Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises concrete structural repairs and waterproofing of the structural slab, and localized repairs of basement beams, posts, and walls located at Fire Station No.5; 845 Sargent Ave.

1.2 REFERENCES AND CODES

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

.2 Meet or exceed requirements of Contract documents, specifications, as specified standards, codes and referenced documents, latest editions.

1.3 WORK SEQUENCE

.1 Construct Work in stages to accommodate The City's continued use of adjacent areas during construction.

.2 Co-ordinate Progress Schedule and co-ordinate with The City with regards to Occupancy during construction.

1.4 CONTRACTOR USE OF PREMISES

.1 Limit use of premises for Work, for storage, and for access, to allow:

.1 Occupancy.
.2 Continuous access to the building entrances/exits.
.3 Continuous usage of adjacent areas of the facility.

.2 Co-ordinate use of premises under direction of Contract Administrator.

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

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

.5 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.5 OCCUPANCY

.1 Co-operate with The City in scheduling operations to minimize conflict and to facilitate usage.

1.6 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to normal use of premises. Arrange with Contract Administrator to facilitate execution of work.

1.7 EXISTING SERVICES

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

.2 Where Work involves connecting to existing services, give The City minimum 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions.

.3 Where embedded electrical conduits are encountered, immediately advise Contract Administrator and confirm findings in writing.

.4 Protect, relocate or maintain existing active services.

1.8 DOCUMENTS REQUIRED

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

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed Shop Drawings.
- .5 Change Orders.
- .6 Other Modifications to Contract.
- .7 Field Test Reports.
- .8 Copy of Approved Work Schedule.
- .9 Health and Safety Plan and Other Safety Related Documents including:
  - .1 Material data sheets (MSDS) on all products used in Project.

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 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work.

1.2 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, in accordance with relevant municipal, provincial and other regulations.

1.3 USE OF SITE AND FACILITIES

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

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

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

.4 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

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

1.4 WORKING HOURS

.1 For the purposes of Bid preparation, the Bidder must note the following restrictions regarding working hours.

.1 Working hours for excessive noise-generating Work will be restricted to between 8:00 a.m. and 5:00 p.m. Monday through Friday, and 9:00 a.m. to 5:00 p.m. Saturday.

.2 Working hours for all other Work processes will be restricted to between 7:00 a.m. and 6:00 p.m. Monday through Friday, and 8:00 a.m. to 6:00 p.m. Saturday.

.3 The City of Winnipeg Neighbourhood Liveability By-Law No. 1/2008.

.2 Refer also to Section 01 14 00 – Work Restrictions.

1.5 BUILDING SMOKING ENVIRONMENT

.1 Smoking is not allowed.

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 CASH ALLOWANCES FOR PRODUCTS, LABOUR, MATERIAL

.1 Include in Contract Price, allowances to cover Work specified in respective Sections or as otherwise listed below.

.2 Work may be carried out by Subcontractors already employed on site, or by sub-contractors brought in for the Cash Allowance work.

.3 Obtain quotations from for the work and submit to Contract Administrator for review.

.4 Pay all costs for work performed from cash allowance specified.

.5 The invoices for work performed shall be directed to the Contractor, and forwarded with monthly request for payment. The invoices will be processed onto a Change Order periodically to formalize an expenditure from the Cash Allowance.

.6 Cash Allowance is for payment of invoices from companies carrying out the Work.

.7 Include testing/examination allowances for:

.1 Temporary support of electrical conduit to facilitate concrete repairs; lump sump of $20,000.00.

.8 Contractor shall not exceed Cash Allowances without authority from Contract Administrator. Contractor will not be allowed expenses or profit on overage unless authority for over expenditure is obtained. Over expenditure of Cash Allowances may, at Contract Administrator's discretion, be deducted from sums of money due Contractor, should Contractor exceed allowance without authority from the Contract Administrator.

.9 Adjustments to the Cash Allowances will be made by a written Change Order, signed by The City, or as amendments to the Contract at the time of final payment, on the basis of submitted net cost invoices.

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 PRECONSTRUCTION MEETING

.1 Within 5 working days after award of Contract, request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities.

.2 Senior representatives of The City, Contract Administrator, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

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

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

- .1 Appointment of official representative of participants in the Work.
- .2 Schedule of Work: in accordance with Section 01 32 16 - Construction Progress Schedule.
- .3 Submission of shop drawings, concrete mix statements. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
- .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .7 Monthly progress claims, administrative procedures, photographs, hold backs.
- .8 Insurances, transcript of policies.

1.2 PROGRESS MEETINGS

.1 During course of Work schedule progress meetings at biweekly intervals.

.2 Contractor, major Subcontractors involved in Work, Contract Administrator and The City's representative are to be in attendance.

.3 Contract Administrator will be responsible for recording minutes of meetings and circulate to attending parties and affected parties not in attendance within 7 working days after meeting.

.4 Agenda to include the following:

- .1 Review, approval of minutes of previous meeting.
- .2 Review of Work progress since previous meeting.
- .3 Field observations, problems, conflicts.
- .4 Problems which impede construction schedule.
- .5 Review of off-site fabrication delivery schedules.
- .6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

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

.12 Other business.

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 ADMINISTRATIVE

.1 Submit to Contract Administrator submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

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

.3 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. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

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

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

.6 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator’s review of submittals.

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

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

1.2 PRODUCT DATA

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

.2 Allow 5 working days for Contract Administrator's review of each submission.

.3 After Contract Administrator's review, distribute copies.

.4 Submit one hardcopy of product data sheets or brochures for requirements requested in specification Sections and as requested by Contract Administrator where shop drawings will not be prepared due to standardized manufacture of product.

.5 Delete information not applicable to project.

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

.7 If upon review by Contract Administrator, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of

Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.3 SAMPLES

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

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

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

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

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

1.4 CERTIFICATES AND TRANSCRIPTS

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

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

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

.1 Material Safety Data Sheets (MSDS).

.3 Province of Manitoba

.1 The Workers Compensation Act RSM 1987 - Updated 2006.

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

1.2 SUBMITTALS

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

.2 Submit copies of incident and accident reports.

.3 Submit WHMIS MSDS - Material Safety Data Sheets on all products used in conjunction with the Work.

.4 W.H.I.M.I.S. Training: Provide copies of valid certification/training for all employees (regular or temporary) including all Subcontractors.

.1 All individuals involved in the application of any product shall meet all WHIMIS/provincial standards safety/protection requirements at all times.

.5 Upon request submit Letter of Good Standing or C.O.R. Certificate.

1.3 GENERAL REQUIREMENTS

.1 Contractors to be C.O.R. Certified.

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

1.4 HAZARDOUS MATERIALS

.1 Independent testing has confirmed the presence of lead-based paints (LBPs) present within the basement area.

.2 Refer to Appendix A – Lead Abatement Procedures and Inspection Report.

1.5 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.

1.6 PERSONAL PROTECTIVE EQUIPMENT (PPE)

.1 All employees (regular or temporary) of Contractor and Subcontractors shall wear PPE in accordance with Manitoba Regulation 217/2006.

.2 Fall Protection: Provide fall protection in accordance with Manitoba Regulation 217/2006.

1.7 EMBEDDED ELECTRICAL CONDUIT

.1 When the presence of embedded electrical conduits are known:

.1 Prior to demolition ensure circuits feeding conduit within repair areas are disconnected, de-energized, or abandon.

.2 Coordinate shutdowns with The City.

.2 When the presence of embedded electrical conduits is unknown or are known but locations cannot be determined:

.1 Prior to demolition of concrete repairs, scan existing concrete structures for embedded electrical conduit.

.2 Ensure circuits feeding conduit within repair areas are disconnected, de-energized, or abandon.

.3 Coordinate shutdowns with The City.

.4 Costs of scanning to be included in the Contract price.

1.8 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

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

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

.1 Material Safety Data Sheets (MSDS).

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

1.4 HAZARDOUS MATERIALS

.1 Independent testing has confirmed the presence of lead-based paints (LBPs) present within the basement area.

.2 Abatement of LBPs will be completed by the City of Winnipeg prior to commencement of the project.

.3 Refer to Appendix A – Lead Abatement Procedures and Inspection Report.

1.5 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.

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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 RELATED SECTIONS

.1 Section 01 21 00 – Allowances.

1.2 INSPECTION

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

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Contract Administrator instructions, or law of Place of Work.

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

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

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged for purpose of inspecting and/or testing portions of Work. Cost of such services will be paid by The City.

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

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

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

1.4 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work.

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

1.5 PROCEDURES

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

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

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

1.6 REJECTED WORK

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

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

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

1.7 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

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

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 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.2 WATER SUPPLY

.1 The City will make available, for the extent that it is available, a supply of potable water for construction use at no charge to the Contractor

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

.3 The Contractor shall provide all necessary hoses, lines, connections, and other ancillary hardware which may be required.

.4 The services are to be returned 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 Provide temporary heating when required, during construction period, including attendance, maintenance and fuel.

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

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

- .1 Facilitate progress of Work.
- .2 Protect Work and products against dampness and cold.
- .3 Prevent moisture condensation on surfaces.
- .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
- .5 Provide adequate ventilation to meet health regulations for safe working environment.

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

.5 Ventilating:

- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

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

.6 Permanent heating system of building, may be used for heating. Be responsible for damage to heating system if use is permitted.

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

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.5 Vent direct-fired combustion units to outside.

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

1.4 TEMPORARY POWER AND LIGHT

.1 Connect to existing power supply in accordance with Canadian Electrical Code.

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

.3 Temporary power for equipment requiring in excess of that available on-site is responsibility of the Contractor.

.4 Provide and maintain temporary lighting throughout project.

1.5 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for cellular telephone for site superintendent and use of Contract Administrator.

1.6 FIRE PROTECTION

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

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

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 SITE STORAGE/LOADING

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

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

1.2 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not interfere with normal operations, access, or disrupt performance of Work.

1.3 SANITARY FACILITIES

.1 The Contractor may use on-site facilities for the duration of the project. The facilities must be maintained in a neat condition or use will be revoked.

