging to permit inspection for damage, re-package, replace damaged items, and safely store on-site.

.3 **Provide:** Wherever the term "provide" is used in relationship to equipment, piping and other materials specified for the work, it means "supply, install and connect". Wherever the terms “provide” is used in connection with services such as testing, balancing, start-up, preparation of drawings for any part of the work, it means procure, prepare, supervise, take responsibility for, and pay for these services.

.4 **Typical:** A representative characteristic that is standard for all installations whether individually noted or not throughout the documents. “Typical” applies to each individual or combined installation except where specifically noted or otherwise indicated that the application is non-typical.

.5 **Exposed:** Any work not concealed in wall, shaft, or ceiling cavities or spaces. Work behind doors, in closets or cupboards or under counters is considered exposed.

.6 **New:** Produced from new materials.

.7 **Renewed:** Produced or rejuvenated from an existing material to like-new condition to serve a new or existing service.

.8 **Defective:** A condition determined exclusively by the Contract Administrator.

1.3 COMPLEMENTARY DOCUMENTS

.1 Drawings, specifications, and schedules are complementary to each other and what is called for by one will be binding as if called for by all.

.2 Should any discrepancy appear between the drawings and specifications, which leaves the Contractor in doubt as to the true intent and meaning of the plans, and specifications, the Contractor shall obtain a ruling in writing from the Contract Administrator in writing before submitting the bid. If this is not done it will be assumed that the most expensive alternative has been included in the bid price.

.3 The drawings for mechanical work are performance drawings. They are generally diagrammatic and are not to scale unless detailed otherwise. They establish scope, material and installation quality and are not detailed installation instructions showing every offset, fitting, valve or every difficulty encountered during execution of work and will not be used as an excuse for deficiencies or omissions. Where required installations are not shown on plans or are only shown diagrammatically, install in such a way as to conserve headroom and interfere as little as possible with free use or space through

which they pass, while adequate space is allowed for service, maintenance, repair, or replacement for all equipment.

.4 The drawings indicate general location and route of new and existing mechanical systems. The review of exact location and routing of systems prior to bidding is the responsibility of the Contractor. Install piping and duct systems not exactly shown in plan or indicated by note, by graphic, or diagrammatically in schematic or riser diagrams to provide an operational assembly or system.

.5 Install components to physically conserve headroom, to minimize furring spaces, to accommodate installed Work, or other obstructions.

.6 Install ceiling mounted or exposed mechanical components such as diffusers, sprinkler heads and grilles in accordance with reflected ceiling drawings or floor plans.

.7 Locate devices with primary regard for convenience of operation and usage.

.8 Examine the drawings, specifications, and schedules and related Work for all other Sections to ensure that Work can be satisfactorily executed. Conflicts or additional Work beyond the Work described shall be brought to the attention of the .

.9 All specification sections of the Project Manual and Drawings are affected by requirements of Division 01 sections.

1.4 DESCRIPTION OF THE WORK

.1 Division of the Work among other Contractors, Subcontractors, suppliers or vendors is solely the Contractor's responsibility. Neither The City of Winnipeg nor Contract Administrator assumes any responsibility to act as an arbiter to establish Subcontract terms or disagreements between sectors or disciplines of the Work.

1.5 CONTRACT METHOD

.1 Construct Work under the Contract requirements in the Applicable Part C – General Conditions, Part D – Supplementary Conditions, and Division 01 Sections.Contract Documents were prepared by the Contract Administrator for The City of Winnipeg. Any use which a third party makes of the Contract Documents, or any reliance on or decisions to be made based on them, are the responsibility of such third parties. The Contract Administrator accepts no responsibility for any damages suffered by any third party as a result of decisions made or actions based on the Contract Documents.

1.6 PERMITS, INSPECTION AND TESTING

.1 File all necessary notices and approved layouts, obtain and pay for all Local Authority and Fire Underwriters Inspections, approvals and permits applicable to each Mechanical Section. Make changes required to secure Local Authorities approval, without extra cost. Where conflicting requirements occur, comply with most stringent regulation. Note that requirements shown or specified may exceed minimum standards set by Local Authorities.

.2 The Regulations of the A.S.M.E. Code and the Provincial Labour Department shall cover the design, manufacture, installation, welding and tests of piping and other equipment as specified hereafter.

.3 Obtain Registration Certificates for all pressure vessels, with suitable metal-framed glass covers installed where directed. Furnish all certificates required by Local Authorities before acceptance of building by The City of Winnipeg.

.4 The City may request the Mechanical Section to operate device or material installed for such time as may require, as a thorough test, before final acceptance. Such tests shall not be construed as evidence of acceptance, and no claim for cost of such operation for test, or damage due to inadequacy or defect will be recognized.

.5 Note that site reviews by are for the purpose of determining in general if the work is proceeding in accordance with the Contract Documents, and to endeavour to guard The City of Winnipeg against defects and deficiencies and not to superintend the execution of the work, which is the Mechanical Contractor's and their Subcontractors' responsibility.

1.7 EXAMINATION

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

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

.3 Examine all Contract documents to ensure work can be performed without changes to the Work as shown on plans. No allowance will be made later for necessary changes, unless notification of interferences have been brought to Contract Administrator's attention in writing, prior to bid closing.

.4 Verify that materials and equipment can be delivered to the place of the work and that sufficient space and access is available to permit installation as shown on the drawings.

.5 Verify the locations and inverts of service lines leaving and entering building to ensure their proper function prior to commencing work.

1.8 CLOSEOUT SUBMITTALS

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

.2 Four (4) weeks prior to Substantial Performance of the Work, submit to the Contract Administratordigital copies of operating and maintenance manuals and record drawings in Canadian English.

.3 Copy will be returned with Contract Administrator's comments.

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

.5 Two (2) weeks prior to Substantial Performance of the Work, submit to the Contract Administrator final digital copies of operating and maintenance manuals and record drawings, revised as per Contract Administrator's comments.

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

.7 Provide complete list of parts and supplies included location of where parts and supplies were stored in the building. List to include parts and supplies recommended, but not specified, for use within the first two years of operation. Listed parts and supplies to be reviewed with The City of Winnipeg's Representative and marked by The City of Winnipeg's Representative as reviewed and accepted.

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

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

.10 On Contract Administrator's acceptance of the operating and maintenance manuals and record drawings, produce 2 hard copies (or quantity as required by Section) of the closeout documents and ship to The City of Winnipeg. Pay costs of transportation. Provide digital copy to The City of Winnipeg by electronic file transfer or physical media.

1.9 OPERATION AND MAINTENANCE MANUAL

.1 Format – Hard Copy

.1 Refer also to Section for formats for manuals. Where there is a discrepancy with this section, follow the requirements of .

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

.3 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 8.5 x 11 inch (219 x 279 mm) with spine and face pockets.

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

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

.6 Arrange content by systems under Section numbers and sequence of Table of Contents.

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

.8 Text: Manufacturer's printed data, or typewritten data.

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

.2 CONTENTS - EACH VOLUME

.1 Refer also to Section for formats for contents. Where there is a discrepancy with this section, follow the requirements of .

.2 Table of Contents: Provide:

.1 Title of project.

.2 Date of submission.

.3 Names, addresses, and telephone numbers of Contract Administrator and Contractor with name of responsible parties.

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

.3 For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

.4 Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section .

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

.6 Certificate of Acceptance: Relevant certificates issued by authorities having jurisdiction, including code compliance certificate, life safety systems performance certificate. pressure vessel acceptance.

.7 Training: Refer to Demonstration and Training in this Section.

1.10 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on a full-sized set of drawings, and within the Project Manual.

.2 Annotate with coloured felt tip marking pens, maintaining separate colours for each major system, for recording changed information.

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

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

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

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

.3 Field changes of dimension and detail.

.4 Changes made by change orders.

.5 Details not on original Contract Drawings.

.6 References to related shop drawings and modifications.

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

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

.2 Changes made by Addenda and change orders.

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

1.11 RECORD DOCUMENTS

.1 Prior to Substantial Performance of the Work, electronically transfer the marked-up information from the as-built documents, as follows:

.1 Drawings: Transfer the final marked-up information to AutoCAD and produce an electronic record set in Adobe Acrobat (PDF) format, as well as the AutoCAD file. AutoCAD base drawing files will be available from the Contract Administrator for a charge.

.2 Specifications: Adobe Acrobat (PDF).

.2 Mark revised documents as "RECORD DOCUMENTS". Include all revisions.

.3 Submit completed record documents to Contract Administrator on physical electronic media or by electronic transfer.

1.12 WARRANTIES AND BONDS

.1 Refer also to.

.2 Provide written guarantee that complete installation including materials, work and operation of all equipment provide under Mechanical Sections are first class in every respect, subject only to improper usage by The City of Winnipeg, and make good forthwith when reported all defects which develop within one year from date of acceptance of building by The City of Winnipeg at no additional cost to The City of Winnipeg.

.3 In addition, guarantee heating and cooling systems through one complete heating or cooling season, as applicable.

.4 Deliver to The City of Winnipeg all equipment manufacturer's guarantees specified in excess of one year.

1.13 FABRICATION AND WORKMANSHIP

.1 Employ skilled mechanics in their respective trades, under competent supervision, and where required by Provincial or Local regulations holder of acceptable qualification certificates.

1.14 QUALITY ASSURANCE

.1 Provide testing organization services as specified in subsequent Sections.

.2 Testing organization: Current member in good standing of their respective professional or industry organization and certified to perform specified services.

.3 Comply with applicable procedures and standards of the certification sponsoring association.

.4 Perform services under direction of supervisor qualified under certification requirements of sponsoring association.

1.15 DEMONSTRATION AND TRAINING

.1 Refer also to Section - Demonstration and Training. Where there is a discrepancy with this section, follow the requirements of .

.2 Instruct The City of Winnipeg's designated employees in proper care, operation, use and maintenance of all systems and equipment, and provide general explanatory literature required and start up supervision and instructions.

.3 Provide two (2) weeks prior notice to The City of Winnipeg to schedule the training.

.4 The City of Winnipegwill provide list of personnel to receive instructions and will coordinate their attendance at agreed-upon times.

.5 Upon completion of instructions, forward to Contract Administratorwith a copy to The City of Winnipeg a letter indicating person instructed and dates that the instruction took place. If in Contract Administrator's opinion, this is not done satisfactorily, Contract Administrator may direct such instruction, and charge all costs involved to relevant section.

1.16 CONDITIONS FOR DEMONSTRATIONS

.1 Equipment has been inspected and put into operation in accordance with related sections.

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

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

1.17 SHOP DRAWINGS - ADMINISTRATIVE REQUIREMENTS

.1 Shop drawings shall be submitted electronically in PDF format documents to shopdrawings@eppsiepman.com.

.2 Shop drawing documents **shall be grouped by specification section**. Clearly list the specification section on the front page or cover sheet of the submittal. Shop drawings related to **multiple sections may not be grouped together** into a single document. Documents that are groups incorrectly will be returned without being examined and shall be considered rejected.

.3 Each drawing shall include the name of project as found on the drawings or specifications, the equipment supplier and the specification section that the equipment is specified under.

.4 Submit to Contract Administrator submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 Work affected by submittal shall not proceed until review is complete.

.6 Present Shop Drawings, product data, samples and mock-ups in SI Metric and/or Imperial inch-pound units, to match the units used in the schedules.

.7 Review submittals prior to submission to Contract Administrator. 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.

.8 Submittals not stamped, signed, dated, identified as to specific project, and attesting to their being reviewed will be returned without being examined and shall be considered rejected.

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

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

.11 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.

.12 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administratorreview.

.13 Keep one (1) reviewed copy of each submission on site.

1.18 SHOP DRAWINGS AND PRODUCT DATA SUBMISSIONS

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

.2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications. Indicate layouts, quantity, details of equipment, control wiring diagrams, sizes, capacities and roughing in and exact requirements for concrete pits, bases and other supporting members.

.3 Each shop drawing must be certified by manufacturer and as such shall indicate that all product engineering has been performed to ensure the product will meet the requirements of the intended installation.

.4 Shop drawings for grilles, registers and diffusers shall be accompanied by an itemized list indicating the unit locations by room number and the unit size.

.5 Allow fifteen (15) working days for Contract Administrator's review of each submission.

.6 Adjustments made on Shop Drawings by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.

.7 Make changes in Shop Drawings as Contract Administratormay require, consistent with Contract Documents. When resubmitting, notify Contract Administrator in writing of any revisions other than those requested.

.8 Accompany submissions with transmittal letter, containing:

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

.9 Submissions shall include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.

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

.5 Details of appropriate portions of Work as applicable:

.1 Fabrication.

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

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to other parts of the Work.

.10 After Contract Administrator's review, distribute copies.

.11 Submit one (1) copy of Shop Drawings as a pdf document by email attachment for each requirement requested in specification Sections and as Contract Administrator may reasonably request. Any electronic copy of shop drawings shall bear all the required marks of certification and approval by the manufacturer and Contractor(s) as indicated above. The Contract Administrator will review and mark up one copy of the shop drawing, and return to the Contractor by email attachment. The Contractor shall then make copies as required for ordering and documentation purposes. Multiple copies of shop drawings will not be returned.

.12 Submit one electronic copy of product data sheets or brochures for requirements requested in specification sections and as requested by Contract Administratorwhere Shop Drawings will not be prepared due to standardized manufacture of product. Submittals shall be submitted as a pdf document by email attachment, or delivered as a hard copy. Any electronic copy of shop drawings shall bear all the required marks of certification and approval by the manufacturer and Contractor(s) as indicated above.

.13 Delete information not applicable to project.

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

.15 If upon review by Contract Administrator, no errors or omissions are discovered or if only minor corrections are made, one electronic copy will be returned and fabrication and installation of Work may proceed. If Shop Drawings are rejected, noted copy will be returned and re-submission of corrected Shop Drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed. The Contractor shall then make copies as required for ordering and documentation purposes. Multiple copies of shop drawings will not be returned.

.16 Checking of shop drawings by the Contract Administratordoes not constitute acceptance of responsibility. Such checking constitutes assistance only to the Mechanical Division in the proper execution of their work.

1.19 PRODUCT CHANGES & SUBSTITUTIONS

.1 Change in Product/Products: Submit request for substitution or alternative in accordance with this section, Part B – Bidding Procedures, B7, and Section 01 61 00. In case of a discrepancy between this section and Part B and Division 01, the more stringent shall apply.

.2 Part B – Bidding Procedures, B7 specify time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this section.

.3 Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

.4 Any substituted item submitted for consideration must not exceed the available space and weight limitations, and all additional costs for mechanical, electrical, structural and architectural revisions including Contract Administrator fees required to incorporate the substituted material shall be the responsibility of the Mechanical Division. Review the maximum dimensions and weights when provided in the specification and schedules, and where not specified review the drawings for space limitations. The Bidder may be required to submit to the Contract Administratordrawings in plan and sections to prove that the substituted item will fit in the allowable space.

