Oshawa Public Library
McLaughlin Branch Stair Replacement

Issued for Tender

Project Number: 2024-0455-10

Date: June 30, 2025

Prepared for:

City of Oshawa
65 Debwewin Miikan
Oshawa, Ontario
L1H 1N2

Prepared by:

WalterFedy
675 Queen St. S.
Suite 111
Kitchener, Ontario
N2M 1A1
walterfedy.com
A part of WF Group Inc.

WALTERFEDY

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Key:

A = Architectural	S = Structural	M = Mechanical
E = Electrical	LC = LEED Consultant	EC = Energy Consultant
C = Civil	L = Landscape Consultant	O = Owner

Section 01 14 00 - Work Restrictions

1 General

1.1 Work Areas

1. The Owner will permit the temporary storage of materials. The Contractor is responsible for obtaining and paying for any road occupancy permits that may be required to perform the work.

2. Confine operations within easements for construction, storage and access as shown in the Contract Documents.

3. Install and maintain silt fencing along working and storage areas and access routes.

4. Do not enter upon or occupy with workers, tools or materials any lands other than public streets, roadways, rights-of-way or easements indicated in the Contract Documents except after written consent has been received from property owner and a copy submitted to the Consultant. Any rentals or damages paid for occupying private lands shall be at the Contractor's expense.

1.2 Restrictions On Use of Premises

1. Limit use of premises for Work, to allow;

   i. Owner occupancy.

2. Coordinate use of premises under direction of Owner.

1.3 Work Sequence

5. Schedule work to accommodate Owner's continued use of premises during construction.

1.4 Owner Occupancy

1. Owner will occupy premises during entire construction period.

2. Cooperate with Owner in scheduling operations to minimize disruptions and to facilitate Owner usage.

1.5 Restricted Hours of Work in Occupied Facilities

1. Work hours are restricted by the established City of Oshawa Bylaws. Owner permission to work outside the approved work hours will be required.

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

1.6 Noisy Work Restrictions in Occupied Facilities

1. Schedule excessively noisy work to avoid disturbance to building occupants. Perform

excessive noise generating work outside of Owner's approved business hours.

2. Use powder actuated devices only with Consultant's written permission.

1.7 Maintaining Life Safety Systems in Occupied Facilities

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

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

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

Section 01 21 00 – Allowances

1 General

1.1 Instructions

1. Refer to Supplementary Conditions for further requirements.

1.2 Cash Allowances for Services

1. Amount of each cash allowance includes:

   i. All costs related to the services, excluding Value Added Taxes.

   ii. Subcontractor's and sub-Subcontractor's overheads and profits related to the cash allowance.

2. Amount of each cash allowance does not include Contractor's overhead and profit, and other related costs, which shall be included in the Contract Price and not in the cash allowance.

3. Allow the stipulated sum for services as follows:

#	Description	Value
1	Testing and inspections including: • Site work and earthwork • Reinforcing steel • Concrete • Waterproofing	$15,000.00
2	Soil Testing Allowance	$10,000.00
	Total Cash Allowance	**$25,000.00**

1.3 Expenditure of Cash Allowances

1. The Owner, through the Consultant, will provide the Contractor with signed documentation required to permit pricing of a cash allowance item.

2. The Owner, through the Consultant, may request the Contractor to identify potential Suppliers or Subcontractors, as applicable, and to obtain at least three (3) competitive prices for each cash allowance item.

3. The Owner, through the Consultant, may request the Contractor to disclose originals of all bids, quotations, and other price related information received from potential Suppliers or Subcontractors.

4. The Owner, through the Consultant, will determine by whom and for what amount each cash allowance item will be performed. Obtain the Owner's prior written approval in the form of a Change Order before entering into a subcontract, amending an existing

subcontract, or performing own forces work included in a cash allowance. Upon issuance of the Change Order, the Contractor's responsibilities for a cash allowance item shall be the same as for other work of the Contract.

Section 01 25 00 – Substitution Procedures

1 General

1.1 Definition

2. In this Section “Substitution” means a Product, a manufacturer, or both, not originally specified in Contract Documents by proprietary name but proposed for use by Contractor in place of a Product, a manufacturer, or both, specified by proprietary name.

1.2 Substitution Procedures

1. Contractor may propose a Substitution wherever a Product or manufacturer is specified by proprietary name(s), unless there is accompanying language indicating that Substitutions will not be considered.

3. Contractor may propose a Substitution wherever a Product or manufacturer is specified by proprietary name(s) and accompanied by language such as "or equal", "or approved equal", or other similar words. Do not construe such language as an invitation to unilaterally provide a Substitution without Consultant’s prior acceptance in writing. Do not order or install any Substitution without a Supplemental Instruction or Change Order.

4. Provided a proposed Substitution submission includes all of the information specified in this Section under Submission Requirements for Proposed Substitutions, Consultant will promptly review and accept or reject the proposed Substitution.

5. Consultant may accept a Substitution if satisfied that:

   i. The proposed substitute Product is the same type as, is capable of performing the same functions as, interfaces with adjacent work the same as, and meets or exceeds the standard of quality, performance and, if applicable, appearance and maintenance considerations, of the specified Product,

   ii. The proposed substitute manufacturer has capabilities comparable to the specified manufacturer, and

   iii. the Substitution provides a benefit to Owner.

6. If Contractor fails to order a specified Product or order a Product by a specified manufacturer in adequate time to meet Contractor’s construction schedule, Consultant will not consider that a valid reason to accept a Substitution.

7. If Consultant accepts a Substitution and subject to Owner’s agreement, the change in the Work will be documented in the form of either a Supplemental Instruction or Change Order as specified in Section 01 26 00 – Contract Modification Procedures.

8. If a Substitution is accepted in the form of a Supplemental Instruction or Change Order, Contractor shall not revert to an originally specified Product or manufacturer without

Consultant’s prior written acceptance.

1.3 Submission Requirements for Proposed Substitutions

1. Include with each proposed Substitution the following information:

   i. Identification of the Substitution, including product name and manufacturer’s name, address, telephone numbers, and web site.

   ii. Reason(s) for proposing the Substitution.

   iii. A statement verifying that the Substitution will not affect the Contract Price and Contract Time or, if applicable, the amount and extent of a proposed increase or decrease in Contract Price and Contract Time on account of the Substitution.

   iv. A statement verifying that the Substitution will not affect the performance or warranty of other parts of the Work.

   v. Manufacturer’s Product literature for the Substitution, including material descriptions, compliance with applicable codes and reference standards, performance and test data, compatibility with contiguous materials and systems, and environmental considerations.

   vi. Product samples as applicable.

   vii. A summarized comparison of the physical properties and performance characteristics of the specified Product and the Substitution, with any significant variations clearly highlighted.

   viii. Availability of maintenance services and sources of replacement materials and parts for the Substitution, as applicable, including associated costs and time frames.

   ix. If applicable, estimated life cycle cost savings resulting from the Substitution.

   x. Details of other projects and applications where the Substitution has been used.

   xi. Identification of any consequential changes in the Work to accommodate the Substitution and any consequential effects on the performance of the Work as a whole. A later claim for an increase to the Contract Price or Contract Time for other changes in the Work attributable to the Substitution will not be considered.

1.4 Installation of Substitute Products or Materials

1. When an accepted substitute, or "equivalent to" item of equipment or material, requires changes or additions to Project, make adjustments and changes required to coordinate Work for installation without additional cost to Owner.

1.5 Changes Due to Substitutions

1. Any additional cost, loss or damage arising from substitutions are Contractor's responsibility, notwithstanding approval or acceptance of such substitution by Owner or Consultant, unless such substitution was made at written request or direction by the Owner or Consultant.

1.6 Modifications to Contract Price Due to Substitutions:

1. Owner will receive full credit for cost differential between the specified item and proposed substitution.

2. Substitution proposals that increase Contract Price will be rejected, unless proposed substitution was made at written request or direction by the Owner or Consultant.

Section 01 26 00 – Contract Modification Procedures

1 General

1.1 Requests For Interpretation/Information

1. Refer to Section 01 26 13.

1.2 Schedule of Labour Rates

1. As part of bid submission, schedule of labour rates for all trades and classifications of trades, such as journeyperson, apprentices, and foreperson that will be employed in the Work. Provide a breakdown of payroll burden component of labour rates.

2. Labour rates shall reflect the salaries, wages, and benefits paid to personnel in the direct employ of the Contractor, Subcontractors, and sub-Subcontractors, stated as hourly rates, that will be used when:

   i. preparing price quotations for Change Orders, and

   ii. determining the cost of work attributable to Change Directives.

3. Labour rates stated in the schedule of labour rates shall be consistent with rates that will actually be paid, and payroll burden costs that will actually be incurred, in the normal performance of the Work, during regular working hours. Labour rates shall not include any additional overhead and profit component.

4. Where collective agreements apply, the labour rates shall not exceed those established by collective agreement.

5. Accepted schedule of labour rates will be used solely for evaluating Change Order quotations and cost of performing work attributable to Change Directives.

6. The Contractor may request amendments to the accepted schedule of labour rates if changes in the labour rates that will actually be paid, or payroll burden cost that will actually be incurred, in the normal performance of the Work can be demonstrated. Obtain the Owner’s written acceptance of such changes.

1.3 Schedule of Equipment Rates

1. As part of the bud submission, schedule of equipment rates for Contractor owned Construction Equipment.

2. Equipment rates shall reflect the rates that will be used when:

   i. preparing price quotations for Change Orders, and

   ii. determining the cost of work attributable to Change Directives.

3. Equipment rates stated in the schedule shall be consistent with local equipment rental market rates and shall not include any additional overhead and profit component.

4. Accepted schedule of equipment rates will be used solely for evaluating Change Order quotations and cost of performing work attributable to Change Directives.

5. The Contractor may request amendments to the accepted schedule of equipment rates if changes in local equipment rental market rates can be demonstrated. Obtain the Owner's written acceptance of such changes.

1.4 Valuation of Changes Based on Agreed Unit Prices

1. The Consultant may, at the outset of the Contract or at any other time, request the Contractor to submit unit prices anticipated to be required in valuing changes in the Work.

2. The Contractor shall submit such unit prices promptly upon request.

3. The unit prices shall be valid for a specified duration.

4. The unit prices shall exclude all fees for overhead and profit and shall be subject to the percentage fees specified in this Section under Fees for Overhead and Profit – Change Orders.

5. The Consultant will evaluate the Contractor's quoted unit prices and, if accepted by the Owner in writing, the agreed unit prices shall be used to value subsequent proposed changes in the Work wherever they are applicable.

1.5 Method of Contract Price Adjustment - Change Orders

1. Unless otherwise agreed, the adjustment of the Contract Price on account of a proposed change in the Work shall be based on a quotation for a fixed price increase or decrease to the Contract Price regardless of the Contractor's actual expenditures and savings.

1.6 Change Order Procedures

1. Upon issuance by the Consultant to the Contractor of a proposed change in the Work, and unless otherwise requested in the proposed change or unless otherwise agreed:

    i. Submit to the Consultant a fixed price quotation for the proposed change in the Work within 5 days after receipt of the proposed change in the Work.

    ii. If requested in the proposed change, provide a detailed breakdown of the price quotation including the following to the extent applicable, with appropriate supporting documentation:

        a. Estimated labour costs, including hours and applicable hourly rates based on the accepted schedule of labour rates.

        b. Estimated Product costs, including Supplier quotations, estimated quantities and

unit prices.

c. Estimated Construction Equipment costs.

d. Enumeration of all other estimated costs included in the price quotation.

e. Estimated credit amounts for labour and Products not required on account of the proposed change.

f. Fees, not exceeding the applicable percentages for overhead and profit as specified in this Section.

g. Where applicable, Subcontractor quotations, also including a detailed breakdown of all of the above.

iii. Include in the quotation the increase or decrease to the Contract Time, if any, for the proposed change, stated in number of days.

iv. Include in the quotation the number of days for which the quotation is valid.

v. The quotation will be evaluated by the Consultant and the Owner and, if accepted by the Owner, be documented in the form of a signed Change Order.

1.7 Fees For Overhead and Profit – Change Orders

1. Where the Contractor's price quotation for a Change Order results in a net increase to the Contract Price, the Contractor's entitlement to a fee for overhead and profit in the quotation shall be as follows, as applicable:

   i. See Part D - Supplementary Conditions.

2. Where a Subcontractor's price quotation for a Change Order results in a net increase to the Subcontractor's contract price, the Subcontractor's entitlement to a fee for overhead and profit in the quotation shall be as follows, as applicable:

   i. Total overhead and profit not exceeding 5%

3. be for the net decrease without any adjustment for fees for overhead and profit.

1.8 Method of Contract Price Adjustment - Change Directives

1. Unless the Owner and the Contractor reach an earlier agreement on the adjustment to the Contract Price by means of a Change Order that cancels the Change Directive, the adjustment in the Contract Price for change carried out by way of a Change Directive shall be determined as specified in the General Conditions of Contract after the change in the Work is completed.

1.9 Change Directive Procedures

1. If the Owner requires the Contractor to proceed with a change in the Work prior to the Owner and the Contractor agreeing upon the corresponding adjustment in Contract Price and Contract Time, the Owner, through the Consultant, shall issue a Change Directive.

2. When proceeding with a change in the Work under a Change Directive, keep accurate records of daily time sheets for labour and Construction Equipment, and invoices for Product and Construction Equipment costs. Submit such records to the Consultant weekly, until the Change Order superseding the Change Directive is issued.

1.10 Fees For Overhead and Profit – Change Directives

1. The Contractor's entitlement to a fee for overhead and profit on the Contractor's expenditures and savings attributable to a Change Directive shall be as follows, as applicable:

   i. See Part D- Supplementary Conditions.

2. A Subcontractor's entitlement to a fee for overhead and profit on the Subcontractor's expenditures and savings attributable to a Change Directive shall be as follows, as applicable:

   i. Total overhead and profit not exceeding 5%.

   ii. Where a Change Directive results in net savings on account of work not required to be performed and a net decrease in the Contractor's or Subcontractor's cost, the net savings to the Contractor or Subcontractor shall be calculated without any adjustment for fees for overhead and profit.

3. When a Change Directive is ultimately recorded as a Change Order, there shall be no additional entitlement to fees for overhead and profit beyond those specified in this article.