1.4 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 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.2 HOARDING

.1 The Contractor must barricade off the area under construction to prevent the general public from improper access to the construction area. Suitable barricades and protection systems include:

- .1 Erect temporary full height insulated site enclosures using 2” x 4” construction grade lumber framing at a maximum 24” centres and 4’ x 8’ x1/2 plywood to CSA 0121.
- .2 Provide tarps from top of hoarding wall to underside of ceiling. Tape and seal off terminations and penetrations to prevent dust travel beyond work areas.
- .3 Ventilate work area to the exterior to provide a slight negative pressure.
- .4 Barricade around or cover all surface patches and through-slab openings not able to be completed prior to days end with ¾” plywood, secured to deck to prevent shifting. Ensure coverings are capable of supporting a construction load of 20 psf.
- .5 Barricade areas below through-slab repairs prior to commencement of demolition.
- .6 Maintain hoarding in good repair.

.2 Repair surface coatings and/or finishes which are damaged by temporary hoardings and barricades.

.3 Provide adequate signage, fencing, etc. to inform the public of the work being undertaken.

1.3 FIRE ROUTES

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

1.4 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

1.5 PROTECTION OF BUILDING FINISHES

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

.2 Provide necessary screens, covers, and hoardings.

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

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

.3 If there is question as to whether products or systems are in conformance with applicable standards, Contract Administrator reserves right to have such products or systems tested to prove or disprove conformance.

.4 The Cost for such testing will be borne by the Contractor or Supplier.

1.2 QUALITY

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

.2 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.

.3 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.

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

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

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

1.3 AVAILABILITY

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

.2 In event of failure to notify 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.

1.4 STORAGE, HANDLING AND PROTECTION

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

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

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

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

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

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

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

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

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

1.5 TRANSPORTATION

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

1.6 MANUFACTURER'S INSTRUCTIONS

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

.2 Notify Contract Administrator in writing, of conflicts between specifications and manufacturer's instructions, so that Contract Administrator will establish course of action. Where conflicts exist, the more stringent instruction will be enforced.

.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.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify 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, 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.

1.8 CO-ORDINATION

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

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

1.9 REMEDIAL WORK

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

.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.

1.10 PROTECTION OF WORK IN PROGRESS

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

1.11 EXISTING UTILITIES

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

.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.

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 PROJECT CLEANLINESS

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

.2 Remove waste materials from site at daily regularly scheduled times. Do not burn waste materials on site.

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

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

.5 Dispose of waste materials and debris off site.

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

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

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

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

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

1.2 FINAL CLEANING

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

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

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

.4 Remove waste products and debris other than that caused by The City or other Contractors.

.5 Remove waste materials from site at regularly scheduled times. Do not burn waste materials on site.

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

.7 Remove stains, spots, marks and dirt from existing surfaces, fixtures, and finishes within the work area or affected by the affected by the Work, including but not limited to existing structural steel framing, ceiling mounted equipment, light fixtures, etc.

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

.9 Remove dirt and other disfiguration from exterior surfaces.

.10 Sweep and power wash clean all work areas.

.11 Remove construction debris from drain and pits. Mechanically clean all drains and drain lines within area of Work.

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 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Contract Administrator in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Contract Administrator's inspection.

.2 Contract Administrator's Inspection:

.1 Contract Administrator and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Work: complete and ready for final inspection.

.4 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Contract Administrator, and Contractor.

.2 When Work incomplete according to Contract Administrator, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Contract Administrator considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

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

.7 Final Payment:

.1 When Contract Administrator considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with Contractual agreement.

1.2 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 – Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

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 RELATED SECTIONS

.1 Section 03 20 00 – Concrete Reinforcing.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

- .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-O86S1-09 Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
- .3 CSA O121-08, Douglas Fir Plywood.
- .4 CSA O153-M1980(R2008), Poplar Plywood.
- .5 CSA O437 Series-93(R2006), Standards for OSB and Waferboard.
- .6 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
- .7 CAN/CSA-S269.3-M92(R2008), Concrete Formwork, National Standard of Canada

1.3 MEASUREMENT PROCEDURES

.1 No measurement will be made under this Section. Include costs in items of work for which concrete formwork and falsework is required.

Part 2 Products

2.1 MATERIALS

.1 Formwork materials:

- .1 Use wood and wood product formwork materials to CSA-O121, CAN/CSA-O86, CSA O437 Series, and CSA-O153.

.2 Form ties:

- .1 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 stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene.

.4 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 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.

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

.4 Use ¾" chamfer strips on external corners and/or ¾" fillets at interior corners, joints, unless specified otherwise, or to match existing.

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

.6 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 Through-slab repairs: Three (3) days or the time it takes to reach 70% of the 28 day design strength, whichever is greater.

.2 Miscellaneous curbs, pads, etc.: One (1) day.

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

.2 ASTM A143/A143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

.2 CSA International

.1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.3 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.2 MEASUREMENT PROCEDURES

.1 Measure reinforcing steel in kilograms of steel incorporated into Work, computed from theoretical unit mass specified in CSA-G30.18 for lengths and sizes of bars as indicated or authorized in writing by Contract Administrator.

.1 These unit prices will only cover supplemental reinforcing steel in concrete repair areas or as designated by the Contract Administrator. All other reinforcing steel costs must be included in the fixed price portions of the work to which they correspond.

.2 Dowels will be measured individually and will include dowel drilling, cleaning, preparation, epoxy supply and placement, and bar insertion, but excluding steel costs which will be covered by the rate per kilogram unit prices. The Contract Administrator and the Contractor will count and agree upon the numbers and lengths of bars as well as the number of bar embedment's. These agreed upon number will form the basis for payment.

.3 No measurement will be made under this Section for supplemental reinforcing steel shown on drawings.

Part 2 Products

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by 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 A82/A82M.

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 Contract Administrator, weld reinforcement in accordance with CSA W186.

2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide 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 Contract Administrator of proposed source of material to be supplied.

Part 3 Execution

3.1 PREPARATION

.1 Upon request, conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.2 PLACING REINFORCEMENT

.1 Place reinforcing steel in accordance with CSA-A23.1/A23.2.

3.3 DOWELING PROCEDURES

.1 For bars that are indicated as being dowelled, drill in and grout bars into slab as follows:

.1 10M bars, 6 inches

.2 15M bars, 8 inches

.2 Use only approved adhesive to manufacturer’s instructions. Acceptable product:

.1 Hilti HIT HY-200 by Hilti Canada.

.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.

3.4 FIELD TOUCH-UP

.1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 03 20 00 – Concrete Reinforcing.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

- .1 CSA-A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA A283-06, Qualification Code for Concrete Testing Laboratories.

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

- .1 ASTM C260/C260M-10a, Specification for Air-Entraining Admixtures for Concrete.
- .2 ASTM C309-07, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- .3 ASTM C494/C494M-10a Standard Specification for Chemical Admixtures for Concrete.

.3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

1.3 MEASUREMENT PROCEDURES

.1 Include all costs for concrete required for concrete repairs in appropriate unit prices.

1.4 CERTIFICATES

.1 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CSA-A23.1. Certification letter to be sealed by an Engineer registered in the Province of Manitoba.

.2 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1. Certification letter to be sealed by an Engineer registered in the Province of Manitoba.

1.5 QUALITY ASSURANCE

.1 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures for review by Contract Administrator on following items:

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

.6 Joints.

1.6 ABBREVIATIONS

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

.1 Type GU or GUb - General use cement.
.2 Type CI - with CaO content ranging from 8 to 20%.

.2 SCM – Supplemental cementing materials.

.3 SSD - Saturated surface dry.

.4 WRA – Water reducing agent.

1.7 DELIVERY, STORAGE AND HANDLING

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

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

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

Part 2 Products

2.1 MATERIALS

.1 The concrete constituents shall comply with the following standards:

.1 Cement: to CAN/CSA-A3001.
.2 Blended Hydraulic cement: to CAN/CSA-A3001.
.3 Supplementary cementing materials: to CAN/CSA-A3001.
.4 Water: To CSA-A23.1.
.5 Aggregates: to CSA-A23.1. Coarse aggregates to be normal density.
.6 Air entraining admixture: ASTM C260.
.7 Chemical admixtures: ASTM C494/C494M. Contract Administrator to approve accelerating or set retarding admixtures during cold weather.
.8 Macro Synthetic Fibres:
  .1 Acceptable products:
    .1 Strux 90/40 by Grace Construction Products.
    .2 Fibermesh 650 by Propex Concrete Systems.
    .3 MasterFiber MAC 100F by BASF Building Systems.
    .4 TUF-STRAND SF by Euclid Canada.

2.2 MIX REQUIREMENTS

.1 See General Notes on Drawings.

2.3 BONDING SLURRY

.1 The bonding slurry shall consist of a cement/sand grout mixed in a 1:1 ratio by weight to a maximum water/cement ratio of 0.40 in accordance with CSA-A23.1 and as follows:

.1 1.0 kg Type GU to CSA A3001.

.2 1.0 kg SSD concrete sand to CSA A23.1.

.3 0.40 kg Water to CSA A23.1.

.4 High range water reducing agent to ASTM C494/C494M as required and approved by Contract Administrator.

.5 Volume batching will be permitted provided the volumes are calibrated by weight prior to batching. The measuring containers shall be clearly labelled, indicating material type, calibrated weight of material, and calibrated volume. The Contract Administrator reserves the right to randomly check batch weights.

.6 Shovel batching is strictly prohibited.

.2 Alternative Method: Plastic concrete from same mix utilized for overlying concrete. Scrub plastic concrete. Scrub plastic concrete into substrate with stiff bristled broom or brush to produce a uniform thickness of 1/8” over entire area. Collect and remove all coarse aggregate prior to placement of the overlay.

2.4 ACCESSORIES

.1 Evaporation retardant: Acceptable Product:

.1 MasterKure ER 50, formerly (Confilm) by BASF Building Systems at a minimum application rate of 4.9 m²/L.

.2 Vapour Barrier: 10 mil polyethylene film to CAN/CGSB-51.34.

Part 3 Execution

3.1 PREPARATION

.1 Obtain Contract Administrator's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

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

.3 Prior to placing of concrete obtain Contract Administrator's approval of proposed method for protection of concrete during placing and curing in adverse weather.

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

.5 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and epoxy grout to anchor and hold dowels in positions as indicated. Refer to Section 03 20 00.

.6 Do not place load upon new concrete until authorized by Contract Administrator.

.7 Provide formwork and falsework to Section 03 10 00 - Concrete Forms and Accessories.

.8 Place reinforcing steel and install dowels to Section 03 20 00 - Concrete Reinforcement. Provide dowels at locations shown on the drawings.

.9 Obtain Contract Administrator's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

3.2 MIX PRODUCTION

.1 Concrete to be mixed, delivered and placed in accordance with CSA A23.1.