.5 A request constitutes a representation that the Bidder:

.1 Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

.2 Will provide the same warranty for the Substitution as for the specified Product.

.3 Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to The City of Winnipeg.

.4 Waives claims for additional costs or time extension which may subsequently become apparent.

.5 Will reimburse The City of Winnipeg and Contract Administratorfor review or redesign services associated with re-approval by authorities.

.6 Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

1.20 SAMPLES

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

.2 Deliver samples prepaid to Contract Administrator's business address unless otherwise instructed.

.3 Notify Contract Administrator 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 Contract Administratorare not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administratorprior to proceeding with Work.

.6 Make changes in samples which Contract Administratormay require, consistent with Contract Documents.

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

1.21 MOCK-UPS

.1 Erect mock-ups to the requirements of Division 01.

1.22 PROGRESS PAYMENT SUBMISSIONS

.1 Submit progress payment breakdowns for review by the Contract Administrator to the requirements of Division 01.

.2 Prior to the first application for payment, submit for review a draft progress application template.

.3 Progress Application shall contain separate line items for the following systems:

.1 Fire Protection

.2 Plumbing

.3 Hydronic

.4 HVAC

.5 Controls

.6 Insulation

.7 Air Balancing

.8 Commissioning, Start Up and Training

.9 Close out documents – Record drawings, Operation and Maintenance documents.

.4 Progress for each system shall break out labor and materials separately.

.5 Equipment and materials must be located on site or in bonded storage with proof of storage for payment request to be accepted.

1.23 PRODUCT SUPPLIED

.1 QUALITY

.1 Products, materials, equipment, parts or assemblies (referred to as Products) incorporated in Work: New, not damaged or defective, of best quality (compatible with specification requirements) for purpose intended. If requested, provide evidence as to type, source and quality of Products provided.

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

.3 Should any dispute arise as to quality or fitness of Products, decision rests strictly with Contract Administrator.

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

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

.2 AVAILABILITY

.1 Immediately upon signing Contract, review Product delivery requirements and anticipate foreseeable supply delays for any items.

.2 If delays in supply of Products are foreseeable, notify Contract Administratorof such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

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

.3 STORAGE AND PROTECTION

.1 Store and protect Products in accordance with manufacturers' written instructions.

.2 Store with seals and labels intact and legible.

.3 Store sensitive Products in weather tight, climate controlled, enclosures in an environment favourable to Product.

.4 For exterior storage of fabricated Products, place on sloped supports above ground.

.5 Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.

.6 Cover open ends of pipes, fixtures, ductwork, etc. to prevent entry of building rubbish.

.7 Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

.8 Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

.9 Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

.4 TRANSPORTATION AND HANDLING

.1 Transport and handle Products in accordance with manufacturer's written instructions.

.2 Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

.3 Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

.4 Protect all finished and unfinished work from soiling or damage, cover floors with tarpaulins or plywood as necessary, and repair any damage resulting from work of Mechanical Section.

.5 Protect finished surfaces to remain exposed, by paper, polyethylene or other satisfactory removable protective covering using paste acceptable to fixture manufacturer to prevent possible damage to finishes, until all reason for construction damage has passed and until acceptance by The City of Winnipeg, and make good any such damage.

1.24 SPECIAL CLEANING

.1 Maintain tidiness within work of Mechanical Sections and at completion remove protective paper, labels, etc. and tools and waste materials. Leave clean and in perfect operating condition.

.2 Remove dirt, rubbish, grease, and dust for which this section is responsible from all exposed surfaces and fixtures.

.3 Operate, drain and flush out bearings and refill with new charge of lubricant, before final acceptance.

.4 Thoroughly clean piping, ducts and equipment of dirt, cuttings and other foreign substances within the scope of work area. Disconnect, clean and reconnect whenever necessary for purpose of locating and removing obstructions. Repair work damaged in course of removing obstructions. Refer to 23 31 00 for any additional duct cleaning requirements.

.5 Clean exposed surfaces of mechanical equipment, ductwork, piping, etc., and polish plated work.

.6 Protect bearings and shafts during installation. Grease shafts and sheaves to prevent corrosion. Supply and install extended nipples to outside of bearing enclosures for lubrication purposes.

.7 Remove tools, surplus, and waste material from the building site upon completion of work. Clean grease, dirt, and excess material from walls, floors, ceilings, surfaces, and fixtures for which this Contractor was responsible, and leave the premises suitable for immediate use.

.8 Schedule cleaning operations so that resulting dust and other contaminants will not fall on wet, newly painted surfaces, infiltrate into occupied areas, or trigger fire alarm smoke or dust detectors.

.9 Replace heating, ventilating and air conditioning filters if units were operated during construction.

.10 Do not start air-handling systems unless the systems and associated ductwork are clean. Failure to properly clean the equipment and ductwork shall make the Contractor responsible to clean, repair or replace equipment and ductwork rendered deficient.

.11 At the end of construction all systems shall be left ready for operation.

.12 This Section shall be responsible for repair work as may be necessary to remove dents and touch-up of factory finishes.

1.25 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 the Work, building occupants, or pedestrian or vehicular traffic.

.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.

1.26 MANUFACTURER'S WRITTEN INSTRUCTIONS

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

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

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

1.27 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 Contract Administrator if required Work is such as to make it impractical to produce required results.

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

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

.4 Assume full responsibility for layout of own work and for any damage caused to property of others through improper location or poor workmanship.

.5 ACCESSIBILITY OF EQUIPMENT

.1 The Contract Administrator places a high priority on being able to safely and efficiently gain access to systems and equipment for replacement and repair. All equipment must be accessible, as defined as follows:

.1 Ceiling mounted equipment shall only be considered accessible if a tradesman can place both hands on the equipment components which requires services (ie: fan motor, belt, pulley, bearing, fire damper linkages, valve/control valve, strainer or any other equipment component

which requires periodic maintenance). The component must be in clear view, and access must be gained from an 8 or 10 foot step ladder. Access panels provided in drywall shall be sized and placed in such a manner that trades personnel can place two hands on the equipment components as stated above. Equipment located above acoustic tile ceiling shall be positioned in such a manner that equipment and its components can be accessed through a full tile which does not contain any devices such as light fixtures, speakers, smoke detectors or sprinkler heads. If this is not possible, it should be reviewed by the Contract Administrator before deemed acceptable.

.2 Conduit, pipe, ducting and support racking or any other obstruction to accessibility shall be relocated at the Contractor's expense by the Contractor's forces.

.6 COORDINATION

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

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

.3 Check levels shown before commencement to ensure adequate falls for sewers and pipes and report discrepancies immediately. Failure to so check and report does not relieve this section from responsibility for consequent extra expenditures.

.4 Where space is indicated as reserve for future equipment, leave clear and install piping and other work so that connections can be made to future equipment.

.5 Secure approval where necessary to cut holes in either finished or unfinished work, employ section whose work is involved, cut openings no larger than necessary and without damage to adjoining work and carefully repair all damage to match adjacent work. Note the Mechanical Division is responsible for all required cutting and patching relating to this Contract, except as specifically noted otherwise.

.6 Provide and set bolts, templates, sleeves and fixing materials for fixing work under this section securely to work provided under other sections, in advance of other work, where required.

.7 Locate all openings in walls, partitions, beams, etc. required for installation of ducts, pipes and equipment, etc. specified in this section of the specifications and frame all openings as required.

.8 Installation of all equipment shall allow sufficient space to facilitate ease of maintenance. Clearance space shall allow for the removal of all components of equipment without hindrance. Where clearance requirements are not shown on the mechanical plans, manufacturer clearances must be maintained at a minimum.

.7 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 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 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.

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

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

.8 FASTENINGS - EQUIPMENT

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

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use Type 304 or 316 stainless steel for exterior areas.

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

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

1.28 WORK FOR OTHER TRADES

.1 The Mechanical Contractor shall install rough-ins and/or connections for all equipment requiring mechanical services, as shown on drawings or mentioned elsewhere in the specifications.

.2 Supply other trades with all necessary details, rough-in drawings, wiring diagrams, etc. as required.

1.29 ELECTRICAL REQUIREMENTS

.1 Motors and electrical equipment supplied under Mechanical Division shall comply with Electrical Section and electrical characteristics scheduled or shown.

.2 See "Installation and Wiring Controls" in Electrical Section for equipment supplied under Electrical Section.

.3 The Electrical section shall provide starters for all motors and wire from starters to motors, unless otherwise indicated.

.4 The Electrical section shall wire between starters and switching components such as relays, float switches, and pressure switches.

.5 Supply to Electrical Section within four (4) weeks after Contract award, fully detailed diagrams of power and control wiring required for equipment supplied by Sections 21 – 25.

.6 Motors shall be squirrel cage induction type 1800 RPM unless otherwise noted. Where dampness occurs, all motors and electrical apparatus such as float switches, etc. supplied integrally with any piece of apparatus, shall be totally enclosed.

.7 All motors 1 hp and larger shall be high efficiency as defined in CSA C390.

1.30 CONCEALMENT

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

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

1.31 ACCESS PANELS

.1 Provide in ample time for installation under relevant sections all necessary access panels in walls and ceilings to allow access to dampers, valves, etc., size 300 mm x 300 mm (12" x 12") min. or as required for proper maintenance with steel panel and frame, similar to Acudor, type to suit application. Instruct relevant section for proper location of access panels. Final locations subject to Contract Administrator's approval. ULC approved access panels must be provided where access is through or into a fire partition or assembly. If access doors have been specified by architectural sections the architectural specification shall supersede this section.

1.32 REMEDIAL WORK

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

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

1.33 ALTERATION WORK

.1 Where work is to be done in existing buildings, accurately survey, provide for avoidance of damage and interference to existing work and rectify any such damage due to work under Mechanical Sections. Accept existing work as it exists at time of Bid Submission.

.2 Carefully dismantle existing mechanical equipment to be removed or relocated. Temporarily disconnect, remove, and reinstall existing equipment, piping, ductwork, conduit, light fixtures, and similar items, which interfere with the new installation after completion of new work or of existing installations to be demolished. Store equipment and materials on the premises as directed by The City of Winnipeg.

.3 All usable salvaged equipment and materials shall remain the property of The City of Winnipeg unless specifically noted otherwise. Such material shall be removed from the building and be safely and neatly stored on the site for removal by The City of Winnipeg. The Contractor shall remove all rejected salvage from the site and legally dispose of it off site.

.4 Reuse existing equipment in new work after first repairing and reconditioning any defective items where noted. Safely cap and seal disconnected mechanical services within finished surfaces.

.5 The abandonment of existing equipment and material in place is not acceptable. All redundant services are to be removed back to active mains, which shall then be capped at existing point of connection.

.6 All mechanical equipment conflicting with new equipment being installed shall be moved or disconnected, without damage, by Contractor and shall remain property of The City of Winnipeg. Remove ducts and piping not required in revised systems and interfering with new installation. This material shall become property of Contractor.

.7 Disconnect existing equipment indicated, intended to be reused, rough-in in new position, and after replacement connect fully, ready for use.

.8 Removal and relocation of mechanical equipment by relevant Mechanical Sections.

.9 Operation of HVAC equipment serving occupied areas during renovation

.1 Protect HVAC air handling equipment from collecting odours and pollutants during demolition & construction by implementing the following measures:

.1 Shut-down HVAC equipment in coordination with The City of Winnipeg's representative during heavy construction or demolition.

.2 Isolate the functional HVAC system from the renovation to prevent intake of pollutants.

.3 Seal all return system openings in and immediately adjacent to the construction area where isolation of the renovation area is possible.

.4 Install and maintain temporary filters on return air openings from the renovation space when system is in operation and connection to the renovation space is necessary. Replace these filters at the end of the project.

.5 Avoid storage of waste and construction materials in the mechanical room.

.6 Use high-efficiency filters (MERV 13) for central filtration when operating the system during construction. Inspect filters daily and replace as required over the duration of the project.

.7 Protect diffusers, VAV boxes, ducts and other HVAC system components.

.8 Final cleaning of existing ducts, diffusers, and window units is required upon completion of work if evidence of contamination is found.

1.34 LOCATION OF FIXTURES

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

.2 Inform Contract Administrator of conflicting installation. Install as directed.

1.35 TEMPORARY USE OF EQUIPMENT

.1 No portion of any mechanical system or equipment provided under Mechanical Sections may be used for temporary heating without Contract Administrator's written permission and observance of the following procedure:

.1 Oil and grease motor, fan and pump bearings, etc. check on a regular basis and maintain as recommended by manufacturer.

.2 Maintain and clean when necessary cleanable type filters and clean and oil just prior to Total Performance and take-over of building.

.3 Ensure that mechanical air handling equipment is not operated during painting.

.4 Employ equipment manufacturers and subtrades to ensure and certify that all systems and equipment are in proper condition, and guarantee all work used prior to take-over as for new work, from date of acceptance of building by Contract Administrator.

.5 If permission for temporary use of mechanical equipment is granted, use Canadian Plumbing and Mechanical Contractors Association standard form of agreement as basis of responsibilities. Guarantee on complete installation shall not start until acceptance of building by Contract Administrator.

.2 Where air handling systems are permitted to be operated before turnover to The City of Winnipeg, all return air grilles/openings shall be equipped with MERV 8 filters to keep return air system clean of dust and dirt. Monitor all filters for dust loading and replace heating, ventilating and air conditioning filters. Replace non-LED lamps if used for more than one month.

1.36 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of any part of the Project.

.2 Do not cut, drill or sleeve any load bearing structural member unless specifically indicated without written approval of Contract Administrator.

1.37 EQUIPMENT START UP AND VERIFICATION REPORTS

.1 The Contractor shall supply the equipment start-up reports for the mechanical equipment being installed.

.1 Forms shall be filled out in full, with all required and suggested fields.

.2 Forms shall include tester’s signature and the signature by the project manager for the mechanical Contractor.

.2 The controls Contractor shall supply a completed sequence verification checklist confirming all points of the system are functioning, reporting, and properly executing the sequence operation.

.1 Forms shall be developed and filled out by the Contractor

.2 Forms shall include tester’s signature and the signature by the project manager for the mechanical Contractor.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 EXECUTION

PART 1 GENERAL

1.1 DESCRIPTION OF THE WORK

.1 Disconnect building from all utilities and services related to mechanical sections (Fire Protection, Plumbing, HVAC, Hydronic and Controls).

.2 Demolish all mechanical systems and related components within and associated with the building being demolished.

.3 Remove all demolished materials from site and leave in conditions suitable for construction of a new building with new site services. The abandonment of existing equipment, material and services in place is not acceptable.

.4 Division of the Work among other contractors or subcontractors is solely the Contractor's responsibility. Neither The City of Winnipeg nor Contract Administrator assumes any responsibility to act as an arbiter to establish subcontract terms or disagreements between sectors or disciplines of the Work.