1.11 Supplemental Instructions

1. The Consultant may issue Supplemental Instructions to provide clarifications to the Contract Documents, provide additional information, or make minor variations in the Work not involving adjustment in the Contract Price or Contract Time.

2. If the Contractor considers a Supplemental Instruction to require an adjustment in Contract Price or Contract Time, the Contractor shall promptly notify the Consultant and the Owner in writing and shall not proceed with any work related to the Supplemental Instruction pending receipt of a Change Order, a Change Directive, or, in accordance with the dispute resolution provisions of the General Conditions of Contract, a Notice in Writing of a dispute and instructions to proceed.

Section 01 25 13 – Request for Information

1 General

1.1 Requests For Interpretation/Information

1. The Contractor shall review the Contract Documents and shall report promptly to the Consultant any error, inconsistency or omission the Contractor may discover.

2. If the Contractor finds discrepancies in and/or omissions from the Contract Documents or has any doubt as to the meaning or intent of any part thereof, the Contractor must immediately notify the Consultant, who will provide written instructions or explanations. Neither the Owner nor the Consultant will be responsible for oral instructions.

3. Request for Information is a formal process used during the Work to obtain information from Consultant with regards to Contract Documents.

4. Request for Information does not constitute notice of claim for a delay.

5. Submittal procedure:

    i. Submit Requests for Information on form including the following information:

        a. Request for Information No.:

        b. Posted Date:

        c. Initiated Date:

        d. Date Required:

        e. Originated By:

        f. Specification Section:

        g. Drawing/Detail No.:

        h. Subject:

        i. Description/Question: (required)

    ii. Submit necessary supporting information with Request for Information form.

    iii. Request for Information Log:

        a. Maintain tracking log of Requests for Information sent to and responses received from Consultant complete with corresponding dates.

6. Submit Requests for Information sufficiently in advance of affected parts of the Work so

not to cause a delay in the Work. Any costs resulting from failure to do this will not be paid by Owner.

7. Submit Request for Information to Consultant only.

8. Submit Request for Information from Contractor only, Requests for Information submitted by subcontractors or suppliers will not be accepted.

9. Number Requests for Information consecutively in one (1) sequence in order submitted.

10. Submit one Request for Information per Request for Information form.

11. Allow five (5) Working Days for review of Request for Information from time of Consultant's receipt of Request for Information to time of Consultant's return to Contractor. When the Request for Information submittal is received by the Consultant before 12:00pm, review period will begin that day. If it is received after 12:00pm the review period will begin the next Working Day.

    i. Contractor will establish a steady flow of Requests for Information for review and avoid accumulation of an excessive quantity of Requests for Information in a single submission. If, at any time, the Contractor submits a large enough number of Requests for Information such that the Consultant cannot process these Requests for Information within five (5) Working Days, the Consultant, will confer with the Contractor within one (1) Working Day of receipt of such Requests for Information, and the Consultant and the Contractor will jointly prepare an estimate of the time necessary for processing same as well as an order of priority between the Requests for Information submitted. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.

12. Consultant's response is not considered a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.

13. Thoroughly review the Contract Documents to satisfy a claim, dispute or other matters in question relating to performance of the Work or interpretation of Contract Documents that cannot be resolved by direct reference to Contract Documents. Describe in detail this review on Request for Information form as part of Request for Information submission. Requests for Information lacking such detailed review description or where the detail provided is in opinion of Consultant insufficient, Consultant will not review Request for Information and reject it.

Section 01 29 00 – Payment Procedures

1 General

1.1 Schedule of Values

1. Prior to the first application for payment, submit for Consultant's review an initial schedule of values. Modify the initial schedule of values if and as requested by Consultant. Obtain Consultant's written acceptance of the initial schedule of values prior to the first application for payment.

2. Together with the first and all subsequent applications for payment, submit updated versions of the schedule of values to indicate the values, to the date of application for payment, of work performed and Products delivered to Place of the Work.

3. Provide the schedule of values in an electronic spreadsheet format that provides for inclusion of the following information:

    i. Identifying information including title and location of the Work, name of Contractor, number and date of application for payment, and period covered by the application for payment.

    ii. A work breakdown structure based on Contractor, Subcontractor and sub-Subcontractor work, Specification sections and material and labour breakdown. Include separate line items for closeout procedures including closeout submittals, demonstration and training, start-up and testing, and commissioning collectively valued at minimum 10% of Contract Price.

1.2 Cash Flow Projection

1. Prior to the first application for payment submit, for Consultant's review, a forecast of approximate monthly progress payments for each month of the Contract Time.

2. Submit revised cash flow forecasts when required due to significant changes in rate of progress of the Work or significant changes in the Contract Price.

1.3 Workers' Compensation Clearance

1. Submit proof of workers' compensation clearance with each application for payment.

1.4 Statutory Declarations

1. Submit a Statutory Declaration of Progress Payment Distribution by Contractor with each application for payment except the first.

1.5 Payment For Products Stored Off Site

1. Owner may, due to extraordinary circumstances and at Owner's sole discretion, make payments for Products delivered to and stored at a location other than Place of the Work,

subject to:

i. A request submitted by Contractor in writing, with appropriate justification, and

ii. Whatever conditions Owner or Consultant may establish for such payments, as required to protect Owner's interests.

1.6 Release of Holdback

1. Holdback to be released upon completion of the lien period, 60 days past date of substantial completion.

Section 01 31 19 – Project Meetings

1 General

1.1 Construction Start Up Meeting

1. Promptly after Contract award, Consultant will establish the time and location of a construction start-up meeting to review and discuss administrative procedures and responsibilities. Consultant will notify Contractor at least five (5) Working Days before the meeting.

2. Senior representatives of Owner, Consultant, and Contractor, including Contractor's project manager and site superintendent, shall be in attendance.

3. Consultant's representative will chair the meeting and record and distribute the minutes.

4. Agenda will include following:

    i. Appointment of official representatives of Owner, Contractor, Subcontractors, Consultant, and subconsultants.

    ii. Project communications.

    iii. Contract Documents for construction purposes.

    iv. Documents at the site.

    v. Contractor's use of premises.

    vi. Work restrictions.

    vii. Cash allowances.

    viii. Substitution procedures.

    ix. Contract modification procedures.

    x. Payment procedures.

    xi. Construction progress meetings.

    xii. Construction progress schedule, including long lead time items.

    xiii. Submittals schedule and procedures.

    xiv. Quality requirements, including testing and inspection procedures.

    xv. Contractor's mobilization.

xvi. Temporary utilities.

xvii. Existing utility services.

xviii. Construction facilities.

xix. Temporary barriers and enclosures.

xx. Temporary controls.

xxi. Field engineering and layout of work.

xxii. Site safety.

xxiii. Site security.

xxiv. Cleaning and waste management.

xxv. Closeout procedures and submittals.

xxvi. Commissioning.

xxvii. Other items.

1.2 Construction Progress Meetings

1. Schedule regular bi-weekly construction progress meetings for the duration of the Work. Consultant shall prepare meeting agendas, chair the meetings, and record and distribute the minutes.

2. Arrange for and provide physical space for meetings.

3. Contractor shall record in the meeting minutes significant decisions and identify action items and action dates by attendees or the parties they represent.

4. Contractor shall distribute copies of minutes within three (3) Working Days after each meeting-to-meeting attendees and any affected parties who may not be in attendance.

5. Ensure that Subcontractors attend as and when appropriate to the progress of the Work.

6. Agenda for each meeting shall include the following, as a minimum:

   i. Work progress since previous meeting.

   ii. Field observations, including any problems, difficulties, or concerns.

   iii. Construction progress schedule.

   iv. Submittals schedule.

v. Proposed changes in the Work.

vi. Requests for information.

vii. Site safety issues.

viii. Other business.

Section 01 32 00 – Construction Progress Documentation

1 General

1.1 Summary

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

2. The purpose of submitting progress schedules is to:

   i. Inform Owner and Consultant of actual progress versus planned progress, and

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

1.2 Construction Progress Schedule

1. Format and Content:

   i. Prepare schedule in the form of a Critical Path Method Gantt chart using appropriate scheduling software.

   ii. Provide a work breakdown structure identifying key activities, work packages, and major milestones, including long delivery Products, inspection and testing activities, and similar items, at a sufficient level of detail to effectively manage construction progress.

   iii. Indicate milestone date(s) for Ready-for-Takeover and Substantial Performance of the Work.

2. Submission:

   i. Submit initial schedule to Owner and Consultant within 15 Working Days after Contract award.

   ii. Submit schedule via e-mail as .pdf files.

   iii. Consultant will review format and content of initial schedule and request necessary changes, if any, within five (5) Working Days after receipt.

   iv. If changes are required, resubmit finalized initial schedule within five (5) Working Days after return of review copy.

   v. Submit updated progress schedule bi-weekly to Owner and Consultant, indicating actual and projected start and finish dates with report date line and progress.

1.3 Submittals Schedule

1. Format and Content:

   i. Prepare schedule identifying all required Shop Drawing, Product data, and sample submissions, including samples required for testing.

   ii. Prepare schedule in electronic format.

   iii. Provide a separate line for each required submittal, organized by Specifications section names and numbers, and further broken down by individual Products and systems as required.

   iv. For each required submittal, show planned earliest date for initial submittal and latest date for return of reviewed submittal without causing delay.

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

2. Submission:

   i. Submit initial schedule to Consultant within 20 Working Days after Contract award.

   ii. Submit schedule via e-mail as .pdf files.

   iii. Consultant will review format and content of initial schedule and request necessary changes, if any, within five (5) Working Days after receipt.

   iv. If changes are required, resubmit finalized schedule within five (5) Working Days after return of review copy.

   v. Submit updated submittals schedule monthly to Consultant.

1.4 Schedule Management

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

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

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

1.5 Recording Actual Site Conditions on As-Built Drawings

1. Obtain from Consultant an electronic copy of the construction Drawings for the purpose

of creating as-built drawings. Record information in electronic form, clearly identifying as-built deviations from the originally obtained construction Drawings.

i. A copy of the original contract drawings are available from the Consultant's office:

a. At an extra cost to the Contractor of $200/sheet.

b. Contact (Ryan Schultz) for Limitation of Liability Agreement.

2. Clearly label each drawing as "As-Built Drawing". Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

3. Record actual construction including:

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

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

iii. Measured locations of pipes, ducts, conduits, outlets, fixtures, access panels, and appurtenances, referenced to visible and accessible features of construction.

iv. Field changes of dimension and detail.

v. Changes made by Change Orders and Supplemental Instructions.

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

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

1.6 Progress Photographs

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

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

3. Do not use progress or any other Project photographs for promotional purposes without Owner's written consent.

Section 01 33 00 – Submittal Procedures

1 General

1.1 Administrative

1. Submit specified submittals to Consultant for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time or for Product substitutions or other deviations from the Drawings and Specifications.

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

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

4. Present Shop Drawings, Product data, and samples in Metric units per the International System of Units. Where items or information is not produced in Metric units per the International System of Units, converted values are acceptable.

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

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

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

8. Reproduction of construction Drawings to serve as background for Shop Drawings is permitted. If construction Drawings are used for this purpose, remove references to Consultant.

9. Do not propose Substitutions or deviations from Contract Documents via Shop Drawing, Product data and sample submittals.

10. Maintain reviewed submittals, including all Shop Drawings, product data and samples at the Place of the Work, available for reference by Owner and Consultant.

1.2 Shop Drawings and Product Data

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

2. Where Products attach or connect to other Products, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and

installed. Indicate cross-references to Drawings, Specifications and other already reviewed Shop Drawings.

3. Accompany submittals with a transmittal information including:
    i. Date.
    ii. Project title and number.
    iii. Contractor's name and address.
    iv. Identification of each submittal item and quantity.
    v. Other pertinent data.
4. Shop Drawing submittals shall include:
    i. Date and revision dates.
    ii. Project title and number.
    iii. Name and address of:
        a. Subcontractor.
        b. Supplier.
        c. Manufacturer.
    iv. Contractor's stamp, date, and signature of Contractor's authorized representative responsible for Shop Drawing review, indicating that each Shop Drawing has been reviewed for compliance with Contract Documents and, where applicable, that field measurements have been verified.
    v. Details of appropriate portions of the Work as applicable:
        a. Fabrication.
        b. Layout, showing dimensions, including identified field dimensions, and clearances.
        c. Setting or erection details.
        d. Capacities.
        e. Performance characteristics.
        f. Standards.

g. Operating weight.

h. Wiring diagrams.

i. Single line and schematic diagrams.

j. Relationships to other parts of the Work.

5. Product data submittals shall include Material Safety Data Sheets for all controlled Products.

6. Submit electronic copy of Shop Drawings where specified in the technical Specifications.

7. Submit electronic copy of Product data sheets or brochures where specified in the technical Specifications.

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

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

10. Allow 10 Working Days for Consultant's review of each submittal and incorporate in submittals schedule specified in Section 01 32 00 – Construction Progress Documentation.

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

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

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

14. Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of the Work proceeds. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.

1.3 Interference Drawings

1. Prepare drawings indicating relationship of new and existing and unforeseen conditions at congested areas prior to commencement of the Work in those areas.

2. For congested locations, before installation, prepare drawings showing relationships of

ductwork, conduit, piping, sprinklers, ceiling supports and framing, communication and specialized equipment located within ceiling and shaft spaces.

3. Indicate locations of visible items such as air handling outlets, light fixtures, smoke detectors, sprinkler heads, communication grilles and access panels occurring at these locations.

4. Ensure interference drawings are initialed by a responsible person of each Subcontractor involved along with Contractor's signature and submitted to Consultant for review and record purposes.

1.4 Samples

1. Submit samples physically identical with proposed material or product for Consultant's review in duplicate where specified in the technical Specifications. Label samples as to origin, Project name, and intended use.

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

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

4. Where a required colour, pattern or texture has not been specified, submit full range of available Products meeting other specified requirements.

5. Consultant selection from samples is not intended to change the Contract Price or Contract Time. If a selection would affect the Contract Price or Contract Time, notify Consultant in writing prior to proceeding with the Work.

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

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

1.5 Contractor's Review of Submittals

1. Prior to transmitting submittal, review and approve submittal, and affix Contractor's signature and stamp to submittal cover page.