.2 Concrete to be batched and mixed at a ready mix plant and delivered to site in ready to place form.

.3 Control of slump on the job site to be in accordance with CSA-A23.1 except as otherwise specified below:

.1 The addition of water to increase slump is strictly prohibited unless prior written permission from concrete supplier is obtained.

.2 The use of WRA may be required to aid in placement of the concrete and obtain adequate consolidation in heavily reinforced sections.

.3 WRA addition shall occur at the batch plant or on site. For site addition, concrete supplier to provide written notice minimum 2 weeks prior to commencement of concrete work, indicating recommended dosages based on slump at point of discharge.

.4 Site addition WRA will be the responsibility of the concrete supplier.

.5 Slump and air must be measured both before and after addition of WRA.

3.3 PLACEMENT

.1 Place concrete work in accordance with CSA-A23.1.

.2 When concrete is placed by pump, the initial slurry used to prime the pump shall not be incorporated into the topping. The slurry shall be trapped and disposed off-site.

.3 Ensure high points and slopes to drains as shown on drawings are maintained.

.4 Pour concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur. Install a construction dam or bulkhead in case of a delay longer than 60 minutes. During delays between 5 and 60 minutes, protect the end of the placement with damp burlap.

.5 Protect freshly placed concrete from exposure to dust, debris and precipitation.

.6 Sleeves and inserts.

.1 Sleeves and openings greater than 4” X 4” not indicated, must be approved by Contract Administrator.

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

3.4 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Contract Administrator in accordance with CSA-A23.1 and Section 01 45 00 - Quality Control and as described herein.

.1 Testing laboratory to be certified in accordance with CSA A283.

.2 Frequency and Number of Tests:

.1 Not less than one strength test per 50 m³ of concrete placed and not less than one test for each class of concrete placed on any one day.

.2 Slump and air measurements will be completed on each of the initial 3 loads of concrete per day of casting to ensure satisfactory control of the air content is established. If adequate control of air content is not established within the first 3 loads of concrete or if a test falls outside the specified limits, the testing frequency shall revert to one test per load until satisfactory control is re-established. Costs for additional testing will be the responsibility of the concrete supplier.

.3 Contract Administrator may take additional test cylinders during cold weather concreting or when concrete quality is suspect. Cure cylinders on job site under same conditions as concrete which they represent.

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

.5 Inspection or testing by Contract Administrator will not augment or replace Contractor quality control nor relieve Contractual responsibility.

3.5 DEFECTIVE CONCRETE

.1 Defective concrete: cracking, spalling, scaling and concrete not conforming to required lines, details, dimensions, tolerances, 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 Contract Administrator for each individual use.

.4 Modify or replace concrete not conforming to lines, detail and elevations indicated on drawings.

.5 Repair or replace concrete not properly placed, resulting in excessive honeycombing and other defects in critical areas of stress.

.6 Notify Contract Administrator of proposed methods of repairing or replacing defective concrete. Methods of repairing or replacing defective concrete shall be acceptable to the Contract Administrator.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 03 20 00 – Concrete Reinforcing.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA-A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

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

.1 ASTM C260/C260M-10a, Specification for Air-Entraining Admixtures for Concrete.

.2 ASTM C494/C494M-10a Standard Specification for Chemical Admixtures for Concrete.

Part 2 Products

2.1 MATERIALS

.1 See Section 03 30 00.

2.2 MIX REQUIREMENTS

.1 See General Notes.

2.3 BONDING SLURRY

.1 See Section 03 30 00.

2.4 ACCESSORIES

.1 Evaporation reducer: Acceptable Product:

.1 MasterKure ER 50 formerly (Confilm) by BASF Building Systems at a minimum application rate of 4.9 m²/L.

Part 3 Execution

3.1 CONCRETE SURFACE PREPARATION

.1 Within 24 hours prior to placement, sandblast the substrate to texture the concrete and remove loose deteriorated concrete, laitance, dust, dirt, oil, and any other material that could interfere with the bond of the new concrete. Prepare vertical surface by sandblasting, grinding, bush hammering, or other suitable method. Provide a uniform surface profile of ICRI-CSP-5 or better. Sample surfaces are available for inspection in

the Contract Administrator's office. These samples will be used as the standard of acceptance.

.2 Surface preparation applies equally to any horizontal or vertical concrete surfaces to which the concrete is to bond.

.3 Vacuum clean surface and/or air blast with oil free compressed air to remove residue and spent media created by surface preparation.

.4 After all surface preparation is complete the Contractor shall request an inspection from the Contract Administrator to review the substrate.

.5 Maintain substrate in a clean condition using polyethylene film until the overlay is ready to be placed.

.6 Saturate substrate for a period of not less than 6 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.

.7 Final cleaning: High pressure waterblast substrate at minimum 4,000 psi to remove any residual dust, dirt, debris, or other materials which could reduce bond.

.8 Prior to placement remove standing water from all depressions and allow substrate to become saturated, surface-dry (SSD) with no standing water and dry to the touch. A SSD substrate typically exhibits a colour change of dark grey to light grey. Remove any standing water by vacuuming.

3.2 PLACEMENT

.1 Obtain Contract Administrator's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

.2 Provide temporary bridging as required to permit access to all areas during placement, finishing and curing.

.3 Bonding Slurry Application:

.1 Apply the specified bonding slurry to a SSD substrate.

.2 Scrub plastic slurry into substrate with stiff bristled broom or brush to produce a uniform thickness of 1/8” (3 mm) over entire area. Collect and remove all coarse aggregate prior to placement of the concrete.

.4 Place concrete while the slurry is still plastic. Do not apply more slurry than can be covered with concrete before it dries. Do not retemper. If the bonding slurry dries prior to placement of the repair material, 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 Place concrete work in accordance with CSA-A23.1.

.6 When concrete is placed by pump, the initial slurry used to prime the pump shall not be incorporated into the topping. The slurry shall be trapped and disposed off-site.

.7 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.

.8 Pour concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur. Install a construction dam or bulkhead in case of a delay longer than 60 minutes. During delays between 5 and 60 minutes, protect the end of the placement with damp burlap.

.9 The concrete must be internally vibrated by use of a floating vibratory screed to consolidate the top surface. Move vibrating screed forward as rapidly as possible while allowing proper consolidation and finishing of the concrete surface. Extended use of a vibratory screed may result in segregation of the concrete producing excessive mortar at the surface which can result in a weak surface layer.

.10 Continuously consolidate and finish to specified elevations.

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

.12 Protect freshly placed concrete from exposure to dust, debris and precipitation.

3.3 FINISHING

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

.2 Finishing:

.1 Immediately after concrete has been placed and consolidated, bull-float slab surface to a smooth uniform surface.

.2 Use of hand trowels will be required to hand finish areas the finishing machine cannot reach.

.3 Surface free of all trowel marks and ridges.

3.4 CURING

.1 Immediately after final finishing, protect exposed surface against plastic shrinkage by means of a fog spray and/or application of an evaporation reducer, until the concrete has enough strength to support the placement of the wetted burlap. When an evaporation reducer is used, intermittent reapplication may be required if the film evaporates before initiation of the wet cure.

.2 Bonded concrete overlays to be wet cured with burlap for a minimum of 7 days at 10°C. Provide supplemental heat and hoarding as required throughout curing period.

.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 3” (75 mm) and be securely held in place without marring the concrete surface.

.1 Days 1 through 6: Maintain burlap in a continuously wet condition throughout the curing period. Periodic rewetting by means of a soaker hoses, sprinklers, or other suitable methods approved by the Contract Administrator may be necessary.

.2 Day 7: Discontinue re-wetting procedures allowing burlap to dry naturally.

.5 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 Concrete tests to Section 03 30 00.

.2 The bond strength between the overlay and substrate will be measured in accordance with CSA-A23.2-6B. The minimum acceptable bond strength between the overlay and substrate is 1.0 MPa at 28 days

.3 Direct pull-out tensile tests to determine bond strength will be completed as follows:

.1 Minimum (3) tests will be completed within the first phase of repairs.

.2 Not less than one (1) bond test will be completed in each subsequent phase.

.3 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.

.4 Testing agency to submit copies of concrete test reports directly to The City and Contract Administrator.

.5 Inspection or testing by Contract Administrator will not augment or replace Contractor quality control nor relieve Contractual responsibility.

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 Contract Administrator for each individual use.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 The care that is exercised during the removal and preparation phases of concrete repairs can be the most important factor in determining the longevity of the repair, regardless of the material or technique used. 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.

.2 All delaminated or deteriorated concrete must be removed down to sound concrete. The reinforcing may have to be exposed at these locations by removing additional concrete, if there is any sign of corrosion. All concrete and exposed reinforcing shall be cleaned of all corrosion by mechanical means.

1.2 RELATED SECTIONS

.1 Section 03 20 00 – Concrete Reinforcing.

.2 Section 03 92 10 – Top Surface Repairs.

.3 Section 03 92 20 – Top Surface Scaling Repairs.

.4 Section 03 93 10 – Hand Patching.

.5 Section 03 93 20 – Pressure Grouting.

1.3 REFERENCES

.1 American Concrete Institute (ACI)

- .1 ACI RAP-5, Surface Repair Using Form-and-Pump Techniques.
- .2 ACI RAP-7, Spall Repair of Horizontal Concrete Surfaces.
- .3 ACI RAP-4, Surface Repair Using Form-and-Pour Techniques.
- .4 ACI RAP-6, Vertical and Overhead Spall Repair by Hand Application.

.2 International Concrete Repair Institute (ICRI)

- .1 ICRI Guideline No. 310.1R–2008, Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.
- .2 ICRI Guideline No. 310.2R–2, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

1.4 MEASUREMENT PROCEDURES

.1 Refer to applicable Sections for measurement procedures for each type of 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 over-wet 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 QUALITY ASSURANCE

.1 Contractor Repair Personnel:

.1 Site Superintendent to have a minimum of 5 years experience exhibiting successful performance in concrete restoration projects. Provide references upon request.

.2 Ensure all personnel involved with concrete restoration is adequately trained and familiar with the requirements of this Section.

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 30 lb. electric or pneumatic chipping hammers.

.2 Final removal and undercutting of reinforcing steel: maximum 15 lb. electric chipping hammers.

.3 Bulk removal of full depth repairs: electric or pneumatic jack hammers with weight ratings above 30 lbs..

.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 4,000 psi.

Part 3 Execution

3.1 EXAMINATION

.1 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.