1.2 CONTRACT METHOD

.1 Construct Work under the Contract requirements in the Applicable Part C – General Conditions, Part D – Supplementary Conditions, and Division 01 and 02 Sections.

1.3 PERMITS, INSPECTION AND TESTING

.1 File all necessary notices, obtain and pay for all approvals and permits applicable to each Mechanical Section.

.2 Make changes required to secure Local Authorities approval, without extra cost. Where conflicting requirements occur, comply with most stringent regulation.

1.4 EXAMINATION

.1 Inspect existing conditions, including elements or adjacent buildings subject to irregularities, damage, movement, or other that could result from demolition Work.

.2 Hazardous containing materials may be present within existing buildings. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials. Coordinate all abatement requirements with the Contract Administrator.

.3 Buried conditions

.1 Refer to drawings for extent of buried system removal in coordination with Site and Civil drawings.

.4 Coordinate full extent of demolition work with all disciplines. Coordinate on site with all trades prior to commencement of demolition.

.5 Beginning of demolition means installer accepts existing conditions.

1.5 EXISTING UTILITIES AND SERVICES

.1 Coordinate disconnection of existing natural gas, sanitary and domestic water service with utility providers. When disconnecting existing services or utilities, execute Work at times directed by local governing authorities.

.2 Disconnect fuel oil piping and equipment to requirements of applicable laws and bylaws.

.3 Disconnect propane service and piping from building back to service provider’s equipment. Coordinate termination point with propane service provider. Coordinate removal of propane service with service provider. Where propane service equipment is the property of The City of Winnipeg, remove full extent of propane service.

.4 Disconnect district hydronic piping in coordination with district hydronic system representative.

1.6 ELECTRICAL REQUIREMENTS

.1 Division 26 shall disconnect power from all mechanical equipment and components prior to mechanical section beginning demolition. Coordinate with Division 26 to confirm power disconnection requirements.

1.7 WASTE MANAGEMENT

.1 In accordance with Section 01 74 00 - Cleaning and Waste Management.

.1 Recycle all materials where facilities exist.

.2 Refer to Section 01 74 00 for ownership of demolished materials.

.3 Refer to Division 02 for requirements of handling hazardous materials. Where requirements are not addressed, refer to applicable laws and bylaws.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Provide as required for the installation of mechanical systems.

- .1 Paint
- .2 Concrete – Equipment Pads
- .3 Firestopping

1.2 REFERENCE STANDARDS

1.3 SUBMITTALS

.1 Submittals in accordance with Section .

.2 Product Data:

- .1 Submit manufacturer's printed product literature, specifications and datasheet for piping, fittings and equipment.

PART 2 PRODUCTS

2.1 PAINT

.1 Refer to Division 09 for painting requirements

.2 Paint: Conform to Canadian General Standards Board (CGSB) standards.

- .1 Prime coat material shall conform to Canadian General Standards Board Standard No. 1GP-48.

.3 Provide materials identical to those tested and third-party certified to UL 2818 GREENGUARD Gold or equivalent when tested to CDPH Standard Method v1.2 for VOC emissions compliance.

2.2 CONCRETE – EQUIPMENT PADS

.1 Provision of concrete work by Division 03.

.2 Provide all concrete work required for mechanical work (bases, curbs, anchors, thrust blocks, manholes, catch basins, etc.) to industry standard.

- .1 Roughen concrete surface prior to pouring slab.
- .2 Rebar: 10M rebar 300 mm (12") centre to centre each way, middle of full pad. Drill in and epoxy grout 10M rebar into concrete at least 3" below existing surface. Tie to dowl or bend to cross though centre of equipment pad thickness. Minimum spacing of 600mm (24") on centre around perimeter of pad.
- .3 Concrete: 25 MPa, exposure class N
- .4 Chamfer or round pad corners.

.3 Provide other concrete work and material required for Mechanical Division work including but not limited to inserts, anchors, frames and any related components.

2.3 FIRESTOPPING

.1 Firestopping by Division 07.

PART 3 EXECUTION

3.1 PAINTING

.1 Paint all ferrous metal work except piping, galvanized and stainless steel ductwork with one prime coat, coating may be manufacturer or site applied.

.2 Clean and steel brush surfaces with exposed welds. Prime coat all steel supports, brackets, piping and ductwork welds.

.3 Touchup or repaint surfaces damaged during shipment or installation and leave ready for finish painting.

.4 Finish painting will be provided by Division 09 90 00.

3.2 FIRESTOPPING

.1 Ensure that fire ratings of floors and walls are maintained.

.2 Fill spaces between openings, pipes and ducts passing through fire separations and install firestopping systems in accordance with the appropriate ULC system number for the products, type of penetration and manufacturer’s instructions.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Pipe and Pipe Fittings, Valves, Strainers.

1.2 RELATED SECTIONS

.1 Section 20 05 00 – Common Work for Mechanical

.2 Section 22 11 16 – Domestic Water Piping.

.3 Section 26 05 80 - Equipment Wiring

1.3 REFERENCES

.1 American Society of Mechanical Engineers

.1 ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.

.2 ASME SEC VIIID - Boiler and Pressure Vessel Code - Rules for Construction of Pressure Vessels.

.2 ASTM

.1 ASTM A36/A36M - Carbon Structural Steel.

.2 ASTM B32 - Solder Metal.

.3 ASTM B88/M - Seamless Copper Water Tube.

.4 ASTM D1785 - Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

.5 ASTM D2467 - Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

.6 ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.

.3 American Welding Society

.1 AWS A5.8 - Filler Metals for Brazing and Braze Welding.

.4 Canadian Standards Association

.1 CSA B149.1 – Natural Gas and Propane Installation Code

.2 CSA C22.1 – Canadian Electrical Code

.3 CSA 4.7/ ANSI Z21.56 - Gas-fired pool heaters

.5 National Pool and Spa Institute (NPSI)

.1 Minimum Standards for Public Swimming Pools.

.6 NSF

.1 NSF 50 - Circulation System Components and Related Materials for Swimming Pools, Spas/Hot Tubs.

.7 Underwriters Limited

.1 UL 174 - Standard for Household Electric Storage Tank Water Heaters.

.2 UL 1081 - Swimming Pool Pumps, Filters, and Chlorinators.

.3 UL 1261 - Standard for Electric Water Heaters for Pools and Tubs.

.4 UL 1453 - Standard for Electric Booster and Commercial Storage Tank Water Heaters.

1.4 SUBMITTALS FOR REVIEW

.1 Refer to 20 05 00 – Common Work for Mechanical

.2 Product Data:

.1 Include data on pipe materials, pipe fittings, valves and accessories.

.2 Include component sizes, rough-in requirements, service sizes, and finishes.

.3 Include product description, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes.

.4 Include dimension drawings of water heaters indicating components and connections to other equipment and piping.

.5 Include heat exchanger dimensions, size of trappings, and performance data.

.6 Include dimensions of tanks, tank lining methods, anchors, attachments, lifting points, trappings, and drains.

.7 Indicate pump type, capacity, power requirements, and affected adjacent construction. Submit certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.

.8 Provide electrical characteristics and connection requirements.

.3 Shop Drawings: Indicate detailed assembly of components of each system or sub-system.

1.5 SUBMITTALS FOR INFORMATION

.1 Submission procedures: Refer to 20 05 00 – Common Work for Mechanical

.2 Manufacturer's Instructions: Indicate installation details, components assembly, and start-up procedures.

.3 Manufacturer's Field Reports: Indicate results of water treatment system set-up and testing.

1.6 CLOSEOUT SUBMITTALS

.1 Refer to 20 05 00 – Common Work for Mechanical

.2 Operation Data: Include installation instructions, lubrication instructions, and assembly views.

.3 Maintenance Data: Include maintenance and inspection data, replacement part numbers and availability, and service depot location and telephone number.

.4 Record Documentation: Record actual locations of controlling devices and underfloor piping.

.5 Warranty Documentation: Submit manufacturer warranty and ensure forms have been completed in The City's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

.1 Products of This Section: Manufactured to ISO 9000 certification requirements.

.2 Perform Work to NSF.

.3 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.4 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience.

1.8 REGULATORY REQUIREMENTS

.1 Conform to applicable code for installation of swimming pool systems.

.2 Perform work to local health department regulations.

.3 Provide certificate of compliance from authority having jurisdiction indicating approval of installation.

.4 Products Requiring Electrical Connection: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND PROTECTION

.1 Section 20 05 00 – Common Work for Mechanical: Transport, handle, store, and protect products.

.2 Accept equipment on site in shipping containers with labelling in place. Inspect for damage.

.3 Protect equipment from damage and elements by maintaining shipping packaging in place until installation. Maintain temporary inlet and outlet caps in place until installation.

PART 2 PRODUCTS

2.1 WATER PIPING AND PIPE FITTINGS

.1 PVC Pipe: ASTM D1785, Schedule 80.

.1 Fittings: ASTM D2467, PVC.

.2 Joints: ASTM D2855, solvent weld.

.2 Unions for Pipe Sizes 50 mm (2 inch) and Under: PVC for plastic piping; bronze unions for copper pipe, soldered joints.

.3 Flanges for Pipe Sizes over 50 mm (2 inch): PVC for plastic piping; bronze for copper piping.

.4 Valves: PVC plastic body and ball, double lever handle, double union with socket ends, EPDM seals, teflon seats.

.5 Butterfly Valves: Iron body, bronze disc, resilient replaceable seat for service to 82 degrees C (180 degrees F) wafer style, 10 position lever handle.

2.2 POOL FITTINGS AND EQUIPMENT

.1 Main Drain:

.1 Manufacturers:

.1 Lawson Aquatics Superflow Main Drain System Model 18x18.

.2 As per Drawings

.3 Substitutions: Refer to Section 20 05 00 – Common Work for Mechanical

.2 Molded sump, frame and cover, 450 x 450mm (18 x 18 inch) square frame and cover, 1181 sq cm (183 sq in) open area, side outlet, .

.2 Floor Inlets:

.1 Manufacturers:

.1 Atlantis Heavy Duty Adjustable Bottom Inlets Model 6765-2.

.2

.3 Substitutions: Refer to Section 20 05 00 – Common Work for Mechanical Not permitted.

.2 Nominal 125 mm (5 inch) diameter, with internal spinner valve disc.

.3 Vacuum Ports:

.1 Manufacturers:

.1 Atlantis Model 2” FPT Vacuum Inlet for Institutional Pool.

.2

.3 Substitutions: Refer to Section 20 05 00 – Common Work for Mechanical Not permitted.

.2 Nominal 100 mm (4 inch) diameter, with plug.

.4 Gutter Drain Grates:

.1 Manufacturers:

.1 Commercial Pool Model Custom bent Stainless Steel.

.2 Substitutions: Refer to Section 20 05 00 – Common Work for Mechanical

.5 Skimmers:

.1 Manufacturers:

.1 Commercial Pool Model Floating Weir Skimmer with Custom Bent Stainless Steel grate.

.2 Substitutions: Refer to Section 20 05 00 – Common Work for Mechanical

.2 New floating weir skimmer fittings to match existing. Provide shop drawing for new product. Work with Commercial Pool to provide appropriate product to suit existing condition.

.3 Custom bent grate shall match new gutter profile, coordinate with structural.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install equipment to manufacturer's instructions.

.2 Install Work to Province of Manitoba and City of Winnipeg standards.

.3 Install piping to conserve building space, not interfere with use of space and other work. Route piping in orderly manner, and maintain gradient. Group whenever practical at common elevations.

.4 Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Provide access to valves and fittings.

.5 Pipe relief valve outlet and backwash to nearest floor drain.

.6 Install unions downstream of valves and at equipment or apparatus connections.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Duct and HVAC equipment cleaning of HVAC systems serving the pool area.

1.2 QUALITY ASSURANCE

.1 Contractor Qualifications:

.1 Duct cleaning contractor to be member of National Air Duct Cleaners Association (NADCA).

Part 2 Products

2.1 AIR DUCT CLEANING EQUIPMENT

.1 Manually propelled full contact brushes:Ensure brushes are specifically manufactured and shaped to fit individual ducts, equipment and components of HVAC system.Ensure brushes are sized to fit various duct sizes in HVAC system.Ensure brushes make scrubbing motion and full contact with HVAC system interior surfaces to be cleaned.

.2 Brushes: manually propelled with integrally-mounted drive and nylon, polypropylene, or other non-metallic material bristles.

.3 Ensure drive has capacity to continue to push brush after bristles are distorted.

.4 Replace worn and ineffective brushes when required.

2.2 HEPA FILTER EVACUATION FAN

.1 Evacuation Fan: includes fan, HEPA filter, flexible hose and motor capable of maintaining debris and particulates airborne in airstream until they reach evacuation fan and maintaining system under negative pressure. Ensure HEPA filters are clean and maintain evacuation fan and HEPA filter to run efficiently.

2.3 HEPA VACUUM UNIT

.1 Vacuum Unit: includes vacuum fan, integral HEPA filter, suction hose and vacuum head, capable of maintaining HVAC System debris and particulates airborne in air stream until they reach vacuum unit and maintaining system under negative pressure. Ensure HEPA filters are clean and maintain vacuum unit and HEPA filter to run efficiently.

2.4 MATERIALS

.1 Access Panel: Fabricated sheet metal closure.

.1 Minimum of same gauge as ductwork.
.2 Minimum 19mm larger than opening on all sides.
.3 Attached with sheet metal screws.
.4 Sealed with duct sealant.

Part 3 Execution

3.1 PREPARATION

3.2 PREPARATION

.1 Close down HVAC system.

.2 Locate and identify externally visible HVAC system features which may affect cleaning process including:

- .1 Control devices;
- .2 Fire and smoke control dampers;
- .3 Balancing dampers: indicate and record positions for resetting;
- .4 Air volume control boxes: indicate and record positions for resetting;
- .5 Fire alarm devices;
- .6 Monitoring devices and controls;

.3 Cut openings in equipment panels and ductwork for access to system interior.

- .1 Square or rectangular opening sizes: 200 mm minimum each side.
- .2 Circular opening sizes: 200 mm minimum diameter.

.4 Installation of Access Doors and Panels: install access doors and panels for equipment where required to facilitate system inspection and cleaning.

- .1 Install access doors and panels for inspection and cleaning of equipment as follows:
  - .1 Heating and cooling coils;
  - .2 Fan units;
  - .3 Filters;
  - .4 Dampers;
  - .5 Sensors

.5 Installation of Access Doors in Ductwork: install access doors in ductwork where required to facilitate system inspection and cleaning.

- .1 Access door installation is not permitted in flexible ductwork.
  - .1 Inspect flexible ductwork only by disconnecting from main duct and inspecting from open end.

.6 When acoustically lined duct is cut for access, repair cut edges of acoustic lining using self-adhesive fibre glass tape and water based duct sealer.