2. Consultant will not review submittals that do not bear the Contractor's signature and in the case of mechanical and electrical, the Subcontractors' stamp and signature also. If it appears a review has not taken place, the submittal will be returned to the Contractor not reviewed.

3. By signing and submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents that he has approved, determined and verified dimensions, quantities, field dimensions, relations to existing work, coordination with work to be installed later, coordination with information on previously accepted Shop Drawings,

Product Data, Samples, or similar submittals and verification of compliance with requirements of Contract Documents.

4. In reviewing Shop Drawings, Product Data, Samples, and similar submittals, the Consultant shall be entitled to rely upon Contractor's representation that information in submittals is correct and accurate.

5. Submittals that are returned or rejected because of insufficient Contractor review or coordination will not be justification for a claim for extension of time.

1.6 Consultant's Review of Submittals

1. After receipt of submittal, Consultant will review it for conformance to Contract Documents and certify that this review has been performed by affixing Consultant's review stamp.

2. Review Time:

   i. Allow not less than ten (10) working days for processing and review of any one submittal except as noted below, and except when processing must be delayed for coordination with subsequent submittals. Consultant will advise Contractor promptly of such delay.

      a. Allow an additional five working days for processing and review of submittals specified in Divisions 05, 09, 21, 22, 23, 25, 26, 27, and 28.

      b. Identify those submittals for which review is necessary urgently.

      c. Allow four (4) weeks after submission of all samples in Division 09, for the Consultant to select finishes and prepare a colour schedule.

   ii. Review period begins on date of receipt of submittal by Consultant and extends to mailing date of return to Contractor.

3. Action Following Consultant's Review: Process submittals according to notations placed on them by Consultant.

   i. Reviewed:

      a. Proceed with fabrication, purchase, or both, of items in submittal, subject to the minor revisions or clarifications if any, included in the Consultant's review.

   ii. Reviewed as Modified:

      a. Proceed with fabrication, purchase, or both, only after the original drawing has been corrected. Mechanical and Electrical Contractors to include corrected drawings in Maintenance and Operating Manuals.

   iii. Resubmit:

a. Submission is rejected, therefore fabrication and work indicated cannot proceed.

b. Correct submission and resubmit.

iv. Not Reviewed:

a. Submission was not reviewed for one of the following reasons:

- Completed submittal cover page was not provided.
- Contractor’s stamp was not found on submission.
- In the Consultant’s opinion, review was not necessary.

4. Limitations of Consultant's Review:

i. Consultant’s review is not a complete check, but only review of general methods of construction and detailing, subject to limitations and requirements set forth in GC 3.10.5.

ii. Consultant’s review does not authorize changes in Contract Amount or Contract Time unless so stated in a separate Proposed Change or Change Directive.

iii. If the Contractor feels the shop drawing have changed the Contract Price or Contract Time, he must notify the Consultant within seven (7) Working Days from date of Consultant’s transmittal otherwise it will be assumed no change in Contract Price or Contract Time will be considered.

iv. Review of shop drawings is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the reviewer approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the Place of the Work, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co- ordination of the Work.

5. After the Consultant’s review of a submittal or resubmittal, changes will not be considered unless accompanied by an explanation acceptable to the Consultant concerning reason substitution is necessary.

Section 01 40 00 – Quality Requirements

1 General

1.1 Reference Standards

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

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

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

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

5. Within the Specifications, reference may be made to the following standards writing, testing, or certification organizations:

    i. Aluminum Association

    ii. American Concrete Institute

    iii. American Institute of Steel Construction

    iv. American National Standards Institute

    v. American Society of Mechanical Engineers

    vi. American Society for Testing and Materials

    vii. Architectural Woodwork Manufacturers Association of Canada

    viii. American Wire Producers Association

    ix. Canadian Green Building Council

    x. Canadian General Standards Board

    xi. Canadian Institute of Steel Construction

    xii. Canadian Prestressed Concrete Institute

xiii. Canadian Standards Association

xiv. Canadian Sheet Steel Building Institute

xv. Canadian Welding Bureau

xvi. Insulated Cable Engineers Association

xvii. Institute of Electrical and Electronics Engineers

xviii. Insulating Glass Manufacturers Association of Canada

xix. Leadership in Energy and Environmental Design

xx. Master Painters Institute

xxi. Manufacturers Standardization Society of the Valve and Fittings Industry

xxii. National Association of Architectural Metal Manufacturers

xxiii. National Electrical Manufacturers Association

xxiv. National Fire Protection Association

xxv. National Hardwood Lumber Association

xxvi. National Lumber Grades Authority

xxvii. The Society for Protective Coatings

xxviii. Terrazzo, Tile and Marble Association of Canada

xxix. Underwriters' Laboratories of Canada

1.2 Certificates

1. Definition: Notarized certification of type specified.

2. Do not construe certification as relieving Contractor from furnishing satisfactory materials if, after tests are performed on selected samples, material does not meet specified requirements.

3. Professional Certification:

   i. When professional certification of performance criteria of materials, systems or equipment is required by Contract Documents, Owner and Consultant are entitled to rely on such certifications.

   ii. Neither Owner nor Consultant shall be expected to make independent examination or

verification of professional certifications.

1.3 Codes, Fees, Permits and Certificates

1. Refer to GC 10.2.

2. Execute the Work in accordance with the laws, rules, and regulations of the local and provincial codes and other authorities having jurisdiction.

3. In the event that specified Products do not meet these conditions, notify Consultant in writing before ordering or installing same.

4. If any Contractor chooses to carry out work in contravention of any Code or By-law, he shall be responsible for all changes required to obtain Code acceptance.

5. Expedite obtaining the building permit from the municipality.

6. Obtain necessary permits and notices, pay all fees in order that the work hereinafter specified may be carried out and he shall furnish any certificates necessary as evidence that the work installed conforms with the laws and regulations of all authorities having jurisdiction before final certificates are issued.

7. All changes and alterations required by an authorized inspector of any authority having jurisdiction shall be carried out in accordance with the General Conditions of the Contract.

    i. All equipment supplied must have approval of Canadian Standards Association, Underwriters' Laboratories of Canada, National Fire Protection Association, International Accreditation Organization, Factory Mutual, or and any other authority having jurisdiction.

1.4 Manufacturer's Field Services

1. When required by Contract Documents, have manufacturer provide qualified representative to observe field conditions, conditions of surfaces and installation, quality of work to start-up equipment and to test, adjust and balance equipment as applicable.

1.5 Contractor's Quality Control

1. Maintain quality control over supervision, Subcontractors, Suppliers, manufacturers, Products, services, quality of work and existing conditions, to produce Work in accordance with requirements of Contract Documents.

1.6 Independent Inspection and Testing Agencies

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

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

3. Section 01 21 00 – Allowances specifies a cash allowance for independent inspection and testing services to be retained and paid for by Contractor. Cash allowance excludes any inspection and testing that is for Contractor's own quality control or is required by regulatory requirements.

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

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

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

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

8. Provide labour, Construction Equipment and temporary facilities to obtain and handle test samples on site.

1.7 Inspection And Testing Agency Reports

1. For inspection and testing required by Contract Documents or by regulatory requirements, and performed by Contractor retained inspection and testing agencies, submit to Consultant copies of reports. Submit within ten (10) days after completion of inspection and testing.

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

1.8 Inspection And Testing Procedures

1. Start-up Meeting

   i. Conduct an initial start-up meeting with the Inspection and Testing Company, scheduled at least one week in advance of work commencing at the Place of the Work.

   ii. Ensure an up-to-date construction schedule is available such that the Inspection and Testing Company and Consultant can develop a testing program.

   iii. Re-inspection

iv. Any re-inspections that are required due to deficiencies uncovered at the initial inspection shall be at the expense of the Contractor.

v. Payment for Inspection and Testing Services.

vi. Pay costs for inspection and testing from the cash Allowance specified in Section 01 21 00.

vii. Re-inspection costs are not included in the cash Allowance and are to be paid directly by the Contractor outside of the Contract.

2. Reports

i. The Inspection and Testing company shall issue written reports to the Contractor and to the Consultant indicating the location and results of specific material tests, as well as the results of visual inspections, and the instructions given at the Place of the Work.

ii. If, in the opinion of the Inspection and Testing Company, the specified materials are not being used or the required results are not being achieved, the Inspection and Testing Company shall verbally inform the Contractor of the deficiencies and promptly confirm the deficiencies in writing to the Contractor and the Consultant. Note in the written report corrective action taken by the Contractor and the results thereof.

iii. Accompanying each report shall be a key plan of the Project, clearly indicating the areas to which the report refers. These plans shall also be submitted with and keyed into the invoices for the inspection and testing.

3. Responsibilities:

i. The following indicates the minimum responsibilities for each of the parties to ensure the quality of construction is maintained.

ii. Contractor

a. Ensure the quality of the Work meets the requirements of the Contract Documents.

b. Once the testing program has been developed, notify the Testing Company and the Consultant in advance, to request the required inspection or test.

c. Consult with the testing company on construction techniques, but retain responsibility for construction means, methods and techniques in accordance with the General Conditions of the Contract.

d. Changes in construction means, methods and techniques required to meet quality requirements of the Contract Documents shall not be considered as

cause for an extra to the Contract.

e. Defective materials or quality of work whenever found at any time prior to the final acceptance of the Work shall be rejected, regardless of previous inspection.

f. Inspection does not relieve Contractor of responsibility but is a precaution against oversight and error.

g. Remove and replace defective work at own expense, and be responsible for additional costs incurred by other Sections affected by this replacement.

iii. Inspection & Testing Company

a. Provide the level of inspection, testing and reporting as described in the Contract Documents.

b. Inform the Contractor and the Consultant immediately of any material, procedure or test that does not meet the Contract Documents.

c. Advise the Contractor of any construction procedure that is likely to fail to meet the Contract Documents. Promptly inform the Consultant of questionable construction practices and submit a written report to the Consultant.

iv. Consultant

a. As the Owner's representative, make the final decision on changes that may increase or decrease the Contract Price or Contract Time.

b. Upon notification by the Testing and Inspection Company of defective work, respond expediently to resolve the issue.

1.9 Mock-Ups

1. Provide field or shop erected example of work complete with specified materials and workmanship.

2. Do not proceed with work for which mock-ups are required prior to Consultant’s review of mock-ups.

3. Prepare mock-ups of Work as specified in the technical Specifications. If a mock-up location is not indicated in the Drawings or Specifications, locate where directed by Consultant.

4. Modify mock-up as required until Consultant approval is obtained.

5. Reviewed and accepted mock-ups shall be the standard of workmanship and material against which installed work will be compared.

6. Protect mock-ups from damage and maintain mock-up until the Work they represent is complete.

7. Commence work demonstrated in mock-up only after review and acceptance of workmanship.

8. Remove and replace materials or assemblies appearing in the finished work that do not match reviewed and accepted mock-ups.

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

10. Remove mock-ups which will not remain as part of the Work only when the Work they represent is complete or when otherwise directed by Consultant.

Section 01 51 00 – Temporary Utilities

1 General

1.1 Temporary Utilities – General

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

2. Remove temporary utilities after use.

1.2 Temporary Water Supply

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

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

1.3 Temporary Heating and Ventilation

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

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

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

   i. Facilitate progress of Work.

   ii. Protect the Work against dampness and cold.

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

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

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

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

   ii. Ensure that hazardous, noxious, or volatile substances do not migrate to Owner occupied spaces.

   iii. Ventilate temporary sanitary facilities.

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

1.4 Temporary Electrical Power and Lighting

1. Arrange and pay for temporary power and lighting required during construction.
2. Do not use permanent building lighting systems during construction.

Section 01 52 00 – Construction Facilities

1 General

1.1 Construction Facilities – General

1. Provide temporary construction facilities as necessary for performance of the Work and in compliance with applicable regulatory requirements.
2. Maintain temporary construction facilities in good condition for the duration of the Work.
3. Remove temporary construction facilities from Place of the Work when no longer required.

1.2 Construction Parking

1. Limited parking will be permitted at Place of the Work provided it does not disrupt continuing operation of the facility.

1.3 Vehicular Access

1. Refer also to Section 01 55 26.
2. Provide and maintain adequate access to Place of the Work.
3. Consult with authority having jurisdiction in establishing public thoroughfares to be used for site access haul routes.
4. Coordinate and comply with local authorities regarding necessary diversion of roads or sidewalks (if applicable).
5. Do not stack materials or supplies on existing roads or sidewalks.
6. Maintain access roads in good condition.
7. Protect permanent site improvements to remain such as curbs, pavement and utilities.
8. Maintain access for fire-fighting equipment and access to fire hydrants.

1.4 Sanitary Facilities

1. Provide sanitary facilities for workers.
2. Do not use permanent washroom facilities during construction.
3. Keep sanitary facilities clean and fully stocked with the necessary supplies.

1.5 Fire Protection

1. Provide and maintain temporary fire protection systems and equipment during construction, in accordance with the authorities having jurisdiction, including the local Fire Department and the insurance companies.

2. Protect the Work, adjacent properties, Owner's equipment and Contractor's equipment against fire hazards.

3. Adjust and modify temporary fire protection facilities to accommodate the progress of the Work.

4. Provide and maintain access routes to exits, clean and visibly identified.

5. Fire Watch:

    i. A fire watch is required for each of the following activities, regardless of the number in a single area:

        a. Any open flame activity, including soldering and welding.

        b. Shut down of the fire detection system.

        c. Shut down of the sprinkler system.

6. Temporary Buildings:

    i. Locate temporary buildings and storage areas in relation to their hazards and probability of damage to existing buildings under construction. Unless constructed of non-combustible materials, wherever possible locate them at least ten (10) metres away from buildings.

    ii. If constructed of combustible materials separate these structures into small, detached units.

7. Access To Fire Extinguishing Equipment and Exits:

    i. Provide and maintain free access at all times from the street to fire hydrants and to outside connections for standpipes or other fire extinguishing equipment whether permanent or temporary. Do not place material or construction equipment within three (3) metres of hydrants or connection, nor between them and centre line of the street.

    ii. Maintain free access at all times to control valves and hose on fire lines within building and to all portable extinguishers.

8. Fire Doors:

    i. Install fire doors and put into operating condition at the earliest possible time.

9. Rubbish:

    i. Remove flammable rubbish promptly from the premises. If removal is unavoidably delayed reduce fire hazards by wetting down. Disposal of waste material by burning on or near the premises is not permitted.

    ii. Clean up and remove rubbish into containers. Removal of containers and disposal off the site including all dumping fees will be the responsibility of the Contractor.