.2 The Contractor shall make available as required throughout the Contract labour to carry out the following under the direction of Contract Administrator:

.1 Sample chipping and/or drilling.

.2 Operators for access equipment.

.3 The Contractor shall 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 public throughout all aspects of the Work.

.2 Remove or protect all surface attachments (e.g. 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.

3.3 CONCRETE DELAMINATION REMOVAL

.1 Remove all loose and or delaminated concrete above corroded reinforcing steel.

.2 Do not operate hammers or mechanical chipping tools at an angle in excess of 45° measured from the surface of the slab.

.3 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 Contract Administrator of increases in areas.

.4 Where the bond between existing concrete and reinforcing steel 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 6 inches (150 mm) or more, the concrete adjacent to the bar shall be removed by maximum 15 lb. electric chipping hammers to provide sufficient clearance between the reinforcement and concrete.

.1 Provide a minimum 3/4 inches (20 mm) clearance, or 1/4 inch (6 mm) larger than the largest aggregate in the repair material, whichever is greater.

.5 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.

.6 Conduct soundings to determine if any further unsound or delaminated concrete is present, which must be removed.

.7 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 Within 24 hours prior to infilling, sandblast the substrate to remove loose and deteriorated concrete, laitance, dust, dirt, oil, and any other material that could interfere with the bond of the new concrete.

.2 Concrete surfaces repaired by chipping hammers to have a profile of ICRI-CSP-10 after sandblasting. Sample surfaces are available for review in the Contract Administrator's office. These samples will be used as the standard of acceptance.

.3 Surface preparation applies equally to any horizontal concrete surfaces to which the concrete is to bond.

.4 Exposed reinforcing steel to be cleaned to near white metal and totally free of rust for the full circumference of the bar.

.5 Secure any reinforcement which is loose by tying to other secured bars or by other methods approved by Contract Administrator.

.6 Vacuum clean surface and/or air blast with oil free compressed air to remove residue and spent media created by surface preparation.

.7 Maintain substrate in a clean condition using polyethylene film until the patch material is ready to be placed.

.8 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.

.9 Final cleaning of the concrete substrate shall consist of a high pressure waterblast substrate at minimum 4,000 psi to remove any residual dust and dirt.

.10 Maintain substrate in a saturated condition for a period of not less than 2 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 Contract Administrator. Provide minimum 24 hours notice prior to each phase of the work.

.2 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.

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 either ready-mix concrete or 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 30 00 – Cast-in-Place Concrete.

.4 Section 03 91 10 – Surface Preparation for Concrete Delamination Repair.

.5 Section 03 35 30 – Bonded Concrete Overlays.

1.3 REFERENCES

.1 American Concrete Institute (ACI)

.1 ACI RAP-7, Spall Repair of Horizontal Concrete Surfaces.

.2 International Concrete Repair Institute

.1 ICRI Guideline No. 130.1R–2009, Guide for Methods of Measurement and Contract Types for Concrete Repair Work.

1.4 MEASUREMENT PROCEDURES

.1 Unit prices must include all supervision, labour and materials, and equipment.

.2 The following unit prices are requested for top surface concrete repairs after removal of the existing concrete overlay.

.1 0” to 3” removal. Infilling at the time of overlay placement.
.2 3” to 6” removal. Infilling at the time of overlay placement.
.3 Through-slab removal. Infilling at the time of overlay placement.

.3 Minimum payment for repair areas will be one square foot.

.4 The Contractor is to note that if the area of the repair is increased over that originally measured without consultation with the Contract Administrator, then the Contractor will not be paid for the increased area.

1.5 DELIVERY, STORAGE AND HANDLING

.1 See 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 See Section 03 30 00.

2.2 ACCESSORIES

.1 Evaporation retardant: MasterKure ER 50, formerly (Confilm) by BASF Building Systems at a minimum application rate of 4.9 m²/L.

Part 3 Execution

3.1 EXAMINATION

.1 See Section 03 91 10.

3.2 PREPARATION

.1 Protection: Protect adjacent Work areas and finish surfaces from damage during repair mortar application.

.2 Preparation of concrete substrates:

.1 Slab substrate preparation: to Section 03 35 30

.2 Surface repair preparation: to 03 91 10.

.3 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.

.4 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.5 Obtain Contract Administrator's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

.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 and construction live loads.

.4 Securely anchor formwork to substrate. Anchors to be sized and space to prevent deflection of the forms during 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 same grout mixed to dry pack consistency. Completely fill all anchor holes.

.7 A minimum of 1 inch 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 Use form-release agent to facilitate removal of forms from cast material.

.9 Test formwork for leaks. Any areas of leakage are to be sealed prior to placement of repair material. Re-test as required.

3.3 INFILLING PROCEDURES

.1 Top surface concrete repairs will be infilled at the time of overlay place. Refer to Section 03 35 30.

3.4 FINISHING

.1 Finishing: to Section 03 35 30.

3.5 CURING

.1 Curing: to Section 03 35 30.

3.6 FIELD QUALITY CONTROL

.1 Concrete testing: to Section 03 30 00.

.2 Bond testing: to Section 03 35 30.

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 Contract Administrator for each individual use.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Walls exhibiting extensive spalling and/or delamination requiring localized repairs less than 2" in depth will be repaired by removing the deteriorated sections of wall, cleaning and preparing the substrate, and patching the area with a cementitious patching material

1.2 RELATED SECTIONS

.1 Section 03 20 00 – Concrete Reinforcing.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C109/C109M-08, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. (50-mm) Cube Specimens).

.1 ASTM C309-03, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

1.4 MEASUREMENT PROCEDURES

.1 The areas of repair will be identified and quantified by the Contract Administrator in the presence of and with the assistance of the Contractor. The areas will then be measured and agreed upon by the Contractor and Contract Administrator prior to commencement of work.

.2 Unit prices must include all supervision, labour and materials, and equipment.

.3 The unit price submitted will apply to removal depths of up to 2 inches and at no point less than 1/2 inch in depth.

.4 The minimum area of payment will be one 1 square foot.

.5 The Contractor is to note that if the area of the repair is increased over that originally measured without consultation with the Contract Administrator, then the Contractor will not be paid for the increased area.

1.5 QUALITY ASSURANCE

.1 Contractor Qualifications:

.1 Minimum of 5 years experience in application of specified (or similar) products on projects of similar size and scope.

.2 Successful completion of a minimum of 5 projects of similar size and complexity to specified Work within the last 3 years.

1.6 DELIVERY, STORAGE AND HANDLING

.1 See 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 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 CL (formerly Emaco S88 CI) by BASF Building Systems.
- .2 Planitop X by Mapei.

2.2 ACCESSORIES

.1 Evaporation retardant: MasterKure ER 50 (formerly Confilm) by BASF Building Systems at a minimum application rate of 4.9 m²/L.

.2 Cure and sealing compound: to ASTM C309, Type 1. Acceptable product(s):

- .1 Florseal WB by Sika Canada Inc. at a minimum application rate of 4.9 m²/L.
- .2 MasterKure CC 160 WB formerly (Kure-N-Seal WB) by BASF Building Systems at a minimum application rate of 4.9 m²/L.

2.3 FINISHES

.1 Materials

.1 Paint materials for each coating formulae to be products of a single manufacturer.

.2 Provide specified, approved paint, finish materials.

.3 Provide linseed oils, shellacs, turpentine, etc. of pure grade, highest quality.

.2 Acceptable Products

.1 Specified manufacture: Sherwin Williams.

.2 Acceptable manufacturers, using equal quality, performance products subject to Contract Administrator approval:

.1 Pratt & Lambert Inc.

.2 Glidden Paint Co.

.3 Canadian Pittsburgh Industries.

.3 Acceptable Systems

.1 Surface preparation: in accordance with manufacturer's recommendations.

.2 Acceptable materials: S-W Duration Exterior Latex Acrylic Satin Coating

.3 Colour by: to match existing.

Part 3 Execution

3.1 PREPARATION

.1 Protection: Protect adjacent Work areas and finish surfaces from damage during repair mortar application.

.2 Surface Preparation:

.1 Complete concrete delamination repairs to 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

.3 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.

.4 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 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 1/8" over entire area.

.5 Apply repair mortar by hand towelling on vertical or overhead surfaces in depths ranging from 1/2” to 2".

.1 Vertical Applications: Repair mortar can be applied on vertical applications up to a 2" depth per lift.

.2 Overhead Applications: Do not exceed 1.5" thickness per lift. For depths greater than 1.5", limit succeeding lifts to 1" 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.

.5 Prepare surface and paint.

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.

.2 Protect fresh mortar from premature evaporation.

.3 Concrete repairs to be cured for a minimum of 7 days at 10°C.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Beams and columns 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 20 00 – Concrete Reinforcing.

.2 Section 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

.3 Section 03 93 10 – Hand Patching.

1.3 REFERENCES

.1 American Concrete Institute (ACI)

.1 ACI 546-04, Concrete Repair Guide.

.2 ACI RAP-5, Surface Repair Using Form-and-Pump Techniques.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM C109/C109M-13, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. (50-mm) Cube Specimens).

.2 ASTM C309-11, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 Canadian Standards Association (CSA)

.1 CSA- S448.1-10, Repair of Reinforced Concrete in Buildings.

.4 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).

1.4 MEASUREMENT PROCEDURES

.1 The areas of repair will be identified and quantified via hammer soundings by the Contract Administrator in the presence of and with the assistance of the Contractor. The areas will then be measured and agreed upon by the Contractor and Contract Administrator prior to commencement of work.

.2 Unit prices must include all supervision, labour and materials, and equipment.

.3 The Contractor is to note that if the area of the repair is increased over that originally measured without consultation with the Contract Administrator, then the Contractor will not be paid for the increased area.

1.5 DELIVERY, STORAGE AND HANDLING

.1 See 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 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, formerly (LA Repair Mortar) by BASF Building Systems.

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 FINISHES

.1 Materials

.1 Paint materials for each coating formulae to be products of a single manufacturer.

.2 Provide specified, approved paint, finish materials.

.3 Provide linseed oils, shellacs, turpentine, etc. of pure grade, highest quality.

.2 Acceptable Products

.1 Specified manufacture: Sherwin Williams.

.2 Acceptable manufacturers, using equal quality, performance products subject to Contract Administrator approval:

.1 Pratt & Lambert Inc.

.2 Glidden Paint Co.

.3 Canadian Pittsburgh Industries.

.3 Acceptable Systems

.1 Surface preparation: in accordance with manufacturer’s recommendations.