- .1 Adhere new acoustic lining to match existing to inside of access panel or door to ensure continuity of acoustic properties of system.

.7 Remove and reinstall ceiling to gain access to HVAC system as required.

- .1 Replace ceiling damaged or soiled by air duct cleaning procedures.

3.3 EXAMINATION / PRE-CLEANING INSPECTION

.1 Verification of Conditions:

- .1 Make visual inspection of interior of HVAC system using remote controlled robotic camera.
- .2 Insert camera at pre-established strategic locations to evaluate condition and cleanliness of HVAC systems and components.

.2 Evaluation and Assessment:

.1 Identify location and type of internal components.

.2 Identify extent of potential problems.

.3 If toxic or hazardous materials or deposits are suspected after inspection, immediately stop work and notify the Contract Administrator.

.1 Do not proceed further with inspection operations until written approval from the Contract Administrator.

3.4 DUCT CLEANING

.1 Do duct cleaning in accordance with NADCAACR Standard.

.2 Isolate and clean sections in zones to ensure that dirt deposits and debris from zone being cleaned does not pass through another zones which has already been cleaned.

.1 Isolate zone of duct using air inflated zone bag before cleaning.

.3 Ensure vacuum units and evacuation fans are securely in place before starting cleaning operation of isolated section of HVAC air duct system.

.4 Install HEPA filter evacuation fan at one end of zone section and insert full contact brushes at other end.

.5 Clean HVAC supply air duct system and components.

.6 Clean exhaust, return, transfer ductwork and plenums, equipment and components.

.7 Energize brushes to travel from insertion point to HEPA filter evacuation fan.

.1 Pass brushes through sections as often as necessary to achieve required cleanliness.

.2 Change brush sizes as required to ensure positive contact with duct and component interiors.

.3 Clean corners and pockets where dirt and debris can accumulate.

.8 Clean equipment, components and other features in isolated zone before moving to next zone of HVAC air duct system.

.9 Clean diffusers, registers, louvers, and other terminal units.

.10 Remove perforated supply diffusers from suspended tee-bar ceiling.

.1 Dismantle and clean perforated plates and supply diffuser duct collars.

.2 Re-assemble perforated plate diffusers and reconnect to HVAC system using supply diffuser duct collar after cleaning.

.11 Advise Contract Administrator 24 hours minimum before deactivation of fire alarm and smoke detectors duct cleaning operations.

3.5 COMPONENTS AND EQUIPMENT CLEANING

.1 Brush and vacuum coils, humidifiers, air handling unit enclosures, and heat exchanger surfaces to achieve required cleanliness.

.2 When cleaning equipment and components by brushing and vacuuming is inappropriate or insufficient, dismantle and remove equipment or component and move to area designated by the Contract Administrator for cleaning.

.1 Pressure wash with water and cleaning solution until required cleanliness is achieved.

.2 Clean equipment and components in place only if there is no hazard to adjacent materials.

.3 Compressed air and manual cleaning is acceptable only for cleaning individual components and small areas as follows and only after written approval from the Contract Administrator:

.1 Fan blades;
.2 Dampers;
.3 Turning vanes;
.4 Controls;
.5 Sensor bulbs;
.6 Fire alarms;
.7 Smoke detectors.

3.6 SYSTEM STARTUP

.1 Install new system filters after cleaning operations are completed.

.2 Cover each inspection opening with access door or panel and secure in place after inspection and cleaning are completed.

.3 Restart each HVAC system.

3.7 CLEANING

.1 Clean in accordance with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Division 0 – Bidding & Contract Requirements

.2 General Requirements

.3 All Electrical Drawings and Division 25, 26, 27, 28 Series Specification Sections.

1.2 REFERENCES

.1 CSA-C22.1-24 - Canadian Electrical Code, Part I (26th Edition), Safety Standard for Electrical Installations.

.2 CAN3-C235-83 (R2015) - Preferred Voltage Levels for AC Systems, 0 to 50 000 V.

.3 CSA (Canadian Standards Association).

.4 ULC (Underwriters' Laboratories of Canada).

.5 ASTM E-814, - Fire Tests of Penetration Fire Stops.

.6 ANSI/ UL1479 - Fire Tests of Through Penetration Firestops

1.3 REGULATORY REQUIREMENTS

.1 Conform to CSA-C22.1-21.

.2 Comply with all CSA Electrical Bulletins in force at time of tender submission.

.3 Comply with all provincial by-laws, ordinances, codes, rulings, and other requirements.

.4 Comply with requirements of the electrical supply authority and the local inspection authority.

.5 Products: Listed and classified by CSA, or ULC and as suitable for the purpose specified and indicated. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from the appropriate Inspection Departments.

1.4 DEFINITIONS

.1 The following are definitions of terms and expressions used in the specification:

.1 Contract Administrator: Electrical Engineering Consultant: Epp Siepman Engineering Inc.

.2 Defective: A condition determined exclusively by the Contract Administrator.

.3 Demolish: The complete removal of the existing item identified complete with associated infrastructure back to last remaining device or source as required to accommodate the overall scope of work. Demolished items shall be legally disposed of off site.

.4 Electrical Code: Canadian Electrical Code or Local Code in effect at project location.

.5 Exposed: Any work not concealed in wall, shaft, or ceiling cavities or spaces. Work behind doors, in closets or cupboards or under counters is considered exposed.

.6 Indicated: as shown on Contract drawings or noted in Contract Documents.

.7 Inspection Authority: agent of any authority having jurisdiction over construction standards associated with any part of electrical work on site.

.8 Install: To remove from site storage, move or transport to intended location, install in position, connect to utilities, repair site caused damage, and make ready for use.

.9 New: Produced from new materials.

.10 Provide**:** Wherever the term "provide" is used in relationship to equipment, conduit and other materials specified for the work, it means "supply, install, connect and leave in working order all materials and necessary wiring, supports, access panels, etc., as necessary for equipment indicated." Wherever the terms "provide" is used in connection with services such as testing, load balancing, start-up, preparation of drawings for any part of the work, it means procure, prepare, supervise, take responsibility for, and pay for these services.

.11 Relocate: The complete relocation of the existing item identified to the new location as indicated, modifying the existing infrastructure as required to accommodate the relocation and overall scope of work.

.12 Remove and Reinstall: The temporary removal of the existing item identified complete with associated infrastructure to accommodate the overall scope of work, the temporary storage of the item, preparing the item for reuse, and reinstallation of the item as indicated.

.13 Remove and Replace: The complete removal and replacement of the item identified in its current location, with a new item, modifying the existing infrastructure as required to accommodate the overall scope of work.

.14 Renewed: Produced or rejuvenated from an existing material to like-new condition to serve a new or existing service.

.15 Supply: To acquire or purchase, ship or transport to the site, unload, remove packaging to permit inspection for damage, re-package, replace damaged items, and safely store on-site.

.16 Supply Authority: electrical power utility company responsible for delivery of electrical power to project.

.17 Typical: A representative characteristic that is standard for all installations whether individually noted or not throughout the documents. "Typical" applies to each individual or combined installation except where specifically noted or otherwise indicated that the application is non-typical.

1.5 ABBREVIATIONS

.1 The following are common abbreviations used in the specification:

.1 **AFF:** Above finished floor.

.2 **AFG:** Above finished grade.

1.6 PERMITS & FEES

.1 Submit all quantities of drawings and specifications necessary for examination and approval to Electrical Permit Department and Electrical Supply Authority prior to commencement of work.

.2 Obtain and pay for all permits necessary for the electrical installation.

1.7 INSPECTION

.1 Furnish a Certificate of Acceptance from the Inspection Authorities on completion of work. Copies of Certificate shall be included in Maintenance Manuals.

.2 Certificate of Inspection and Approval shall be submitted before final payment may be considered to be due.

.3 During the course of the project construction, the Contract Administrator will carry out periodic site reviews and prepare a deficiency list for remedial action by the Electrical Subcontractor. When requested, the Electrical Subcontractor shall respond in writing to the Contract Administrator, stating corrective action and completion date for each item listed as deficient. This response shall be in the hands of the Contract Administrator within three working days of receipt of the Site Review Report.

1.8 PRODUCT CHANGES & SUBSTITUTIONS

.1 Change in Product/Products: Submit request for substitution or alternative in accordance with this section, Part B – Bidding Procedures, B7, and Section 01 61 00. In case of a discrepancy between this section and Part B and Division 01, the more stringent shall apply.

.2 Part B – Bidding Procedures, B7 specify time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this section.

.3 Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

.4 Any substituted item submitted for consideration must not exceed the available space limitations, and all additional costs for mechanical, electrical, structural and architectural revisions required to incorporate the substituted material shall be the responsibility of the Electrical Division. Review maximum dimensions and weights when provided in the specification and schedules, and where not specified review the drawings for space limitations.

.5 A request constitutes a representation that the Bidder:

.1 Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

.2 Will provide the same warranty for the Substitution as for the specified Product.

.3 Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to the City of Winnipeg.

.4 Waives claims for additional costs or time extension which may subsequently become apparent.

.5 Will reimburse City of Winnipeg and Contract Administrator for review or redesign services associated with re-approval by authorities.

.6 Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

1.9 SUBMITTALS FOR REVIEW

.1 Refer to Division 01.

.2 Progress Payment Application Template

.1 Prior to the first application for payment, submit for review a draft progress application template.

.2 Progress Application shall contain separate line items for the following systems:

.1 Distribution Equipment including Panels, Distribution Panels, Transformers, etc.

.2 Branch Wiring, Conduit, Raceway, Boxes

.3 Exit & Emergency Lighting

.4 Fire Alarm

.5 Pool Grounding

.6 Close Out (As-Builts, O&Ms)

.3 Progress for each system shall break out labor and materials separately.

.3 Shop Drawings Administrative Requirements

.1 **Shop drawings shall be submitted electronically in PDF format documents to** shopdrawings@eppsiepman.com.

.2 Shop drawing documents **shall be grouped by specification section**. Clearly list the specification section on the front page or cover sheet of the submittal. Shop drawings related to **multiple sections may not be grouped together** into a single document. Documents that are groups incorrectly will be returned without being examined and shall be considered rejected.

.1 Each drawing shall include the name of project as found on the drawings or specifications, the equipment supplier and the specification section that the equipment is specified under.

.3 Submit to Contract Administrator submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.4 Work affected by submittal shall not proceed until review is complete.

.5 Present Shop Drawings, product data, samples and mock-ups in SI Metric and/or Imperial inch-pound units, to match the units used in the schedules.

.4 Shop Drawings and Product Data

.1 Submit shop drawings and product data for review by the Contract Administrator. All drawings shall be in English and metric dimensions or in imperial where indicated. Manufacture of equipment shall not commence until shop drawings have been reviewed.

.2 Material submitted for review shall be marked up bear the Contractor's and where applicable the Utility's reviewed stamp.

.3 Shop drawings shall be reviewed by the Electrical Subcontractor, Contractor, and where applicable the Utility prior to submittal to Contract Administrator, confirming that they meet all the design requirements. 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.

.4 Submittals not stamped, signed, dated, identified as to specific project, and attesting to their being reviewed will be returned without being examined and shall be considered rejected.

.5 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.

.6 Where applicable, include wiring, single line and schematic diagrams.

.7 Include wiring drawings or diagrams showing inter-connection with work of other sections.

.5 Provide scaled drawings showing layout of all electrical equipment and coordination of same with mechanical equipment in all electrical, electrical/mechanical and voice data rooms.

.6 Submit samples in accordance with General Conditions. Samples shall be forwarded to the Contract Administrator's office and returned. Approved samples will be retained until after tender closing, then all samples will be returned except for the sample submitted by the Manufacturer who has been listed by the successful Contractor in the tender

documents. This sample will be used for comparison with the actual production run of successful manufacturer.

.7 Submit shop drawings of service entrance equipment to utilities.

1.10 CLOSEOUT SUBMITTALS

.1 Refer to Division 01.

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

.3 Four (4) weeks prior to Substantial Performance of the Work, submit to the Contract Administrator, one (1) draft copy of operating and maintenance manuals in Canadian English.

.4 Copy will be returned with Contract Administrator's comments.

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

.6 Two (2) weeks prior to Substantial Performance of the Work, submit to the Contract Administrator, three (3) final copies of operating and maintenance manuals in Canadian English.

.7 Summary audit documents associated with requirements for LEED classification documentation.

.8 Maintenance Data:

.1 Provide operation and maintenance data for incorporation into Maintenance Manuals.

.2 Include details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.

.3 Include technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature not acceptable.

.4 Include all warranty information.

.5 Submit Maintenance Manuals to the Contract Administrator for review. Manuals that are incomplete shall be returned to the Electrical Subcontractor for completion. Completed manuals shall be submitted, to the satisfaction of the Contract Administrator, before final payment may be considered to be due.

.6 Format

.1 Refer also to Section 01 78 00 - Closeout Submittals for formats for manuals. Where there is a discrepancy with this section, follow the requirements of 01 78 00.

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

.3 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 8.5 x 11 inch (219 x 279 mm) with spine and face pockets.

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

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

.6 Arrange content by systems under Section numbers and sequence of Table of Contents.

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

.8 Text: Manufacturer's printed data, or typewritten data.

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

.7 Contents

.1 Refer also to Section 01 78 00 for formats for contents. Where there is a discrepancy with this section, follow the requirements of 01 78 00.

.2 Table of Contents: Provide:

.1 Title of project.

.2 Date of submission.

.3 Names, addresses, and telephone numbers of Contract Administrator and Contractor with name of responsible parties.

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

.3 For each product or system, list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.4 Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 40 00.

.5 Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control, wiring, and schematic diagrams and performance curves.

.6 Include Systems Certifications where applicable.

.7 Include manufacturer specific warranties where applicable.

.8 Include a list of maintenance materials provided in each related section.

.9 Certificate of Acceptance: Relevant certificates issued by authorities having jurisdiction, including code compliance certificate, life safety systems performance certificate.

.10 Training: Record of the City of Winnipeg’s representative training as specified.

.9 Maintenance Materials:

.1 Provide maintenance materials as specified. Include a list of the maintenance materials in each related section of the operation and maintenance data.

.2 Turn materials over to the City of Winnipeg in an orderly fashion upon completion of installation.

1.11 EXAMINATION

.1 Prior to submitting a tender, examine the site and local conditions which will affect the work. Refer to the Architectural, Mechanical and Structural drawings, schedules and specifications for construction details to be certain that the electrical work can be satisfactorily carried out as specified. Claims for extra payments resulting from conditions which could reasonably be foreseen during an examination of the documents and/or site, will not be recognized.

.2 Ensure that all equipment designated as “Existing to Remain” or “Existing to be Relocated” is suitable for its intended re-use, including panelboards and circuits. Report any discrepancies to the Contract Administrator before tender close.

.3 Refer to General Conditions for instructions regarding a prearranged site visit during the tender period.