10. Cutting and Torching:

    i. Where electric or gas welding or cutting is to be done within three (3) metres of, or above space that may be occupied by persons, or combustible material interpose shields of incombustible material.

    ii. Maintain appropriate fire extinguishing equipment near all welding and cutting operations.

11. Storage of Paints, Oils and Gasoline:

    i. Store paints and volatile liquids in a separate shed and inspect frequently. Place fire extinguisher at the door of paint storage shed.

    ii. Store gasoline outside under lock and key, well away from the structure.

12. Temporary Wiring:

    i. Inspect temporary wiring, drop cords or temporary extension cables frequently for defective insulation or connections.

13. Elevators

    i. Do not use permanent elevators for construction purposes.

Section 01 55 26 – Traffic Control

1 General

1.1 Summary

1. Section Includes:
    i. Control of traffic during construction operations.
2. Intent:
    i. Conduct operations along roads and highways in a manner that inconvenience and hazards to traffic are minimized.
    ii. Maintain roadways safe for traffic.
    iii. Confine operations so that only a minimum length of trench is open at any time.
    iv. Backfill a length each day equivalent to that opened.
    v. Provide and maintain pedestrian access to all properties.
    vi. Provide and maintain emergency access to all properties.
    vii. Provide and maintain emergency access for fire trucks, ambulances and other vehicles for emergency services.

1.2 Approvals And Notices

1. Obtain approval from the authority having jurisdiction for closing any road to traffic.
2. Notify Fire Department, Police Department, Works Department and any other necessary authority of approximate times roads will be closed for.

1.3 Traffic Control

1. Provide all flagmen necessary to direct flow of traffic.
2. Provide and maintain traffic signals and warning signs as required.
3. Provide and maintain detours for traffic where required. Mark detours as directed by Police Department, Works Department.
4. Make arrangements with appropriate authorities if single lane conditions continue past normal working hours.
5. Supply and plane crushed stone on road shoulder to maintain traffic on road shoulders as required.

Section 01 56 00 – Temporary Barriers and Enclosures

1 General

1.1 Barriers and Enclosures General

1. Provide temporary barriers and enclosures necessary to protect:
   i. The public and building occupants during performance of the Work.
   ii. Protect and secure site, building, materials and equipment from theft, vandalism and unauthorized entry
2. Comply with applicable regulatory requirements.
3. Maintain temporary barriers and enclosures in good condition for the duration of the Work.
4. Remove temporary barriers and enclosures from Place of the Work when no longer required.

1.2 Fencing

1. Erect temporary security and safety site fencing of type and height determined by Contractor, subject to applicable regulatory requirements.
2. Provide lockable access gates as required to facilitate construction access.

1.3 Exterior Hoarding

1. Erect temporary exterior site hoarding to comply with applicable regulatory requirements.

1.4 Weather Enclosures

1. Provide weather tight enclosures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
2. Provide weather enclosures to protect floor areas where walls are not finished and to enclose work areas that require temporary heating.
3. Design weather enclosures to withstand wind pressure and snow loading requirements.

1.5 Fire Routes

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

1.6 Protection of Building Finishes

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

1.7 Acoustical Hoarding System

1. This system consists of 3/4-inch plywood full height of opening supported by 2”x4” construction grad studs at maximum at maximum 4’-0” c.c. Continuous 2”x4” top and bottom plates to be supplied. Upon the installation of the above, 2” thick A.F. 545 insulation is to be installed on the inside of the hoarding. The acoustical hoarding is to be wedged tight to the underside of the slab.

2. The main purpose of this system is to control the noise and dust and keep them from escaping from the work area.

3. This system shall be supplied along the building exterior at the north elevation to enclose all areas at which dust and noise generating activities are to be performed, including windows and doors along this elevation.

Section 01 57 00 – Temporary Controls

1 General

1.1 Temporary Controls - General

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

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

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

1.2 Plant Protection

1. Protect trees and other plant material designated to remain on site [and on adjacent properties] where indicated on Drawings.

2. Protect trees and shrubs susceptible to damage during construction by encasing with protective wood framework from grade to height of one metre.

3. For trees designated to remain, protect roots inside dripline from disturbance or damage during excavation and grading. Avoid traffic, dumping and storage of materials over root zones.

4. Minimize stripping of topsoil and vegetation.

1.3 Dust And Particulate Control

1. Implement and maintain dust and particulate control measures in accordance with applicable regulatory requirements.

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

3. Provide temporary enclosures to prevent extraneous materials resulting from sandblasting or similar operations from contaminating air beyond immediate work area.

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

5. Provide dust control for temporary roads.

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

1.4 Dewatering

1. Provide temporary drainage and pumping as necessary to dewater excavations, trenches, foundations, and other parts of the Work. Maintain such areas free of water

arising from groundwater or surface run-off, as required to keep them stable, dry, and protected from damage due to flooding.

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

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

1.5 Site Drainage

1. Maintain grades to ensure proper site drainage.

2. Prevent surface water runoff from leaving the site [except as otherwise provided by stormwater management plan.

3. Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover stockpiled [waste] materials with an impermeable liner during periods of work stoppage including at end of each Working Day.

4. Control surface drainage from cuts and fills, from borrow and waste disposal areas, from stockpiles, staging areas, and other work areas as required to prevent erosion and sedimentation.

5. Control surface drainage by ensuring that gutters are kept open and water is not directed across or over pavements or sidewalks, except through pipes or properly constructed troughs. Ensure that runoff from unfinished areas is intercepted and diverted to suitable outlets.

1.6 Erosion And Sediment Control

1. Minimize amount of bare soil exposed at one time. Stabilize disturbed soils as quickly as practical to minimize erosion. Remove accumulated sediment resulting from construction activity from adjoining surfaces, drainage systems, and watercourses, and repair damage caused by soil erosion and sedimentation.

2. Provide and maintain appropriate temporary measures such as silt fences, straw bales, ditches, geotextiles, drains, berms, terracing, riprap, temporary drainage piping, sedimentation basins, vegetative cover, dikes, and other measures that may be required to prevent erosion and migration of silt, mud, sediment, and other debris.

3. Do not disturb existing embankments or embankment protection.

4. Periodically inspect erosion and sediment control measures to detect evidence of erosion and sedimentation. Promptly take corrective measures when necessary.

5. If soil and debris from site accumulate in ditches or other low areas, remove

accumulation and restore area to original condition.

1.7 Pollution Control

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

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

   i. Authority having jurisdiction,

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

   iii. Owner and consultant.

3. Contact manufacturer of pollutant, if known and applicable, to obtain Material Safety Data Sheets and ascertain hazards involved and precautions and measures required in cleanup or mitigating actions.

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

Section 01 61 00 – Common Product Requirements

1 General

1.1 Instructions

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

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

1.2 Product Options

1. Subject to the provisions of Section 01 25 00:

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

   ii. Wherever more than one Product or manufacturer is specified by proprietary name for a single application, provide any one of the named Products.

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

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

1.3 Product Availability and Delivery Times

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

2. If a specified Product is no longer available, promptly notify Consultant. Consultant will take action as required.

3. If delivery delays are foreseeable, for any reason, promptly notify Consultant.

   i. If a delivery delay is beyond Contractor’s control, Consultant will provide direction.

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

1.4 Storage, Handling, And Protection

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

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

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

4. Comply with the requirements of the Workplace Hazardous Materials Information System regarding use, handling, storage, and disposal of hazardous materials, including requirements for labeling and the provision of Material Safety Data Sheets.

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

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

7. Remove and replace damaged Products.

Section 01 71 00 – Examination and Preparation

1 General

1.1 Surveyor Qualifications

1. Engage a registered land surveyor, licensed to practice in Place of the Work.

1.2 Existing Utilities and Structures

1. Before commencing excavation, drilling or other earthwork, establish or confirm location and extent of all existing underground utilities and structures in work area.

2. Promptly notify Consultant if underground utilities, structures, or their locations differ from those indicated in Contract Documents or in available project information. Consultant will provide appropriate direction.

3. Record locations of maintained, re-routed and abandoned utility lines.

1.3 Verification of Existing Conditions

1. Where work specified in any Section is dependent on the work of another Section or Sections having been properly completed, verify that work is complete and in a condition suitable to receive the subsequent work. Commencement of work of a Section that is dependent on the work of another Section or Sections having been properly completed, means acceptance of the existing conditions.

2. Verify that ambient conditions are suitable before commencing the work of any Section and will remain suitable for as long as required for proper setting, curing, or drying of Products used.

3. Ensure that substrate surfaces are clean, dimensionally stable, cured and free of contaminants.

4. Notify Consultant in writing of unacceptable conditions.

Section 01 73 00 – Execution Requirements

1 General

1.1 Summary

1. Except where otherwise specified in technical Specifications or otherwise indicated on Drawings, comply with requirements of this Section.

1.2 Manufacturer’s Instructions

1. Install, erect, or apply Products in strict accordance with manufacturer's instructions.

2. Notify Consultant, in writing, of conflicts between Contract Documents and manufacturer’s instructions where, in Contractor’s opinion, conformance with Contract Documents instead of the manufacturer’s instructions may be detrimental to the Work or may jeopardize the manufacturer’s warranty.

3. Do not rely on labels or enclosures provided with Products. Obtain written instructions directly from manufacturers.

4. Provide manufacturer’s representatives with access to the Work at all times. Render assistance and facilities for such access so that manufacturer’s representatives may properly perform their responsibilities.

1.3 Quality Of Work

1. Comply with industry standards specified except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise quality of work.

2. Where no explicit quality or standards for materials or quality of work are established for Work, such Work shall be of good quality for the intended use and consistent with the quality of the surrounding Work and of the construction of the Project generally.

1.4 Anchorage

1. Secure products with positive anchorage devices designed and sized to withstand stresses, vibration and racking.

1.5 Mounting Heights

1. Where mounting heights are not indicated, mount individual units of Work at industry-recognized standard mounting heights for applications indicated.

2. Refer questionable mounting height choices to Consultant before proceeding.

3. Obtain exact locations of fixtures and outlets from Consultant before Work is roughed in; Work installed without such information from Consultant shall be relocated at Contractor's expense.

1.6 Equipment Preparation

1. Lubricate moving parts.
2. Test and start up motors and machinery.
3. Replace defective or damaged equipment.

1.7 Overloading

1. Precautions shall be taken to prevent overloading of any part of the structure, falsework or scaffolding during operations. If doubt exists, obtain approval from Consultant.

1.8 Load Bearing Members

1. Load bearing members shall not be cut, bored or sleeved without written approval of the Consultant. All cuts shall be made with clean, true and smooth edges.
2. Where required by the Consultant, reinforcement of any such openings shall be made at the Contractor's expense. Any such reinforcement shall be detailed by the Contractor and bear the stamp of a Professional Engineer.

1.9 Concealment

1. Conceal pipes, ducts, and wiring in floors, walls and ceilings in finished areas:
   i. after review by Consultant and authority having jurisdiction, and
   ii. where locations differ from those shown on Drawings, after recording actual locations on as-built drawings.
2. Provide incidental furring or other enclosures as required.
3. Notify Consultant in writing of interferences before installation.

1.10 Fastenings - General

1. Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials.
2. Prevent electrolytic action and corrosion between dissimilar metals and materials by using suitable non-metallic strips, washers, sleeves, or other permanent separators to avoid direct contact.
3. Use non-corrosive fasteners and anchors for securing exterior work and in spaces where high humidity levels are anticipated.
4. Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage.

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

6. Do not use fastenings or fastening methods that may cause spalling or cracking of material to which anchorage is made.

7. Powder Activated Fasteners:

    i. Powder activated fastenings shall not be used on any portion of the Work unless approval for a specific use is obtained from the Consultant.

1.11 Fastenings - Equipment

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

2. Bolts shall not project more than one diameter beyond nuts.

1.12 Fire Rated Assemblies

1. When penetrating fire rated walls, ceiling, or floor assemblies, completely seal voids with fire-stopping materials, smoke seals, or both, in full thickness of the construction element as required to maintain the integrity of the fire rated assembly.

1.13 Location Of Fixtures, Outlets and Devices

1. Consider location of fixtures, outlets, and devices indicated on Drawings as approximate.

2. Locate fixtures, outlets, and devices to provide minimum interference, maximum usable space, and as required to meet safety, access, maintenance, acoustic, and regulatory, including barrier free, requirements.

3. Promptly notify Consultant in writing of conflicting installation requirements for fixtures, outlets, and devices. If requested, indicate proposed locations and obtain approval for actual locations.

1.14 Protection Of Completed Work and Work in Progress

1. Adequately protect parts of the Work completed and in progress from any kind of damage.

2. Promptly remove, replace, clean, or repair, as directed by Consultant, work damaged as a result of inadequate protection.

3. Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the safety or integrity of the Work.

1.15 Remedial Work

1. Notify Consultant of, and perform remedial work required to, repair or replace defective or

unacceptable work. Ensure that properly qualified workers perform remedial work. Coordinate adjacent affected work as required.

Section 01 73 29 – Cutting and Patching

1 General

1.1 Request For Cutting, Patching and Remedial Work

1. Submit written request in advance of cutting, coring, or alteration which affects or is likely to affect:
    i. Structural integrity of any element of the Work.
    ii. Integrity of weather exposed or moisture resistant elements.
    iii. Efficiency, maintenance, or safety of any operational element.
    iv. Visual qualities of sight exposed elements.
    v. Work of Owner or other contractors.
    vi. Warranty of Products affected.
2. Include in request:
    i. Identification of Project.
    ii. Location and description of affected work, including drawings or sketches as required.
    iii. Statement on necessity for cutting or alteration.
    iv. Description of proposed work, and Products to be used.
    v. Alternatives to cutting and patching.
    vi. Effect on work of Owner or other contractors.
    vii. Written permission of affected other contractors.
    viii. Date and time work will be executed.

1.2 Products

1. Unless otherwise specified, when replacing existing or previously installed Products in the course of cutting and patching work, use replacement Products of the same character and quality as those being replaced.
2. If an existing or previously installed Product must be replaced with a different Product, submit request for substitution in accordance with Section 01 25 00.