.2 Acceptable materials: S-W Duration Exterior Latex Acrylic Satin Coating

.4 Colour by: to match existing.

Part 3 Execution

3.1 PREPARATION

.1 Protection: Protect adjacent Work areas and finish surfaces from damage during repair mortar application.

.2 Surface Preparation:

.1 Complete concrete delamination repairs to 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

.3 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.

.4 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.

.5 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 14 psi (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 1 inch 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 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 or minimum 4 days for surfaces to be painted.

.3 For concrete surface to be left exposed, 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 Contract Administrators written approval.

.2 Prepare surface and paint to match existing.

3.5 FIELD QUALITY CONTROL

.1 Concrete tests to Section 03 30 00.

.2 Testing agency to submit copies of concrete test reports directly to The City and Contract Administrator.

.3 Inspection or testing by Contract Administrator will not augment or replace Contractor quality control nor relieve Contractual responsibility.

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 Contract Administrator for each individual use.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Work in this section consists of furnishing all labour, material, equipment, supervision, and incidentals as necessary to prepare the existing substrate and install a complete traffic-bearing waterproofing membrane system. Existing surface preparation is also included in this section.

1.2 RELATED SECTIONS

.1 Section 03 92 10 – Top Surface Repairs.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C957/C957M-10, Standard Specification for High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Integral Wearing Surface.

.2 ASTM C1127-01(2009), Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with an Integral Wearing Surface.

.3 ASTM D4263-83(2005), Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

.2 Canadian Standards Association (CSA)

.1 CSA- S413-07, Parking Structures.

.3 International Concrete Repair Institute (ICRI)

.1 ICRI concrete Repair Terminology (2010 Edition).

.2 ICRI Guideline No. 310.2–1997, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays (formerly No. 03732).

1.4 MEASUREMENT PROCEDURES

.1 No measurement will be made under this section. The Contractor shall include in the appropriate fixed price component all labour, materials, supervision, and equipment as required to complete the work required under this Section and as shown on the Drawings.

1.5 SUBMITTALS

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

.2 Upon request, manufacturer to submit independent laboratory certification attesting that the materials conforms to the latest edition of ASTM C957. Complete documentation, including a referenced method, the material specification limits, and typical test results to be included.

1.6 QUALITY ASSURANCE

.1 Contractor Qualifications:

.1 Minimum of 5 years experience in application of specified (or similar) products on projects of similar size and scope.

.2 Successful completion of a minimum of 5 projects of similar size and complexity to specified Work within the last 3 years.

.2 Field Mock-up:

.1 Install field mock-up at Project site or pre-selected area of building or location approved by Contract Administrator. Install material in accordance with this Section.

.2 Provide mock-up of at least 100 square feet to include surface profile, sealant joint, crack, flashing, and juncture details and allow for evaluation of slip resistance and appearance.

.3 Field mock-up will be standard for judging workmanship on remainder of Project.

.4 Maintain field sample during construction for workmanship comparison.

.5 All costs associated with the installation of the field mock-up are to be included in the fixed price for membrane installation.

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 WARRANTY

.1 The system manufacturer shall furnish a written single-source performance warranty that the membrane system will be free of defects related to workmanship or material deficiency for a five (5) year period from the date of Substantial Performance. The following problems shall be specifically covered under the warranty:

.1 cohesive or adhesive failure of the system;

.2 deficiencies resulting in crack-bridging failure of the system;

.3 leakage as a result of any installation or material deficiency.

.2 The waterproofing Contractor shall supply The City with a written and signed document, guaranteeing that all work (supply and installation of membrane) completed shall remain as installed, free from any application defect and to be bonded, for a period of three (3) years from date of acceptance of the Work of this trade and so stated by the Contract Administrator.

Part 2 Products

2.1 MANUFACTURERS

.1 The waterproofing membrane shall be of the same manufacturer throughout the work of this section.

.2 Alternates to acceptable manufacturer will be considered only on basis of written requests by the Contractor at the time of Bid. Include substantiation of product performance and confirmation that it meets or exceeds the performance criteria specified herein.

2.2 MATERIALS

.1 The waterproofing membrane shall be complete system of compatible materials including primer coat, base coat, top coats, flashings, aggregates and miscellaneous materials as required by the system manufacturer and meet the following performance requirements.

- .1 Compliance: ASTM C957/C957M.
- .2 Weight loss of base coat: to ASTM C1250
  - .1 Maximum 1%.
- .3 Low Temperature Flexibility and Crack Bridging to ASTM C1305 (modified):
  - .1 no cracking in base coat.
- .4 Adhesion-in-Peel after Water-Immersion (Base Coat) to ASTM C794 (modified):
  - .1 Concrete: minimum 22.2 N (5 lbf).
- .5 Chemical resistance to ASTM D471 (modified), average tensile retention:
  - .1 Water exposure: minimum 70%.
  - .2 Ethylene glycol exposure: minimum 70%.
  - .3 Mineral spirits exposure: minimum 45%.
- .6 Weather Resistance and recovery from elongation:
  - .1 Recovery from elongation: minimum 90%
  - .2 Average tensile retention: minimum 80%
  - .3 Elongation retention: minimum 90%
- .7 Abrasion resistance: to ASTM C501(modified):
  - .1 Maximum 50 mg.
- .8 Stability: to ASTM C957
  - .1 Minimum 6 months.

2.3 ACCEPTABLE SYSTEMS

.1 Autogard FC by Neogard .

- .1 Primer: as per manufacturer’s recommendations.
- .2 Base Coat: FC7500/FC7960.
- .3 Wearing Courses:
  - .1 Intermediate: FC7510/FC7961.
  - .2 Top Coat (no UV exposure): FC7510/FC7961.
  - .3 Top Coat (UV exposure): FC7540/FC7964.

.2 MasterSeal Traffic 2500 by BASF Building Systems.

.1 Primer: MasterSeal P255 Primer, as per manufacturer's recommendations.
.2 Base Coat: MasterSeal M 265.
.3 Wearing Courses:
.1 Intermediate: MasterSeal TC 275.
.2 Top Coat (no UV exposure): MasterSeal TC 275.
.3 Top Coat (UV exposure): MasterSeal TC 295.

.3 Sikalastic Duodeck Traffic System by Sika Canada Inc.

.1 Primer: as per manufacturer's recommendations.
.2 Base Coat: Sikalastic Duochem 390 Membrane.
.3 Wearing Courses:
.1 Intermediate: Sikalastic Duochem 391.
.2 Top Coat (no UV exposure): Duochem 391.
.3 Top Coat (UV exposure): Duochem 394.

.4 Qualideck by Advanced Polymer Technology

.1 Primer: Q102 or Q152, as per manufacturer's recommendations.
.2 Base Coat: Q252.
.3 Wearing Courses:
.1 Intermediate: Q372.
.2 Top Coat (no UV exposure): Q372.
.3 Top Coat (UV exposure): Q372 SPF.

2.4 APPLICATION RATES

.1 Primer: Primer (as per manufacturer's specifications).
.2 Base Coat: 28 ± 2 wet mils to achieve minimum **25 dry mils**.
.3 Wearing Course:
.1 Intermediate Coat: 20 wet mils with 16-30 silica sand at 10-20 lbs./100 ft² back-rolled to encapsulate aggregate.
.2 Top Coat: 25 wet mils with 16-30 silica sand at 15-25 lbs./100 ft² back-rolled to encapsulate aggregate.

Part 3 Execution

3.1 PROTECTION

.1 Protect adjacent surfaces against any damage that could result from the waterproofing installation.

3.2 EXAMINATION

.1 Inspect existing caulked joints to ensure there is no deteriorated sealant, adhesion loss or non elastomeric sealants installed in joints. Remove and replace all deficient sealant in accordance with Section 07 92 10.

.2 Inspect all penetrations, including electrical, lighting, signage, plumbing, HVAC, fire sprinkler piping for watertight seal. Remove and replace deficient sealant in accordance with Section 07 92 10 and as shown on the drawings.

3.3 SURFACE PREPARATION

.1 Substrates must be sound and free of dust, dirt, laitance, paints, oils, grease, curing compounds, or any other contaminants.

.2 Preparation of Concrete Surfaces:

.1 All new concrete surfaces to have minimum compressive strength of 21 MPa and be cured for minimum of 28 days or 80 percent of design strength.

.1 All surfaces must be clean and dry. Ensure relative humidity is below 75% at 40% of the slab depth.

.2 Concrete moisture content must be less than 3% at the time of application.

.2 There may be surface voids, pop outs, or rough areas of repair which must be prepared prior to membrane application. Limit surface irregularities to within 1/16". The concrete deck surface shall be made free of all ridges, surface voids, bugholes, and sharp projections.

.1 Smooth out localized ridges, voids, bug holes, popouts, and scaled areas (generally 1/16 to 1/8 inch), which are otherwise sound, by applying a levelling material consisting of either an epoxy resin and silica sand misture, or matrix of membrane material and aggregate when approved by the membrane manufacturer.

.1 Profile and prepared substrate by bush hammering, sandblasting, shot blasting, and/or grinding to obtain a smooth surface with a profile of ICRI-CSP-3 or greater.

.2 Apply a slurry coat with a flat squeegee to fill in the voids. The slurry coat would consist of resin mixed with 2-3 parts 20/40 or 16-30 mesh silica sand.

.3 Fill larger voids with a mortar consisting of resin with 4-5 parts silica sand. Where defects are shallow or sporadic apply resin neat, tight squeegee and broadcast to refusal

.4 While the resin is still wet, broadcast silica sand (16-30 mesh) to refusal, allow to cure then remove all loose sand. The repair area must have a sand finish, not smooth. If a smooth surface results, it must be sandblasted or shotblasted.

.5 The costs of localized repairs are to be carried in the Contract price for the membrane installation.

.3 Larger areas of scaling, top surface deterioration will be repaired by the mechanical removal of the deteriorated concrete and infilling with a proprietary repair mortar or concrete in accordance with the applicable Sections. The cost of these repairs will be paid for on a unit price basis.

.4 Shotblast all horizontal surfaces to remove existing coatings, laitance, and miscellaneous surface contamination, and to clean and texture the surface. The specified surface profile is ICRI-CSP-3.

.5 Sandblast all perimeters, vertical projections, and areas not accessible by shotblasting to remove existing coatings, laitance, and miscellaneous surface

contamination, and to clean and texture the surface. The specified surface profile is ICRI-CSP-3.