.4 Notify Contract Administrator of any discrepancies, omissions, etc., prior to the awarding of the Contract, otherwise the Electrical Subcontractor shall perform the work as directed at no additional cost to the City of Winnipeg.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

.1 Provide labour, materials, transportation, equipment and facilities, etc., required for the complete electrical installation as indicated or implied on the drawings and specifications.

.2 Electrical equipment shall be new and of type and quality specified.

.3 Request for approval of material, as equal, shall conform to the specification.

.4 Equivalent materials and equipment

.1 Bidders shall submit a tender based on the specified materials and equipment only.

.2 Bidders may submit a tender based on equivalent materials and equipment only if such items have been approved as equals by the Contract Administrator.

.3 Bidders may submit, with their tender, an alternate price based on alternate materials and equipment only if such items have been approved as alternates by the Contract Administrator.

.4 Submissions for equals or alternates shall be received by the Contract Administrator, ten (10) working days prior to tender closing. Submissions shall include sufficient manufacturer's data to clearly show equivalency, as well as an itemized list of equal or alternate items, the items for which they were submitted and a space for the Contract Administrator to indicate "approved equal in accordance with B6", "approved alternate in accordance with B6", or "not approved". Submittal list will be returned or may be picked up at the Contract Administrator's office. Where submissions are not returned by the Contract Administrator before tender closing or are not received by the Contract Administrator ten (10) working days before close of tender, they are considered not approved.

.5 All submissions shall include the following phrase "We have reviewed all Contract documents, Contract drawings and specifications relating to the equipment presented herein" and shall bear the name and signature of the manufacturer or their agent.

2.2 VOLTAGE RATINGS

.1 Operating voltages: to CAN3-C235-83(R2015).

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment shall operate in extreme operating conditions established in above standard without damage to equipment.

2.3 FINISHES

.1 Finish outdoor electrical equipment such as parking lot panels, to match light standards.

.2 Paint indoor switchgear light grey to EEMAC-2Y-1.

.3 Paint indoor distribution enclosure trims light grey to EEMAC-2Y-1. Distribution tub shall be galvanized.

.4 Paint outdoor electrical equipment enclosures with two (2) coats of U.V. resistant Urethane Enamel to minimum 1.5 mil dry coat thickness. Colour shall be “equipment green” to EEMAC 2Y-1.

.5 Clean and touch up surfaces of shop-painted equipment, scratched or marred during shipment or installation, to match original paint.

.6 Clean, prime and paint exposed wiring, conduit, junction and pull boxes, hangers, racking, and fasteners to prevent rusting and to match surrounding finishes where applicable.

2.4 LABELS AND WARNING SIGNS

.1 Manufacturer’s nameplates and CSA labels shall be visible and legible after equipment is installed.

.2 Provide warning signs on equipment, as required, to meet the requirements of the Inspection Authorities, including indication of multiple power sources.

.3 Provide quantity as required of buried cable signs reading “Buried Cable” and “Buried High Voltage Cable”. Signs shall be installed at building structure/equipment, at locations as directed on site and as per Canadian Electrical Code.

2.5 PROTECTION

.1 Guards

.1 Provide guards for all electrical equipment and devices in gymnasium and other areas subject to damage.

.2 Sprinkler Proof Equipment

.1 All surface mounted electrical equipment located in sprinklered areas shall be sprinkler proof and shall be provided with suitable hoods and shields.

.2 Entrance of conduits into the top of surface mount electrical panels/cabinets/distributions and motor control centers shall utilize O-rings and watertight connectors.

.3 All recessed mounted branch circuit panels and distribution panels shall be provided with a Type 2 enclosure.

.3 Construction

.1 Protect exposed live equipment during construction for personnel safety.

.2 Shield and mark live part “LIVE ( ) VOLTS”, with appropriate voltage.

.3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision.

2.6 SPARE PARTS AND MAINTENANCE MATERIALS

.1 Assemble spare parts as specified.

.2 Include the following:

.1 Part number.

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

.3 Installation instructions as applicable.

.3 Provide a written list complete with the City of Winnipeg’s signature assuring that spare parts have been received by the City of Winnipeg.

PART 3 EXECUTION

3.1 COORDINATION WITH OTHER TRADES

.1 Refer to Mechanical, Structural, Architectural and Interior Design drawings and specifications for additional electrical work in connection with other Divisions. Where such work is included in other sections of the specifications, provide equipment, conduit, wiring, etc. (in accordance with the approved manufacturer's shop drawings), as required, for operation of the specified equipment.

.2 Schedule execution of electrical work with associated work specified in other Divisions.

.3 Coordinate electrical work with work of other trades to avoid conflicts with pipes, air ducts or other equipment. Provide additional supports, wiring, etc., to relocate electrical equipment, as required, where structural members, air ducts, piping or other equipment interferes with the electrical installation.

.4 Prior to installation provide scaled drawings of all mechanical/electrical rooms and communication rooms showing layout of all equipment (mechanical and electrical) for Contract Administrator review.

3.2 QUALITY ASSURANCE

.1 Do complete installations in accordance with CSA C22.1-21.

.2 While not identified and specified by number in this Division, comply with CSA Electrical bulletins in force at time of tender submission. Comply with the requirements of all Provincial and local laws, rules, ordinances and codes.

.3 Electrical installations shall comply with all requirements of the electrical supply authority and the inspection authority.

.4 Electrical installation shall be in accordance with the applicable versions of the Canadian Electrical Code, Provincial and other codes, rules and regulations. Supply material and labour required to meet the requirements of these codes, rules and regulations even though the work in not shown on the drawings or mentioned in the specifications. Where the electrical installation calls for better quality materials or construction than the minimum requirements of these codes, rules and regulations, the electrical installation shall be as shown on the drawings and as specified.

3.3 WORKMANSHIP

.1 Install equipment, conduit and cables in a workmanlike manner to present a neat appearance to the satisfaction of the Contract Administrator. Install conduit and cable 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 in a tidy appearance.

.2 Install equipment/junction boxes and apparatus requiring maintenance, adjustment or eventual replacement, with adequate clearances and accessibility for same.

.3 Provide for all requirements shown on shop drawings or manufacturer's installation instructions.

.4 Work deemed by the Contract Administrator to be unsatisfactory shall be replaced at no additional cost.

3.4 DELIVERY STORAGE AND HANDLING

.1 Deliver all materials to site in an orderly fashion.

.2 Store all materials in a clean and dry place, secure from vandalism or theft. All materials shall be left in shipping containers until required for use.

.3 Provide additional protection such as tarps, padding, wood skids, etc., as required to ensure protection of equipment and as directed by the Architect.

3.5 EXCAVATION AND BACKFILLING

.1 Excavate and backfill as required for underground electrical services as indicated. Provide protective materials around and over services and be present at all times during excavation and backfilling to supervise work. Backfilling shall restore the excavated area to the original condition and shall include sodding where required.

.2 Work shall be in accordance with the current CSA Bulletin.

.3 Include all costs for excavation and backfilling, for any underground electrical installation, unless otherwise indicated.

.4 Work shall be arranged in such a manner that will not interfere with regular pedestrian or vehicular traffic patterns.

.5 Provide trenching, cable installations and backfill promptly. Open trenches shall be barricaded in an appropriate manner.

.6 Cables required to cross under roadways, paved areas, sidewalks, etc. shall be installed in PVC conduits pushed under such areas.

.7 Six _ (6") of sand shall be provided surrounding installed cables and _ x _ 2" x 4" treated plank installed _ 6" above the cables. Install cable marker tape in all trenches, minimum _ 12" above cables. The remainder of the trench shall be backfilled with granular base course. All backfill material shall be thoroughly tamped and compacted to at least 90% of maximum density at optimum moisture. The ground shall be left free from ruts and rough spots. In any asphalt areas, backfill shall be granular material only.

.8 All sodded areas disturbed or damaged during trenching and backfilling shall be repaired with manured soil mix and resodded. Make all repairs to damaged asphalt and/or concrete surfaces to match existing.

.9 Care shall be taken when excavating near existing services. Existing trees and shrubbery in work area shall be protected from damage.

.10 Install buried cable signs as per CEC and Manitoba Electrical addendums.

3.6 CONDUIT SLEEVES AND HOLES

.1 Install conduit, and sleeves, prior to pouring of concrete. Sleeves through concrete shall be sized for free passage of conduit.

.2 Holes through exterior walls and roof shall be flashed and made weatherproof.

.3 Make necessary arrangements for cutting of chases, drilling of holes and other structural work required to install electrical conduits, cables, pullboxes and outlet boxes.

.4 Install cables, conduits, and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

.5 Provide a minimum of two (2) separate conduit sleeves embedded in each concrete lighting fixture base. At least one (1) unused conduit shall be for possible future extension of wiring.

.6 All conduits and cables shall be entered into the building above grade unless otherwise noted.

.7 All coring in buildings with electrical in the slab shall be scanned at Contractor's expense to prevent damage.

3.7 CUTTING AND PATCHING

.1 Pay the costs of all cutting and patching required for the installation of electrical work. Payment for cutting and patching shall be made through the Contractor.

.2 Cutting and patching required for the installation of electrical work shall be done by the particular trade whose work is involved. No cutting or patching shall be carried out by the tradesman employed on the electrical work.

.3 Obtain the approval of the Architect before arranging for any cutting. Patching shall restore the affected area to the original condition; materials and methods used for patching shall be in accordance with the requirements of the corresponding Divisions of the specification.

3.8 DEVICE/EQUIPMENT INSTALLATION

.1 Device/equipment location and mounting:

.1 Locate devices as indicated.

.2 Do not install devices back-to-back in wall.

.3 Drawings are schematic only and do not indicate all architectural or structural elements.

.4 Outlets or equipment shall be moved to any point within a 3 m (10'-0") radius when the Contract Administrator requests relocation prior to closing of wall framing, without additional cost.

.5 Locate manual lighting controls on latch side of doors.

.6 Vertically align devices of different systems when shown near each other and occurring at different mounting heights.

.7 Coordinate mounting heights and location of all devices/equipment with all discipline Contract documents prior to installation of rough-in boxes.

.8 Panelboards and similar equipment including control panels intended to be surface mounted shall be installed on minimum 19 mm (3/4") good one side, fir plywood mounting backboards. Treat backboards with wood preservative prior to installation and paint with primer and two (2) coats gray enamel before any equipment is mounted. Provide plywood mounted boards unless specified otherwise in other sections.

.9 Panelboards and similar equipment including control panels mounted on exterior concrete/block walls shall have minimum 19 mm (3/4") air gap behind enclosure (to minimize condensation).

.10 All transformers, motor control centers and floor-mounted distribution panels shall be mounted on 100 mm (4") concrete housekeeping pads. The Electrical Contractors shall be responsible for provision of these pads.

.2 Mounting heights

.1 Mounting height of equipment is from finished floor to centre line of equipment unless indicated otherwise.

.2 If mounting height of equipment is not indicated, verify before installation.

.3 Coordinate all mounting heights with Architectural elevations.

.4 Where installed in block or brick, mounting heights shall be as above or at bottom of nearest course.

.5 Install devices/equipment at the following heights unless indicated otherwise:

.1 Receptacles and similar devices:

.1 General height (accessible height): 450 mm (18”)
.2 Above continuous baseboard heater: 200 mm (8”)
.3 Above counters: 150 mm (6”); Note-4
.4 Service and utility spaces: 1000 mm (39”)
.5 Exterior: 1000 mm (39”) AFG

.2 Communications outlets and similar devices:
.1 General height (accessible height): 450 mm (18”)
.2 Above continuous baseboard heater: 200 mm (8”)
.3 Above counters: 150 mm (6”); Note-4
.4 Service and utility spaces: 1000 mm (39”)

.3 Luminaires:
.1 Suspended: Unless indicated otherwise, refer to architectural.
.2 Wall mounted: Unless indicated otherwise, refer to architectural.

.4 Lighting controls:
.1 General (accessible height): 1150 mm (45”)
.2 Occupancy sensors (switch based, manual): 1150 mm (45”)
.3 Barrier free (accessible) suites: 900 mm (36”)

.5 Emergency lighting:
.1 Exit signage: 25 mm (1”); Note-5
.2 Battery units:
.1 2350 mm (92”); Note-1 or
.2 150 mm (6”); Note-2
.3 Remote heads:
.1 2350 mm (92”); Note-1 or
.2 150 mm (6”); Note-2

.6 Fire alarm:
.1 Control panels, annunciators: 2000 mm (78”); Note-1
.2 Manual stations: 1150 mm (45”)
.3 Signal devices (visual and audible):
.1 2350 mm (92”); Note-1 or
.2 150 mm (6”); Note-2
.4 Telephone handsets: 1500 mm (59”)

.7 Automatic door operators:
.1 Controller box: Refer to architectural.
.2 Pushbutton control (button type): 900 mm (36”)
.3 Pushbutton control (bar type): Refer to architectural.
.4 Key switch (line voltage): 1550 mm (61”)
.5 Key switch (low voltage): 1150 mm (45”)
.6 Push-to-lock (PTL) pushbutton: 900 mm (36”)
.7 Occupied-when-lit (OWL) indicator: 25 mm (1”); Note-5

.6 Notes (Note-X):
.1 Measured to top of device/equipment.
.2 Measured from ceiling to top edge of device/equipment where mounting height would be lower than required specification.
.3 Measured to operating handle of device/equipment.

.4 Coordinate counter backsplash heights with architectural drawings prior to rough-in. Maintain minimum 1” clearance above backsplash height.

.5 Measured above door trim to underside of device/equipment.

.6 Measured to bottom of device/equipment.

3.9 FIREPROOFING

.1 Where cables or conduits pass through block or concrete walls and floors and any fire-rated assembly, seal openings with firestopping systems that have been tested for specific fire-resistance-rated construction conditions conforming to the construction assembly type, penetrating item type, annular space requirements, and fire-rating involved in each instance.

.2 Provide products that upon curing, do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.

.3 Openings within walls and floors designed to accommodate cabling systems subjected to frequent cable changes shall be provided with re-enterable products.

.4 Fire proofing of electrical cables, conduits, trays, etc, passing through fire barriers shall conform to local codes and inspection authorities.

.5 Fire stop materials shall be asbestos free and have been tested in accordance with ASTM E-814, and ULC 1479.

.6 Fire stop and smoke seals shall be done in accordance with Section 07 84 13.

.7 Approved manufacturers:

.1 Nelson Firestop Products

.2 Specified Technologies

.3 Hilti Firestop

3.10 CIRCUITING

.1 Circuiting is representational only within a panel only. Circuit all electrical equipment and devices to their individually respective, intended panels.

3.11 LOAD BALANCE

.1 Measure phase current to panelboards with normal loads operating at time of measurement. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Submit, at completion of work, a report listing phase and neutral currents on panelboards, transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

.4 Include load balance test results in maintenance manuals.