1.3 Preparation

1. Inspect existing conditions in accordance with Section 01 71 00.

2. Provide supports to ensure structural integrity of surroundings; provide devices and methods to protect other portions of the Work from damage.

3. Provide protection from elements for areas that may be exposed by uncovering work.

1.4 Existing Utilities

1. When breaking into or connecting to existing services' utilities, execute the Work at times directed by local governing authorities, with a minimum of disturbance to the Work, pedestrian and vehicular traffic, and ongoing Owner operations.

2. Maintain excavations free of water.

3. Keep duration of interruptions to a minimum.

4. Carry out interruptions after regular working hours of occupants, preferably on weekends, unless Owner’s prior written approval is obtained.

5. Protect and maintain existing active services. Record location of services, including depth, on as-built drawings.

6. Construct or erect barriers in accordance with Section 01 56 00 as required to protect pedestrian and vehicular traffic.

1.5 Cutting, Patching, And Remedial Work

1. Coordinate and perform the Work to ensure that cutting and patching work is kept to a minimum.

2. Perform cutting, fitting, patching, and remedial work [including excavation and fill,] to make the affected parts of the Work come together properly and complete the Work.

3. Provide openings in non-structural elements of the Work for penetrations of mechanical and electrical work.

4. Perform cutting by methods to avoid damage to other work.

5. Provide proper surfaces to receive patching, remedial work, and finishing.

6. Perform cutting, patching, and remedial work using competent and qualified specialists familiar with the Products affected, in a manner that neither damages nor endangers the Work.

7. Do not use pneumatic or impact tools without Consultant’s prior approval.

8. Ensure that cutting, patching, and remedial work does not jeopardize manufacturers' warranties.

9. Refinish surfaces to match adjacent finishes. For continuous surfaces refinish to nearest intersection. For an assembly, refinish entire unit.

10. Fit work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces with suitable allowance for deflection, expansion, contraction, acoustic isolation, and firestopping.

11. Maintain fire ratings of fire rated assemblies where cutting, patching, or remedial work is performed. Completely seal voids or penetrations of assembly with firestopping material to full depth or with suitably rated devices.

Section 01 74 00 – Cleaning and Waste Management

1 General

1.1 Regulatory Requirements

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

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

1.2 General Cleaning Requirements

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

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

3. Prevent cross-contamination during the cleaning process.

4. Notify the Consultant of the need for cleaning caused by Owner or other contractors.

1.3 Progressive Cleaning and Waste Management

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

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

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

4. Remove waste materials and recyclables from Place of the Work daily.

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

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

1.4 Final Cleaning

1. Before final cleaning, arrange a meeting at Place of the Work to determine the acceptable standard of cleaning. Ensure that Owner, Consultant, and Contractor are in attendance.

2. Remove from Place of the Work surplus Products, waste materials, recyclables,

Temporary Work, and Construction Equipment not required to perform any remaining work.

3. Provide professional cleaning by a qualified, established cleaning company at areas accessed during the work.

4. Lock or otherwise restrict access to each room or area after completing final cleaning in that area.

5. Re-clean as necessary areas that have been accessed by Contractor's workers prior to Owner occupancy.

6. Remove stains, spots, marks, and dirt from finished surfaces, electrical and mechanical fixtures, furniture fitments, walls, floors.

7. Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and all other finished surfaces, including mechanical and electrical fixtures. Replace broken, scratched or otherwise damaged glass.

8. Remove dust from lighting reflectors, lenses, lamps, bulbs, and other lighting surfaces.

9. Vacuum clean and dust exposed wall, floor, and ceiling surfaces, behind grilles, louvres and screens.

10. Clean mechanical, electrical, and other equipment. Replace filters for mechanical equipment if equipment is used during construction.

11. Remove waste material and debris from crawlspaces and other accessible concealed spaces.

12. Remove stains, spots, marks, and dirt from exterior facades.

13. Clean exterior and interior window glass and frames.

14. Power wash exterior sidewalks, steps, roads, parking lots, and other paved surfaces.

15. Use leaf blowers to clean landscaped surfaces.

1.5 Waste Management and Disposal

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

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

3. Do not dispose of volatile and other liquid waste such as mineral spirits, oil, paints and other coating materials, paint thinners, cleaners, and similar materials together with dry waste materials or on the ground, in waterways, or in storm or sanitary sewers. Collect

such waste materials in appropriate covered containers, promptly remove from Place of the Work, and dispose of at recycling facilities or as otherwise permitted by applicable regulatory requirements.

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

Section 01 77 00 – Closeout Procedures

1 General

1.1 Deficiency

1. At substantial completion of the project, the Contractor is to prepare an itemized deficiency list with associated costs to complete the deficiencies. This total amount will be retained until deficiencies are

2. When all deficiencies have been completed and verified by the Contractor, notify the Consultant for further review. Upon becoming satisfied that all deficiencies have been corrected and upon receiving all certificates, warranties, balancing reports and tax rebates and upon verifying completeness of all final cleaning and demonstrations and upon receiving the Contractor's final invoice, a Final Payment Certificate" will be issued by the Consultant.

3. If the Contractor notifies the Consultant to re-review deficiencies, and upon visiting the project, the Consultant finds less than 75% completion of the outstanding listed deficiency items, it will be judged that the Contractor has not verified the deficiencies prior to notifying the Consultant. If this occurs, all future re-review hours will be charged to the Contractor on an hourly basis. The hourly rate charged will be $120.00/hour plus Value Added Taxes and plus travel costs.

4. If all deficiencies are not completed within a reasonable period of time, the Consultant will invoke the requirements of GC 7.1 - Owners Right To Perform Work Or Stop The Work Or Terminate Contract.

1.2 Ready-For-Takeover

1. The prerequisites to attaining Ready-for-Takeover of the Work are described in the General Conditions of the Contract.

1.3 Inspection And Review Before Ready-For-Takeover

1. Contractor's Inspection: Before applying for the Consultant’s review to establish Ready-for-Takeover of the Work:

   i. Ensure that the specified prerequisites to Ready-for-Takeover of the Work are completed.

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

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

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

2. Consultant’s Review: Upon receipt of the Contractor’s application for review, together

with the Contractor's list of items to be completed or corrected, the Consultant and the Contractor shall arrange a mutually satisfactory agreed date and time to jointly review the Work. The Consultant will advise the Contractor whether or not the Work is Ready-for-Takeover. Add additional items, if any, to the Contractor's list of items to be completed or corrected. Provide the Consultant with a copy of the revised list.

3. Maintain the list of items to be completed or corrected and promptly correct or complete defective, deficient and incomplete work. The Contractor's inspection and Consultant's review procedures specified above shall be repeated until the Work is Ready-for-Takeover and no items remain on the Contractor's list of items to be completed or corrected.

4. When the Consultant determines that the Work is Ready-for-Takeover, the Consultant will notify the Contractor and the Owner in writing to that effect.

1.4 Prerequisites To Final Payment

1. After Ready-for-Takeover of the Work and before submitting an application for final payment in accordance with the General Conditions of Contract:

   i. Correct or complete all remaining defective, deficient, and incomplete work.

   ii. Remove from the Place of the Work all remaining surplus Products, Construction Equipment, and Temporary Work.

   iii. Perform final cleaning and waste removal necessitated by the Contractor's work performed after Ready-for-Takeover, as specified in Section 01 74 00 – Cleaning and Waste Management.

1.5 Partial User Occupancy

1. If partial Owner occupancy of a part of the Work is required before the date of Ready- for-Takeover of the entire Work of the Contract, the provisions of this Section shall apply, to the extent applicable, to that part of the Work that the Owner intends to occupy.

1.6 Substantial Performance of the Work

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

   i. independent of those for attaining Ready-for-Takeover of the Work, and

   ii. in accordance with the lien legislation applicable to the Place of the Work.

1.7 Final Inspection for Completion of the Contract

1. Deficiencies and defects shall be made good before the Contractor submits a written

request for final review of the Work and before the Contract is considered complete.

2. When Contractor is satisfied that the Work is complete, and after the Contractor has reviewed the Work to verify its completion in accordance with the requirements of the Contract Documents, the Contractor shall submit a written request for a final review by the Consultant, who in turn will notify the Owner.

3. If there are any deficiencies identified as a result of this review, they shall be listed by the Consultant and submitted to the Contractor. This list shall be recognized as the final deficiency list for purposes of acceptance of the Work under the Contract.

4. Such deficiencies shall be corrected by a date mutually agreed upon between Consultant and the Contractor, unless a specific date is required by Contract, and a further review by the Consultant shall be called for by the Contractor following his own review to take place within seven (7) days from date of request.

5. Contractor shall thereafter submit invoice for final payment.

6. Money withheld for deficiency work shall be released only when all deficiencies have been completed. No partial payment to be recognized until all work is completed.

Section 01 78 00 – Closeout Submittals

1 General

1.1 Operation And Maintenance Manual

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

2. Submit one initial draft of the operation and maintenance manual for Consultant's review. If required by Consultant's review comments, revise manual contents and resubmit for Consultant's review. If required, repeat this process until Consultant accepts the draft manual in writing.

3. Submit final version to Owner in electronic format.

1.2 Operation And Maintenance Manual Format

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

2. Cover Page: Identify each binder with typed or printed title "Operation and Maintenance Manual", name of Project or facility, and subject matter of contents.

3. Arrange content by systems under Section numbers and sequence of Table of Contents.

4. Text: Manufacturer's printed data, or typewritten data.

5. Provide electronic copy of manual in a Portable Document Format.

6. Provide electronic copy of Shop Drawings in manual as [1:1] scaled CAD files in Portable Document Format on electronic media acceptable to Owner.

1.3 Operation And Maintenance Manual – General Content

1. Table of contents for each volume.

2. Introductory information including:

   i. Date of manual submission.

   ii. Complete contact information for Consultant, subconsultants, other consultants, and Contractor, with names of responsible parties.

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

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

4. Product Data: mark each sheet to clearly identify specific products, options, and

component parts, and data applicable to installation. Delete or strike out inapplicable information. Supplement with additional information as required.

5. Reviewed Shop Drawings.

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

7. Warranties.

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

9. Training materials as specified in Section 01 79 00 - Demonstration and Training.

1.4 Operation And Maintenance Manual - Equipment and Systems Content

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

2. Panel Board Circuit Directories: provide electrical service characteristics, controls, and communications.

3. Include installed colour coded wiring diagrams.

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

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

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

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

8. Include sequence of operation by controls manufacturer.

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

10. Provide installed control diagrams by controls manufacturer.

11. Provide Contractor's coordination drawings, with installed colour coded piping diagrams.

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

flow and control diagrams.

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

14. Include testing and balancing reports.

15. Include additional content as specified in technical Specifications sections.

1.5 Operation And Maintenance Manual - Products and Finishes Content

1. Include Product data, with catalogue number, options selected, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured Products.

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

3. Include an outline of requirements for routine and special inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.

4. Include additional content as specified in technical Specifications sections.

1.6 Operation And Maintenance Manual - Warranties Content

1. Separate each warranty with index tab sheets keyed to Table of Contents listing.

2. List each warrantor with complete contact information.

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

1.7 Contractor’s As-Built Drawings

1. Submit final as-built drawings in the form specified in Section 01 32 00 – Construction Progress Documentation to Consultant.

1.8 Spare Parts, Maintenance Materials, And Special Tools

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

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

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

4. Deliver to and store items at location directed by Owner at Place of the Work. Store in

original packaging with manufacturer’s labels intact and in a manner to prevent damage or deterioration.

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

Section 01 79 00 – Demonstration and Training

1 General

1.1 Summary

1. Demonstrate and provide training to Owner's personnel on operation and maintenance of the heat tracing system prior to scheduled date of Ready-for- Takeover of the Work.

2. Owner will provide list of personnel to receive training and will coordinate their attendance at agreed upon times.

3. Coordinate and schedule demonstration and training provided by Subcontractors and Suppliers.

1.2 Submittals

1. Submit proposed dates, times, durations, and locations for demonstration and training of each item of equipment and each system for which demonstration and training is required. Allow sufficient time for training and demonstration for each item of equipment or system, or time as may be specified in technical Specifications.

2. Consultant and Owner will review submittal and advise Contractor of any necessary revisions.

3. Submit report(s) within five (5) Working Days after completion of demonstration and training:

   i. identifying time and date of each demonstration and training session,

   ii. summarizing the demonstration and training performed, and

   iii. including a list of attendees.

1.3 Prerequisites To Demonstration and Training

1. Testing, adjusting, and balancing has been performed in accordance with Contract Documents.

2. Equipment and systems are fully operational.

3. Copy of completed operation and maintenance manual is available for use in demonstration and training.

4. Conditions for demonstration and training comply with requirements specified in technical Specifications.

1.4 Demonstration And Training

1. Demonstrate start up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment and system.

2. Review operation and maintenance manual in detail to explain all aspects of operation and maintenance.

3. Prepare and insert additional information in operation and maintenance manual if required.

Section 02 41 19 – Demolition

1 General

1.1 Instructions

1. Comply with Instructions to Bidders, the General Conditions of the Contract, Supplementary Conditions and the General Requirements of Division 1.

2. Report in writing to the Project Manager any defects of surfaces or work prepared by others which affect the quality or dimensions of the work of this Section. Commencement of work implies complete acceptance of existing conditions and previous work performed by others.

1.2 Related Sections

1. Section 01 14 00 – Work Restrictions

2. Section 01 51 00 – Temporary Facilities and Controls

3. Section 01 55 26 – Traffic Controls

4. Section 03 01 30 – Concrete Repairs

1.3 Intent

1. Provide articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified and required to complete the work of this Section.

1.4 Section Includes

1. Complete all the removal and selective demolition work as indicated on the drawings and as specifically mentioned in these Specifications.

1.5 References

1. Canadian Standards Association S350-M1980, Code of Practice of Safety in Demolition of Structures.

1.6 Examination And Existing Conditions

1. Visit the Place of the Work and note conditions affecting the work of this Section.

2. No allowance will be made for any difficulties encountered or any expenses resulting from conditions at the Place of the Work or any item existing thereon which is visible or known to exist at the time of bidding.

3. Examine areas to be selectively demolished or dismantled, and confirm that their condition is substantially the same as the date on which bids closed, and as indicated in

the contract documents. Advise the Consultant of any conditions that vary.