.6 For bonded concrete overlays cast with macro-synthetic fibres, all protruding fibres must be removed prior to shotblasting. Acceptable removal method consists of “tiger-torching” the surface to burn-off fibres. Do not over expose concrete surface to the torch. Excess heating of the slab can result in permanent damage.

.7 Additional surface preparation may be required where contamination remains after the initial surface preparation and cleaning. Costs for additional cleaning, shotblasting and/or sandblasting are to be included in the Contractor’s price.

.8 Surfaces contaminated with oil, grease, car fluids or other materials, are to be vigorously scrubbed with a stiff bristle broom and a strong non-sudsing detergent acceptable to the manufacturer. Thoroughly wash, clean, and dry surface. Where oil or other contaminants penetrate deep into the concrete, removal by mechanical methods may be required and will be paid for on a unit price basis.

.9 After the concrete surface has been prepared to the required soundness and surface profile, complete final cleaning by vacuuming and/or air blasting with oil free compressed air to remove the residue created by the surface preparation method and to remove spent media.

.10 Cleaned surfaces are to be covered and protected against exposure to vehicles, dust, and debris.

.11 If the prepared surface becomes wet, or is contaminated, repeat surface preparation as described above.

.12 Install membrane to prepared and approved surfaces within 24 hours of completion of surface preparation.

3.4 APPLICATION

.1 The elastomeric coating shall be applied in strict accordance with the system manufacturer's recommendations, by a certified installer with proven experience with the specified systems. Where discrepancies exist between the manufacturer’s specifications, project specifications and drawings, the more stringent will govern.

.2 The elastomeric coating shall be applied in strict accordance with the system manufacturer's recommendations, by a certified installer with proven experience with the specified systems.

.3 Unless otherwise indicated, all costs associated with detailing joints, surface defects, cracks and joints, terminations, and corners described above are to be included in the fixed price for membrane installation.

.4 Cracks and Joints:

.1 Rout and clean cracks and joints over 1/16" wide to minimum of 1/4" wide x 1/4" deep as directed by the Contract Administrator. Joint sizes will be determined on-site.

.1 Install bond breaker tape, prime joint faces and seal with manufacturer approved sealant in accordance with Section 07 92 10. Allow sealant to cure. Costs associated with the routing and caulking of joints and random cracks will be paid for on a unit price basis.

.2 Pre-stripe all joints and cracks (sealed or not) with 25 wet mils of base coat. Note: Increase application rate if required by manufacturer’s specifications. Fill and

overlap joint or crack 3 inches on each side. Costs associated with the pre-striping of random cracks, and caulked joints are to be included in the fixed price for membrane application.

.5 Inside Corners and Penetrations:

.1 Sealant cants to be installed at all inside corner details.

.2 Prime surface and form sealant cant into corner at junction of all horizontal and vertical surfaces (e.g. wall sections, curbs, or columns). Unless otherwise noted on the drawings, install bond breaker tape or 1/4" diameter foam rod in corner and apply 1" x 1" (25 mm x 25 mm) cant of sealant. Tool to 45 degree cant. Allow sealant to cure.

.3 Prime and apply 25 wet mils of base coat over sealant cant and minimum 4 inches (100 mm) up vertical surface and onto deck surface.

.4 At locations of potential high movement, install reinforcing fabric and/or membrane flashing sheet in accordance with manufacturer’s recommendations.

.5 Costs associated with preparing and detailing corners and penetrations are to be included in the fixed price for membrane installation.

.6 Use slope grade base coat for sloped areas and vertical surfaces.

.6 Vertical Terminations:

.1 Waterproofing membrane to extend minimum 6 inches up all vertical surfaces.

.2 Apply masking tape at at appropriate height to provide clean and straight termination.

.3 Costs to be included in the fixed price for membrane installation.

.7 Outside Corners:

.1 Round all outside corners to create a 3/8" (10 mm) fillet.

.2 Prime and apply 25 wet mils of base coat minimum 4 inches (100 mm) up vertical surface and onto deck surface.

.3 Costs associated with preparing and detailing outside corners to be included in the fixed price for membrane installation.

.8 Horizontal Terminations:

.1 Rout a 1/4" wide by 1/4" deep reglet into concrete deck where coating system will be terminated.

.2 Prime surface and fill reglet with base coat in accordance with Section 07 92 10. Bond breaker tape will not be required in this instance.

.3 Costs associated with completing horizontal terminations shown on the Drawings are to be included in the fixed price for membrane installation.

.9 Primer: Where required by manufacturer, apply manufacturer's specified primer to all areas receiving deck coating. Apply at to manufacturer's recommendations.

.1 Roll apply uniform coat to penetrate concrete surface, avoid puddling.

.2 Force primer into pores and voids to eliminate pinholes.

.3 Do not apply Primer over prestriping.

.4 Allow primer to dry tack free.

.5 Apply membrane base coat within manufacturer’s specified timeframe.

.10 Base Coat:

.1 All preparatory work must be completed and cured before application of membrane basecoat begins.

.2 Apply base coat with properly sized squeegee to arrive at required dry mil thickness. Back roll to level base coat.

.3 Apply base coat to achieve a dry film thickness of 25 mils to entire deck surface, over coating prepared cracks, joints, and integral flashings. Verify mil thickness of all coats by use of wet mil thickness gauge.

.4 Use slope grade material for sloped areas and vertical surfaces.

.5 Allow base coat to cure before proceeding with top coat(s)

.11 Intermediate Coat:

.1 Ensure base coat is free of dust which may inhibit bond. If dust is present, clean surface according to manufacturer's recommendations.

.2 Apply intermediate coat with properly sized squeegee to arrive at required wet mil thickness. Back roll to level coat. Verify mil thickness of all coats by use of wet mil thickness gauge.

.3 Broadcast aggregated at specified rate to produce an even, consistent finish. Work in small sections to ensure aggregate is applied before the membrane begins to skin over.

.4 Upon adequate cure, remove excess aggregate by sweeping or vacuuming.

.5 Allow base coat to cure before proceeding with top coat(s)

.12 Top Coat:

.1 Ensure previous coat is free of dust which may inhibit bond. If dust is present, clean surface according to manufacturer's recommendations.

.2 Apply top coat with properly sized squeegee to arrive at required wet mil thickness. Back roll to level coat. Verify mil thickness of all coats by use of wet mil thickness gauge.

.3 Broadcast aggregated at specified rate to produce an even, consistent finish. Work in small sections to ensure aggregate is applied before the membrane begins to skin over.

.4 Back roll aggregate into top coat immediately with short nap roller lightly wetted initially with top coat. Apply sufficient pressure to encapsulate aggregate and distribute evenly.

.13 Plan membrane installation carefully to avoid unnecessary walking in freshly applied material.

3.5 FIELD QUALITY CONTROL

.1 Confirmation of theoretical wet mil film thickness (Applicable to membrane base coat and wearing coat(s)):

.1 Wet mil thickness measurements will be taken at random locations throughout the application of all coats of the membrane.

.2 Apply additional material where the measured wet mil thickness is less than the specified or shown on approved application rates.

.2 Confirmation of theoretical wet mil film thickness (Applicable to membrane base coat and wearing coat(s)):

.1 Wet mil thickness measurements will be taken at random locations throughout the application of all coats of the membrane.

.2 Apply additional material where the measure wet mil thickness is 5 mils less than the specified wet mil thickness.

.3 Confirmation of dry mil film thickness (Applicable to membrane base coat only) :

.1 Cut tests of the membrane base coat will be completed at locations selected by the Contract Administrator to confirm thicknesses.

.2 If a discrepancy exists between the theoretical wet mil thickness and the measured dry mil thickness, dry mil thickness readings will govern.

.3 A minimum of five (5) cut tests will be completed for each day of application. The Contract Administrator will measure the thicknesses using a microscope and/or micrometre and the average thickness calculated. The base coat application will be considered acceptable if the average thickness is **not less than 25 dry mils**. The following remedial work will be required where membrane thickness is less than specified.

.1 Average thickness is less than 25 dry mils: place additional 8 wet mils of material to increase average thickness to greater than 25 dry mils. Contract Administrator will determine extent of the area requiring additional application.

.2 Individual cut test reading is less than 18 dry mils: place additional 8 wet mils of material. Contract Administrator will determine extent of the area requiring additional application.

.4 Unless the Contract Administrator deems the waterproofing Contractor to be negligent in the application of the membrane, costs associated for the application of additional membrane material will be paid for by The City via the unit price rates.

.4 Manufacturer's Field Service. Final inspection: Warranty request. Manufacturer's representative will inspect finished surface preparation, application, and finished coating and may require further preparation or application to achieve appropriate result. In no case will manufacturer's representative approve surface or finish if following conditions are found: pinholes, insufficient coating thickness, or any other conditions, that, in manufacturer's representative's opinion, may cause failure of installation.

.1 Acceptance of any stage of the work by the manufacturer’s representative does not necessarily reflect the opinion of the Contract Administrator.

.2 Do not take instructions directly from the manufacturer’s representative unless approved by the Contract Administrator.

3.6 CLEAN UP

.1 Clean site of refuse of this work, including adjacent areas or fixtures. Use of manufacturers applied solvent will be required. Use caution as solvents are extremely flammable.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This section covers the installation of an elastomeric joint sealant in cleaned and routed cracks and joints in concrete. The work covered under this section consists of all labour, material, equipment, supervision and incidentals required to prepare and seal the joints and cracks as shown and detailed on the drawings, and as specified herein.

1.2 RELATED SECTIONS

.1 Section 03 30 00 – Cast-in-Place Concrete.

.2 Section 07 18 16 – Vehicular Traffic Coatings.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM):

.1 ASTM C920-14a, Standard Specification for Elastomeric Joint Sealants.

.2 ASTM C1193-16 Standard Guide for Use of Joint Sealants.

.3 ASTM C1330-02(2013) Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

.4 ASTM C1521-13 – Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

1.4 MEASUREMENT PROCEDURES

.1 No measurement will be made under this section for joint sealants which are specifically shown on drawings. Include costs in items for which joint sealant is required.

.2 Miscellaneous cracks, control joints, and double tee joints designated for routing and caulking will be identified and quantified by the Contract Administrator in the presence of and with the assistance of the Contractor. The areas will then be measured and agreed upon by the Contractor and Contract Administrator prior to commencement of work.

.3 Unit prices must include all supervision, labour and materials, and equipment. Joints/reglets to be uniform in size over the given length and conform to one of the following configurations. The following unit prices have been requested for miscellaneous joint/crack routing and caulking. The minimum unit of payment will be one (1) lineal foot for various reglet sizes.