3.12 TESTING

.1 Conduct and pay for tests including, but not limited to, the following systems:

.1 Circuits originating from branch distribution panels.

.2 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.

.3 Grounding systems.

.2 Insulation Resistance Testing

.1 Megger circuits, feeders and equipment up to 350V with a 500V instrument.

.2 Megger 350-600V circuits, feeders and equipment with a 1000V instrument.

.3 Check resistance to ground before energizing.

.3 Furnish Manufacturer's Certificate or letter confirming that entire installation, as it pertains to each system, has been installed to manufacturer's instructions. Submit letter in accordance with this section.

.4 Carry out tests in presence of Contract Administrator where directed.

.5 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.6 Submit test results in Maintenance Manuals.

3.13 CARE, OPERATION AND START-UP

.1 Instruct the City of Winnipeg's operating personnel in the operation, care and maintenance of equipment. Arrangement of such instructional sessions shall be done at a time convenient to the City of Winnipeg.

.2 Arrange and pay for services of Manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components.

.3 Provide these services for such a period, and for as many visits as necessary to put equipment into operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

3.14 CLEANING

.1 Final cleaning shall be done in accordance with the specification.

.2 Final cleaning shall include, but not be limited to, all lighting reflectors, lenses, and other lighting surfaces that have been exposed to dust and dirt throughout the course of construction.

.3 Clean surfaces that have been exposed to dust and debris throughout construction.

.4 Remove dirt and debris from enclosures.

.5 Clean electrical parts to remove conductive and deleterious materials.

.6 Clean finishes and touch-up damage.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Electrical demolition.

1.2 RELATED SECTIONS

.1 Section 02 41 19 - Selective Demolition.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

.1 Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Verify field measurements and circuiting arrangements are as shown on Drawings.

.3 Verify that abandoned wiring and equipment serve only abandoned facilities.

.4 Electrical drawings are based on existing record documents and/or casual field observations. Coordinate full extent of demolition work with all disciplines. Coordinate on site with all trades prior to commencement of demolition.

.5 Report discrepancies to the Contract Administrator, and The City of Winnipeg before disturbing the existing installation.

.6 Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

.1 Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

.2 Reroute/extend/re-feed existing electrical as required to maintain existing systems not indicated to be removed.

.3 Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

.1 Demolish and extend existing electrical work to this Section and as indicated.

.2 The construction documents indicate major items of equipment, fixtures and devices, that exist and may not indicate every item or supporting wiring and conduit to be removed and/or relocated.

.3 Carefully examine the site and construction documents to verify the extent of work defined in the construction documents. Be responsible for determining which existing equipment and/or devices are to be removed and/or relocated.

.4 Remove, relocate, and extend existing installations to accommodate new construction including all existing equipment and/or devices indicated within the construction documents.

.5 Where existing equipment and/or devices are to be temporarily relocated, coordinate the required structure to support the equipment.

.6 Remove abandoned wiring to source of supply.

.7 Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

.8 Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.

.9 Disconnect and remove abandoned panelboards and distribution equipment.

.10 Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

.11 Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

.12 Repair adjacent construction and finishes damaged during demolition and extension work.

.13 Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

.14 Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.4 PANELBOARDS

.1 Existing panelboards shall be retrofitted to accommodate new sprinklers. Provide mechanically fastened manufacturer approved drip hoods for all surface mounted panelboards. Seal existing conduit and wiring penetrations for all surface mounted panelboards with weatherproof connectors. All work shall be conducted in accordance to approved methods by the authority having jurisdiction.

3.5 CLEANING AND REPAIR

.1 Clean and repair existing materials and equipment which remain or are to be reused.

.2 Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts, broken electrical parts and lenses.

3.6 FINISHES

.1 Clean, prime and paint exposed wiring, conduit, junction and pull boxes, hangers, racking, and fasteners to prevent rusting and to match existing finishes where applicable.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Building wire and cable.

.2 Armoured cable.

.3 Armoured cable wet underground (ACWU)

.4 Metal clad cable (TECK)

.5 Wiring connectors and connections.

1.2 RELATED SECTIONS

.1 Section 26 05 53 - Electrical Identification.

.2 Section 31 23 18 - Trenching: Trenching and backfilling for direct burial cable installation.

1.3 REFERENCES

.1 CSA-C22.1-24 - Canadian Electrical Code, Part I (26th Edition), Safety Standard for Electrical Installations.

.2 C22.2 No. 0.3-09 (R2014) - Test Methods for Electrical Wires and Cables.

.3 CSA C22.2 No. 51-14 - Armoured Cables.

.4 CSA C22.2 No. 52-15 - Underground Secondary and Service Entrance Cables.

.5 CAN/CSA-C22.2 No. 65-18 - Wire Connectors.

.6 CSA C22.2 No. 75-17 - Thermoplastic-Insulated Wires and Cables.

.7 CSA C22.2 No. 123-16 - Metal Sheathed Cables.

.8 CAN C22.2 No.131-17 - Type TECK 90 Cable.

.9 NECA (National Electrical Contractors Association) - National Electrical Installation Standards (NEIS).

.10 NETA (InterNational Electrical Testing Association) - ANSI/NETA ATS-2017 - Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems.

.11 CSA (Canadian Standards Association).

.12 ULC (Underwriters' Laboratories of Canada).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Coordination:

.1 Coordinate with other work having a direct bearing on work of this section.

.2 Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.

1.5 SUBMITTALS FOR REVIEW

.1 Refer to 26 05 00 Common Work Results for Electrical.

1.6 SUBMITTALS FOR INFORMATION

.1 Refer to 26 05 00 Common Work Results for Electrical.

1.7 STORAGE, AND HANDLING

.1 Cables shall be stored and handled in accordance with manufacturer's recommendations.

1.8 CLOSEOUT SUBMITTALS

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Record Documentation:

.1 Record actual locations of components and circuits.

.2 Record routing of all equipment and panelboard feeders.

1.9 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.

1.10 REGULATORY REQUIREMENTS

.1 Conform to CSA-C22.1.

.2 Provide products listed and classified by CSA or ULC and as suitable for the purpose specified and indicated.

1.11 PROJECT CONDITIONS

.1 Conductor sizes are based on copper unless indicated as aluminum or "AL".

PART 2 PRODUCTS

2.1 BUILDING WIRE AND CABLE

.1 Description: Single conductor insulated wire RW90.

.2 Conductor: Copper unless otherwise noted.

.3 Insulation Voltage Rating: 600 volts.

.4 Insulation: Cross-Linked Polyethylene material rated 90 degrees C.

2.2 ARMOURED CABLE (AC90)

.1 Description: Type AC90.

.2 Conductor: Copper unless otherwise noted.

.3 Insulation Voltage Rating: 600 volts.

.4 Insulation Temperature Rating: 90 degrees C (_ degress F).

.5 Insulation Material: Cross-Linked Polyethylene.

.6 Rating: CSA FT4

2.3 ARMOURED CABLE WET UNDERGROUND (ACWU90)

.1 Description: Type ACWU90

.2 Conductor: Aluminum, conductor quantities as indicated complete with bond

.3 Insulation: Cross-linked polyethylene (XLPE), type RW90, 600 volts

.4 Armour: Interlocking aluminum

.5 Outer jacket: Flame-retardant, moisture and sunlight resistant black PVC

.6 Temperature rating: 90 degrees C (_ degress F).

.7 Listings: CSA FT4, CSA C22.2 No. 51, CSA C22.2 No. 174

.8 Options: Outer jacket color coding as indicated

2.4 METAL CLAD CABLE (TECK90)

.1 Description: Type TECK90.

.2 Conductor: Copper, conductor quantities as indicated complete with bond

.3 Insulation: Cross-linked polyethylene (XLPE), type RW90, 600 or 1,000 volts

.4 Inner jacket: Flame-retardant, moisture and sunlight resistant black PVC

.5 Armour: Interlocking aluminum

.6 Armour: Interlocking galvanized steel

.7 Outer jacket: Low-temperature, moisture and sunlight resistant black PVC

.8 Listings: CSA FT1, CSA FT4, CSA C22.2 No. 131, CSA C22.2 No. 174

2.5 CONNECTORS

.1 Pressure type connectors, fixture type splicing connectors, cable clamps and lugs, as required.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Verify that field measurements are as indicated.

.3 Verify that interior of building has been protected from weather.

.4 Verify that mechanical work likely to damage wire and cable has been completed.

.5 Verify that raceway installation is complete and supported.

3.2 PREPARATION

.1 Completely and thoroughly swab raceway before installing wire.

3.3 WIRING METHODS

.1 Concealed Dry Interior Locations: Use only armoured cable, armoured cable wet underground, metal clad cable, or building wire in raceway.

.2 Exposed Dry Interior Locations: Use only building wire in raceway.

.3 Above Accessible Ceilings: Use only armoured cable, armoured cable wet underground, metal clad cable, or building wire in raceway.

.4 Wet or Damp Interior Locations: Use only armoured cable wet underground, metal clad cable, or building wire in PVC raceway.

.5 Exterior Locations: Use only armoured cable wet underground, metal clad cable, or building wire in raceway.

.6 Underground Installations: Use only armoured cable, armoured cable wet underground, or building wire in raceway.

3.4 INSTALLATION

.1 Route wire and cable as required to meet project conditions.

.2 Install cable to the CSA-C22.1.

.3 Use solid conductor for feeders and branch circuits 10 AWG and smaller.

.4 Use stranded conductors for control circuits.

.5 Use conductor not smaller than 12 AWG for power and lighting circuits and sized for maximum 3% voltage drop as per the following Table:

Maximum Conductor Length for 120V Branch Circuits

Breaker SizeA	Conductor	
	Size AWG	Max Length m
15A	#12	20
	#10	35
	#8	55
	#6	90
20A	#12	15
	#10	25
	#8	40
	#6	65
	#4	110
30A	#10	15
	#8	25
	#6	45
	#4	70

.1 Where conductors are required to meet voltage drop requirements that are too large for proper termination at breakers or end devices, a transition to a suitable sized conductor may be made within 3m (10') of the termination with a minimum smaller conductor size of #10AWG.

.6 Use conductor not smaller than 16 AWG for control circuits.

.7 Pull all conductors into raceway at same time.

.8 Use suitable wire pulling lubricant for building wire 4 AWG and larger.

.9 Protect exposed cable from damage.

.10 All cable routed below grade shall enter/exit the building below grade unless noted otherwise.

.11 Where cabling is installed on building exterior, or direct buried, make provision for differential settling of exterior grade, buildings, and other structures and supports. Provide slack within cabling systems as required.

.12 Support cables above accessible ceiling, using spring metal clips to support cables from structure. Do not rest cable on ceiling panels.

.13 Single conductor cables shall be installed one cable diameter apart on suspended cable tray or channel supports and shall be clamped with aluminum cable clamps. Cables shall be terminated using non-magnetic connectors and shall be watertight for top entry. Cable armour shall be grounded via an aluminum plate at the supply end and isolated via an insulating plate, at the load end of the cable. A #3/0 AWG insulated (unless otherwise noted) copper ground wire shall be installed with each set of feeder cables. Cable bending radius shall be at least twelve times the overall cable diameter and bend shall not damage or distort the outer sheath.

.14 Armoured cable shall be used for connections from conduit systems to recessed luminaires in accessible ceilings. Cable shall be of sufficient length to allow the lighting fixture to be relocated to any location within an 1800mm (6') radius. Cable shall be clamped before entering the lighting fixture and shall be clipped before entering the conduit system junction box. (Minimum requirements).

.15 Use suitable cable fittings and connectors.

.16 Use bonding bushings at both ends of armoured cables.

.17 Neatly train and lace wiring inside boxes, equipment, and panelboards.

.18 Clean conductor surfaces before installing lugs and connectors.

.19 Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

.20 Aluminum Conductors

.1 Terminate aluminum conductors with tin-plated aluminum- bodied compression connectors only. Fill with anti- oxidant compound before installing conductor.

.2 Use suitable reducing connectors or mechanical connector adaptors for connecting aluminum conductors to copper conductors.

.21 Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

.22 Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

.23 Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

.24 Identify wire and cable to Section 26 05 53. Identify each conductor with its circuit number or other designation indicated.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Grounding electrodes and conductors.

.2 Equipment grounding conductors.

.3 Bonding.

1.2 REFERENCES

.1 CSA-C22.1-24 - Canadian Electrical Code, Part I (26th Edition), Safety Standard for Electrical Installations.

.2 IEEE 81-2012 IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.

1.3 SYSTEM DESCRIPTION

.1 Metal and underground water pipe.

.2 Metal frame of the building.

.3 Metal and underground gas piping system.

1.4 PERFORMANCE REQUIREMENTS

.1 Maximum Grounding System Resistance: 5 ohms.

1.5 SUBMITTALS FOR REVIEW

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Product Data: Provide for grounding electrodes and connections.

.3 Shop Drawings: Submit shop drawing showing floor plan layout of all bonding conductor routing and connections.

1.6 SUBMITTALS FOR INFORMATION

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Test Reports: Indicate overall resistance to ground.

.3 Photographs: Submit photographs of installation connections and routing.

1.7 CLOSEOUT SUBMITTALS

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Record Documentation: Record drawings identifying:

- .1 Locations of bonded equipment.
- .2 Routing of bonding conductors.
- .3 Details of connections.
- .4 Photographs showing connection details.

.3 Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.

1.8 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years experience.

1.9 REGULATORY REQUIREMENTS

.1 Products: Listed and classified by ULC and/or CSA as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 MECHANICAL CONNECTORS

.1 Material: Bronze.

2.2 CONDUCTORS

.1 Material: Stranded copper

.2 Sized to CSA-C22.4 requirements minimum, or larger where indicated.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Verify that final backfill and compaction has been completed before driving rod electrodes.

3.2 INSTALLATION

.1 Provide grounding and bonding to meet regulatory requirements.

.2 Exposed conductors shall be protected from mechanical injury.

.3 Mechanical connections shall be used for bonding connections to equipment. Soldered joints shall not be permitted.

.4 Buried connections of grounding and bonding conductors shall be made using exothermic welding process.

.5 Provide bonding wire connected to both ends of flexible conduit. Neatly attach to exterior of flexible conduit.

.6 Bonding connections shall be made using a star configuration. Loop connections shall be avoided.

.7 Provide separate bonding conductor in all non-metallic raceways.

.8 Swimming pools:

.1 Bond together reinforcing steel and metal accessories

.2 Bond as required by regulatory requirements and as indicated.

.9 Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

.10 Schedule a review of the installation by the The City of Winniepg, Contract Administrator, and Electrical Designer prior to covering the installation. Do not proceed without written instruction by the Contract Administrator.

3.3 SYSTEM GROUNDING

.1 Install system and circuit grounding connection to neutral points of 600V and 208V systems.

.2 Grounding conductors shall be routed in or adjacent to primary conduits or cables.