4. Be familiar with the structural system, and the elements being demolished or dismantled.

5. Inspect site and verify with Consultant items designated for removal and items to remain. Protect existing items designated to remain and material designated for salvage. In the event of damage to such items, immediately replace or make repairs to approval of Consultant and at no cost to the Owner.

6. Demolition of spray or trowel-applied asbestos can be hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in the course of demolition work stop work and notify the Consultant immediately. Do not proceed until written instructions have been received from the Consultant.

7. Demolition of applied asbestos materials can be hazardous to health. Should material resembling asbestos be encountered in the course of demolition work, stop work and notify the Consultant immediately. Do not proceed until written instructions have been received from the Consultant.

8. Removal of lead containing paint materials can be hazardous to health. Should material resembling lead paint be encountered in the course of demolition work, stop work and notify the Consultant immediately. Do not proceed until written instructions have been received from the Consultant.

1.7 Permits and Regulations

1. Refer to contract documents.

2. Owner will apply and pay for any permit(s) required.

3. Arrange and pay for landfill fees, notices, and inspections necessary for the proper execution and completion of the demolition.

1.8 Extent of Demolition

1. Drawings showing extent of selective demolition are intended to be schematic and do not indicate full extent of all selective demolition Work. Examine all Documents to determine complete scope of selective demolition, removals, re-instatement, repair and make good required to complete the Work.

1.9 Protection

1. The Contractor shall be entirely responsible for, and make good damage to adjoining properties and buildings, adjacent walks, curbs, etc.

2. The Contractor shall be entirely responsible for the safety of all persons lawfully engaged on the Work when such injury is caused by negligence or any act of this Contractor or any person or persons engaged in the work of this Section.

3. It shall be the responsibility of the Contractor to protect the public from injury during the course of demolition by providing suitable barriers, fences, coverings, guardrails, etc., that may be required by the Owner or authorities having jurisdiction.

1.10 Existing Services Within the Structure

1. Locate and protect any services as required. In each case, notify the Owner before commencing that portion of the services Work.

1.11 Salvage Material

1. All material from the demolition shall become the property of this Contractor unless noted, who shall remove all material and debris from the Place of the Work as quickly as possible. Burning debris at the Place of the Work will not be permitted.

2. Endeavour to sort and recycle materials wherever practical.

1.12 Clean-up

1. Leave the Place of the Work in a clean and orderly condition to the satisfaction of the Consultant. If this Contractor fails to do so the Consultant may order excess debris to be removed at this Contractor's expense.

2 Products

1. Not applicable.

3 Execution

3.1 Inspection

1. Visit and examine the site and note all building features which may affect the Work.

2. Locate all services (buried, cast-in, or exposed) and protect or disconnect as necessary to complete the Work. Properly identify and understand type of service, size, direction of flow, etc.

3. Inspect all materials, equipment, components to be salvaged or reinstalled or turned over to the Owner.

3.2 Preparation and Protection

1. Remove materials and equipment for salvage, and store, protect, and reinstall to suit execution of other parts of the Work whether they are specifically indicated on the Contract Documents, or not.

2. Carefully dismantle items containing materials for salvage and stockpile salvaged materials on site at locations as indicated or as directed by Consultant.

3. Temporary re-route service lines entering the building or withing the building in accordance with authorities having jurisdiction, and to suit the Work of this Contract. Post warning signs on electrical lines and equipment that must remain energized during period of work. Do not disrupt active or energized utilities to remain undisturbed, without Consultant and Owner approval.

4. Cut and/or cap existing services within the work area before starting demolition.

5. Prevent movement, settlement or damage of existing structures, services, walks, paving, trees, landscaping, adjacent grades and parts of existing building to remain.

6. Provide bracing, shoring and underpinning as required. Make good damage caused by demolition.

7. Take precautions to support affected structures and, if safety of building being demolished appears to be endangered, cease operations and notify Consultant.

8. Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation. Apply filter cloth and maintain during construction on all exhaust and ventilation intakes within work zone to prevent demolition dust from entering systems.

9. Prevent debris from blocking surface drainage system, and obstructing mechanical and electrical systems which must remain in operation.

10. Cover all floor drains to prevent concrete debris or abrasive blast material from entering drains. Ensure function of drains is not impeded during construction.

11. Provide bracing, shoring, or needling as required to support portions of existing structure or building to remain, where demolition or dismantling, cutting out, or partial removal of any elements, as specified in other Sections degrades the structural integrity of the structure to a point where it will not support all imposed loads. All bracing, shoring, and needling shall be designed to cause no damage to existing surfaces upon which the bracing, shoring or needling bears.

12. Shoring, bracing, or needling of structural items shall be designed by a Professional Engineer registered in the Province of Ontario, and drawings shall bear the seal of this Engineer. Submit drawings of shoring, bracing, or needling to the Consultant prior to installing.

13. Maintain temporary supports in place until permanent structure is able to fully support all imposed loads.

14. Provide demolition plan and schedule to Consultant and Owner for review prior to starting Work.

3.3 Demolition and Dismantling

1. Comply with all applicable safety legislation and applicable codes.

2. Do all work in a manner to prevent endangering safety of building or occupants.

3. Seal off all work areas to prevent dust and debris from impacting pedestrians or other areas of the building. Secure work zone and repair areas from all unauthorized access.

4. Provide temporary lighting and ventilation, if necessary, to complete the specified Work. All noise producing generators or equipment shall meet noise control requirements. Install acoustic enclosures to produce acceptable noise levels in accordance with local and municipal regulations and by-laws.

5. Do not throw or allow debris to fall uncontrolled from heights. Use chutes and other controls.

6. Selectively dismantle and demolish all parts to suit Work. Carry out demolition, removal and disposal in accordance with applicable provincial and local regulations.

7. Execute demolition in an orderly and careful manner with due consideration for adjacent structures and finishes.

8. Keep work wetted down thoroughly to prevent dust and dirt from rising during demolition operations. Water shall be provided for this purpose by this Contractor.

9. Make good damage to existing elements to remain caused by demolition.

10. Protect salvaged elements from damage. Provide protective coverings and storage.

11. Remove and dispose all material and concrete debris resulting from the concrete repairs as indicated in the Contract Documents and as directed by the Consultant.

12. Remove and dispose of all waterproofing systems as indicated in the Contract Documents and as directed by the Consultant. Concrete surface shall be left with a clean, sound surface, suitable for the installation of the new waterproofing system and to meet the manufacturer’s specifications.

13. Pneumatic demolition to be performed in accordance with Specification Section 03 01 30.

14. At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements at all times.

3.4 Waterproofing Removal Equipment

1. High pressure waterblast or other approved removal techniques are to be used to remove traffic deck waterproofing coatings on suspended concrete within the structure where indicated on the drawings or as directed by the Consultant.

2. Equipment to be used shall prevent damaging the concrete surface while effective to remove the coating. Refer to manufacturer's specifications.

3.5 Disposal

1. Dispose all waste in accordance with applicable provincial and local regulations and manufacturer's material safety data sheets.

2. Do not dispose of waste material within the building or using the existing sanitary or storm drainage system.

3. All volatile waste and materials are to be stored and disposed accordingly in appropriate containers.

3.6 Restoration and Clean-Up

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

2. Reinstate areas and existing works outside areas of demolition to conditions that existing prior to commencement of Work.

Section 03 01 30 – Concrete Repairs

1 General

1.1 Instructions

1. Comply with the requirements of the Instructions to Bidders, the General Conditions of the Contract, Supplementary Conditions and General Requirements of Division 1.

2. Report in writing to the Construction Manager any defects of surfaces or Work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of Work implies acceptance of existing conditions and Work by others.

1.2 Intent

1. Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required to complete the work of this Section.

1.3 Scope

1. Provide all materials, labour, and equipment as necessary to complete the concrete repair work as shown on the drawings and described herein, including location and removal of deteriorated or unsound concrete, formwork, shoring, protection, preparation, additional reinforcement, supply and placement of all concrete repair materials, finishing and curing.

2. The summarized breakdown of the above mentioned work does not set out all the work under this Section of the Contract, but rather outlines the essentials. Any concrete work indicated on the drawings or hereinafter specified, whether enumerated above or not, shall be carried out under this Section of Work.

3. The work of this section shall include, but is not limited to:

   i. Partial-depth top-surface concrete slab repairs;

   ii. Full-depth concrete slab repairs; and

   iii. Partial-depth concrete wall repairs;

1.4 Standards and References

1. Except where modified by the plans and/or the specifications, all concrete and reinforcing steel work shall conform to the current editions of Canadian Standards Association Standard CAN3-A23.1 and Reinforcing Steel Institute of Canada - Reinforcing Steel Manual of Standard Practice and all referenced standards and publications therein.

2. American Society for Testing and Materials C1059: Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.

3. Canadian Standards Association A23.1: Concrete Materials and Methods of Concrete Construction.

4. Canadian Standards Association A23.2: Methods of Test and Standard Practices for Concrete.

5. Canadian Standards Association A23.3: Design of Concrete Structures.

6. Canadian Standards Association A3001: Cementitious Materials for Use in Concrete.

7. International Concrete Repair Institute 310.2R: Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

1.5 Unit Prices

1. Submit unit prices for all Work.

2. All quantities and costs associated with the cleaning and adjustment of existing reinforcement are incidental and shall be included in the unit price for the Work. Replacement and new reinforcement and accessories shall be provided as part of the unit price for the repair work unless separate unit prices are requested on the Bid Form. Unit prices provided for replacement of reinforcement shall apply only to bars in need of replacement due to section loss caused by corrosion or bars added at the discretion of the consultant. Replacement of bars for other reasons shall not be billed to the Owner.

3. Unit prices apply to authorized work performed within the quantities defined by the general requirements.

1.6 Shoring and Protection

1. Provide temporary shoring as required to complete the Work. Should the Contractor proceed without shoring where requested by the Consultant, submit documentation from a competent shoring engineer that none is required prior to the start of demolition on the structure. This documentation must by sealed by a professional engineer in Ontario.

2. Provide temporary shoring as required to ensure the adequacy of the existing structure is maintained at all times during construction.

1.7 Warranty

1. Provide a written guarantee of work of this Section against defects in material and quality of work for a period of two (2) years from the date of publication of the Certificate of Substantial Performance.

1.8 Submittals

1. Submit Shop Drawings as specified in Section 01 33 01. Shop drawings are to be sealed by a Professional Engineer in Ontario. Provide the following shop drawings as applicable,

including any shop drawings requested on the drawings:

i. Shoring and bracing;

ii. Concrete reinforcing;

2. Submit documentation of existing conditions, especially around areas of pre-existing damage and deterioration unrelated to the Work, including finishes of surfaces, before proceeding with the Work.

3. Submit product datasheets and associated Material Safety Data Sheets for selected repair materials noted in these specifications as specified in Section 01 33 00. Product datasheets submitted must include the following:

i. Packaged Repair Material;

ii. Corrosion Inhibitor;

iii. Bonding Agents;

iv. Form Release Agent;

v. Admixtures;

vi. Curing Compounds;

vii. Corrosion-Inhibiting Coating;

viii. Doweling Bonding Material; and

4. Products and materials that deviate from those specified herein are permitted to be rejected at the discretion of the Consultant. Provide documentation in addition to the data sheets that alternate materials submitted are equivalent or superior to those provided in these specifications for evaluation by the Consultant. Include the reason for the proposed substitution.

5. Where ready mixed/site batch concrete is to be used for concrete repair applications, provide submittals for mix design.

6. All submittals shall be made at least two (2) weeks prior to starting the Work. Do not proceed with the Work prior to receiving submittal acceptance. Submittals for unforeseen Work shall be provided at least two (2) weeks prior to the use of the material to allow adequate time for the Consultant to evaluate.

7. Where a substitution request is accompanied by a cost savings offer to the Owner, the cost savings shall be returned to the Owner in the form of a credit change order.

1.9 Pre-Installation Meeting

1. Prior to the start of Work, the following personnel shall attend a pre-installation site meeting with the Consultant to discuss and review the Contract Documents, Scope of Work, repair process, repair materials, dust control, preparation, acceptance criteria, and quality assurance:

    i. Contractor's Project Manager;

    ii. Contractors Superintendent; and

    iii. Concrete Repair Subcontractor; and

    iv. Additional trades as applicable;

2. Time and location of the pre-installation meeting shall be mutually agreed upon by the Contractor and Consultant.

1.10 Quality Assurance

1. All contractors and trades shall be experienced in the Work required to complete the Work specified in this Section. Submit documentation demonstrating experience with previous projects of similar size and complexity.

2. Prepare mockups for concrete removal, surface preparation, and repair material placement. Mockups must be constructed using the same personnel, equipment and materials that will be used for the final Work. It is the responsibility of the contractor to ensure that the quality of the mockups are maintained for all Work completed. The Consultant must be notified at least two (2) days in advance of the mockup placement to allow for inspection and acceptance of the Work.

3. Repair materials and operations may be inspected as Work progresses. Failure to detect defective Work or material at the time of inspection by the Consultant will not prevent rejection if a defect is discovered later, nor shall it obligate the Consultant for final acceptance. Consequences for delay as a result of defective Work or material shall be fully borne by the Contractor.

4. The Contractor must notify the Consultant a minimum of 48-hours in advance to arrange for inspections as indicated on the drawings.

1.11 Acceptance of Repair Work

1. Completed concrete repair Work shall conform to this Specification and the Contract Documents.

2. Concrete repair Work that fails to meet one or more project requirement is subject to rejection provided that it cannot be brought into compliance at the discretion of the Consultant.

3. Correct rejected concrete repair Work by full removal and replacement to the satisfaction of the Consultant.

1.12 Delivery, Storage, and Handling of Materials

1. Deliver materials to the project site in the manufacturer's original and unopened containers, label intact with type and name of products and manufacturer's. Containers or bags of materials must not be used if broken or damaged.

2. Do not use materials that have exceeded their stated expiration date.

3. Store all materials in a location approved by the Owner.

4. Materials shall be stored off the ground, undercover, and in a dry location. Protect from rain, water, freezing, excessive heat, foreign matter, and any other damaging conditions until ready for use. Where material becomes frozen, obtain the manufacturer's written approval prior to use. Liquids must not be stirred or mixed until they are completely thawed. Do not force-thaw materials if they become frozen.