.1 ¼” width.

.2 ½” width.

.3 ¾” width.

.4 1” width.

.4 The Contractor is to note that if he increases the area of repair over that originally measured of his own accord and without consultation with the Contract Administrator, he will not be paid for the increased area.

1.5 SUBMITTALS

.1 See Section 01 33 00.

.2 Product Data: Submit manufacturer's technical bulletins and MSDS on each product.

.3 Samples: For each product exposed to view, manufacturer's standard bead consisting of strips of actual products showing full range of colors available.

1.6 DELIVERY STORAGE AND HANDLING

.1 See Section 01 60 00.

.2 The sealant shall be delivered to the jobsite in the manufacturer's original unopened

.3 Deliver products in original factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets for each product.

.4 Store products in a location protected from freezing, damage, construction activity, precipitation, and direct sunlight per manufacturer's recommendations.

.5 Handle products with appropriate precautions and care as stated on Material Safety Data Sheet.

Part 2 Products

2.1 MATERIALS

.1 Two-component polyurethane joint sealant for routing and caulking of random cracks and control joints and miscellaneous cants below cold-applied liquid waterproofing.

.1 Compliance: ASTM C920, Type M, Grade NS, Class 25, Use T, NT, M, and A.

.2 Acceptable products:

.1 Sikaflex 2C/NS by Sika Canada Inc.

.2 MasterSeal NP2 by BASF Building Systems.

2.2 ACCESSORIES

.1 Primers, bond breakers and miscellaneous materials required to install the sealant shall be in accordance with manufacturer's recommendations, and as approved by the Contract Administrator. Use of aggregate bond breakers is prohibited.

.1 Primer: Use only manufacturer's approved primer.

.2 Closed-cell foam backing rod shall conform: to ASTM C1330.

.3 Bond breaker tape: self-adhesive, pressure sensitive tape made from TFE-flourocarbon (Teflon), polyethylene, or similar which will not react with or adhere to the sealant.

Part 3 Execution

3.1 PROTECTION

.1 Protect adjacent surfaces against any damage that could result from sealant installation.

3.2 EXAMINATION

.1 Inspect existing caulked joints and cracks to ensure there is no deteriorated sealant, adhesion loss or non elastomeric sealants installed in joints. Remove and replace deficient sealant at location identified by Contract Administrator.

.2 Inspect all deck penetrations, including electrical, lighting, signage, plumbing, HVAC, fire sprinkler piping for watertight seal. Remove and replace deficient sealant at location identified by Contract Administrator.

3.3 PREPARATION

.1 Substrates must be sound and free of dust, dirt, laitance, paints, oils, grease, curing compounds, or any other contaminants.

.2 All new concrete surfaces to have minimum compressive strength of 21 MPa and be cured for minimum of 28 days or 80 percent of design strength.

.3 Joint and crack preparation:

.1 Completely remove sealant from existing joints and cracks designated for repair.

.2 Sawcut reglet along cracks and joints identified by Contract Administrator.

.3 Reglet dimensions are to be site confirmed based on crack dimensions and pattern and be uniform over the given length. The depth of the reglet must be consistent with the type of backing material (ie. bond breaker tape, or backing rod) and sized to produce a width to depth ratio of of approximately 2:1.

.4 Thoroughly clean joints and reglets by grinding, sandblasting, or wire brushing to expose a sound surface free of contamination and in order to provide a clean, sound substrate for optimum seal adhesion.

.5 Remove loose particles present or resulting from grinding, abrading, or blast cleaning by blowing out joints with oil-free compressed air, or vacuuming prior to primer application.

.6 Ensure that surfaces to be sealed are sound, dry, free from dirt, water, frost, loose scale, corrosion, oil, grease, waterproofing or water-repellent treatments, or other contaminants which may adversely affect the performance of the sealing materials.

.7 If the substrate is suspected of being substandard, an on-site trial application is to be conducted to verify that the substrate is satisfactory. Work will not proceed until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer. All costs associated with verification to be carried by Contractor.

.8 Prior to installation of the sealant an inspection of both the joint and substrate is required to confirm the joint design and to ensure that the substrate is sound and acceptable for sealant application. A substrate that is unsound, cracked, or weak must be repaired prior to sealant.

.9 Do not proceed with Work until any unsatisfactory conditions have been corrected in a manner acceptable to the Contract Administrator.

3.4 INSTALLATION

.1 Primer: Unless otherwise approved by the sealant manufacturer, priming of all substrates is mandatory.

.1 Prime substrates as recommended by the sealant manufacturer.

.2 Primer to be installed prior to installation of the sealant backing.

.3 Allow primer to dry until all the solvent evaporates. This typically takes 15 to 120 minutes, depending on temperature and humidity.

.4 Prime only those surfaces that will be sealed with sealant the same day. If a previously primed surface that was performed the day before is encountered, it must be reprimed.

.2 Sealant backup: Where joint depth requires backup, pack joints continuously with closed cell backer rod meeting ASTM C1330

.1 Backer rod to be installed under adequate compression to hold it in-place in the joint opening and to resist the pressure applied when tooling a non-sag sealant into place. Backer rod diameter to be at least 25% greater than the joint width.

.2 Do not install backer rod with a sharp tool which could puncture the rod. Ensure surface skin of the backer rod is not punctured or cut during installation. A puncture in the backer rod may result in out-gasing into the uncured sealant resulting in voids or other defects in the cured sealant.

.3 Install backer rod without stretching.

.4 Under no circumstances should backer rod that is too small for the joint be doubled up or braided together to fit the opening.

.3 Bond breaker: A bond breaker will be required in the bottom of all joints containing a rigid, non-flexible backing material to preclude three-side adhesion where movement will occur. A bond breaker is not required to prevent a sealant from adhering to a soft, flexible, sealant backing material that would not significantly restrict movement.

.1 Install bond breaker tape in joint to be sealed on top of back-up material to prevent adhesion of sealant to back-up material. The tape shall be installed continuously with no skips or voids in the tape application.

.4 Mixing:

.1 Prepare sealants that require mixing; follow manufacturer's recommended procedures, mixing thoroughly.

.2 Mix only as much material as can be applied within manufacturer's recommended application time period.

.3 Mix in a manner to prevent inclusion of foreign materials.

.5 Sealant installation:

.1 Apply sealants only within manufacturer's specified application life period. Discard sealant after application life is expired or if prescribed application period has elapsed.

.2 Application of sealants must be completed by skilled applicators installed in accordance with manufacturer's printed directions and this Section.

.3 Apply sealants to meet Specification and design requirements.

.4 Do not install sealant on wet or damp substrates. Wet or damp substrates should be allowed to dry before application of primer and/or sealant.

.5 Do not install sealants under conditions of precipitation or temperatures below 4°C. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.

.6 All sealants have a temperature range for optimum handling which can vary considerably, and should be stored at a temperature within this range for at least 4 hours before use.

.7 Do not use sealant that has started to set in its container, exceeded shelf life or installation times as stated by the manufacturer.

.8 Sealant to be installed in a manner that will completely fill the cavity formed in the joint opening by the substrates and sealant backing or bond breaker.

.9 Apply sealant by any of the common types of hand operated guns. Nozzles shall be sized and shaped to fit the intended joint opening width, which will confine the sealant to the joint and aid in building pressure to force the sealant into the cavity. joint. Ensure that mixing and placing procedures do not entrain air within the sealant.

.10 Immediately after applying the sealant, tool the bead. Tooling forces material into cavities and into more intimate contact with the substrate. Wet tooling will not be permitted.

.11 Tool sealant to produce a concave shaped surface. Specifically, the sealant and concrete are to be flush at the edges but recessed at the joint centre, forming a parabolic arc. Do not re-use any material forced outside of the joint by the tooling procedure.

.12 Sealant bead to be free of air pockets, embedded impurities, and free of ridges, wrinkles and sags.

.13 Use anti-tack solutions only with the approval and directions of the sealant manufacturer.

3.5 CLEANING

.1 Do not clean inadvertent spills or splatters of sealant on concrete or masonry with solvent because of possible permanent staining of the substrate. Scrape, wipe or scrub such spills with dry tools or rags.

.2 Clean bulk caulking guns, barrel and nozzle completely after every day's use.

.3 The special precautions recommended by the manufacturer shall be rigidly followed where hazardous materials are involved.

3.6 FIELD ADHESION TESTING

.1 Field adhesion testing of miscellaneous joints and cracks will be complete at the discretion of the Contract Administrator.

.2 Field adhesion testing will be performed during the field mockup and throughout the course of the work by the Contract Administrator in the presence of and with the assistance of the Contractor and be completed throughout the course of the work. The purpose of the field adhesion testing is to help detect application problems such as improper cleaning, use of improper primer, poor primer application, or improper joint configuration.

.3 A minimum three (3) field adhesion tests will be completed for each type of sealant used for the first 500 lineal feet and two (2) tests per 500 lineal feet thereafter.

.4 The field adhesion test shall be performed as follows:

.1 Make a knife cut across the full width of the joint.

.2 Make two (2) cuts (from the cross cut) approximately 3" long, along both sides of the joint.

.3 Place a 1" mark on the sealant tab.

.4 Grasp the 3" sealant tab firmly 1" from its bonded edge and pull at a 90° angle.

.5 If dissimilar substrates are being sealed, check the adhesion of sealant to each substrate separately. This is accomplished by extending the vertical cut along one side of the joint, checking adhesion to the opposite side and then repeating for the other surface.

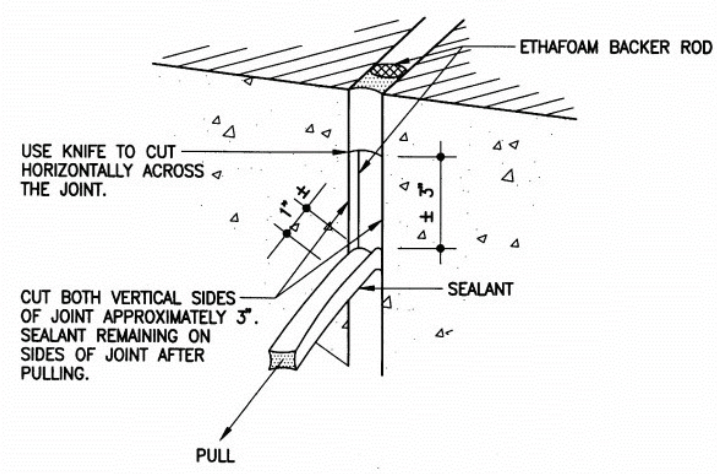

FIGURE 1.1 HAND PULL TEST

.5 Field adhesion test criteria:

.1 Urethane Sealants (Class 25): the sealant should tear cohesively within itself without bond loss.

.6 At this time the joint will be inspected for complete fill. The joint should not have voids, and joint dimensions should match those shown on the drawings.

.7 This testing will be completed by the Contract Administrator in the presence of and with the assistance of the Contractor and results recorded by the Contract Administrator, retained and made available for review upon request. A sample log form has been appended with this specification.

.8 Repair of Sealant at Field Adhesion Test Locations

.1 Repair the sealant pulled from the test area by applying new sealant to the test area. Assuming good adhesion was obtained, use the same application procedure to repair the area as was used originally for the joint. Care should be taken to ensure that the original sealant surfaces are clean and that the new sealant is in contact with the original sealant.

.2 Carry costs associated with sealant testing and repair in their bid including but not limited to access, labour, materials, etc.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.2 REFERENCES

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

- .1 ASTM C36/C36M-03e1, Specification for Gypsum Wallboard.
- .2 ASTM C475-02(2007), Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .3 ASTM C630/C630M-03e1, Specification for Water-Resistant Gypsum Backing Board.
- .4 ASTM C840-08, Specification for Application and Finishing of Gypsum Board.
- .5 ASTM C919-12(2017), Standard Practice for Use of Sealants in Acoustical Applications.
- .6 ASTM C1002-07, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .7 ASTM C1047-10a, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

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

.3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

1.3 DELIVERY, STORAGE AND HANDLING

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

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

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

1.4 SITE ENVIRONMENTAL REQUIREMENTS

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

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Do not dispose of unused paint and caulking materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

.1 Standard board: to ASTM C36/C36M Type X, 5/8” thick, 48” wide x maximum practical length, ends square cut, edges squared.

.2 Water-resistant board: to ASTM C630/C630M regular, thickness to suit.

.3 Steel drill screws: to ASTM C1002.

.4 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, 0.5 mm base thickness, perforated flanges, one piece length per location.

.5 Interior Sealants: MasterSeal NP 150, by BASF.

.6 Acoustic sealant to ASTM C919

.7 Polyethylene: to CAN/CGSB-51.34, Type 2.

.8 Joint compound: to ASTM C475, asbestos-free.

Part 3 Execution

3.1 ERECTION

.1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.

.2 Install work level to tolerance of 1:1200.

3.2 APPLICATION

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

.2 Apply gypsum board to metal furring or framing using screw fasteners. Maximum spacing of screws 12” on centre.

.1 Single-Layer Application:

.1 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.

.2 Double-Layer Application:

.1 Install gypsum board for base layer and exposed gypsum board for face layer.

.2 Apply base layers at right angles to supports unless otherwise indicated.

.3 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 10” with base layer joints.

.3 Apply water-resistant gypsum board as indicated.

.4 Install gypsum board with face side out.

.5 Do not install damaged or damp boards.

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

3.3 INSTALLATION

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 6” on centre.

.2 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.

.3 Splice corners and intersections together and secure to each member with 3 screws.

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

.5 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:

.1 Levels of finish:

.1 Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

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

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

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

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

.10 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.

.11 Mix joint compound slightly thinner than for joint taping.

.12 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.

.13 Allow skim coat to dry completely.

.14 Remove ridges by light sanding or wiping with damp cloth.

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

3.4 SCHEDULES

.1 Construct fire rated assemblies where indicated.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA)

- .1 CAN/CSA-A3000-13, Cementitious materials compendium.
- .2 CSA-A23.1-14, Concrete materials and methods of concrete construction.
- .3 CSA-B111-1974(R2003), Wire Nails, Spikes and Staples.

.2 American Society for Testing and Materials (ASTM)

- .1 ASTM A653/A653M-08 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.
- .2 ASTM B659-90(2014) Standard Guide for measuring Thickness of Metallic and Inorganic Coatings.
- .3 ASTM C206-14, Standard Specification for Finishing Hydrated Lime.
- .4 ASTM C847-14a, Standard Specification for Metal Lath
- .5 ASTM C897-15 Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters.
- .6 ASTM C926-16a, Standard Specification for Application of Portland Cement-Based Plaster.
- .7 ASTM C979/C979M-16, Standard Specification for Pigments for Integrally Colored Concrete.
- .8 ASTM C1032-14 Standard Specification for Woven Wire Plaster Base.

1.2 QUALITY ASSURANCE

.1 Stucco Contractor shall be qualified in the workmanship of plastering (stucco) with a minimum of five (5) years proven experience.

1.3 SUBMITTALS

.1 Submit in accordance with Section 01 33 00 Submittals.

.2 Qualification Statements:

- .1 Upon request provide a minimum of three (3) local references exhibiting successful performance in stucco work.

1.4 DELIVERY, STORAGE, HANDLING, AND SETUP

.1 Deliver and store material undamaged in original wrappings or containers with manufacturer’s labels and seals intact and legible.

.2 Prevent damage to materials during handling and storage, and protect from adverse environmental conditions.

Part 2 Products

2.1 STUCCO MATERIALS

.1 Water: To CSA-A23.1.

.2 Hydraulic cement: regular or white to CAN/CSA-A3000.

.3 Blended hydraulic cement: to CAN/CSA-A3000.

.4 Masonry cement: to CAN/CSA-A3000.

.5 Hydrated Lime: to ASTM C206, Type S.

.6 Aggregate for base and finish: to ASTM C897, freshwater washed and free of deleterious materials.

.7 Admixtures: for bonding, pumping, or curing to be manufactured specifically for use in stucco mixes and to be used in strict accordance with manufacturer's recommendations. Common household detergent is not acceptable.

.8 Raw Colour Pigments: natural or synthetic iron oxides to ASTM C979.

2.2 CEMENT PARGING

.1 Mix parging proportions by volume using standard accurate measuring devices and known volumes for all materials with sequential batches to be proportionally alike. Once project has been started, do not switch to another mix and do not interchange components.

.2 Mix material in the following sequence: (1) water, (2) half of sand, (3) all of the cementitious and/or lime, (4) balance of sand and, (5) water for workability.

.3 Mix all ingredients in a mechanical mixer and continue to mix for 3 to 5 minutes after all ingredients have been added.

.4 Use enough water to produce a suitably plastic cementitious material, keeping water to a minimum.

.5 Mix job site mixed finish coat parts by volume in accordance with ASTM C926 and following proportions.

.1 1 part Type GU (Portland) cement.

.2 1 to 2 parts lime.

.3 1 ½ to 3 parts sand.

.6 Mix finish coat materials in strict accordance with manufacturer's written recommendations.

Part 3 Execution

3.1 EXAMINATION

.1 Prior to starting lathing or plaster work, carefully review own work and work installed by other trades to verify that it is complete to the point where work of this section may properly commence.

.2 Notify the Contract Administrator in writing of conditions detrimental to the proper and timely completion of the lathing and/or plastering work.

.3 Do not begin installation until all unsatisfactory conditions are resolved.

3.2 APPLICATION

.1 Finished thickness to match existing.

.2 Install parging without interruption or cold joints.

.3 Apply job-site stucco finish coat to cured and dampened base coat in a uniform nominal thickness of 3 mm to 6 mm (1/8" to ¼") with sufficient material and pressure to ensure a tight bond with stucco base coat or concrete surface to texture/finish specified.

.4 Apply finish coat starting from the top of the wall surface and work down with no interruptions; no cold joints and with no scaffold lines or joint stains to provide a finish to match existing conditions.

.5 During application, maintain a wet edge at all times to provide a finished appearance with no edge/stain lines or scaffold lines.

3.3 PROTECTION

.1 Protect surfaces from adverse environmental and job site conditions until stucco is completely dry and cured.

3.4 CLEAN-UP

.1 Remove all droppings as work progresses without damaging affected surfaces and remove masking materials from adjacent surfaces.

.2 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

.3 Remove combustible rubbish materials and empty containers each day and safely dispose of same in accordance with the requirements of authorities having jurisdiction.

.4 Clean equipment and dispose of wash water as well as all other cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.) coatings, thinners, in accordance with the authorities having jurisdiction.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

.1 Material Safety Data Sheets (MSDS).

.2 Master Painters Institute (MPI)

.1 MPI Architectural Painting Specifications Manual, 2004.

.2 MPI - Maintenance Repainting Manual, 1998.

1.2 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 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.

.4 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Submit manufacturer's installation instructions.

1.3 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.

.2 Fire Safety Requirements:

.1 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.2 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

Part 2 Products

2.1 MATERIALS

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

2.2 COLOURS

.1 Submit proposed Colour Schedule to The City 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.

.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 INTERIOR PAINTING

.1 Painting shall be in accordance with the recommendations of the latest edition of the MPI Architectural Painting Manual of the Master Painters Institute.

.2 All paint shall be certified by Green Seal or Eco Logo; or the VOC content of paints and coatings used must be less than the current VOC content limits of SCAQMD Rule 1113.

.3 Minimum standards shall include, but are not limited to:

.1 Paint to walls shall be acrylic latex with low sheen, eggshell finish, unless noted otherwise.

.2 Paint to areas that require waterproof finishes, i.e. washrooms, shall be alkyd semi-gloss enamel.

.3 A three-coat system of one prime coat and two top coats is required for new walls to ensure all surfaces are covered completely, and seamlessly.

.4 Allow for 20% cut-in of accent colours on drywall walls and circulation areas.

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.

3.2 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 Contract Administrator.

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

.3 Protect factory finished products and equipment.

.2 Surface Preparation:

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

.2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.3 Place "WET PAINT" signs in occupied areas as painting operations progress.

.3 Clean and prepare surfaces in accordance with MPI - Architectural Painting Specification Manual 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 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.2 Apply wood filler to nail holes and cracks.

.3 Tint filler to match stains for stained woodwork.

.6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 40 inches.

.7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.

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

.9 Do not apply paint until prepared surfaces have been accepted by Contract Administrator.

3.3 APPLICATION

.1 Method of application to be as approved by The City. 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.

3.4 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment exposed in finished areas, to match adjacent surfaces, except as indicated.

.2 Do not paint over nameplates.

.3 Keep sprinkler heads free of paint.

.4 Paint fire protection piping red.

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

.6 Paint natural gas piping yellow.

.7 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

END OF SECTION