3.4 EQUIPMENT BONDING

.1 Install bonding connections to typical equipment included in, but not necessarily limited to:

- .1 Service equipment
- .2 Distribution Panels
- .3 Building Steel Work

3.5 FIELD QUALITY CONTROL

.1 Perform ground continuity and resistance tests using fall-of-potential measurement system method per IEEE 81-2012 standards. A report shall be submitted to the Contract Administrator from the testing agency.

.2 Perform tests before energizing electrical system.

.3 Disconnect ground fault indicator, if provided, during tests.

.4 A ground electrode with an unsatisfactory resistance test result shall be altered as necessary until the required resistance reading is achieved.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Conduit and equipment supports.

.2 Anchors and fasteners.

1.2 REFERENCES

.1 CSA-C22.1-24 - Canadian Electrical Code, Part I (26th Edition), Safety Standard for Electrical Installations.

.2 CECA - Canadian Electrical Contractors Association.

.3 CSA (Canadian Standards Association).

.4 ULC (Underwriters' Laboratories of Canada).

1.3 SUBMITTALS FOR REVIEW

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Product Data: Provide manufacturer's catalogue data for fastening systems.

1.4 REGULATORY REQUIREMENTS

.1 Provide products listed and classified by CSA and as suitable for purpose specified and shown.

PART 2 PRODUCTS

2.1 PRODUCT REQUIREMENTS

.1 Materials and Finishes: Provide adequate corrosion resistance.

.2 Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.

.3 Anchors and Fasteners:

.1 Concrete Structural Elements: Use expansion anchors.

.2 Steel Structural Elements: Use beam clamps and spring steel clips.

.3 Concrete Surfaces: Use expansion anchors.

.4 Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.

.5 Solid Masonry Walls: Use expansion anchors.

.6 Sheet Metal: Use sheet metal screws.

.7 Wood Elements: Use wood screws.

2.2 STEEL CHANNEL

.1 U-shape, galvanized steel or stainless steel as indicated, sized to suit installation, surface-mounted, suspended or set in poured concrete walls and ceilings as required.

.2 Provide appropriate anchors, fasteners, fittings and supports for a complete supporting system.

2.3 INSTALLATION

.1 Install products to manufacturer's written instructions.

.2 Provide anchors, fasteners, and supports to CSA-C22.1.

.3 Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

.4 Do not use powder-actuated anchors.

.5 Do not drill or cut structural members.

.6 Do not use plastic cable ties.

.7 Use stainless steel channel for exterior or wet applications.

.8 Use galvanized steel channel for interior dry location applications.

.9 Fabricate supports primarily from steel channel systems. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

.10 Where the structural system is open web steel joists, supporting device shall be by means of structural steel angles or channel system spanning the top chords of adjacent joists. The number of joists to be spanned in this way shall be determined by the incident load of the system or equipment being supported.

.11 In no case shall the hanging of the electrical supporting devices be directly from roof or ceiling decking, be allowed, unless special permission is obtained from the Contract Administrator.

.12 Install surface-mounted cabinets and panelboards with minimum of four anchors.

.13 In wet and damp locations use steel channel supports to stand cabinets and panelboards 25 mm (1 inch) off wall.

.14 Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Metal conduit.

.2 PVC coated metal conduit.

.3 Flexible metal conduit.

.4 Electrical metallic tubing.

.5 Non-metallic conduit.

1.2 RELATED SECTIONS

.1 Section 07 84 00 - Firestopping.

.2 Section 26 05 34 - Boxes.

.3 Section 26 05 26 - Grounding And Bonding.

.4 Section 26 05 29 - Electrical Supporting Devices.

.5 Section 26 05 53 - Electrical Identification.

1.3 REFERENCES

.1 CSA-C22.1-24 - Canadian Electrical Code, Part I (26th Edition), Safety Standard for Electrical Installations.

.2 CSA C22.2 No. 18.1-13 (R2018) - Metallic Outlet Boxes.

.3 CSA-C22.2 No. 83.1-07 (R2017) - Electrical Metallic Tubing - Steel.

.4 CSA C22.2 No. 211.2-06 (R2016) - Rigid PVC (Unplasticized) Conduit.

.5 CSA C22.2 No. 227.2.1-14 - Liquid-Tight Flexible Nonmetallic Conduit.

.6 CSA (Canadian Standards Association).

.7 ULC (Underwriters' Laboratories of Canada).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Coordination:

.1 Coordinate with other work having a direct bearing on work of this section.

1.5 CLOSEOUT SUBMITTALS

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Record Documentation:

.1 Accurately record actual routing of conduits equal to or larger than 35mm (1-1/4").

.2 Accurately record actual routing of backbone conduit runs.

.3 Accurately record actual routing of all conduit in slab.

1.6 REGULATORY REQUIREMENTS

.1 Design conduit size to CSA-C22.1.

.2 Provide products listed and classified by CSA or ULC as suitable for purpose specified and shown.

1.7 DELIVERY, STORAGE, AND PROTECTION

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Accept conduit on site. Inspect for damage.

.3 Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

.4 Protect PVC conduit from sunlight.

PART 2 PRODUCTS

2.1 CONDUIT REQUIREMENTS

.1 Minimum Size: 21 mm (3/4 inch) unless otherwise specified.

.2 In Slab:

.1 Use electrical non-metallic tubing.

.3 Wet and Damp Locations: Use non-metallic conduit.

.4 Dry Locations:

.1 Concealed: Use electrical metallic tubing.

.2 Exposed: Use electrical metallic tubing.

2.2 ELECTRICAL METALLIC TUBING (EMT)

.1 Description: CSA C22.2 N0. 83.1; galvanized tubing.

.2 Fittings and Conduit Bodies: CSA C22.2 No. 83.1; steel, set screw type in dry locations, watertight connectors in sprinklered areas

.3 Refer to Section 26 05 53 for colour requirements.

2.3 NON-METALLIC CONDUIT

.1 Description:

.1 CSA C22.2 No. 211.2; PVC.

.2 CSA C22.2 No. 327-18; HDPE

.2 Fittings and Conduit Bodies:

.1 CSA C22.2 No. 211.2.

.2 CSA C22.2 No. 327-18

.3 Provide a separate ground wire in all non-metallic conduit

2.4 FITTINGS

.1 Fittings shall be manufactured for use with conduit specified.

.2 Insulated throat liners on connectors.

.3 Steel raintight connector fittings complete with O-rings, for use on weatherproof or sprinklerproof enclosures. Steel raintight couplings shall be used for surface conduit installation exposed to moisture or sprinkler heads. Steel raintight connectors shall be used for all top entries to panels, contactors and motor control centres.

.4 Expansion fittings

.1 Outdoor locations - Weatherproof expansion fittings with internal bonding assembly, suitable for 100 mm (4") or 200 mm (8") linear expansion.

.2 Wet and Damp Locations - Watertight expansion fittings with integral bonding jumper suitable for linear expansion, and 21 mm (3/4") deflection in all directions, as required.

.3 Panel Entry - Weatherproof expansion fittings for linear expansion as required.

.4 PVC Conduit - O-ring type expansion fittings.

.5 Flexible watertight conduit between junction boxes with integral bonding jumper suitable for linear and lateral movement greater than 19 mm (3/4”).

PART 3 EXECUTION

3.1 EXAMINATION

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Verify that field measurements are as indicated on drawings.

.3 Verify routing and termination locations of conduit prior to rough-in.

.4 Conduit routing is indicated on drawings in approximate locations unless specifically dimensioned. Coordinate routing on site.

.5 Drawings do not indicate all conduit. Provide all conduit as required for a complete system.

.6 All conduit sizes indicated on drawings are minimum sizes unless noted otherwise. Where larger conduit sizes are required to meet the requirements of the Canadian Electrical Code, contractor shall provide larger conduit size at no additional cost to the The City of Winnipeg.

.7 Increase conduit size at no additional cost to the The City of Winnipeg where required to accommodate length of run and voltage drop requirements.

3.2 INSTALLATION

.1 General:

.1 Install conduit to CSA C22.1.

.2 Install conduit to manufacturer's written instructions.

.3 Minimum conduit size shall be 21mm (3/4”) unless specifically noted otherwise.

.4 All conduit shall generally be concealed except in mechanical and electrical rooms or as otherwise noted.

.5 Group related conduits where appropriate.

.6 Arrange conduit to maintain headroom and present neat appearance.

.7 Arrange supports to prevent misalignment during wiring installation.

.8 Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, split hangers or steel channel conduit rack.

.9 Where steel channel conduit rack is used, provide space to support an additional 25% additional conduit.

.10 Fasten conduit supports to building structure and surfaces to Section 26 05 29.

.11 Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

.12 Do not attach conduit to ceiling support wires.

.13 Locate more than 2000 mm (78 inches) from infrared or gas-fired heaters.

.14 Route conduit parallel and perpendicular to walls.

.15 Route conduit installed above accessible ceilings parallel and perpendicular to walls.

.16 Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket.

.17 Route conduit in and under slab from point-to-point.

.18 Do not route conduits through structural members unless otherwise indicated.

.19 Do not route conduit through terrazzo or concrete toppings unless otherwise indicated.

.20 Do not route conduit horizontally in masonry walls unless otherwise indicated.

.21 Maintain adequate clearance between conduit and piping.

.22 Maintain 300 mm (12 inch) clearance between conduit and surfaces with temperatures exceeding 40 degrees C (104 degrees F).

.23 Cut conduit square using saw or pipe cutter; de-burr cut ends.

.24 Bring conduit to shoulder of fittings; fasten securely.

.25 Where threaded connections are used, threads shall be of sufficient length to ensure a tight connection.

.26 Where conduit becomes blocked, remove and replaced blocked sections.

.27 Use conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

.28 Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

.29 Ensure conduit systems are dry prior to installation of wiring.

.30 Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic and control expansion joints

.31 Use suitable caps to protect installed conduit against entrance of dirt and moisture.

.32 Conduit raceway systems shall not be longer than 27m (90’-0”) or have more than two 90˚ bends without the use of a pull box or junction box. Pull box shall be standard square or octagonal box for conduit 41mm (1-1/2”) and smaller.

.33 Ground and bond conduit to Section 26 05 26.

.34 Identify conduit to Section 26 05 53.

.2 Conduit bends:

.1 Use conduit bodies only as required or necessary for applications requiring sharp changes in direction.

.2 Use factory elbows, or bend conduit on site using hydraulic or manual bender.

.3 Install no more than equivalent of two 90-degree bends in a single conduit run, or between junction or pullboxes.

.4 Conduit shall be bent cold.

.5 Replace conduit sections where kinked or flattened.

.1 Flexible conduit:

.1 Provide flexible metal conduit for the following connections:

.1 Motors.

.2 Lighting fixtures.

.3 Transformers.

.4 Equipment subject to movement or vibration.

.3 Conduit in poured concrete slab:

.1 Submit sketch of proposed conduit routing complete with conduit sizes to Contract Administrator for approval prior to installation.

.2 Coordinate installation of conduit to suit reinforcing steel.

.3 Locate in centre third of slab.

.4 Provide minimum separation of 150 mm (6”) between parallel conduit runs.

.5 Do not install conduit in drop panels, beams, or columns unless approved by the Contract Administrator.

.6 Where conduit are grouped, or do not follow perpendicular or parallel to building lines, provide photos in electronic format (minimum resolution 1920x1080) of conduit installation prior to concrete pour.

.7 Record drawings shall indicate location of all conduit embedded in concrete, complete with dimensions to building lines.

.8 For slab-on-grade, conduit larger than 27 mm (1”) shall be routed below slab and encased in minimum 75 mm (3”) of concrete.

.4 Conduit below slab:

.1 Record drawings shall indicate location of all conduit run below slab complete with dimensions to building lines.

.5 Conduit below-grade:

.1 Conduit below grade shall be sloped to provide drainage away from the building.

.2 Where conduit transitions from below grade to above grade, provide suitable fittings to accommodate expansion and deflection due to differential settling of exterior grade, buildings, and other structures and supports.

.6 Non-metallic conduit:

.1 Join non-metallic conduit using cement as recommended by manufacturer.

.2 Wipe non-metallic conduit dry and clean before joining.

.3 Apply full even coat of cement to entire area inserted in fitting.

.4 Allow joint to cure for 20 minutes, minimum.

.7 Empty conduit:

.1 Provide polypropylene pull string in each empty conduit except sleeves and nipples.

.2 Provide conduit bushings at each conduit end.

.3 Empty conduit shall be temporarily capped to prevent debris and moisture from entering the conduit system.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Wall and ceiling outlet boxes.

.2 Pull and junction boxes.

1.2 RELATED SECTIONS

.1 Section 07 84 00 - Firestopping.

.2 Section 26 27 26 - Wiring Devices.

1.3 REFERENCES

.1 CSA-C22.1-24 - Canadian Electrical Code, Part I (26th Edition), Safety Standard for Electrical Installations.

.2 CSA C22.2 No. 18.1-13 (R2018) - Metallic Outlet Boxes.

.3 CSA C22.2 No. 40-17 - Junction and Pull Boxes.

.4 CSA C22.2 No. 85-14 - Rigid PVC Boxes and Fittings.

.5 CSA (Canadian Standards Association).

.6 ULC (Underwriters' Laboratories of Canada).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Coordination:

.1 Coordinate with other work having a direct bearing on work of this section.

.2 Coordinate installation of outlet box for equipment connected under Section 26 05 80.

1.5 CLOSEOUT SUBMITTALS

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Record Documentation: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.6 REGULATORY REQUIREMENTS

.1 Products: Listed and classified by CSA or ULC, and as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 OUTLET BOXES

.1 Sheet Metal Outlet Boxes: CSA-C22.2 No. 18, galvanized steel.

.1 Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 13 mm (1/2 inch) male fixture studs where required.

.2 Concrete Ceiling Boxes: Concrete type.

.2 Non-metallic Outlet Boxes: CSA-C22.2 No. 18.

.3 Cast Boxes: CSA-C22.2 No. 18, Type FS or FD as indicated or as required, cast ferric alloy. Provide gasketed cover by box manufacturer. Provide threaded hubs.

.4 Wall Plates for Finished Areas: As specified in Section 26 27 26.

2.2 PULL AND JUNCTION BOXES

.1 Sheet Metal Boxes: CSA-C22.2 No. 18, galvanized steel.

.2 Hinged Enclosures: As specified in Section 26 27 16.

.3 Surface Mounted Cast Metal Box: CSA-C22.2 No. 18, Type 4 or Type 6 as required or as indicated; flat-flanged, surface mounted junction box:

.1 Material: Galvanized steel.

.2 Cover: Provide with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Verify locations of floor boxes and outlets throughout prior to rough-in.

3.2 INSTALLATION

.1 Install boxes to CSA-C22.1.

.2 Install in locations as shown on drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

.3 Set wall mounted boxes at elevations to accommodate mounting heights specified in section for outlet device and as indicated. Coordinate locations with architectural drawings.