1.13 Project Conditions

1. Work only in areas where permitted by the Owner within the approved schedule.

2. Protect all electrical conduits, boxes, wiring, and fixtures from damage. Safe removal of lighting fixtures and existing surface mounted electrical lines, when required, shall be the responsibility of the Contractor. All electrical lines shall be reattached to the surface after completion of the repairs.

3. Take reasonable precautions to avoid damaging embedded electrical conduits. Reasonable precautions shall include but are not limited to, reviewing existing documentation and connected services in combination with non-destructive testing to determine the layout of the conduit. Demolition equipment shall be selected to minimize damage to the conduits. Damage to embedded conduits as a result of Contractor negligence shall be repaired by the contractor at no cost to the Owner.

4. The extent of known existing electrical, plumbing, and mechanical items to be protected is indicated on the drawings. The layout and quantity of services shown on the survey drawings are approximate and are intended to provide a sense of the extent of services that will affect the Work during construction. The actual extent shall be field verified by the Contractor.

5. Execute demolition in a manner to limit unnecessary dust and noise. Enclose each phase of the Work with a minimum of a plastic or cloth barrier to maximize confinement of dust and debris inside the Work area. Enclosures shall be securely constructed and inspected by the Contractor each working day to ensure there are no holes or tears. Take other steps as required to keep dust and debris confined to the Work, such as providing air filtration equipment, the use of wet cutting equipment, and the use of wet abrasive cleaning equipment. Vent exhaust fumes from enclosed Work areas. If the exhaust fume

level cannot be kept at an acceptable level, use other equipment or relocate the equipment so that the exhaust can be properly vented away from occupied areas.

6. Dispose of water from operations in a safe and lawful manner.

7. Protect and install filters in mechanical ductwork to protect against the intake of dust particles and odor.

8. Protect plumbing, mechanical/electrical equipment, and ductwork from damage. Safe removal of plumbing, mechanical/electrical equipment, and ductwork, when required, shall be the responsibility of the Contractor. All plumbing, mechanical/electrical equipment, and ductwork shall be reattached to the structure after completion of the repairs.

9. Maintain electrical, plumbing, and mechanical services in continuous operation except as approved by the Owner.

1.14 Environmental Requirements

1. Protect repair materials from freezing and hot weather in accordance with the cold and hot weather concrete procedures of Canadian Standards Association A23.1, and the manufacturer's recommendations.

1.15 Clean-Up

1. Upon completion of the work of this Section, all surplus materials and debris caused by the work of this Trade shall be removed from the site to the satisfaction of the Consultant and Owner.

1.16 Safety

1. All Work shall be performed per the applicable provincial, local, and federal requirements for safety and the recommendations of International Concrete Repair Institute 120.1.

2. Maintain a copy of Material Safety Data Sheets at the job site for all materials.

2 Products

2.1 Equipment

1. Select appropriate means and methods of concrete removal, cleaning of reinforcement, and preparation of the concrete substrates as defined in these specifications. The Consultant is to approve the type of equipment used. The following equipment are permitted for use:

    i. Chipping hammers with a total weight not to exceed:

        a. 15-pounds with sharp pointed tools for the removal of concrete for partial- depth repairs, beneath reinforcing bars and around edges of all repair types.

b. 30-pounds and equipped with appropriate chipping bits for the initial demolition of repair areas only. 30-pounds chipping hammers may be used for deep or full-depth repairs. In no case shall they be used to extend concrete removal around the repair edges within 50-milimeters (2-inches) of the existing concrete substrate to minimize microcracking.

c. Approved equivalent.

ii. Dry and oil free abrasive blast cleaning equipment capable of removing rust from the exposed steel reinforcement, and cleaning the surface of the exposed concrete substrate. Cleaning shall include the removal of damaged paste and aggregate.

iii. Pressure-washing equipment capable of delivering at least 20 Megapascal (3000 pounds-per-square inch) nozzle pressure for cleaning loose material from repair areas.

iv. Water-blasting equipment capable of delivering pressures of 35 Megapascal, (5000 pounds-per-square inch) to 70 Megapascal (10,000 pounds-per-square inch) for concrete surface preparation.

v. Compressed air equipment capable of delivering compressed air free of oil for cleaning loose material from repair areas.

vi. Adjustable depth concrete saw for cutting edges of repair areas.

2. Select appropriate means and methods of placing concrete and repair materials. Obtain acceptance from the Consultant as to the type of equipment to be used.

2.2 Products and Manufacturers

1. Products and their corresponding manufacturers cited in the sections that follow shall be the basis for pricing the Work. The Contractor must bid the specified products but may request a substitution subject to review and acceptance by the Consultant.

2.3 Product Compatibility

1. It is the responsibility of the contractor to ensure that products selected from the approved lists in the sections that follow are compatible with one another when used together. Where products are selected from different manufacturers, written approval regarding product compatibility shall be obtained from the manufacturers involved and supplied to the Consultant for review and approval.

2.4 Performance Requirements

1. The concrete and concrete repair mortar shall be designed to meet the specified requirements.

2. Ensure minimum bond strength of 1.2 Megapascal is achieved at the interface between

the new and existing concrete.

2.5 Bonding Agent

1. Cement slurry consisting of one part Portland Type 10 Cement to one-part fine aggregate with sufficient water to form a heavy cream consistency. Cement slurry to be complete with specified cement slurry admixture.

2. Provide cement slurry consisting of a scrub coat of the bagged repair material when specified by the manufacturer. In these cases, prepare the cement slurry bond in accordance with the manufacturer's specifications.

2.6 Cement Slurry Admixture

1. Sikacem 810 (Latex / Silica Fume Admixture for Cement Mortar / Concrete / Bonding Slurries) by Sika Canada Inc.

2. Approved equivalent.

2.7 Pre-Packaged Repair Materials

1. Polymer modified mortar for the partial-depth patching applications listed, shall be selected from the following list:

   i. Vertical and Overhead Applicant Repairs (Shallow Surface Repairs)

      a. MasterEmaco N 425; BASF

      b. SikaTop 123 Plus; Sika Canada

      c. Planitop X; MAPEI

      d. Meadow-Crete OV; WR Meadows

      e. Approved equivalent

   ii. Horizontal Applications (Topside) Repairs (Shallow Surface Repairs)

      a. MasterEmaco S466; BASF

      b. SikaTop 122 Plus; Sika Canada

      c. Planitop X; MAPEI

      d. Meadow-Crete H; WR Meadows

      e. Where high-early strength is required: MasterEmaco T1060; BASF

      f. Approved equivalent

iii. Pre-blended, synthetic, pre-packaged high performance cementitious repair material for formed, full-depth horizontal and vertical concrete repairs (where self-consolidating materials are not preferred), shall be selected from the following list:

a. MasterEmaco T430; BASF

b. SikaRepair 222; Sika Canada

c. Planitop 11; MAPEI

d. Meadow-Crete OV/H; WR Meadows

e. Where high-early strength is required for horizontal applications: MasterEmaco T1060; BASF

f. Approved equivalent

iv. Pre-blended, synthetic, pre-packaged high performance cementitious repair material for formed, full-depth horizontal and vertical concrete repairs (where self-consolidating materials are preferred), shall be selected from the following list:

a. MasterEmaco S440; BASF

b. MasterEmaco S440 MC; BASF

c. Sikacrete-08 SCC; Sika Canada

d. Planitop 11 SCC; MAPEI

e. Meadow-Crete FNP Extended; WR Meadows

f. Approved equivalent

2.8 Corrosion Inhibiting Coating

1. Corrosion control coating for existing reinforcing shall consist of either:
2. MasterProtect 8100AP Zinc Epoxy Primer; BASF
3. Sika Armatec 110 Epocem; Sika Canada
4. Carbozinc 111 VOC; Carboline

a. Patch-Prime; WR Meadows

b. Approved equivalent

2.9 Pre-Packaged Aggregate

1. For deep repairs: Pea gravel or crushed stone approved by repair mortar manufacturer.

2. Premixed aggregate not to be used with SikaTop 123 Plus.

2.10 Doweling Bonding Material

1. HIT-HY 100 injectable adhesive for rebar and threaded rod by Hilti Canada Corp.

3 Execution

3.1 Examination

1. Locate areas of delaminated or unsound concrete using hammer sounding and/or chain-drag sounding in accordance with American Society for Testing and Materials D4580. Approximate locations of areas to be repaired are indicated on the drawings.

2. Mark boundaries of area to be repaired and arrange for the Consultant to inspect and approve the approximate extent and geometry. Layout geometry shall be performed in accordance with International Concrete Repair 310.1R, and as indicated on the drawings.

3. Notify the Consultant at least 48 hours in advance to inspect and approve repair extent and geometry.

4. If additional delaminated or unsound concrete is present that is not shown on the drawings, the Consultant must be notified and written direction given prior to proceeding with repair.

3.2 Protection

1. Protect pedestrians, motor vehicles, mechanical, electrical, and plumbing equipment, surrounding construction, project site, existing services, landscaping, and surrounding buildings and their contents from damage or injury resulting from concrete rehabilitation Work.

2. Protect areas adjacent to repair Work from damage and stains with appropriate barriers and masking. Repair damage and remove stains resulting from the Work to its condition at the start of work. When the condition at the start of work is not documented by the Contractor, it shall be repaired to its original condition.

3. Neutralize and collect alkaline and acid wastes for proper disposal off-site in accordance with Local, Provincial, and Federal regulations.

4. Dispose of runoff from wet operations in accordance with all local ordinances and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

5. Comply with local noise ordinances during demolition operations. The Contractor must

verify with the Owner any required supplemental considerations regarding noise prior to proceeding with the Work.

6. Protect all new repair Work from damage by the public, construction traffic, construction equipment and materials, vibration, dust, and any deleterious environmental effects during the Work, such as temperature, humidity, sunlight, wind, precipitation, and water. Provide adequate cure time for concrete repairs to allow for compressive and bond strength gain prior to performing demolition adjacent to the repairs.

3.3 Formwork and Shoring

1. General

   i. Construct forms to sizes, shapes, lines, and dimensions to match existing adjacent surfaces and textures.

   ii. Provide for openings, offsets, moldings, chamfers, anchorages, inserts, and other required features.

   iii. Construct forms to accommodate installation of products by other trades.

   iv. Provide for easy removal of form without damage to the concrete and adjacent surfaces.

   v. Apply an appropriate form release coating over surfaces of formwork prior to erecting in-place before each concrete placement. Form release agents shall not be applied to or come in contact with the concrete substrate or reinforcement at any time.

   vi. Provide ports through slabs where required to install repair materials at soffits and beams and to vent air during concrete placement.

   vii. Provide ports through the sides of forms where required to install repair materials. Remove and patch ports immediately after removal of forms.

2. Shoring

   i. Provide shoring and bracing in accordance with the shoring and bracing drawings prior to performing work.

   ii. Where concrete is to be removed beyond the vertical reinforcing in concrete columns, provide shoring as required prior to proceeding with concrete removal.

   iii. Maintain and adjust shoring and bracing during the repair process as required to complete to Work at the direction of the shoring engineer. Shoring inspections to be completed by the shoring engineer.

3.4 Preparatory Work

1. Partial-Depth Concrete Removal: Removal of deteriorated concrete, surface preparation, and provisions for reinforcement in areas to be repaired shall be conducted in

accordance with International Concrete Repair 310.2R and at the direction of the Consultant. The surface of the repair area shall be roughened to a minimum surface profile of CSP 7, as described in International Concrete Repair 310.2.R. In addition, the following criteria shall be met within the repair locations:

i. Repair configurations should be kept as simple as possible and shall preferably have square corners and approximately uniform depth.

ii. The aspect ratio of the repair area for slabs shall be as square as possible, not exceeding a 1.5:1 aspect ratio. Odd shapes shall be avoided. If they cannot be avoided, re-entrant corners shall be mitered or reinforced to limit cracking at these locations.

iii. Remove concrete using power equipment such as impact breakers, as required, or using hydro-demolition or Consultant agreed upon method.

iv. Remove all loose, deteriorated, or unsound concrete from the structure by breaking up and dislodging concrete to a minimum depth of 90-milimeters (3.5- inches). Extend the repair area such that a minimum of 50-milimeters (2-inches) of steel free of corrosion is exposed. Where half or more of the perimeter of reinforcing bar is exposed, or the bond between the reinforcing bar and surrounding concrete is broken, remove concrete from the entire perimeter of the bar to provide at least 50-milimeters (2-inches) of clearance between exposed reinforcing steel and surrounding concrete. Reinforcing bars in both directions shall have the required clearance.

v. Operate equipment so as to not damage reinforcement or other embedded items.

vi. Test areas where concrete has been removed by tapping with a mason’s hammer, and remove additional concrete until unsound concrete is completely removed.

2. Full-Depth Concrete Removal: Procedures described previously for partial-depth removal shall be followed except that the depth of removal shall extend through the entire thickness of the concrete section. Saw cuts and chipped edges shall be provided at the perimeter of the repair. In the case of slabs and walls, the saw cuts and chipped edges shall be provided at both the top and at the underside. Special care must be taken to provide shoring around the perimeter of the full-depth removal area where shown on the drawings. Precautions regarding falling debris must be taken to prevent damage to structures or other property below the removal area.

3. Remove bruised concrete substrate weakened by microcracking by abrasive blasting or high-pressure water blasting with or without abrasive. When water blasting, provide 35 Megapascal (5000 pounds-per-square-inch) water pressure or higher if required to satisfy the tensile bond requirements. Keep nozzle not less than 150- millimeters (6-inches) and no more than 300-milimeters (12-inches) away from the surface.

4. Reinforcing Steel

i. Remove concrete fragments, corrosion product, mill scale, and other contaminants deleterious to bond from existing reinforcing bars by mechanical means or commercial blast cleaning until a bare metal finish has been achieved on the reinforcing bars.

ii. Where section loss of reinforcing bars is more than 20% of the cross-sectional area, splice replacement bars to existing bars as directed by the Consultant or as indicated on the drawings. Extend concrete removal if required to achieve adequate splice length. Remove additional concrete as necessary to provide at least a 25-milimeters (1-inch) clearance beyond existing and replacement or supplemental bars. Splice replacement bars to existing bars according to Canadian Standards Association A23.3 or by using noncorrosive mechanical couplings. Welding of reinforcing is not permitted without approval from the Consultant, unless noted on the drawings.

iii. New reinforcement with rust is considered satisfactory, provided that it not loose or deleterious to bond in any way, at the Consultant's discretion.

iv. At areas around the repair perimeters where the development length cannot be achieved within the repair, drill into sound concrete as shown on the drawings or directed by the Consultant to provide the required bar development and splice length or remove additional concrete to allow for the splice. Reinforcement shall be bonded to the existing concrete with the specified dowel bonding material in accordance with the approved manufacturer's recommendations.

a. Replace existing reinforcing bars where shown or as directed by the Consultant.

b. Provide support chairs, slab spacers, and holding bars properly spaced and with sufficient strength to carry loads of reinforcement and deposited concrete without collapsing or allowing bars to sag. All accessories used at exposed concrete must have plastic tips capable of resisting concrete stains.

c. Place reinforcing bars accurately and tie firmly in place. Replace or supplement reinforcing bars in accordance with the size and spacing noted on the repair drawings.

d. Provide the minimum concrete cover as specified on the repair drawings. In areas where the minimum concrete cover for outer mat reinforcement cannot be achieved without mounding of the repair concrete, the outer mat reinforcing bars are permitted to be bent, if practical, to achieve the required cover. Alternately, the Contractor is permitted, with the Consultant's acceptance, to extend the limits of concrete removal to expose the entire bar to allow for lowering of the bars. Mounding of the repaired concrete is permitted where approved by the Consultant.

e. All new and existing reinforcement shall be coated with the specified corrosion inhibiting coating, where noted on the drawings.

f. Protect prepared surfaces from the elements until ready to place repair

materials.

5. Cleaning

   i. Remove bond-inhibiting materials (dirt, concrete slurry, loosely bonded aggregates, etc.) by abrasive blasting or low-pressure water blasting with or without abrasive. When water blasting, provide 20 Megapascal (3000 pounds- per-square-inch) or greater water pressure. Keep nozzle not less than 150- millimeters (6-inches) and no more than 300-milimeters (12-inches) away from the surface to be cleaned.

   ii. Confine, collect, and dispose of broken concrete, sandblast grit, dust, debris, removed reinforcement, and other waste material resulting from removal operations and surface preparation in a safe and legal manner.

   iii. Check concrete surfaces after cleaning to ensure they are free of loose aggregate, microcracking, and additional delamination.

   iv. Where abrasive blasting or high-pressure water blasting is infeasible, thoroughly clean removal areas of loose concrete, dust, and debris using high-pressure with oil-free air. Obtain approval from the Consultant prior to proceeding.

6. Bonding

   i. Pre-dampen concrete substrate surfaces to saturated surface-dry condition immediately prior to placement.

   ii. Install a cement slurry onto saturated surface-dry substrate just prior to placing the repair material. Agitate thick slurry periodically to avoid settling of components in the container. The bonding agent shall be installed immediately prior to the placement of the repair material.

3.5 Concrete Mixing, Conveying, and Placement

1. Mixing, conveying, and placement shall conform to the requirements of Canadian Standards Association A23.1, except as modified within these specifications.

2. Use placement methods suitable for each particular field situation.

3. Place repair materials within open time of any mortar scrub coat or bonding agent.

4. Mix and place packaged repair materials in accordance with the manufacturer’s written instructions.

5. Fully consolidate the concrete as required to encapsulate the reinforcement, fill all voids, and avoid honeycombing.

3.6 Finishing and Curing

1. Finishing: Finish concrete to match adjacent existing concrete surfaces.

2. Curing: Cure repairs for a minimum of 72 hours unless otherwise specified. Ready mixed concrete shall be cured for a minimum of seven (7) days. Packaged repair materials shall be cured no less than the time recommended by the manufacturer. Polymer-modified repair materials shall be wet-cured 24 to 48 hours.

    i. Wet-cure all repair locations following placement and finishing.

    ii. Apply curing compound to the repair areas in accordance with the manufacturer's written instructions and at the minimum rates and number of applications specified by Canadian Standards Association A23.1.

    iii. Remove curing compound prior to installation of coatings or finishes in accordance with the manufacturer's specified procedures.

    iv. Apply curing/sealing compound to the repair areas in accordance with the manufacturer's written instructions and at the minimum rates and number of applications specified by Canadian Standards Association A23.1.

3. Formwork Removal: Removal of formwork and shoring shall not occur until both of the following criteria have been met:

    i. Repair material has cured for a minimum of 72 hours unless otherwise permitted by the Consultant.

    ii. Repair material has attained a minimum of 75% of the specified compressive strength of the substrate concrete as determined by testing of field-cured cylinder samples. Loading of the structure with design live loads shall not occur until the concrete has attained 100% of the specified compressive strength of the substrate concrete based on field-cured cylinder samples.

4. Grind the perimeter of all formed surfaces at the interface with the existing concrete to remove all loose material and provide a smooth transition from new to existing concrete.

    i. Additional finishing shall be performed as required to match the existing concrete surface.

Section 07 14 16 – Cold Fluid-Applied Waterproofing

1 General

1.1 Instructions

1. Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.

2. Report in writing to the Construction Manager any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 Intent

1. Provide materials, labour and equipment to complete the waterproofing in accordance with the Contract Documents.

1.3 Scope

1. Provide all materials, labour, and equipment as necessary to complete the waterproofing work as shown on the drawings and described herein, including location and removal of existing waterproofing (if applicable), supply and placement of all new waterproofing materials.

2. The summarized breakdown of the above-mentioned work does not set out all the work under this Section of the Contract, but rather outlines the essentials. Any waterproofing work indicated on the drawings or hereinafter specified, whether enumerated above or not, shall be carried out under this Section of Work.

1.4 Related Sections

1. Section 03 01 30 – Concrete Repairs.

1.5 References

1. American Society for Testing and Materials C836: Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course

2. American Society for Testing and Materials C1305: Standard Test Method for Crack Bridging Ability of Liquid-Applied Waterproofing Membrane

3. American Society for Testing and Materials C1522: Standard Test Method for Extensibility After Heat Aging of Cold Liquid-Applied Elastomeric Waterproofing Membranes

4. American Society for Testing and Materials D412: Standard Test Methods for Rubber Properties in Tension

5. American Society for Testing and Materials D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics

6. American Society for Testing and Materials D1777: Standard Test Method for Thickness of Textile Materials

7. American Society for Testing and Materials D2240: Standard Test Method for Rubber Property – Durometer Hardness

8. American Society for Testing and Materials D3776: Standard Test Methods for Mass Per Unit Area (Weight) of Fabric

9. American Society for Testing and Materials D4491: Standard Test Methods for Water Permeability of Geotextiles by Permittivity

10. American Society for Testing and Materials D4533: Standard Test Method for Trapezoid Tearing Strength of Geotextiles

11. American Society for Testing and Materials D4632: Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

12. American Society for Testing and Materials D4716: Standard Test Method for Determining the Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head

13. American Society for Testing and Materials D4833: Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products

14. American Society for Testing and Materials D6241: Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products

1.6 Submittals

1. Submit Product data as specified in Section 01 33 00 – Submittal Procedures.

2. Provide certification of the applicator from the membrane manufacturer.

3. Provide certification from the manufacturer that the concrete surface preparation was acceptable and that the installation was in accordance to the manufacturer's recommendations, including recommendations associated with installation of an epoxy primer to existing concrete.

4. Submit all waterproofing details and lift thicknesses as recommended by membrane manufacturer for review by consultant.

5. Submit the following Product Data:

    i. Materials list of items provided under this section.

ii. Manufacturer’s specifications and other data required to prove compliance.

iii. Manufacturer’s current recommended installation procedures.

1.7 Quality Assurance

1. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

2. Applicator Qualifications:

   i. Applicator and the designated project foreman shall have at least three years of experience successfully installing materials of types specified and shall have successfully completed at least three projects of similar size, scope and complexity. Provide references to the Consultant.

   ii. The applicators designated foreman shall be on site at all times during installation.

   iii. Applicator to have an agreement in place with the membrane supplier setting out the responsibilities of each party for purposes of satisfying the warranty for the project.

   iv. Convene a pre-installation job-site conference two (2) weeks prior to commencing work of this Section:

      a. Secure attendance by Owner’s Representative, Construction Manager, Consultant, Applicator, and authorized representatives of the membrane system manufacturer and interfacing trades.

      b. Examine Drawings and Specifications affecting work of this Section, verify all conditions, review installation procedures, and coordinate scheduling with interfacing portions of the work.

      c. Prepare mock-up of concrete surface preparation and waterproofing installation. It is the responsibility of the Construction Manager and the Applicator to ensure that the quality of the waterproofing installation is consistent with the mock-up quality.

1.8 Delivery, Storage and Handling

1. Refer to Section 01 61 00 - Common Product Requirements.

2. Deliver and store Products in original containers with manufacturer's labels and seals intact.

3. Store solvent base liquids away from excessive heat and open flame.

4. Store emulsion liquids at above freezing temperatures, free from contact with cold or frozen surfaces.

1.9 Environmental Requirements

1. Perform work only when existing and forecasted weather conditions, including temperature and humidity, are within the limits established by the manufacturer of the materials and products used.

2. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive the waterproofing.

1.10 Warranty

1. Submit an extended warranty in accordance with the General Conditions of the Contract.

2. Deliver to the Consultant signed copies of the following written warranty against defective materials and workmanship for a period of ten years following date of completion. Warrant that installed waterproof coating system shall be free of defects including adhesive failure, cohesive failure, weathering deficiencies and waterproofing failure resulting from substrate cracking.

3. Manufacturer, Applicator, and General Contractor to jointly and severally guarantee to the Owner the installation and material.

4. Extended Warranty: For a period of five (5) years; protecting against defects due to improper workmanship or inferior materials; in a form satisfactory to Owner and signed by the membrane manufacturer, the Applicator and General Contractor.

2 Products

2.1 Waterproofing Membrane

1. Vertical and Horizontal Application

   i. Cold Fluid-Applied Elastomeric Waterproofing System: TREMproof®-250GC by Tremco Commercial Sealants and Waterproofing; a single-component, rapid curing, fluid-applied elastomeric waterproofing membrane. Provide min. two lifts to a build of 215 mil of Tremco 250 GC.

   ii. Where membrane is being applied on existing concrete with an existing waterproofing having been removed, provide Tremco Epoxy Primer with aggregate almost to refusal per manufacturer's directions where directed by the manufacturer's recommendations. Provide min. one 25 mil lift of Tremco Epoxy Primer.

   iii. Provide TREMproof TRA Sheeting and compatible Butyl Sealant for all looped butyl sheet details noted within the typical details.

2.2 Protection Board

1. Provide Tremco 2450 Protection Board by Tremco.

2.3 Crack and Construction Joint Sealants

1. DYMONIC 100 by Tremco.

2.4 Liquid-Applied Flashing

1. Tremco PUMA primer and Tremco PUMA flashing (basecoat) and Tremco PUMA TC (topcoat) by Tremco, as per manufacturer's instruction.

2.5 Other Materials

1. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the coating system manufacturer as compatible, subject to review of the Consultant.

3 Execution

3.1 Examination

1. Examine concrete to ensure it is clean and dry, free from surface water, ice, snow or frost, dust, dirt, oil, grease, curing compounds of any other foreign matter.

2. Ensure concrete has cured a minimum of 14 days.

3. Report in writing conditions that may be detrimental to the installation.

4. Review the existing conditions with a representative of the manufacturer to assess whether installation of an epoxy primer to the existing substrate is required.

5. Beginning of installation implies acceptance of existing conditions.

3.2 Preparation

1. Refer to manufacturer's literature for requirements for preparation of substrates.

2. Surfaces may be dry or damp, but must be sound and free of standing water, dust, laitance, grease curing compounds, impregnations, waxes and any other contaminants. All concrete shall be structurally sound and free of voids, spalled areas, loose aggregate, and sharp protrusions. Contractor shall use repair methods and materials which are acceptable to the manufacturer.

3. Completely remove existing waterproofing membranes, if any.

4. Fill form tie rod holes with concrete and finish flush with surrounding surface.

5. Remove scaling to sound, unaffected concrete and repair exposed area.

6. Grind protruding form lines and irregular construction joints to suitable flush surface.

7. Ensure surfaces are sufficiently rough to receive waterproofing.

8. Protect adjacent surfaces from damage resulting from application.

9. Install cant strips in all internal corners.

3.3 Primer

1. Apply primer uniformly at manufacturer's recommended rate of application. Avoid excessive or over-spraying application. Do not allow primer to pond on surface.

2. Do not apply the primer coat to concrete surfaces that are not dry and clean.

3. Allow primer to dry and cure.

4. Waterproofing equipment shall not be permitted upon the primer coat until the coating has fully cured.

3.4 Waterproofing

1. Apply membranes free of wrinkles, blisters and fishmouths.

2. Completely terminate all edges to substrate

3. Deck to Vertical Junctures

    i. Apply cold fluid-applied membrane to a minimum thickness of 90 mils at vertical faces horizontal surface. Provide thicker application thickness, as required, per manufacturer's recommendations.

    ii. Embed flashing membrane in cold fluid-applied membrane, extending a minimum of 150-milimeters (6-inches) out onto the horizontal surface and 150-milimeters (6-inches) up vertical beyond finished grade/brick ledges. Lap ends of flashing membrane a minimum of 150-milimeters (6-inches).

4. Cracks

    i. For all cracks up to 1.5-milimeters (1/16-inch) in width, apply a 150-milimeters (6-inches) wide, 30 mils thick stripe coat of waterproofing centered over the crack.

    ii. All cracks exceeding 1.5-milimeters (1/16-inch) in width must be routed to at least 6-milimeters x 6-milimeters (1/4-inch x 1/4-inch), sealed and coated with a 150-millimeters (6-inches) wide, 60 mils thick stripe coat centered on the sealant.

5. Apply cold fluid-applied waterproofing evenly to a thickness of 120 mils at vertical faces and horizontal faces to form a continuous monolithic coating. Provide thicker application thickness, as required, per manufacturer's recommendations.

6. Patch and repair damaged areas using the specified waterproofing and lap with

undamaged waterproofing by 150-millimeters (6-inches) all around the repair.

3.5 Protection

1. Allow membrane to thoroughly dry and protect from rain until fully cured.

2. Do not allow backfill operations to commence until application has been reviewed and accepted.

3. Protect finished membrane from damage during backfill operations by adhering protection board.