.4 Electrical boxes are shown on drawings in approximate locations unless dimensioned. Adjust box location up to 3 m (10 ft) if required to accommodate intended purpose.

.5 Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.

.6 Maintain headroom and present neat mechanical appearance.

.7 Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

.8 Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

.9 Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

.10 Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

.11 Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

.12 Use flush mounting outlet box in finished areas.

.13 Use adjustable steel channel fasteners for hung ceiling outlet box.

.14 Do not fasten boxes to ceiling support wires.

.15 Support boxes independently of adjacent or connecting conduit systems.

.16 Use gang box where more than one device is mounted together.

.17 Use cast outlet box in exterior locations where exposed to the weather and wet locations.

.18 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.19 Vacuum clean interior of outlet boxes before installation of wiring devices.

3.3 ADJUSTING

.1 Adjust floor box flush with finish flooring material.

.2 Adjust flush-mounting outlets to make front flush with finished wall material.

.3 Install knockout closures in unused box openings.

3.4 CLEANING

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Clean interior of boxes to remove dust, debris, and other material.

.3 Clean exposed surfaces and restore finish.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Nameplates and labels.

.2 Wire markers.

.3 Conduit markers.

1.2 RELATED SECTIONS

.1 Section 09 91 10 - Painting.

1.3 REFERENCES

.1 CSA (Canadian Standards Association).

.2 ULC (Underwriters' Laboratories of Canada).

1.4 SUBMITTALS FOR REVIEW

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Product Data: Provide catalogue data for nameplates, labels, and markers.

.3 Installation Data: Provide list of all equipment requiring nameplates complete with associated nameplate configuration for review.

1.5 REGULATORY REQUIREMENTS

.1 Provide products listed and classified by CSA or ULC and as suitable for purpose specified and shown.

1.6 LANGUAGE

.1 All identification shall be in English.

PART 2 PRODUCTS

2.1 NAMEPLATES AND LABELS

.1 Nameplates:

.1 Interior - Engraved three-layer laminated plastic, white letters on blue background for normal power and systems, white letters on red background for life safety power and systems, and white letters on orange background for standby power and systems.

.2 Locations:

.1 Emergency Lighting Units.

.1 Nameplate shall include:

.1 Unit #

.2 Manufacturer & Model # of unit equipment

.3 AC circuit supplying unit

.4 AC lighting circuits monitored (zone sensing)

.5 Date installed

.3 Letter Size:

.1 Use 6 mm (1/4 inch) letters for identifying equipment mark designations and system types.

.2 Use 3 mm (1/8 inch) letters for identifying supporting information.

.3 Use 6 mm (1/4 inch) letters for identifying grouped equipment and loads.

.4 Wording on nameplates shall be approved prior to manufacture. Submit schedule of nameplates and wording.

.2 Labels: Plastic self-adhesive non-smear labels with 5 mm (3/16 inch) black letters on white background.

.1 Locations:

.1 Wiring devices, including lighting control devices and receptacles.

.1 Label shall include:

.1 Indicate associated panel and circuit number.

.2 E.g. “A-32” (A is for Panel-A, and 32 is the circuit number)

.3 Lighting controls to include brief description of lighting being controlled.

.4 E.g. “Pendants”

2.2 WIRE MARKERS

.1 Wire Markers: Permanent tape type wire markers not susceptible to thermal or mechanical influence.

.2 Locations:

.1 Each conductor at panelboard gutters, pull boxes, outlet and junction boxes and each load connection.

.1 Legend:

.1 Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

.2 Control Circuits: Control wire number indicated on Shop Drawings.

2.3 CONDUIT MARKERS

.1 Manufacturers:

.1 Brady; Product: BMP71 Indoor/Outdoor Vinyl Labels.

.2 Substitutions: Refer to Section 26 05 00.

.2 Description: Vinyl label.

.3 Location: Provide markers for each conduit longer than 4.7 m (10 ft).

.4 Spacing: 6 m (20 ft) on centre.

.5 Colour:

.1 Normal Power System: Blue

.2 Fire Alarm System: Red.

.3 Communication System: Yellow

.4 Security Systems: Black

.5 Controls System: White

.6 Legend:

.1 600 Volt System: 600V.

.2 120/208 Volt System: 120/208V.
.3 Fire Alarm System: FIRE ALARM.
.4 Communication System:
  .1 VOICE
  .2 DATA
  .3 VOICE/DATA
.5 CCTV System: CCTV
.6 Access Control System: ACCESS CONTROL
.7 Controls System: CONTROLS

PART 3 EXECUTION

3.1 PREPARATION

.1 Degrease and clean surfaces to receive nameplates and labels.

3.2 APPLICATION

.1 Install nameplate and label parallel to equipment lines.
.2 Secure nameplate to equipment front using rivets or screws.
.3 Identify conduit using field painting to Section 09 91 10.
.4 Paint coloured band on each conduit longer than 2 m (6 ft).
.5 Paint bands 6 m (20 ft) on centre.
.6 Colour:
  .1 600 Volt System: Orange
  .2 208 Volt System: Blue
  .3 Fire Alarm System: Red.
  .4 Communication System: Yellow
  .5 Security Systems: Black
  .6 Controls System: White
.7 Provide identification on all junction box covers indicating associated system, panel and circuit numbering using permanent marker.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Wall switches.

.2 Receptacles.

.3 Device plates and decorative box covers.

1.2 RELATED SECTIONS

.1 Section 09 69 00 - Access Flooring: and Access floor boxes.

.2 Section 26 05 39 - Underfloor Ducts.

.3 Section 26 05 34 - Boxes.

1.3 REFERENCES

.1 CSA-C22.1-24 - Canadian Electrical Code, Part I (26th Edition), Safety Standard for Electrical Installations.

.2 CSA C22.2 No. 42-10 (R2015) - General Use Receptacles, Attachment Plugs, and Similar Wiring Devices

.3 CSA C22.2 No. 42.1-13 (R2017) - Cover Plates for Flush-Mounted Wiring Devices.

.4 CSA C22.2 No. 55-15 - Special use switches.

.5 CAN/CSA C22.2 No. 111-18 - General-Use Snap Switches.

.6 CSA C22.2 No. 184-15 - Solid-State Lighting Controls.

.7 CSA (Canadian Standards Association).

.8 ULC (Underwriters' Laboratories of Canada).

1.4 SUBMITTALS FOR REVIEW

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Product Data: Provide manufacturer's catalogue information showing dimensions, colours, and configurations.

1.5 SUBMITTALS FOR INFORMATION

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Installation Data: Submit manufacturer's installation instructions.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Extra Stock Materials:

.1 Provide two (2) of each style, size, and finish wall plate.

1.7 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.

1.8 REGULATORY REQUIREMENTS

.1 Provide products listed and classified by CSA and as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 WALL SWITCHES

.1 Manufacturers:
- .1 Leviton
- .2 Hubbell
- .3 Cooper
- .4 Legrand
- .5 Substitutions: Refer to Section 26 05 00.

.2 General-use snap switch:
- .1 Grade: Commercial Specification Grade CSA-C22.2 No. 111
- .2 Style: Standard toggle
- .3 Device Body: White nylon toggle.
- .4 Ratings: Match branch circuit and load characteristics. Amperage rating shall be marked on body of switch.

.3 Body and Handle: White with nylon toggle.

2.2 RECEPTACLES

.1 Manufacturer:
- .1 Leviton.

.2 Description: CSA-C22.2 No.42, industrial specification grade.

.3 Device Body: Brown and plastic.

.4 Configuration: Type as specified and indicated.
- .1 General Use Receptacles: Classrooms and other general areas.
  - .1 15A - CAT#5262.
  - .2 20A - CAT#5362.
- .2 High Abuse Receptacles: Labs, shop areas and gymnasiums, corridors.
  - .1 15A - CAT#5262
  - .2 20A – CAT#5362
- .3 GFCI Receptacles
  - .1 15A - CAT#7599
  - .2 20A – CAT#7899
- .4 Exterior GFCI
  - .1 20A - CAT#X7891-PL

.5 Suitable for No. 10 AWG for back and side wiring.

.6 Break-off links for use as split receptacles.

.7 Double wipe contacts and riveted grounding contacts.

.8 Receptacles shall be of one manufacturer throughout the project.

.9 Manufacturers:

.1 Leviton

.2 Hubbell

.3 Cooper

.4 Legrand

.5 Substitutions: Refer to Section 26 05 00.

.10 General-duty duplex convenience receptacle:

.1 Grade: Commercial Specification Grade, Industrial Specification Grade Nema WD-6 Compliant, CSA-C22.2 No.42.

.2 Style: Standard

.3 Device Body: Smooth white nylon face and base.

.4 CSA Configuration: Type as specified and indicated.

.5 Tamper resistant as indicated or as per Electrical Code.

.11 GFCI Receptacle: Duplex receptacle with integral ground fault circuit interrupter to meet regulatory requirements complete with steady-on “Green-Power-On” and steady-on “Red-Power-Tripped Off” LED indicator lights. Washroom GFCI shall be complete with integral photo sensor controlled night light.

.12 Exterior Use Receptacle: Extra Heavy Duty Industrial grade duplex receptacle with integral ground fault circuit interrupter to meet regulatory requirements complete with steady-on “Green-Power-On” and steady-on “Red-Power-Tripped Off” LED indicator lights complete with UV and corrosion resistant device body complete with CSA 5-20R configuration only.

.13 USB Charger Receptacle: General-duty tamper resistant decorator style duplex receptacle with dual USB type C chargers with smart chips optimized for USB power delivery meeting specification of USB-PD 3.0 and Quick Charge 4. Type C port shall be rated 6A @20V (auto sensing) at 60W for single port charging and 30W per port for dual port charging. Standard of acceptance Leviton T5636 for 5-15R and T5836 for 5-20R. Color white.

.14 USB Charger Receptacle: General-duty tamper resistant decorator style duplex receptacle with USB type A and type C chargers with smart chips optimized for USB power delivery. Type A port to be rated 2.4A @5V and type C to be rated 3A @5V. Standard of acceptance Leviton T5633 for 5-15R and T5833 for 5-20R. Color white.

.15 Controlled Receptacle: General-duty dual-controlled duplex receptacle with integral relay, wireless RF communication, and manual override button. Control system shall be complete with wireless RF signal packs to control all receptacles in individual rooms as indicated on drawings. RF signal packs shall be integrated with room lighting control occupancy sensor to turn off controlled receptacle within 20 minutes of unoccupied state.

.16 Surge Protection Receptacle: General-duty duplex receptacle with integral surge protection device, power-on indicator light and damage-alert alarm with silencing screw. Surge suppression shall be 240 joules/15000A per mode. Device body shall be decorator style, smooth blue nylon face and base.

.17 Isolated Ground Receptacle: General-duty duplex receptacle with insulation barrier between green grounding screw and metal box mounting strap. Device body shall be smooth orange nylon face with “IG triangle”.

.18 Receptacle on Emergency Circuit: Heavy Duty Specification grade duplex receptacle with smooth red nylon face. CSA configuration as indicated. Type as indicated.

.19 Range Receptacle: CSA configuration 14-50R commercial specification grade complete with stainless steel faceplate.

.1 Flush Mounted: Leviton CAT#1279-W-50

.2 Surface Mounted: Leviton CAT#55050

.20 Dryer Receptacle: CSA configuration 14-30R commercial specification grade complete with stainless steel faceplate.

.1 Flush Mounted: Leviton CAT#1278-W-30A

.2 Surface Mounted: Leviton CAT#55054

.21 Suitable for No. 10 AWG for back and side wiring.

.22 Break-off links for use as split receptacles.

.23 Double wipe contacts and riveted grounding contacts.

.24 Receptacles shall be of one manufacturer throughout the project.

2.3 WALL PLATES

.1 Nylon Cover Plate: Impact resistant unbreakable nylon with reinforcing ribs. Style and color shall match wiring device. Combination or multi-gang covers as required or indicated. Jumbo or standard size as indicated or specified.

.2 Standard Stainless Steel Cover Plate: 430 type stainless steel cover plate complete with protective plastic film. Combination or multi-gang covers as required or indicated. Jumbo or standard size as indicated or specified.

.3 Heavy Duty Stainless Steel Cover Plate: 302/304 type stainless steel cover plate complete with protective plastic film. Combination or multi-gang covers as required or indicated.

.4 Thermoplastic While-in-Use covers: Nema 3R rated, thermoplastic construction, suitable for horizontal mounting on device box only, and padlock provision.

.5 Weatherproof Cover Plate: Gasketed cast metal with gasketed double hinged device covers suitable for horizontal mounting on device box only. Provide single hinged device cover for GFI type receptacle only.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Verify that outlet boxes are installed at proper height.

.3 Verify that wall openings are neatly cut and will be completely covered by wall plates.

.4 Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

.1 Provide extension rings to bring outlet boxes flush with finished surface.

.2 Clean debris from outlet boxes.

3.3 INSTALLATION

.1 Install to CSA-C22.1 and to manufacturer's written instructions.

.2 Install devices plumb and level.

.3 Install switches with OFF position down.

.4 Provide neutral conductor in box for all line voltage lighting control devices.

.5 Install wall dimmers to achieve full rating specified and indicated after de-rating for ganging as instructed by manufacturer.

.6 Do not share neutral conductor on load side of dimmers.

.7 Install receptacles with grounding pole on bottom.

.8 Connect wiring device grounding terminal to branch circuit equipment grounding conductor and outlet box.

.9 Install locator pilot light for lighting controls located in crawlspace.

.10 Install indicator pilot light for all lighting controlled from a remote switch location. Switch and light shall be clearly labelled identifying the controlled lighting.

.11 Install decorative plates on switch, receptacle, and blank outlets in finished areas.

.12 Connect wiring devices by wrapping conductor around screw terminal.

.13 Use jumbo size plates for outlets installed in masonry walls.

.14 Stainless steel protective coverings shall be maintained until project completion and turn-over to The City of Winnipeg.

.15 Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

.16 Install metallic While-In-Use covers on exterior receptacles.

.17 Install protective rings on active flush cover service fittings.

3.4 INTERFACE WITH OTHER PRODUCTS

.1 Coordinate locations of outlet boxes provided under Section 26 05 34 to obtain mounting heights specified and as indicated on drawings.

.2 Coordinate installation of access floor boxes with access floor system.

.3 Coordinate the installation of wiring devices with underfloor duct service fittings provided under Section 26 05 39.

3.5 FIELD QUALITY CONTROL

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Inspect each wiring device for defects.

.3 Operate each wall switch with circuit energized and verify proper operation.

.4 Verify that each receptacle device is energized.

.5 Test each receptacle device for proper polarity.

.6 Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

.1 Adjust devices and wall plates to be flush and level.

3.7 CLEANING

.1 Refer to 26 05 00 Common Work Results for Electrical.

.2 Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION