Engineers

Eagle Ridge Outdoor Pool

Pool Repair – Phase 2

2689 Guildford Way
Coquitlam BC

BID DOCUMENTS, TECHNICAL SPECIFICATIONS, AND DRAWINGS

Prepared for:

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Division 00 - Procurement and Contracting Requirements

Division 01 - General Requirements

Division 02 - Existing Conditions

Division 03 - Concrete

Division 07 - Thermal and Moisture Protection

1.0 Drawings

The drawings listed below will be included in the General Contractor/Owner agreement and will become part of the contract.

Drawing No.	Drawing Title	Date
R-0.0	Cover Page and Site Plan	May 1, 2026
R-1.1	General Notes	May 1, 2026
R-2.1	Pool Tank Plan	May 1, 2026
R-3.1	Pool Sections	May 1, 2026
R-4.1	Typical Concrete Repair Details	May 1, 2026
R-4.2	Typical Details	May 1, 2026

END OF SECTION

1.0 GENERAL

1.1 Description of Work

.1 The Work includes, but is not necessarily limited to, the following:

.1 Pool Basin Restoration

.1 Repair all concrete cracks by routing and sealing at the pool basin slab as directed by the Consultant and specified herein (unit price item).

.2 Structural repair of concrete deterioration due to corrosion of reinforcing steel (delamination repairs) where directed by the Consultant (unit price item).

.3 Removal of existing pool basin slab coatings, surface preparation, and installation of new liquid-applied pool coating membrane (lump sum price item).

.4 Removal of all existing basin slab expansion joint sealants, not including the wall expansion joint sealant. Perform surface preparation and apply specified sealants complete with joint backup along the existing joints (lump sum price item).

.5 Saw cutting of existing cementitious patch material at the basin perimeter expansion joint. Perform surface preparation and apply Belzona 2000 Series sealant (sealant supplied by Owner).

.6 Surface preparation, resurfacing (parge coat application) and installation of liquid applied coatings at the supply line trench (lump sum price item). Support the supply line as required during the work.

.7 Repaint pool basin surfaces/ markings impacted by the work to match the existing/ pre-construction condition (lump sum price item).

.2 Pool Surge Tank Restoration

.1 Repair all concrete cracks by routing and sealing at the walls and slab as directed by the Consultant and specified herein (unit price item).

.2 Structural repair of concrete deterioration due to corrosion of reinforcing steel (delamination repairs) where directed by the Consultant (unit price item).

.3 Surface preparation and installation of new liquid-applied pool coating membrane (lump sum price item).

.4 Installation of concrete sealer over the top surface suspended slab of the surge tank (lump sum price item).

.3 Repair cracks in pool deck by removing existing sealant, routing concrete, and installing new sealant (lump sum price item).

.4 Replacement of precast concrete pavers over the surge gutters with preformed plastic grating (lump sum price item).

.5 Weatherproof Enclosure (Lump Sum Price Item)

.1 Contractor to provide weather protection including temperature and moisture control to complete the work within the scheduled timeline. The date of completion is not flexible as the pool must be prepared for the 2027 season, with Substantial Performance required by December 18, 2026. Weather Protection may include of a combination of scaffolding with a shrink-wrap, canopy electric heaters, or approved alternate methods.

1.2 Work Sequence

.1 The Work areas will be available as of September 2026. Contractor to confirm date of mobilization.

.2 Subject to adjustments in Contract Time agreed upon by Change Order, attain Substantial Performance of the Work by December 18, 2026. This provides a Contract Time of approximately 14 weeks.

.3 The pool area will be closed for the duration of the Contract. Access to areas outside the designated work areas must be maintained in accordance with phasing requirements.

.4 Time and time limits stated within Bid submittal and Contract Documents are of the essence to the Contract. Perform work expeditiously and with adequate forces to complete the Contract Work within the time specified.

1.3 Schedule

.1 In conjunction with and in a form acceptable to the Consultant and Owner, provide within one week of contract award a schedule indicating phasing and procedures required to complete the Work within the submitted time frame.

.2 Construction schedule shall reflect completion of all work under the Contract within the time specified and in accordance with these Specifications.

.3 Submit a revised schedule to the Consultant if, after commencing the Work, the schedule fails to reflect actual progress, or the Contractor wishes to make a major change to their approach. Submit a revised construction schedule in advance of beginning a revised approach.

1.4 Contractor's Use of Site

.1 Use of all equipment is to be restricted in accordance with the City of Coquitlam noise by-laws. Contractor has access to the work areas with quiet work proceeding around the clock if desired.

.2 Jackhammering or other noise-generating work must be performed in accordance with City of Coquitlam noise bylaws.

.3 Contractor has 24-hour access to site.

.4 Schedule operations to minimize interruptions and to comply with laws, ordinances, rules, and regulations relating to Work.

.5 Building is to remain accessible to City staff throughout the Contract. It is the Contractor's responsibility to ensure the building remains operational and that areas outside those designated for closure remain available and safely accessible at all times.

.6 Confine construction equipment, temporary work, storage of products, waste products and debris, and operations of employees and subcontractors to limits indicated by laws, ordinances, permit, or Contract Documents and do not unreasonably encumber the Place of Work.

.7 Construction-related debris shall not be permitted to accumulate on site where visible to users. Remove daily if necessary.

.8 Do not overload the structures (pool/ pool deck/ building structures). Do not overload slab areas with equipment or stored materials. Review all equipment weights and loading procedures with Consultant prior to commencing work.

.9 Do not close, obstruct, or store materials in roadways, sidewalks, or passageways without prior approval from the Owner. Do not interfere with safe passage to and from building and adjacent public sidewalks and roads. Move stored products or equipment that interfere with building operations.

.10 Take all precautions and provide all required protection to maintain the safety of the general public.

.11 No storage of materials or equipment is allowed outside designated work areas without Owner approval.

.12 During transportation of materials or equipment through occupied areas, protect the public, property, and finishes from damage. All damage caused by the Contractor is to be repaired or rectified at the Contractor's expense.

.13 Propane powered equipment not permitted within interior areas.

.14 Arrange all construction access into occupied areas with the Owner to allow the Owner to provide proper notice, where required.

.15 Maintain work areas and the vicinity clean and tidy to the satisfaction of the Owner and Consultant.

.16 Obtain and pay for all permits required for completion of the Work, excluding the Building Permit. Provide copies of permits to Consultant and post on-site where required.

.17 General Contractor to obtain and pay for all necessary approvals to locate equipment or materials on city property. Disposal bins, supply trucks, etc. are to be located at designated work areas only. Coordinate with the City of Coquitlam.

1.5 Temporary Lighting

.1 Provide and maintain temporary lighting as required for safe demolition and working conditions, in accordance with British Columbia Occupational Health and Safety Regulations.

1.6 Temporary Field Offices and Sheds

.1 The City of Coquitlam will provide space for a temporary field office and storage shed.

.2 Maintain sheds in a clean and orderly condition to Consultant's satisfaction.

.3 Provide suitable hardware and locks on doors to sheds to reasonably secure them and keep locked when unsupervised.

.4 Field sheds shall be weather tight and have floors elevated above grade.

.5 Relocate sheds as required by the progress of the Work. Remove sheds when directed or when no longer required.

1.7 Temporary Heating

.1 Provide and maintain supplementary heating as required to maintain sufficient application and curing temperatures.

.2 Temporary heating and ventilation used during construction -- including the cost of installation, fuel, operation, maintenance and removal of equipment -- shall be paid for by the Contractor. Use of direct-fired heaters discharging waste products into enclosed work areas is not permitted.

1.8 Electrical Power

.1 Discuss available power with the Owner prior to bidding.

.2 Contractor shall pay for any alternations to the electrical system needed to accommodate the Contractor's equipment. Coordinate any required alterations with the Owner. Reinstate system to its original condition upon completion of the Work.

.3 Owner will pay for electrical consumption from building sources made available by the Owner.

1.9 Water Supply

.1 Contractor shall pay for the cost of any temporary water connections or alterations required to perform the Work. Reinstate system to its original condition upon completion of the Work.

.2 Owner will pay for water consumption from building sources made available by the Owner.

1.10 Sanitary Facilities

.1 Provide portable washrooms at time of initial mobilization and maintain throughout the course of work where washroom facilities are not available on-site for the Contractor's use. Locate where agreeable to the Owner.

1.11 Traffic Control and Signage

.1 Provide all signage necessary to protect the public from the construction and work area, control pedestrian and vehicular traffic flow, and to inform users that construction activity is in progress. Signage to be of professional quality to the Consultant's satisfaction.

1.12 Protection of Work and Property

.1 Take all reasonable precautions necessary to protect the Work and property from damage during performance of the Contract and rectify any damage to the Work or property caused by the Contractor or its Subcontractors.

.2 Protect all property (existing supply vents, ancillary pool fixtures, light standards, permanent fencing, walls, plants, etc.) from dust and damage. Clean interior areas that require access outside of working hours at the end of each work shift to provide a functional environment for the user.

.3 Contain dust, dirt, construction debris, water, and fumes from the Work so as to not affect areas remaining in operation outside designated work areas. Damage to all property, mechanical equipment, motors, elevator equipment, fixtures, air intakes, etc. resulting from contamination is the responsibility of the Contractor.

.4 Provide protection for all entrance and exit-ways, floors, walls, standing fixtures, air intakes, and equipment rooms.

.5 Patch and repair all finishes or painted surfaces damaged during the course of the Work, including surfaces damaged by tape, fasteners, or similar materials during hoarding and protection.

.6 Do not keep secure doors open for extended periods without the Owner's permission. Any resulting damage caused to building finishes or equipment, and any resulting property losses due to compromised building security, shall be the responsibility of the Contractor.

.7 Periodic air monitoring may be conducted by the Owner's appointed environmental consultant. Contractor shall provide access and coordinate work with Owner's appointed environmental consultant if necessary.

1.13 Construction Barriers and Enclosures

.1 Supply and construct hoarding, barriers, and enclosures as indicated in these Specifications, on Drawings, and as directed by the Consultant or Owner as construction progresses.

.2 No extras will be entertained for hoarding, barriers, and enclosures after bid closing unless the scope of work significantly changes.

.3 Repair anchor holes after construction hoarding is removed. Repair all finishes and painted surfaces damaged by fastening materials used as part of hoarding and protection systems.

.4 Restrict access for unauthorized personnel by placing barricades or posting guards around areas of the Work. Unauthorized personnel means the public and anyone not directly involved with execution, supervision, or inspection.

1.14 Protection of Existing Exposed Facilities / Services

.1 Make allowance in price to cover all costs of temporary removal and replacement and/or relocation of existing electrical wiring and hardware required for completion of the Work.

.2 Protect exposed conduit, fixtures, attached devices, wet sprinkler fire system plumbing, mechanical system components, louvers, and ducts or correct damages at own expense. Promptly report any damage to the Owner and Consultant.

.3 Prior to commencing the Work, contact the Owner to locate all protective or alarm systems and sensors. Protect services against damage or interruption. Provide Owner with 48 hours minimum advance notice of any necessary interruption. All claims resulting from damage are the responsibility of the Contractor.

1.15 Walk-Through Inspection of Site

.1 Perform a thorough inspection of the site prior to the start of Work, and provide a written notice to the Consultant detailing all damaged property as well as all items that appear to be of poor working order or appearance (i.e. sign fixtures, dirt, etc.)

.2 Upon receiving this notice, the Consultant and Owner will verify the validity of the items listed.

.3 If written notice is not given within five days of commencement of Work, it will be assumed the Contractor reviewed the site and accepted the condition of the property as being free of damage.

.4 Any damages not listed as part of the written notice of clause 1.15.1 above, found after completion of the Work will be the Contractor's responsibility to rectify. Complete rectifications in a timely and satisfactory manner.

1.16 The Work, Work in Progress, Property, and Persons

.1 Protect the Work during construction from damage by weather.

.2 Provide protection as required to protect work in progress and other property from damage and to provide suitable conditions for the progress of finishing work.

.3 Take reasonable and required measures, including those required by authorities having jurisdiction, to protect the public and those employed on the Work from bodily harm.

.4 Comply with requirements of the British Columbia Occupational Health and Safety Regulations and Regulations for Construction Projects.

.5 Be prepared to provide respirators, dust protection, ear protection, hard hats, etc. for those employed by the Consultant and Owner on-site.

.6 Direct all Subcontractors to protect their own work, existing property, adjacent public and private property, and work of other Sections from damage while working.

1.17 Location of Existing Utilities

.1 Locate all existing utilities prior to construction and protect them during construction.

1.18 Work Site Safety – Contractor is "Prime Contractor"

.1 Contractor shall, for the purposes of the British Columbia Occupational Health and Safety Regulations, and for the duration of the Work and Contract:

.1 Be designated as "Prime Contractor" pertaining to safety at the "Work site".

.2 Do everything reasonably practicable to establish and maintain a system or process for compliance with the Act and its regulations, as required to maintain the health and safety of all persons at the "Work site".

.2 Direct all subcontractors, workers, and any other persons at the "Work site" on safety related matters, to the extent required to fulfill its "Prime Contractor" responsibilities pursuant to the Act.

1.19 Material and Equipment

.1 Unless otherwise specified, provide, maintain, and pay for all materials, tools, machinery, equipment, temporary facilities, controls, and conveniences necessary for execution of the Work. All materials shall be new, of merchantable quality, and suitable for the intended purpose.

.2 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods. Notify the Consultant in writing of any conflict between Contract Documents and manufacturer's instructions. Deliver, store, and maintain packaged materials with manufacturer's seals and labels intact.

1.20 Coordination

.1 Contractor is responsible for coordination of trades. Lines of demarcation between Contractor's work and trades' work are sole responsibility of the Contractor. Consultant assumes no responsibility for division of the Work or for any jurisdiction regarding such division.

.2 Contractor is responsible for coordinating with the Owner for on-site activity as it affects operation of the building.

.3 Notify the Consultant at least 24 hours in advance for site review. No work shall be covered or concealed until the Consultant has reviewed it, unless informed by Consultant that a site review will not be performed. Such review does not absolve the Contractor from their responsibility to perform the Work in accordance with Contract Documents.

1.21 Cutting and Remedial Work

.1 Perform cutting and remedial work required to make affected parts of the Work come together properly.

.2 Coordinate the Work so that cutting and remedial work are kept to a minimum.

.3 Cutting and remedial work shall be performed by specialists familiar with the Products affected and in a manner that neither damages nor endangers the Work.

1.22 Waste Removal and Cleaning

.1 Maintain the Place of the Work free from unsightly or hazardous accumulations of waste materials and rubbish, and perform all required cleaning during the Work.

.2 Provide on-site containers for collection of waste materials and rubbish.

.3 Remove wastes that create hazardous conditions from the premises daily.

.4 Dispose of waste products in strict accordance with product manufacturer Safety Data Sheets (SDS) and provincial waste control regulations. Drainage systems shall not be used to dispose of project wastes and materials.

.5 Remove moisture sensitive equipment (i.e. exposed electrical and mechanical systems, etc.) or protect against moisture infiltration during washing and dust-generating activities.

.6 Remove all construction-related grease, dust, dirt, stains, labels, fingerprints, over-spray, and other foreign materials immediately prior to Consultant’s final review. Return all adjacent areas, equipment, duct work, etc. to the Owner in a dust-free condition. Leave site in a neat and tidy condition at completion of the Work.

1.23 Superintendence

.1 Provide a full-time on-site Superintendent who is responsible for quality, control, organization, and coordination of the Work.

.2 Superintendent shall attend all site meetings.

.3 Superintendent shall have a cell phone.

.4 Superintendence shall be satisfactory to the Owner and Consultant.

.5 Superintendence shall be deemed unsatisfactory and changes or additions to superintendence can be demanded by the Owner or Consultant when control, organization, or coordination of the Work is not adequate, quality of the Work does not meet Contract Document requirements, directions given in accordance with Contract Documents are not followed, or progress is behind schedule.

1.24 Administration of Project Meetings

.1 Consultant will preside at meetings.

.2 Contractor shall provide physical space and make arrangements for meetings on site.

.3 Representatives of Contractor, Subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the party each represents.

1.25 Pre-Construction Meeting

.1 After award of Contract, a meeting of all parties in the Contract shall be held to discuss and resolve administrative procedures and responsibilities.

.2 Representatives of the Owner, Consultant, Contractor, major Subcontractors, and construction review personnel will attend.

.3 Consultant will establish a time and location for the meeting and notify concerned parties before the meeting.

.4 Agenda to include the following:

.1 Appointment of official representatives of participants of the Work.

.2 Schedule of Work, progress scheduling.

.3 Shop drawings (if required) and schedule of shop drawing submissions.

.4 Requirements of temporary facilities, site signage, hoarding, dust protection, offices, storage sheds, utilities, fences.

.5 Delivery schedule of critical equipment.

.6 Site security.

.7 Contemplated change orders, procedures, approvals required.

.8 Take over procedures, acceptance, warranties.

.9 Monthly progress claims, administrative procedures, holdbacks.

.10 Appointment of inspection and testing agencies or firms.

.11 Insurance, transcript of policies.

1.26 Progress Meeting

.1 During course of Work, the Consultant or Contractor may schedule progress meetings. Further progress meetings may be scheduled by the Consultant, Contractor, or Owner as required to expedite the Work.

.2 Consultant, Contractor, major Subcontractors involved in the Work, and Owner, when required, may attend.

.3 Consultant will notify parties minimum three days prior to scheduled meetings of any changes to time or place.

.4 Agenda to include the following:

.1 Review of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems that impede construction schedule, conflicts.

.4 Progress, schedule, during succeeding work period.

.5 Corrective measures and procedures to regain projected schedule.

.6 Revisions to construction schedule.

.7 Review of off-site fabrication delivery schedules.

.8 Review submittal schedules; expedite as required.

.9 Maintenance of quality standards.

.10 Pending changes and substitutions, Notices of Proposed Change, Change Orders.

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

.12 Other business.

END OF SECTION

1.0 GENERAL

1.1 Substitution of Materials Prior to Bid Closing

.1 Substitution of specified products or systems is permitted only when alternatives have been approved by the Consultant, in writing, prior to bid closing.

.2 Inform the Consultant in writing when specified products or systems are not anticipated to be available at the Place of the Work during construction. The Consultant will advise Bidders of alternatives.

.3 If specified products or systems are not available and the Consultant was not notified prior to bid submission, the Consultant will choose a suitable substitute product at the time of construction.

1.2 Request for Approval of Alternatives

.1 A Bidder or Supplier of a product or system may apply for approval of their product or system as an alternative up to seven calendar days prior to bid closing. The Consultant will advise applicants of the status of their request prior to bid closing.

.2 Provide the Consultant with sufficient information to review the alternative. This information may include:

.1 Project name and number

.2 Specification sections affected by the proposed alternative

.3 Product technical data sheets

.4 Supplier installation instructions and requirements

.5 Supplier warranty and warranty requirements

.6 Product application sample at specified material thickness and finish on sample substrate

.7 Installation history, including:

.1 Installation locations, dates, project sizes, project values

.2 Description of project and product usage

.3 Owner and consultant

.8 Test data

1.3 Approval of Alternatives

.1 The Consultant reserves the right to reject any requests for approval of alternatives.

.2 The Consultant will outline approved alternatives by addenda issued prior to bid closing. The addenda will indicate the alternative Product or system, where and how it may be used, and limitations. If an addendum is not issued, the bid is to be based on use of the specified Product or system.

.3 The Contractor assumes full responsibility and bears all associated costs where an alternative Product or system is incorporated into the Work. Claims for increases to the Contract Price or for changes to the Date for Substantial Performance of the Work due to changes in the Work that are necessitated by the use of an alternative will not be considered. All associated costs are to be included in the bid.

.4 The Contractor is to reimburse the Owner for their additional costs associated with incorporating alternatives into the Work. This may include additional consulting costs billed to the Owner to accommodate changes to the Contract Documents necessitated by the change.

.5 Contractor cost savings arising from approval of alternatives are to be reflected in the Contract Price.

END OF SECTION

1.0 GENERAL

.1 This Section specifies general requirements and procedures for product data, sample, and mock-up submissions for Consultant's review. Additional specific submission requirements may be specified in other Sections.

.2 Do not proceed with Work until relevant submissions are reviewed by Consultant.

.3 Present product data, samples, and mock-ups in imperial units. Where items or information is not produced in imperial, converted values are acceptable.

.4 Contractor's responsibility for errors or omissions in any submission is not relieved by Consultant's review of the submission.

.5 Notify Consultant, in writing at time of submission, of any deviations from the requirements of Contract Documents that form part of submissions. Also indicate the reasons for the deviations.

.6 Contractor's responsibility for deviations from the requirements of the Contract Documents in submissions is not relieved by Consultant's review of the submissions unless Consultant provides written acceptance of the identified deviations.

.7 Make any changes in submissions that Consultant may require consistent with the Contract Documents and resubmit where directed by Consultant.

.8 Notify Consultant in writing of any revision other than those requested by Consultant when resubmitting.

1.1 Submission Requirements

.1 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.

.2 Submit electronic copies of product data, manufacturer's catalogue sheets, brochures, literature, performance charts, and diagrams.

.3 Comply with the following requirements in regards to submission of product data:

.1 Delete information not applicable to project.

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

.3 Provide certification of compliance to applicable codes.

.4 Provide manufacturer's certification as to current production.

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

.5 Accompany submissions with an electronic transmittal letter that contains:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Identification and quantity of each shop drawing, product data, and sample.

.5 Other pertinent data.

.6 Submission shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 Details of appropriate portions of Work as applicable:

.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.6 After Consultant's review, distribute electronic copies to relevant affected subcontractors.

1.2 Product Data

.1 Product Data: Manufacturer's catalogue sheets, brochures, literature, performance charts, and diagrams, used to illustrate standard manufactured products.

.2 Submit electronic copies of product data.

.3 Delete information not applicable to project.

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

.5 Cross-reference product data information to applicable portions of Contract Documents.

1.3 Samples

.1 Samples: Examples of materials, equipment, quality, finishes, workmanship.

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

.3 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be reviewed.

1.4 Mock-Ups

.1 Mock-Ups: Field-erected examples of work complete with specified materials and workmanship.

.2 Erect mock-ups at locations acceptable to Consultant.

.3 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be reviewed.

END OF SECTION

1.0 GENERAL

1.1 Take Over Procedure

.1 Contractor's Review

.1 The Contractor and their Subcontractors shall conduct a review of the work and correct all noted deficiencies.

.2 The Contractor shall notify the Consultant, in writing, of satisfactory completion of the "Contractor's Review" after the correction of all noted deficiencies and shall request a "Consultant's Review".

.2 Consultant's Review

.1 The review team shall consist of the Consultant and the Contractor. The Owner or their representative shall attend at their option.

.2 The Consultant will prepare a list of deficiencies noted during the "Consultant's Review" and will issue the list to the Contractor.

.3 The Consultant will determine the value of work associated with any outstanding deficiencies noted during the Consultant's Review. Payment of these retained funds will be withheld until the deficiencies have been rectified to the satisfaction of the Consultant and Owner.

.4 The Contractor shall correct all deficiencies indicated on the list in a timely and satisfactory manner.

.3 Final Review

.1 The Contractor shall request a "Final Review" when the Contractor is satisfied that all deficiencies have been corrected. The request shall be made in writing.

.2 The "Final Review" shall be conducted by the Consultant and the Contractor. The Owner or their representative will attend at their discretion.

.4 Certificate of **Substantial Completion**

.1 The Contractor must submit a request in writing to the Consultant for a Certificate of Substantial Completion.

.2 The Contractor shall comply with the following during Contract close-out:

.1 The requirements of the BC Builders Lien Act.

.2 The requirements of the Workers Compensation Act.

.3 All other contractual requirements.

.5 Total Performance

.1 Immediately following the issuance of the Certificate of **Substantial Completion**, the Consultant, in consultation with the Contractor, will establish a reasonable date for the “Total Performance of the Work”.

.2 The Contractor shall supply all guaranties and review certificates in accordance with the requirements of the Contract Documents prior to the date established for “Total Performance of the Work”.

.6 Release of Holdback

.1 The lien holdback amounts will be released pursuant to the BC Builders Lien Act.

END OF SECTION

1.0 GENERAL

1.1 Manual

.1 An organized compilation of maintenance and renewal data including detailed technical information, documents, and records describing maintenance of individual products or systems as specified in individual sections of Divisions 02 through 32. Also including identification of, and contact information for, specific individual trades and suppliers for work as specified in individual sections of Divisions 02 to 32.

1.2 General

.1 Assemble, coordinate, bind, and index required maintenance and renewal data into Maintenance and Renewal Manual.

.2 Submit a review copy of the completed Maintenance and Renewal Manual to the Consultant two weeks prior to application for Certificate of Substantial Performance. Attach draft or example copies of specific warranties/guaranties if required.

.1 A Deficiency Holdback of $5,000 (prior to factoring) may be enforced for non-delivery of the completed maintenance manual as noted above.

.3 Submit electronic and two hard copies in English.

.4 Organize data into same numerical order as Contract specifications.

.5 Material: Label each section with tabs protected with celluloid covers fastened to dividing sheets.

.6 Type lists and notes. Handwritten summaries will not be accepted.

.7 Drawings, diagrams, and manufacturers' literature must be legible. Provide direct print offs, in colour where applicable, from manufacturers' websites. Copies of re-faxes shall not be accepted.

1.3 Binders

.1 Binders: Vinyl hard covered 3" D-ring, loose leaf sized for 215 x 280 mm paper with spine pocket.

.2 Identify contents of each binder on spine.

1.4 Contents

.1 Cover sheet containing:

.1 Date submitted.

.2 Project title, location, and project number.

.2 Maintenance and Renewal Manual, including but not limited to the following:

.1 General Introduction – explain nature of operations and maintenance items, as well as items that constitute renewals.

.2 Contacts – Include a summary sheet of contact names, telephone, fax, e-mail, and mailing addresses for all applicable parties. Include such parties as:

.1 General Contractor

.2 Specific trades

.3 Specific manufacturers

.4 Related consultants

.5 Etc.

.3 Maintenance Plan – include, in tabular form, a maintenance plan identifying specific components, recommended actions, and time frames. Include such items as:

.1 Joint sealers and backers

.2 Pool coatings

.3 Concrete surface sealers

.4 Etc.

.4 Renewals Plan – include, in tabular form, a summary outlining timing, cost, and nature of component replacement. Include such items as:

.1 Joint sealers and backers

.2 Pool coatings

.3 Concrete surface sealers

.4 Etc.

.5 Materials and Components Summary – include, in tabular form, a summary outlining the specific materials involved in the envelope's construction. Include the product, product manufacturer, trade involved in its application or installation, warranty, and technical data sheet supplied by the manufacturer. Include such items as:

.1 Joint sealers and backers

.2 Pool coatings

.3 Concrete surface sealers

ETC. END OF SECTION

1.0 GENERAL

1.1 Bonds

.1 Bonding costs, including expense of getting bonds executed, shall be borne by Contractor.

.2 Provide Owner with the following surety bonds within 14 days after Contract Award:

.1 A Performance Bond to secure due and proper performance of Contractor's obligations under Contract in an amount equal to 50% of Contract Price.

.1 Performance bonding period commences on date of contract execution and ends two years from date of Substantial Performance.

.2 A Labour & Material Payment Bond in an amount equal to 50% of Contract Price to secure:

.1 Due and proper payment of those having direct contracts with Contractor for labour, material, and/or services.

.2 Full reimbursement to Owner for all liability and payments to those having direct contracts with Contractor for labour, material, and/or services in connection with the Contract.

.3 Bonds are to be in favour of Owner in a form satisfactory to Owner.

.4 Bonds are to name Owner as Obligee. Obligors are Contractor and a Guarantee Surety Company unobjectionable to Owner and not insolvent, bankrupt, nor in receivership or winding-up proceedings.

.5 Guarantee Surety Company is to be a properly licensed surety company registered and duly authorized to transact business of suretyship in Province of British Columbia.

1.2 Warranty/Guaranty Period

.1 Provide a five-year minimum warranty for all Work of Contract commencing on date of Ready-for-Takeover and ending five years thereafter.

.2 Warranty shall be secured by a Performance Bond for two years, in accordance with Article 1.1.2.1.

.3 Extended and/or product warranties beyond the minimum period are outlined below.

1.3 Pool Waterproofing Coating System Warranties

.1 Extended and/or product warranties for waterproofing system for a total warranty period of five years are as follows:

.1 Warranty is to be a Joint Warranty by Contractor and Manufacturer. Submit to Consultant a joint warranty certificate that is signed by Contractor and manufacturer.

1.4 Joint Sealant Warranty

.1 Total warranty period of five years as follows:

.1 Warranty is to be a Joint Warranty by Contractor and Sealant Manufacturer. Submit a joint warranty certificate to the Consultant that is signed by the Contractor and Manufacturer.

1.5 Remedial Work Under Guaranty/Warranty

.1 Perform any warranty repair work required during the warranty period at no extra cost. Refer to 1.5.3 for additional information on costs.

.2 Owner will notify Contractor within 30 days of discovery of any suspected warrantable defect in the Work. Immediately take necessary steps to protect area against further damage and take corrective action to bring defect into conformance with Contract Documents and rectify any damage incurred. Schedule repair work with Owner and make every attempt to correct defects within three weeks of notice.

.3 In event of a valid warranty claim resulting in corrective work, Contractor and Owner shall contact Consultant to determine what level of involvement, including but not limited to field review, may be necessary. Should Consultant determine that field reviews are required during warranty repair work, Contractor shall be responsible for Consultant fees.

.4 Remedy is at no cost to Owner and includes all labour, material, equipment, supervision, and field review necessary to correct defective areas of the Work and any damages incurred to obtain access to defective areas.

.5 Reimburse Owner for resulting assessment costs, including fees associated with Consultant involvement, incurred to define extent of defect and for testing costs incurred to confirm acceptability of repairs.

.6 Warranty periods for areas requiring repair are to be extended by amount of time elapsed between issuance of notice and completion of remedial work. Warranty/guaranty period will re-commence upon completion of remedial work.

.7 Warranties are not to be deemed to restrict liability of Contractor arising out of applicable law.

END OF SECTION

1.0 GENERAL

1.1 Record Drawings

.1 Consultant will provide Contractor two sets of clean white prints for project record drawing purposes.

.2 The Contractor shall maintain accurate project record drawings on one set of white prints throughout the course of the Work that indicate deviations from the Contract Documents in red ink.

.3 Record following information:

.1 Field changes of dimensions and details.

.2 Modifications made via Change Order, Change Directive, or Supplemental Instruction.

.3 Deviation from electrical and mechanical installations shown on Drawings.

.4 Other significant deviations that are concealed in construction and cannot be identified by visual inspection.

.5 Type, approximate size, and location of structural repairs, delaminations, etc.

.6 Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

.4 At completion of the Work and prior to final review, neatly transfer “as-built” records to the second set of white prints using a fine red marker. Neatly print lettering and numbers to match original size. Lines shall be neat and accurate.

.5 Add “AS-BUILT RECORD” at each drawing title block.

.6 Contractor shall submit both sets of “as-built” record drawings to the Consultant prior to submission of the final progress payment application.

.7 Project record drawings shall be available for reference purposes and review by the Consultant at all times. Provide reproducible prints to the Consultant or Owner upon request.

.8 If the Project is completed without significant deviations from the Contract Documents, a written declaration may be submitted to the Consultant in lieu of project record drawings.

1.2 Operation and Maintenance Manuals

.1 Submit electronic copies of manufacturers' printed operation and maintenance manuals where outlined in the technical specifications.

.2 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance as requested within the related Specification sections.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, material, equipment, and supervision required to remove and dispose of all material and debris resulting from removal of designated items, including but not limited to the following:

.1 Existing coatings on the pool basin as indicated on the drawings.

.2 Existing sealants at joints in the pool basin and at cracks in the pool deck as indicated on the drawings and as directed by the Consultant.

.3 Deteriorated/delaminated concrete substrate as specified herein.

2.0 PRODUCTS

Not applicable.

3.0 EXECUTION

3.1 Inspection

.1 Visit and examine the site and note all characteristics and features affecting the Work of this Section.

.2 Properly identify all services, whether buried, built-in, or exposed, as to position, type of service, size, and direction of flow.

.3 Inspect materials, equipment, and components to be re-used or turned over to the Owner. Note their condition and advise the Consultant in writing of any defects or conditions that would affect their removal and re-use.

3.2 Preparation

.1 Prevent movement, settlement, or damage of elements of existing building that are to remain. Provide bracing, shoring, and supports as required. Protect existing surfaces not to be restored from damage during removal procedures.

.2 Cut and/or cap existing services within the work area, if any, prior to start of Work as required, but do not affect services of areas not under construction or essential to on-going operation of the building.

.3 In all cases, exercise reasonable care during removal operations to avoid damaging items to be salvaged, re-used, or items that are not part of the Work.

.4 Seal off work areas to prevent dust and debris from affecting other areas outside of work area. Prevent public access to areas being repaired.

.5 Tape and/or seal and provide protection to all mechanical and electrical services and all fire alarm and security devices still functioning adjacent to work areas to prevent damage resulting from dust, water, or impact.

.6 Cover drains as required to prevent any construction-related materials and debris from entering the drains. Ensure that all drains continue to operate as required during construction.

.7 Remove or protect in place all surface-mounted or permanent fixtures not to be demolished from damage during demolition procedure.

.8 Apply filter cloth to all exhaust and ventilation vents within work area to prevent dust generated by construction activity from escaping.

.1 Clean or replace filter cloth if filter cloth becomes unsuitably dirty as determined by Consultant.

.9 Provide proposed demolition sequence for Consultant review prior to commencing work.

Provide temporary lighting and ventilation as required to work areas.

3.3 Demolition

.1 Remove and dispose of material and debris resulting from removal of concrete.

.2 Remove and dispose of material and debris resulting from removal of the existing pool coatings. Use vacuum dustless or wet abrasive techniques and/or mechanical grinding for removal of coatings and tiles. Existing waterproof membrane shall be totally removed from concrete surface leaving a clean, sound, smooth, concrete surface suitable for placement of a new waterproofing coating to approval of Consultant. Refer to Section 07 18 00 – Pool Gutter Coatings for additional specifications on required surface preparation.

.3 Remove and dispose of material and debris resulting from removal of joint sealants and backers and preparing the joint with sawcutting and nosing modifications. Use vacuum dustless or wet abrasive techniques and/ or mechanical griding for removal of sealants. Refer to Section 07 91 00 – Joint Sealants and Backers for additional specifications on required surface preparation.

.4 Pressure wash clean all pool surfaces in the area of work including pool basin and surge tank.

.5 Remove and reinstall existing mechanical and electrical services associated with slab areas to be demolished. Removal of these services is to be accomplished prior to commencing demolition work outlined in Contract Documents.

.6 Jackhammer demolition of concrete shall be restricted to those areas where existing slab reinforcement is to be preserved intact and at locations adjacent to vertical surfaces where sawcut cannot reach, or where undercutting is required.

.1 Jackhammer size is specified in Section 03 01 32.

.7 Demolition procedures and equipment shall meet all applicable noise control by-laws and regulations at the Place of the Work.

.8 Take care not to damage the surface of sound material that is to remain through removal operation. Where any such damage is done, it is to be repaired by Contractor at their own expense to Consultant’s approval.

.9 Where new concrete is to be applied to existing concrete, leave surface clean and sound.

.10 All required re-painting due to damage overspray, etc. is Contractor’s responsibility.

.11 At end of each day’s work, leave work in safe condition so that no part is in danger of causing injury or damage.

3.4 Cutting and Remedial Work

.1 Perform cutting and remedial work required to make affected parts of the Work come together properly and complete the Work.

.2 Coordinate and perform the Work so that cutting and remedial work is kept to a minimum.

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

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

.5 Cutting and remedial work shall be performed by competent and qualified specialists familiar with the Products affected and in a manner that neither damages nor endangers the Work.

.6 Ensure that cutting and remedial work does not jeopardize manufacturers' warranties.

3.5 Waste Disposal

.1 Dispose of waste products and material in strict accordance with product manufacturer's material safety data sheets and governing waste control regulations.

.2 Existing drainage system is not to be used to dispose of project wastes and/or materials.

.3 Clean pool filters after cleaning is completed.

.4 Store volatile wastes or material in covered metal containers. Remove wastes that create hazardous conditions from premises daily.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, material, equipment, and supervision necessary to prepare slab surface, slab soffit, column, wall, and beam repair areas and place new concrete repair material.

.2 Use of pre-packaged materials is to be in targeted repair locations as directed by the Consultant. These locations may include drive aisles requiring fast turnaround, locations requiring expedited application of traffic deck coating following concrete repairs, or smaller localized concrete repair areas.

.3 All repairs to painted surfaces are to be cleaned and repainted after the concrete repairs have been completed and sufficient time for concrete curing has elapsed.

1.2 Repair Quantity Determination

.1 Length and width shall be measured to the nearest 25 mm (1”). Depth, if applicable, shall be measured to the nearest 13 mm (1/2 inch).

1.3 References

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 British Columbia Building Code

.3	CSA A23.1/CSA A23.2	Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete
.4	CSA A3000	Cementitious Materials Compendium
.5	CSA S413	Parking Structures
.6	ASTM C260/C260M	Standard Specification for Air-Entraining Admixtures for Concrete
.7	ICRI 310.2R	Selecting and Specifying Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

1.4 Performance Requirements

.1 Repaired concrete surfaces shall not scale or crack excessively.

.2 Concrete repair materials shall not spall or debond from existing concrete.

.3 Concrete repair materials shall achieve a minimum compressive strength of 20 MPa within 24 hours.

1.5 Submittals

.1 Submit manufacturer's product specifications and data sheets for the following products:

.1 Top surface patch material

.2 Vertical/Overhead patch materials

.3 Expansion joint nosing repair material

.2 Submittals to be provided for review by the Consultant a minimum of two weeks prior to placement or use of products.

.3 Do not commence placement of repair products until review is complete and proposed products and procedures are accepted by Consultant.

.4 If requested by Consultant, provide a certificate signed by the Contractor and pre-packaged material manufacturer certifying the following:

.1 Surfaces to receive pre-packaged material were acceptable and satisfactory to receive the materials per the manufacturer’s requirements and these Specifications. Application of pre-packaged materials shall imply acceptance of surfaces.

.2 Pre-packaged materials were installed in accordance with manufacturer’s written instructions and these Specifications.

1.6 Qualifications

.1 Use only qualified concrete placers and finishers, with a minimum of two years’ experience in similar work.

2.0 PRODUCTS

2.1 Materials

.1 Portland Cement: Type GU to CSA A3000.

.2 Aggregate: Natural stone to CSA A23.1.

.3 Water: Potable and to CSA A23.1.

.4 Air Entraining Agents: To ASTM C260/C260M.

.5 Chemicals Admixtures: To CSA A3000. Calcium chloride is not permitted.

.6 Pozzolanic Mineral Admixtures: To CSA A3000.

.7 Curing Materials: To CSA A23.1.

.8 Blended Hydraulic Cementing Material: Type 10SF to CSA A3000.

.9 Supplementary Cementing Material: To CSA A3000.

.10 Superplasticizing Admixture: To CSA A3000.

2.2 Bonding Agent

.1 Contractor to provide manufacturer's recommended bonding agent, if applicable, prior to placement of repair material.

2.3 Surface Delamination Repair Materials

.1 Proportion patch materials with specially graded aggregate to give the following properties in accordance with CSA A23.2:

	Description	Requirements
.1	Compressive Strength (24 hours)	20 MPa minimum
.2	Compressive Strength (7 days)	30 MPa minimum
.3	Flexural Strength (7 days)	5 MPa minimum
.4	Slant/Shear Bond Strength (7 days)	5 MPa minimum
.5	Linear Shrinkage	0.08% maximum
.6	Rapid Chloride Permeability	less than 1,000 coulombs
.7	Thermally compatible with concrete substrate under all applicable service conditions.	

.2 The patch materials listed below may conform to the specified properties and linear shrinkage requirements. Manufacturer's latest product data sheets for proposed patch materials shall demonstrate that the patch material conforms to the specified requirements. Where product data is incomplete, manufacturer is to provide supplementary independent test data that demonstrates conformance.

.3 Patch Materials:

	Product Name	Manufacturer
.1	SikaEmaco-1060 (formerly MEmaco T 1060)	Sika
.2	SikaEmaco-1061 (formerly MEmaco T 1061)	Sika
.3	SikaEmaco S 466 (formerly MEmaco S 466)	Sika
.4	SikaEmaco 440 (formerly MEmaco S 440)	Sika
.5	Blue-Line Rapid Repair Grout	Con-Spec
.6	CPD Rapidcrete	CPD
.7	Eucocrete	Euclid Chemical
.8	Versaspeed 100	Euclid Chemical
.9	HP-S6 UG	King a Sika Company
.10	MS-S6 SCC	King a Sika Company
.11	MS-S10	King a Sika Company
.12	RS-S10	King a Sika Company
.13	Planitop 18	Mapei
.14	SikaTop 111 Plus w/Sikacem Accelerator	Sika
.15	SikaQuick 1000	Sika
.16	Sikacrete 08 SCC	Sika
.17	Structuroc H	Lafarge
.18	Traffic Patch Coarse	Target
.19	Traffic Patch Fine	Target

2.4 Vertical/ Overhead Delamination Repair Materials

.1 Overhead patch materials shall be polymer-modified, cementitious, fast setting, and formulated especially for the repair of overhead and vertical concrete surfaces.

.2 Patch materials to have the following properties:

	Description	Requirements
.1	Compressive Strength (7 days)	30 MPa minimum
.2	Flexural Strength (7 days)	5 MPa minimum
.3	Slant/Shear Bond Strength (7 days)	5 MPa minimum
.4	Linear Shrinkage	0.10% maximum
.5	Rapid Chloride Permeability	less than 1,000 coulombs
.6	Thermally compatible with concrete substrate under all applicable service conditions.	

.3 The patch materials listed below may conform to the specified properties and linear shrinkage requirements. Manufacturer's latest product data sheets for proposed patch materials shall demonstrate that the patch material conforms to the specified requirements. Where product data is incomplete, manufacturer is to provide supplementary independent test data that demonstrates conformance.

.4 Patch Materials:

	Product Name	Manufacturer
.1	SikaEmaco 440 (formerly MEmaco S 440)	Sika
.2	SikaEmaco S 466 (formerly MEmaco S 466)	Sika
.3	SikaEmaco 488CI	Sika
.4	SikaEmaco 425 Gel Patch (formerly MEmaco N 425)	Sika
.5	MS-S6 SCC Concrete	King a Sika Company
.6	MS-S6 Self-Consolidating Concrete	King a Sika Company
.7	MS-S10 Self-Consolidating Concrete	King a Sika Company
.8	Fibre Patch OV	Gemite Group
.9	Planitop X	Mapei

	Product Name	Manufacturer
.10	Planitop 23	Mapei
.11	Sika Top 122 PLUS (vertical only)	Sika
.12	Sika Top 123 PLUS	Sika
.13	Structuroc V	Lafarge

2.5 Concrete Resurfacing Materials

.1 Proportion patch materials with specially graded aggregate to give the following properties.

	Description	Requirements
.1	Compressive Strength (24 hours)	20 MPa minimum
.2	Compressive Strength (7 days)	30 MPa minimum
.3	Flexural Strength (7 days)	5 MPa minimum
.4	Slant/Shear Bond Strength (7 days)	5 MPa minimum
.5	Linear Shrinkage	0.08% maximum
.6	Thermally compatible with concrete substrate under all applicable service conditions.	

.2 The patch materials listed below may conform to the specified properties and linear shrinkage requirements. Manufacturer's latest product data sheets for proposed patch materials shall demonstrate that the patch material conforms to the specified requirements. Where product data is incomplete, manufacturer is to provide supplementary independent test data that demonstrates conformance.

.3 Patch Materials (6 to 13 mm thickness):

	Product Name	Manufacturer
.1	SikaTop 122 Plus	Sika
.2	Quikrete Bonded Topping Mix	Target
.3	SikaEmaco 1060 (formerly MEmaco T 1060)	Sika
.4	Mapecem 202	Mapei
.5	Planitop 12 SR	Mapei

.4 Patch Materials (greater than 13 mm thickness):

	Product Name	Manufacturer
.1	Quikrete Bonded Topping Mix	Target
.2	MasterEmaco T 1060/1061 SikaEmaco 1060/1061	Sika
.3	Blue-Line Rapid Repair Grout	Con-Spec
.4	Planitop 12 SR	Mapei

2.6 Repair Materials for Reduced Curing Period

.1 Approved product for surface delamination repairs requiring extra-fast curing period:

	Product Name	Manufacturer
.1	VersaSpeed 100	Euclid Chemicals
.2	SikaEmaco 430 (formerly MEmaco T 430)	Sika

2.7 Admixtures

.1 Use only compatible admixtures and add to mix in strict accordance with manufacturer's written instructions.

.2 Use of calcium chloride not permitted.

2.8 Non-Shrink Grout

.1 Premixed compound consisting of non-metallic aggregate, cement, and water reducing and plasticizing agents, of pouring consistency, capable of developing compressive strength of 35 MPa at 28 days.

.2 Non-shrink grout materials:

	Product Name	Manufacturer
.1	In-Pakt Construction	King a Sika Company
.2	Sika Grout 212	Sika Canada Inc.
.3	CPD Non-Shrink Grout (Pre-Mix)	CPD Construction Products

3.0 EXECUTION

3.1 Concrete Surface Preparation

.1 All concrete surfaces to receive new concrete repair material shall have a minimum No. 6 CSP per ICRI 310.2R and be thoroughly abrasive-blast prior to concrete placement to remove laitance, debris, and loose aggregate.

.2 Clean all existing concrete surfaces to receive new concrete of foreign material, dust, debris, grease, and oil as directed by Consultant. Emulsifiers shall be required for surfaces containing grease or oil.

.3 Contractor to notify Consultant to review surfaces prior to concrete placement.

3.2 Concrete Placement – Surface Repairs

.1 Prepare patch surface, mix patch material, and apply, finish, and cure in strict accordance with the more stringent requirements of the Contract Specifications and manufacturer's written instructions.

.2 The patch area shall be thoroughly wetted as required to achieve a saturated surface dry (SSD) state prior to placing concrete repair material.

.3 Puddles of free water shall be blown from the patch area and the surface is to be permitted to dry to a saturated surface dry (SSD) state prior to application of cement slurry.

.4 If required by manufacturer, apply a cement slurry bonding agent to the surface of the concrete just prior to placing new concrete. The bonding agent shall be scrubbed into the concrete to fully saturate the surface but not allowed to puddle.

.5 Pre-wet filter fabric, burlap, or cotton mats shall be available on site prior to placement of concrete to allow for immediate placement overtop of new concrete patches after their initial set.

.6 Prepare pre-packaged concrete mix per manufacturer's specifications.

.7 Contractor to confirm the minimum and maximum application lift thickness prior to placement of concrete. If required and permitted by the manufacturer, the concrete repair material can be extended with aggregate.

.8 Contractor to submit proposed aggregate extension mix design to the Consultant prior to proceeding with Work.

.9 On slab top surfaces, place new dense concrete thoroughly compacted and vibrated into place to ensure good bond.

.1 Ensure reinforcing steel is secured in place and is not disturbed during placement.

.2 Vibrators are to be used for consolidation purposes only and are not to be used to an extent that causes segregation of the concrete.

.3 Internal vibrators shall conform to CSA A23.1 Clause 7.2.5.2 and Table 19: Internal Vibrators for Various Applications.

.4 Vibrators shall be inserted into concrete perpendicular to concrete surface.

.5 Vibrators shall be inserted such that zones of consolidation always overlap.

.10 Concrete surfaces to be flush with existing surfaces, free of voids and cracks, and have a uniform surface and transition to the existing surface.

.11 Finish concrete in accordance with CSA A23.1/A23.2. Initial finish shall be completed before any bleeding or free water is present on the surface of the concrete. Final finishing shall commence after the bleed water has disappeared and when the concrete has stiffened sufficiently to prevent the working of excess mortar to the surface. Do not add water to finish.

.12 Do not overwork concrete surface. Wood float finish is acceptable.

.13 Do not use steel trowels with air-entrained concrete. For air-entrained concrete, the surface can be further levelled and consolidated with a magnesium bull float for larger repairs or a magnesium trowel for smaller repairs. One or more passes shall be made at suitable time intervals to obtain a level finish free of float marks. Do not work bleed water on the concrete surface into the concrete during finishing.

.14 Tool crack control joints where indicated on Drawings or, if not shown on Drawings, per existing layout.

.15 Cure in accordance with the more rigorous requirements of this Section and manufacturer’s written instructions.

.16 Areas of concrete repair completely through the thickness of the slab shall be patched with concrete, well consolidated, and vibrated into place on to smooth plywood forms with suitable release agents adequately shored from the slab below, to the approval of the Consultant. Once forms have been removed, edges of through slab repair are to be ground, hand patched, etc. as required to produce smooth (form like) transition from new patch material to the existing slab.

.17 Do not allow traffic on newly placed repair patches until 75% of the specified 28-day strength has been reached.

3.3 Concrete Placement – Vertical and Overhead Surfaces (Gravity Grouting)

.1 Ensure formwork is secure and free of debris.

.2 Thoroughly wet the patch area and forms for a period of not less than twenty-four (24) hours prior to concrete placement.

.3 Place new concrete into forms by gravity method and thoroughly consolidate concrete in forms using vibrators or other Consultant-approved method.

.4 Remove all formwork and support brackets to leave a smooth and flush concrete finish after curing. Formwork to remain in place for seven days minimum for curing or longer until concrete has attained 75% of its specified 28-day strength.

.1 Apply approved curing compound as recommended by grout manufacturer as alternative to seven-day cure by formwork if 75% of concrete strength is achieved.

.5 Edges of repair areas are to be ground, hand patched, etc. as required to produce a smooth (form-like) transition from the new patch surface to the existing slab to the approval of the Consultant once forms have been removed.

.6 Concrete repair material that is sagged, debonded, porous, honeycombed, or cracked shall be replaced.

3.4 Slab Surface - Repair of Surface Scaling

.1 The entire slab surface shall be lightly jackhammered or scarified to a minimum No. 6 CSP per ICRI 310.2R and be thoroughly abrasive-blast, or shot blast prior to concrete placement to remove laitance, debris, and loose aggregate.

.2 Slab surfaces shall be cleaned of all grease and oil.

.3 Areas where the slab surface has deteriorated greater than 25 mm in total depth, or where reinforcing is exposed, are to be repaired as a concrete surface repair.

.4 Thoroughly clean patch of dust and debris.

.5 Prepare surfaces and place concrete mixture in strict accordance with CSA A23.1 and manufacturer requirements.

.6 Surfaces to be trowelled smooth, flush with existing surfaces, and with no voids at patch edges.

.7 Cure in accordance with the more rigorous requirements of this section and manufacturer written instructions.

.8 Do not permit traffic on repairs for a minimum of 24 hours after finishing.

.9 Repair areas to receive a membrane will require additional surface preparation as outlined in the relevant specification section.

3.5 Concrete Mixing and Placing

.1 Concrete shall be machine mixed unless otherwise stipulated by the manufacturer. Mixing and placing shall be in accordance with CSA A23.1.

.2 Concrete shall be conveyed from the mixer to the place of deposit by methods that will ensure the required quality of concrete. Equipment for conveying the concrete shall be of such size and design as shall ensure a practically continuous flow of concrete at the delivery end without separation of materials.

.3 Concrete shall be deposited in the forms as near as practicable to its final position to avoid re-handling.

.4 Depositing shall be continuous throughout each division and the concrete shall be placed and worked so that a uniform texture will be produced.

.5 No concrete shall be placed later than one half hour after leaving the mixer. No re-tempered concrete shall be allowed.

.6 Mix concrete in accordance with the manufacturer's written instructions.

3.6 Compaction and Vibration

.1 Concrete shall be consolidated by means of sufficient vibrators of adequate size operated by competent workers.

.2 The use of vibrators to transport concrete shall not be allowed.

.3 Concrete shall be thoroughly worked around reinforcement, around embedded items, and into corners.

.4 Compaction and vibration is to eliminate all air and stone pockets that may cause honeycombing, pitting, or planes of weakness.

3.7 Concrete Curing

.1 Ensure manufacturer's recommended curing conditions are maintained over the patch area. The more stringent curing conditions between the manufacturer's written instructions and those outlined in this section will govern unless otherwise agreed upon by the Consultant in writing.

.2 Initiate surface concrete repair wet curing as soon as possible after the concrete has sufficiently set, and no later than 30 minutes after finishing.

.1 Minimum acceptable wet curing method on slab surfaces is installation of pre-saturated filter fabric, burlap, or cotton mats that are covered with soaker hoses and plastic sheeting. Overlap wet-curing mats 150 mm and ballast in place without marring the concrete surface.

.2 Wet curing procedures to be in accordance with manufacturer's written requirements, but shall be no less than a one-day period at a minimum temperature of 10°C. Water shall not be permitted to evaporate from the concrete surfaces at any time within the wet cure period.

.3 Prevent airflow in the space between the wet-curing mats and the plastic sheeting. Protect wet-curing assembly from freezing during cold weather.

.3 Vertical repair patches are also to be wet cured for a duration of seven days by either:

.1 Maintaining formwork in place with form ties loosened and water applied to run down the inside form face after the concrete has hardened to keep the repair surfaces wet.

.2 Removing formwork from vertical surfaces and providing fog misting, light water spray, or application of wet burlap covered with polyethylene to keep the repair surfaces continually wet.

.4 Exposed slab soffit repairs require, as a minimum, misting with a water spray on a daily basis during the wet-curing period, or as often as is necessary to prevent surface dusting.

.5 The use of chemical curing compounds is not permitted.

.6 Protect concrete from the harmful effects of heat, cold, running or surface water, and mechanical shock.

.7 Do not place concrete when air temperature is below 10°C, or without implementing provisions to ensure proper curing of concrete when, in the opinion of the Consultant, there is a possibility of air temperature falling below 10°C. These provisions shall be reviewed by the Consultant and conform to the requirements of CSA A23.1.

.8 Maintain concrete material and forms between 15°C and 32°C until concrete placement whenever the surrounding air is below 5°C. No frozen material or material containing ice shall be used. All existing concrete, reinforcement, forms, and ground that the concrete will contact is to be free from frost.

.9 Maintain a curing temperature above 10°C for a minimum of 24hrs or longer to ensure proper concrete curing per manufacturer requirements. Under no circumstances may dry heat be used. Provide means to humidify the air within the heated enclosure and ensure that moisture requirements for curing are maintained.

.10 Do not allow traffic onto patch until material has adequately cured to its specified 24-hour compressive strength.

.11 The Consultant will have cause to not certify payment for repairs undertaken without adequate wet-curing procedures or that become surface dry during the specified curing period.

3.8 Inspection and Testing

.1 Testing is to conform to CSA A23.2.

.2 Inspection and testing may be conducted by a testing agency designated by the Owner or Consultant. The Owner will pay costs of inspection and testing described in this section.

.3 Contractor to inform testing agency 24 hours in advance of concrete placement.

.4 Testing may include:

.1 Preparation and testing of concrete grout cubes or cylinders for compressive strength.

.2 Review manufacturer product data sheets submitted by the Contractor.

.3 Bond testing of concrete repair patches to existing concrete where designated by the Consultant.

.4 Submission of test results to the Owner, the Consultant, and the Contractor.

.5 A minimum of one set of concrete grout cubes (9 cubes) or cylinders (4 cylinders) shall be taken for compressive strength testing for each concrete patch material used each day unless otherwise directed by Consultant. Concrete test samples are to be placed in an area with similar curing conditions to that of the cast concrete.

.5 Testing procedures for concrete shall conform to the following requirements:

.1 Compression tests on concrete shall be carried out in accordance with CSA A23.1 and A23.2. Strength test on approved grout shall consist of nine grout cubes with three cubes tested at seven days and the remainder tested at 28 days. For cylinders, strength tests shall be undertaken on one cylinder each at 3 and 7 days with the remaining two tested at 28 days.

.6 The Contractor shall provide at no additional costs to the Owner:

.1 Samples of all material required for testing.

.2 Cooperation with the execution of concrete testing which shall include protection against injury or loss of grout cubes or cylinders.

.3 Access for the testing agency to test and/ or inspect materials.

.4 Site storage facilities meeting requirements of CSA A23.2 for concrete test specimens prior to removal to laboratory.

.7 Bond Strength:

.1 After the concrete or grout has cured, the testing agency may perform bond strength tests if requested by Consultant.

.2 These cores are to be used for the evaluation of the bond strength of the new concrete to the existing by direct tensile force. The testing agency will drill through patches selected by Consultant.

.3 Failure to achieve a minimum tensile bond strength of 0.9 MPa shall constitute failure of patches.

.4 Contractor to fill all core holes with non-shrink cementitious grout upon completion of the tests.

.8 Contractor shall pay for costs of additional testing as follows:

.1 If Contractor fails to notify testing agency in event of pour cancellation.

3.9 Field Quality Control

.1 The Consultant shall evaluate bonding of fresh patch material to existing concrete after the fresh patch material has cured sufficiently.

.2 The evaluation shall be performed by sounding, using a "chain-drag" or other techniques.

.3 Hollow sounds detected in repair area provide reason to suspect inadequate bonding. Contractor to core these areas to determine bonding adequacy where requested by the Consultant.

.4 Coring shall be through the new concrete and into the existing concrete. Core diameter shall be 75 mm, or as required by the Consultant. Length of cores shall be twice the core diameter or twice the thickness of new concrete, unless otherwise requested by the Consultant.

.5 Scanning is to be completed prior to coring to avoid coring through embedded reinforcing, conduit, or other embedded items.

.6 Cores will be visually inspected after removal and any further testing that is required will be determined by the Consultant.

.7 Contractor to patch core holes.

3.10 Rejection of Defective Work

.1 The Consultant shall have the right to order additional concrete testing of any portion of repairs in accordance with CSA A23.1 if previous testing demonstrates non-conformance with specified requirements. The testing agency shall be selected by the Consultant and shall deal directly with the Consultant. Payment for costs associated with the additional concrete testing will be at the Contractor’s expense.

.2 Where it is the Consultant’s opinion that material or workmanship fails to meet the specified requirements, the work shall be replaced or repaired to the approval of the Consultant at no additional cost to the Owner.

.3 Bond failure between repair material and the existing concrete, or failure to meet compressive strength requirements based on compression testing of concrete cylinders, will result in drilling of additional core samples at the Contractor’s expense. Failure of these additional samples will require the work to be replaced or repaired to the approval of the Consultant at no additional cost to the Owner.

3.11 Record Drawings

.1 Maintain accurate records of the location, size, and concrete placement date for each repair area.

.2 Records to be kept up-to-date and made available to Consultant throughout the duration of the Work.

.3 Prior to Substantial Performance of the Work, provide a plan showing location, size, and date of concrete repairs.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Remove sound and unsound concrete from slab surfaces, soffits, columns, and walls where directed by Consultant and as described herein.

2.0 PRODUCTS

2.1 Equipment

.1 Provide hand-held jackhammers for concrete removal that are capable of efficiently removing sound and unsound concrete without causing excessive or unwanted removal.

.2 Maximum jackhammer size is 15 kg. Light chipping hammers are to be used where the Consultant deems it necessary to reduce the amount of concrete breakage. Maximum light chipping hammer size is 7 kg. The use of light chipping hammers is at no additional cost to the Owner.

.3 Equipment located outside shall be mufflered or placed within an acoustic enclosure to produce maximum operating noise levels of 70 dBa at 3.0 m. Noise levels are also to be in accordance with all local and municipal by-laws and regulations.

.4 Use "silenced" compressors.

.5 Compressors and all diesel-powered equipment are to be fitted with a diesel exhaust scrubber.

3.0 EXECUTION

3.1 Surface Concrete Removal

.1 Actual concrete removal areas to be designated on site by the Consultant. Minimum depth of removal to be 50 mm at patch boundaries. Delamination sizes and locations as shown on the drawings are provided as general guidelines only.

.2 Take precautions to avoid punching through the slab.

.3 Remove concrete within designated areas to obtain a minimum of 25 mm clearance around all exposed reinforcement within delamination repair. Minimum removal depth shall be 50 mm, which may include sound concrete.

.4 Upon exposure of visibly corroded or debonded reinforcement, additional concrete removal shall be performed until bars appear to be rust-free and well bonded for a distance of 75 mm and perimeter of designated area is sound, or until otherwise directed by the Consultant.

.1 This concrete removal shall not proceed until authorized by Consultant.

.2 Contractor shall not receive payment for concrete removals not authorized by nor considered necessary to Consultant.

.5 Excess or unnecessary concrete removal to be at no extra cost to the Contract.

.6 Outline patch area with a 13-mm deep vertical sawcut as close as possible to limits of concrete already removed. Reduce sawcut depth if necessary to avoid cutting reinforcement. Remove concrete to sawcut taking precautions to avoid damaging sawcut edge. Edges with spalls or chips will be rejected and shall be re-sawcut at Contractor's expense.

.7 Call for review by Consultant to confirm acceptability of patch preparation prior to cleaning of reinforcement. After concrete removal has been complete, a final check adjacent to the areas shall be made by the Contractor to determine any additional spalling or delamination which may have occurred. Contractor shall mark out these areas and notify Consultant to make a review.

.8 Remove additional concrete required to provide adequate development and/or lap for new reinforcing steel required as directed by the Consultant.

3.2 Soffit and Vertical Surface Concrete Removal

.1 All unsound soffit concrete is to be removed in areas designated by Consultant.

.2 Take precautions to avoid punching through the surge tank slab.

.3 Use light chipping hammers for all soffit and vertical concrete removal.

.4 Remove concrete within designated areas to obtain a minimum of 25 mm clearance around all exposed reinforcement within the delamination repair. Minimum removal depth shall not be less than 50 mm, which may include sound concrete.

.5 Unless otherwise specified, do not remove concrete behind vertical reinforcing steel at wall and column locations. Obtain direction from the Consultant once existing reinforcing steel has been exposed if further concrete removal is required.

.6 Upon exposure of visibly corroded or debonded reinforcement, additional concrete removal shall be performed until bars appear to be rust-free for a distance of 75 mm around the perimeter of a patch or until otherwise directed by the Consultant.

.7 Excess or unnecessary concrete removal to be at no extra cost to the Contract.

.8 Outline patch area with a 13-mm deep vertical sawcut as close as possible to limits of concrete already removed. Reduce sawcut depth if necessary to avoid cutting reinforcement. Remove concrete to sawcut taking precautions to avoid damaging sawcut edge. Edges with spalls or chips will be rejected and shall be re-sawcut at Contractor's expense.

.9 Call for review by Consultant to confirm acceptability of patch preparation prior to cleaning of reinforcement. After concrete removal has been complete, a final check adjacent to the areas shall be made by the Contractor to determine any additional spalling or delamination which may have occurred. Contractor shall mark out these areas and notify Consultant to make a review.

3.3 Concrete Removal for Surface Scaling Repairs

.1 The Consultant will locate and define the extent of repair on site. Approximate areas have been indicated on Drawings.

.2 Contractor will outline the area with a 13 mm deep vertical sawcut. All patches will be rectangular and perpendicular to grid lines unless directed otherwise by Consultant.

.3 Remove concrete to sawcut taking precautions to avoid damaging sawcut edge. Edges with spalls or chips will be rejected and shall be re-sawcut at Contractor's expense. Minimum depth of removal is to be 13 mm.

.4 Call for review by Consultant to confirm acceptability of concrete removal prior to patching.

3.4 Existing Exposed Electrical Services

.1 The Contractor shall perform temporary removal, replacement, or relocation of existing electrical wiring, conduit, equipment, fixtures, or hardware in designated concrete delamination repair areas as required for completion of the Work.

.2 All exposed conduit, fixtures, attached devices, wet-sprinkler fire system piping, heads and pull stations, fire extinguishers, mechanical system components, louvers and ducts are to be protected or Contractor to correct damages at their own expense. The Contractor shall promptly report any damage to the Owner and the Consultant.

.3 Prior to commencing the Work, the Contractor shall contact the Owner to locate all protective or alarm systems and sensors. All services shall be protected against damage or interruption. The Contractor shall provide the Owner with minimum 48 hours advance notice of any necessary interruption. All claims resulting from damage shall be the responsibility of the Contractor.

3.5 Existing Embedded Electrical Services

.1 It is the Contractor's responsibility to ensure that all potential areas of buried conduit be identified and that all high voltage systems located in the area of work are switched off to prevent possible injury. Coordinate requirements with Owner.

.2 The Contractor shall take the utmost caution during concrete removal operations in order to prevent damage to embedded conduits. Any damage caused to such conduits will be immediately reported to the Owner and Consultant. In no instance will damaged or deteriorated conduits be covered up by the Contractor without specific approval from the Owner.

.3 Contractor to repair or abandon damaged conduit within the slab at the discretion of the Consultant. Owner to pay for repairs provided that damage did not result from Contractor's negligence.

.4 Contractor to coordinate required repairs with designated Electrical Sub-Contractor. Owner shall designate Electrical Sub-Contractor for the Work.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Clean and prepare existing reinforcement exposed within concrete repairs and where otherwise designated by the Consultant.

.2 Supplement corroded or damaged reinforcement with new reinforcing steel and accessories, including supply, fabrication, handling, and placing.

1.2 Reference Standards

.1 All Reference Standards are latest editions referenced by the building code in the Place of the Work, or latest editions if not referenced by Code.

.2 British Columbia Building Code

.3	CSA A23.1/CSA A23.2	Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete
.4	CSA G30.18	Carbon Steel Bars for Concrete Reinforcement
.5	ACI Manual of Standard Practice for Detailing – 28th Edition	
.6	CSA W186	Welding of Reinforcing Bars in Reinforced Concrete Construction
.7	Reinforcing Steel Institute of Canada (RSIC) Manual of Standard Practice	
.8	SP-71 (08)	ASTM Standards in 318-08
.9	ASTM A775/A775M	Standard Specification for Epoxy-Coated Reinforcing Steel Bars

1.3 Product Handling

.1 Protect reinforcement in a manner that prevents excessive rusting and fouling with dirt, grease, form oil, and other bond-breaking coatings.

.2 Reinforcement shall be free from excessive corrosion, mud, oil or other coatings that adversely affect its bonding capacity at the time concrete is placed.

2.0 PRODUCTS

2.1 New Concrete Reinforcement and Accessories

.1 Reinforcing steel bars shall conform to CSA G30.18, 400 MPa grade unless otherwise specified herein or on the drawings. Plain finish.

.2 Reinforcing bars to be welded shall conform to CSA G30.18.

.3 Bar supports shall conform to SP-71: ASTM Standards in 318 unless otherwise approved by the Consultant.

.4 Chairs, bolsters, bar supports, and spacers shall be epoxy coated or plastic. The use of pebbles, pieces of broken stone or brick, pipe, or wooden blocks will not be permitted.

.5 Tie wire for coated or galvanized reinforcing shall be plastic-coated.

3.0 EXECUTION

3.1 Preparation - Reinforcement in Place

.1 Exposed reinforcement and steel shall be completely cleaned of cement paste, corrosion, oil, and contaminants. Dry abrasive-blast clean to near-white blast, completely cleaned of all grease, oil, dirt, mill scale, cement paste, debonded epoxy, etc. Additional cleaning shall be performed if subsequent corrosion occurs after initial cleaning.

.2 Wire brush, grinding, and similar hand-cleaning methods shall not be permitted in lieu of abrasive-blast cleaning of reinforcement, unless approved by the Consultant.

.3 The Contractor may elect to cut, remove, and replace damaged or corroded reinforcement with new reinforcement in lieu of cleaning existing exposed reinforcement, subject to approval of the Consultant. Provide required tension lap splices with existing cleaned reinforcement at no additional cost to the Owner and Consultant’s approval.

3.2 Installation

.1 Replace or supplement damaged or severely corroded reinforcement exposed in concrete delamination repair patches with new plain reinforcement where existing reinforcing steel has a section loss of 20% or greater.

.2 Replace or supplement damaged or severely corroded reinforcement where otherwise directed by the Consultant.

.3 Replacement or supplemental reinforcing bars shall be the same bar size or greater than the original bar.

.4 Additional concrete removal may be required to allow for placement of supplemental reinforcing bars. The length of the supplemental bars shall be equal to the length of the deteriorated segment of the existing bars, plus the required lap splices at each end. Splicing requirements shall be in accordance with indicated Reference Standards. Supplemental bars shall be placed parallel to, and approximately 20 mm from, the existing bars.

.5 Additional concrete removal required for supplemental reinforcement placement will be paid by Owner except where Contractor elects to replace bars in lieu of abrasive-blast cleaning.

.6 Reinforcement that is fully exposed in repair areas for the entire bar length shall be removed and replaced with new reinforcement of the same bar size or greater at no additional cost to the Owner.

.7 Accurately place supplemental reinforcement and secure existing reinforcement exposed in the delamination repair patches to maintain original design layout.

.8 Reinforcement shall be firmly tied and supported by bar supports and side form spacers to ensure proper concrete cover and spacing within allowable tolerances before and during concrete placement.

.9 Bar supports shall be sufficient in number and strength to carry the reinforcement they support and prevent displacement by workers or equipment before and during concrete placement.

.10 Bars shall be tied at all intersections where spacing is greater than 250 mm in each direction and at alternate intersections where spacing is less than 250 mm in each direction.

.11 Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, and embedded items. If bars are moved more than one bar diameter, or enough to exceed specified tolerances, the resulting arrangement of bars shall be subject to Consultant's approval.

3.3 Inspection and Testing

.1 No concrete shall be placed until Consultant has reviewed reinforcing in-place. Provide minimum 24 hours of notice of time when reinforcement will be substantially in place and ready for Consultant's review.

.2 Inspection of reinforcement coated in place shall include visual inspection with flashlight and mirror. This inspection shall be first made by the Contractor. When the Contractor is satisfied epoxy coating is in conformance with the Specifications, notify Consultant to review the work.

END OF SECTION

1.0 GENERAL

1.2 Work Included

.1 Provide all labour, materials, equipment, and supervision to:

.2 Prepare pool basin slab and surge tank surfaces and vertical upturns, detail all cracks and joints, patch perimeters and voids, and install coatings to areas designated on the Drawings.

.3 Provide all labour, materials, equipment, and supervision to prepare penetrations in the pool surfaces such as drains and install waterproofing tie-ins at locations designated on the Drawings.

.4 Detail cracks, including crack surface preparation and flexible sealant installation.

.5 Perform patching, surface preparation, and membrane upturn at all vertical surfaces.

1.3 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 British Columbia Building Code

.3	ASTM D412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension
.4	ASTM D7234	Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers
.5	ASTM D4541	Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
.6	ASTM E96/E96M	Standard Test Methods for Water Vapor Transmission of Materials
.7	AASHTO T 277	Standard Method of Test for Electrical Indication of Concrete’s Ability to Resist Chloride Ion Penetration

.8	ICRI 310.2R	Selecting and Specifying Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair
.9	ASTM D4263	Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
.10	ASTM F2170	Standard Test Method for Determining Relative Humidity on Concrete Floor Slabs Using in situ probes.
.11	BC Ministry of Health	BC Guidelines For Pool Design

1.4 Site Examination

.1 Bidders shall visit the Place of the Work to review pool surfaces to receive the coating. Rough surfaces may require additional surface preparation after cleaning. Bid shall include all costs of surface preparation and patching of rough surfaces. No extras for surface preparation or additional material will be entertained after bid closing.

.2 If approved by the Owner, bidders may remove sections of the existing waterproofing system to evaluate pool substrate surface roughness. Bidders agree to accept existing surface conditions at time of bid.

1.5 Performance Requirements

.1 The pool coating system shall satisfy the following requirements for the duration of the warranty:

.2 System shall be totally waterproof, flexible, and thermally compatible with the substrate under applicable service conditions.

.3 System shall not allow moisture penetration at termination details, drains, upturns, or splices.

.4 System shall exhibit zero chloride permeability when tested in accordance with AASHTO T 277 test procedure for rapid determination of the chloride permeability of concrete.

.5 System shall withstand active cyclical crack movements to a minimum of 1.5 mm and remain waterproof.

.6 Adhesion Testing to ASTM D4541: Adhesion of coating, primer, or surface patching to the concrete substrate shall meet or exceed 1.0 MPa.

.7 Adhesion Testing to ASTM D4541: Adhesion of all system layers to each other shall meet or exceed 1.0 MPa.

.8 System shall not debond, crack, or wear excessively.

1.6 Submittals

.1 Submit details of waterproofing system not indicated in these documents including material specifications, thicknesses, details at joints, cracks, upstands, walls, drains, and termination points for Consultant review prior to starting work.

.2 Submit installation procedures, including substrate preparation requirements, for Consultant review prior to starting work.

.3 Submit product data for proposed products to be used to patch rough surfaces for Consultant review prior to coating application.

.4 If requested, pool coating system applicator shall submit certificates confirming the following:

.1 Coating system applicator is presently a licensed and trained applicator of the coating system.

.2 System will meet the specified warranty requirements.

.5 If requested, provide a certificate signed by the Contractor and waterproofing system manufacturer certifying the following:

.1 Surfaces to receive waterproofing systems were acceptable and found satisfactory to receive the waterproofing system per the manufacturer’s requirements and these Specifications. Application of coating implies acceptance of surfaces.

.2 Patching compounds, etc. are compatible with waterproofing system.

.3 Coating was applied in accordance with manufacturer’s recommendations and these Specifications.

.4 Completed waterproofing system conforms to the system described herein.

.6 Any existing conditions that may adversely affect bonding or performance of the coating shall be brought to the attention of the Consultant, in writing, for resolution prior to installation of the coating.

Where coating is to lap an existing coating to remain, the manufacturer is to confirm in writing that the new coating is compatible with the existing waterproofing prior to commencement of work.

.8 The Contractor shall install an on-site mock-up including surface preparation and the pool coating system for review by the Consultant and Owner prior to large scale preparation taking place. The mock-up may remain as part of the work.

.9 Provide electronic copies of maintenance instructions for finished surfaces prior to Substantial Completion. Hard copies shall also be provided if requested by the Consultant.

.1 Maintenance manual to include Project name, location, dated and executed copy of manufacturer's guaranty, described herein and name, address, and phone number of nearest manufacturer's representative. Include recommendations for periodic inspections, care, and maintenance. Identify common causes of damage with instructions for temporary patching until permanent repair can be made.

1.7 Pool Coating Acceptance

.1 The Consultant will review material thickness during the coating installation. The material thickness must comply with Manufacturer's written installation instructions or will be rejected. The Owner to pay for initial testing costs. The Contractor to pay for all re-testing costs, if required.

.2 The Consultant or a Third Party Inspection Agency may review adhesion via random location pull off tests to ASTM D7234-12. If the pool coating system fails to achieve the minimum adhesion requirement as specified in 1.4.1.5, Contractor to pay for all testing and all costs incurred by the Owner to prove conformance with the specifications.

.3 If requested, Contractor to submit a certificate as described in 1.5.5.

1.8 Environmental Requirements

.1 Install coatings and oversee curing with ambient and surface temperatures as specified by the Manufacturer. Use temporary heaters if required.

.2 Protect materials from moisture damage or dust contamination until adequately cured.

.3 Use appropriate measures for protection and heating to ensure proper drying and curing conditions in accordance with manufacturer's recommendations if application occurs during inclement weather.

.4 Maintain air temperatures and substrate base temperature of installation area above 10°C for 12 hours before, during, and 72 hours after installation, or until materials have adequately cured.

.5 Ensure substrate is dry and Work areas are properly ventilated to maintain proper application conditions and to avoid disturbing the public with associated odours.

.6 Provide forced air circulation during installation and curing period for enclosed applications.

.7 Protect materials from moisture damage or dust contamination until adequately cured.

.8 All working conditions shall meet the requirements of local, provincial, and federal health and safety regulations in effect at the Place of the Work.

2.0 PRODUCTS

2.2 Pool Coating Systems

.1 The following systems are accepted based on pre-qualifications. No other systems will be considered on this project unless otherwise noted.

.2 Notwithstanding the pre-qualification of these systems, all systems must be bid based on the minimum criteria identified in the Specifications.

.3 The Owner reserves the right to select final colour from those standard colours available for a coating. Contractor is to obtain written acceptance of final colour selection prior to ordering material.

.4 A primer shall be applied prior to the application of the pool coating system per manufacturer recommendations.

2.3 Approved Pool Coating Systems

.1 Standard Grade Chlorinated Rubber – Based Coating:

.1 Paralon 2, by Olympic Pool Paints.

.1 System Coating Thicknesses: Minimum wet film thicknesses for each coating application as follows:

.1 1st Coat: 3 to 4 mils wet film thinned as per manufacturer recommendations.

.2 2nd Coat: 3 to 4 mils wet film as per manufacturer recommendations.

.3 3rd Coat: 3 to 4 mils wet film as per manufacturer

.2 Thicknesses specified are minimum neat film thickness, not average. Contractor shall grind down or patch rough surfaces to ensure minimum thickness of membrane is applied everywhere. Alternatively, if approved by the Manufacturer, additional membrane may be applied to achieve minimum thickness.

.3 Anti-skid aggregate surfacing shall be glass bead, aluminum oxide bead or approved equivalent.

2.4 Paint for Pool Markings Such as Lane and Depth Markings

.1 Rubberized paint compatible with the pool coating as recommended by the manufacturer. Colours to match existing unless otherwise noted. Colours to be approved by the Owner. Standard of acceptance:

.1 Optilon – Synthetic Rubber, by Olympic Pool Paints

.2 Paralon 2 Chlorinated Rubber, by Olympic Pool Paints.

.3 Approved alternate.

2.5 Surface Patch Materials

.1 As recommended by coating manufacturer.

2.4 Joint Filler

.1 Joint filler material at crack locations in the concrete substrate < 0.7mm in width where coating is to be applied. Acceptable products:

.1 Sikadur 31 Hi-Mod Gel by Sika.

.2 Permaseal Permanent Nitrile Rubber Joint Filler by Olympic Pool Paints.

.3 Approved alternate.

2.5 Accessories

.1 Paint for Pool Wall and Gutter Markings: Epoxy paint compatible with pool coating as recommended by the pool coating Manufacturer. Colours to be approved by the Owner.

3.0 EXECUTION

3.1 Preparation

.1 All drains, ladders, grates etc. shall be removed and re-installed as required for application of coatings unless otherwise noted on Drawings.

.2 Preparation of substrate and vertical surfaces is to be in strict accordance with the requirements of the system manufacturer’s recommendations and the Contract Documents. Preparation includes smoothing of rough surfaces and detailing of slab cracks, joints, and voids as required.

.3 Minimum standard of substrate cleaning shall be pressure washing and targeted mechanical grinding or Consultant-approved alternative. Cleaning is to leave slab surfaces free of all laitance and provide a Level 3 Concrete Surface Profile (CSP) per ICRI 310.2R.

.4 Minimum standard of vertical surface cleaning shall be pressure washing and targeted mechanical grinding or Consultant-approved alternative for all systems. Surface preparation is to provide a Level 3 Concrete Surface Profile (CSP) per ICRI 310.2R.

.5 Surfaces shall be cleaned of all grease and oil with an emulsifier or degreaser where necessary to ensure that surface contaminants have been removed. Cleaning products shall not affect the performance of the pool coating. Do not apply coating until water spot testing confirms that water drops penetrate into the concrete without surface beading at cleaned areas.

.6 New concrete surfaces shall be allowed to air dry a minimum of 14 days after moist curing.

.7 All rough surfaces with a vertical amplitude exceeding 40 mils (1.0 mm) must be ground or filled to provide a smooth surface.

.8 Remove all existing crack sealants.

.9 Sawcut cracks or joints shall be straight sided and follow the extent of the crack. Locations of crack sealing shall be where directed by the Consultant. Do not sawcut beyond the extent of the cracks.

.10 Prepare sawcut surfaces prior to priming and sealing.

.11 Fill sawcut cracks and joints with approved sealant material flush with slab surface. Application to be in strict conformance to the manufacturer's recommendations and the Contract Documents.

.12 The preparation of all surfaces for membrane application shall include removal of existing paint and waterproofing materials by abrasive-blasting, water blasting, or Consultant approved alternative. Hand patch voids or depressions in concrete surfaces. No extras shall be entertained for this item after award of Contract.

.13 All vertical surface irregularities to be patched prior to coating application.

.14 The coating shall be turned up all vertical surfaces into a reglet and onto the back surface of the substrate as detailed.

.15 No primer or first coat shall be applied until surface preparation has been reviewed by Consultant and, if applicable, reviewed and accepted in writing by a representative of the system manufacturer.

.16 Commencement of work implies Contractor's acceptance of the prepared concrete surfaces and assumption of full responsibility for the surfaces to receive the primer and membrane.

.17 Application procedures that result in toxic fumes or flammable solvent collecting or endangering workers or building occupants are not permitted.

.18 Paint and finishes damaged by Contractor must be repaired to match adjacent surfaces.

.19 Mask adjacent surfaces during application. Clean up splashes and spills.

.20 Concrete substrate is to be acid etched and neutralized and primed in conformance with the manufacturer's recommendations prior to the application of chlorinated rubber coating.

.21 New chlorinated rubber coating application over existing chlorinated rubber coating: remove debonded existing coatings as directed by the consultant, wash thoroughly with No. 910 POOL WASHING COMPOUND or a tri-sodium phosphate (TSP) solution per the manufacturer recommendations. Rinse with pressurized water and allow to dry completely before coating.

3.2 Installation

.1 Prior to application of primer and membrane/ coating, test the substrate moisture content to confirm the moisture content does not exceed the coating manufacturer's and specified requirements. The Contractor may perform and pay for whatever additional tests they feel are required. Test results shall be submitted to Consultant prior to coating application.

.2 Apply surfacing compound per manufacturer recommendations.

.3 Apply coating system over surfacing compound following adequate curing per the manufacturer recommendations unless otherwise noted.

.4 Application is to be in strict conformance with the more stringent requirements of the manufacturer specifications and these Contract Documents.

.5 Material quantities and placement procedures are to be strictly monitored. Areas to receive a typical material batch or container volume shall have their perimeters clearly marked prior to application to ensure uniform thickness of materials.

.6 Finished surfaces shall be of uniform appearance with minimal variations in light reflection and surface roughness and without ridges in sloped areas. Profiles shall not impede pool surfaces.

.7 Ensure environmental requirements and site conditions are suitable, as outlined by the manufacturer and Contract Documents, for installation of work of this Section.

.8 The pools shall not be filled with water until the membrane has sufficiently cured and in accordance with the Manufacturer's written instructions.

3.4 Flood Testing

.1 Finished system to be flood tested or water tested by the Contractor at the Contractor's expense prior to Substantial Performance of the Work. Consultant to be present during testing.

.2 Restrict run-off during testing.

.3 Maintain surfaces continuously wet for at least one hour. Repair identified leaks and re-test.

3.5 Inspection and Testing

.1 Testing may be conducted by the Consultant or a testing agency designated by Consultant. Owner will pay costs of inspection and testing described in this Section.

.2 Contractor shall inform Consultant and testing agency 24 hours in advance of work to be performed under this Section.

.3 Prior to application of membrane, test moisture content of concrete mass in accordance with ASTM F2170. Test locations shall be as designated by the manufacturer or Consultant. Additional tests may be located by the Contractor. Manufacturer to review results and approve application of membrane.

.4 Consultant may perform wet film thickness tests and dry-film cut tests to confirm coating thicknesses. Number of tests to be at Consultant's discretion.

.5 Adhesion tests may be performed to evaluate the bond of the coating to the substrate per ASTM D4541. Adhesion tests will consist of direct tensile pull tests a minimum of 7 days after installation of the system. Testing will be performed by the designated testing agency. Number of tests will be at the Consultant's discretion. Refer to clause 1.5 for bond requirements

.6 Additional tests may be performed at the discretion of the Consultant where required to confirm in-situ material thickness and bond.

.7 Repair waterproofing system at test locations at no extra cost.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, material, equipment, and supervision to prepare and seal concrete surfaces outlined on the Drawings.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 British Columbia Building Code

1.3 Performance Requirements

.1 System shall not alter the skid resistance of the existing slab surface.

.2 System shall reduce the permeability of the in-situ concrete surface by a minimum of 75% in comparison with the unsealed surface.

1.4 Submittals

.1 Applicator shall be certified in writing by sealer manufacturer.

.2 If requested, provide a letter signed by Contractor and sealer manufacturer certifying that:

.1 Surfaces to receive sealer were inspected and confirmed to be prepared in conformance with manufacturer requirements.

.2 Sealer was applied in accordance with manufacturer installation instructions.

.3 Completed installation conforms to the Specification and manufacturer requirements.

2.0 PRODUCTS

2.1 Approved Surface Sealers

.1 All sealers must be part of the Approved Product List within the reference standards specified herein.

.2 Silane/siloxane-based clear penetrating sealer. Acceptable products:

.1 Sikagard Natural Look Clear Sealer by Sika

.2 Fabrishield 760 by Fabrikem

.3 The application rates are to be in conformance with the manufacturer's requirements. Actual application rates should be adjusted to suit the permeability of the intended concrete substrate. Flood coat the surface and repeat on high spots and areas that dry quickly.

2.2 Non-Moving Crack Sealant

.1 MasterSeal 630 by Master Builders Solutions.

.2 SikaFlex-2c NS EZ Mix by Sika.

3.0 EXECUTION

3.1 Workmanship

.1 Surface cleaning and surface preparation shall be per manufacturer's recommendations. Surfaces shall be cleaned prior to preparing cracks or application of sealer. The minimum standard of cleaning for vertical surfaces shall be abrasive blast. The minimum standard of cleaning for horizontal surfaces shall be shot blast.

.2 Patch concrete is to be adequately cured and concrete surfaces are to have a moisture content not exceeding sealer manufacturer's specifications. No material shall be placed prior to review of the concrete surfaces by the Consultant.

.3 Contractor applying sealer shall be an approved applicator of materials.

.4 Procedures for application of sealer are to be in strict accordance with manufacturer's recommendations.

.5 Application rates may vary throughout the structure. Re-apply material to areas of the concrete surface that dry quickly. Test applications of sealer may be requested by Consultant to determine material application rates over representative areas. Avoid excessive application resulting in loss of skid resistance.

.6 Recommended Sequence (Horizontal Surface):

.1 Surface cleaning.

.2 Application of fillet bead caulking.

.3 First application of sealer.

.4 Route and caulk cracks and joints.

.5 Second application of sealer over cracks and joints caulked in .4 above.

.6 Line painting.

.7 Contractor to determine compatibility between sealer and caulking. If necessary, Contractor may reverse sealer application and caulking operations provided surfaces are re-cleaned prior to sealing concrete.

.8 Traffic shall not be allowed onto treated areas until materials are adequately cured.

3.2 Inspection and Testing

.1 Water testing may be performed by the Consultant on the applicable concrete surfaces following the sealer application to evaluate performance.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide labour, equipment, materials, and supervision as required to remove existing sealants and caulking materials and provide new sealant and backer assemblies in designated joints. Including but not limited to:

.1 Removal of existing joint seal materials, sealants, caulking, backers, and visible contaminants in the pool basin slab and surge tank.

.2 Clean and prepare concrete substrate crack and joint surfaces and modifications to provide uniform and acceptable substrate.

.3 Supply and install new sealant materials, primers, backers and bond-breaker tapes.

.4 Protection and clean up.

1.2 Reference Standards

.1 CAN/CGSB-19.24-M90 Multi-Component, Chemical-Curing Sealing Compound

.2 ASTM C920 - Elastomeric Joint Sealants.

.3 Sealant, Waterproofing and Restoration Institute (SWRI) publication, Sealants: The Professionals' Guide 2013.

1.3 Qualifications

.1 Perform the work of this Section using skilled applicators having at least three years' experience, and trained and competent in use of the specified sealant materials.

1.4 Performance Requirements

.1 Installed sealant and backer assembly shall be waterproof, flexible, and thermally compatible with concrete and coating substrates under applicable service conditions.

.2 Installed joint sealant assembly shall provide watertight seal and not allow moisture penetration.

.3 Belzona Elastomeric Sealant assemblies shall remain bonded and watertight, and withstand active cyclical movements of at least +/- 25% of joint width. Joint width is required to be a minimum 1”.

.4 Polyurethane Sealant assemblies shall remain bonded and watertight, and withstand active cyclical movements of at least +/- 50% of joint width. Joint width is required to be a minimum of 0.5”.

.5 Joint sealant assembly shall not fail adhesively or cohesively.

.6 Joint sealant assembly shall be fully continuous, flexible, and free of surface defects.

.7 Joint sealant assembly shall not debond, crack, or bubble.

1.5 Submittals

.1 Complete joint sealant system product data, installation procedures, including target installation widths at ambient temperatures are to be submitted to Consultant for review and acceptance prior to installation.

.2 Contractor installing expansion joint materials shall be certified in writing by Manufacturer and Contractor shall have proven experience with the specified systems.

.3 Installation Contractor shall submit a certified statement attesting that all areas and surfaces were inspected and found satisfactory to receive the sealant materials, in accordance with the manufacturer’s instructions and requirements. Installation of joint sealants shall be considered as acceptance of the surfaces. Any existing conditions not covered in the Contract, which may affect the bonding or performance of the joint seal shall be forwarded in writing to the Consultant for resolution prior to installation.

.4 Construct a mock-up of complete joint seal system complete with back up material (backer rod), primer and/or conditioner and sealants. Mock-up may remain as part of the finished work.

2.0 PRODUCTS

2.1 Belzona Elastomeric Sealants (Submerged)

.1 Joint sealant at level, sloping, and vertical surfaces: Two component blend of reactive polymers forming a highly flexible elastomeric sealant. Use with manufacturer's recommended primers. Approved products:

.1 Belzona 2221 (Self Leveling) – Horizontal joints. Use Belzona 2911 conditioner per Manufacturer Requirements.

.2 All products from Belzona to provide a continuous and watertight expansion joint seal.

.3 Samples: If requested by Owner, samples of joint sealant shall be applied on site to determine material application methods and final appearance.

2.2 Polyurethane Sealants (Not Submerged or Concealed in Membrane/ Coating)

.1 Joint sealant materials shall meet requirements of ACI 350.4R-04 and ANSI/NSF 61 Sealant must be coated with coating suitable for chlorinated water and submerged exposure and compatible with sealant.

.2 Polyurethane joint sealants shall be two-component, polyurethane compounds.

.3 Joint sealant at level and sloping surfaces: Polyurethane compound of non-sag or self-levelling consistency complete with manufacturer's recommended primers. Approved products:

.1 SikaFlex 2C NS EZ Mix – to ANSI/NSF Standard 61 approval, complete with Sikaflex 429 Primer. Colour as selected by Owner from Manufacturer's standard colour range.

.4 Samples: If requested by Owner, samples of joint sealant shall be applied on site to determine material application methods and final appearance.

2.1 Materials at Pool Deck Penetrations or Concealed by Membrane

.1 Joint Cleaner: Xylol, methylethylketone, alcohol, or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

.2 Primers: Types recommended by sealant manufacturer.

.3 Joint Back-Up: Round closed cell foam, extruded tubing, Shore A hardness of 20, tensile strength 140 to 200 kPa, oversized 30-50%, compatible with sealant and primer, non-adhering to sealant, and non-gassing.

.4 Bond Breaker: Pressure-sensitive plastic tape that will not bond to sealants.

.5 Sealants:

.1 Type 1 - CAN/CGSB 19.13, one (1) component Polyurethane.

.1 Dymonic 100 by Tremco Ltd.

.2 NP1 by Master Builders Solutions

2.3 Waterproof Grout

.1 Waterproof grout materials shall meet requirements of ACI 350.4R-04 and ANSI/NSF Standard 61, be suitable for potable water and submerged exposure, and be resistant to chlorinated water.

.2 Waterproof grout materials shall be cementitious based, waterstopping grout.

.3 Waterproof grout at horizontal and vertical surfaces: Waterproof grout materials shall be mixed to Manufacturer's recommendations non-sag applications. Approved product:

.1 Krystol Waterstop Grout™ - External – to ANSI/NSF Standard 61 approval
.2 Belzona - 4111 Magma Quartz repair composite.
.3 Sika – Sikaset Plug

.4 Compatibility: Waterproof grout shall be mixed to Manufacturer recommended consistencies and installed as recommended by Manufacturer.

.5 Samples: If requested by Consultant, apply samples of waterproof grout on site to determine material application methods.

2.4 Polyethylene Closed Cell Foam

.1 Supply and install closed foam sealant backers, for sealant-filled joints with gap width equal to or greater than 13 mm at time of sealant installation, and as designated on project drawings. Backer rod shape and profile as shown on project documents.

.2 Backer rods shall be closed cell, impermeable material, suitable for project conditions.

.3 Physical Properties:

Density	1.5 to 3.0 lb/ft^3
Compressive strength @ 50% deflection	4 - 20 psi
Compression set ASTM D-395 % original thickness	10 maximum
Tensile strength	100 psi, minimum
Elongation at break	225%, minimum
Tear resistance	10 lb/in, minimum
Movement Range, compression	50%, minimum
Movement range, tension	25%, minimum
Minimum depth	varies, see manufacturer's requirements

.4 Approved Products:

.1 As recommended by sealant Manufacturer.

.5 Adhesives, where applicable: Approved products:

.1 Sikadur 31 Hi-Mod Gel^{CA} epoxy paste adhesive to ANSI/NSF Standard 61 approval.

.6 Installation widths: Provide and install closed cell foam backer rod joint seal to oversized widths in accordance with Manufacturer's recommendations.

2.5 Other Sealant Related Materials

.1 Joint Cleaner: Non-corrosive solvent recommended by sealant manufacturer for applicable substrate material.

.2 Primer: Non-staining type recommended by sealant manufacturer.

3.0 EXECUTION

3.1 Preparation

.1 Joint surfaces shall be sound and clean of moisture, dust, grease, oils, foreign matter, visible contaminants, laitance, loose concrete, previous caulking, sealants, backers, tapes, shims, and other materials that may adversely affect bond.

.2 Grind joint surfaces to remove traces and residue of original sealant materials and other contaminants from concrete surfaces, and to expose clean concrete.

.3 If required, sawcut existing concrete control joints to achieve required joint width. Minimum joint widths as follows:

.1 For Belzona Elastomeric Sealant: Minimum joint width is 1 inch.
.2 For Polyurethane Sealant: Minimum joint width is 5/8 inch.

Use track mounted gang saw to obtain straight precise cuts.

.4 Installation of expansion joint implies acceptance of substrate surfaces. Existing conditions not covered in Contract that may affect bonding or performance of joint material shall be forwarded in writing to Consultant for resolution prior to installation.

.5 After grinding, roughen surface as specified by manufacturer, followed by blowing joint clean with compressed air (minimum 90-psi pressure, moisture-free, and oil-free). After cleaning, prepared joints must be thoroughly dry and dust free before sealing. Prepared joint surfaces shall have no signs of residual sealant, laitance, cement powder, or dust after rubbing a clean cloth across joint faces.

.6 To prevent contamination of substrates, mask adjacent surfaces with tape prior to priming, and prior to application of adhesive on backer materials.

.7 Install joint backer to achieve correct joint depth. Provide 25-33% oversized backers to fit tightly within joint opening and not be displaced during sealant installation. Examine joint dimensions and size materials to achieve designated and consistent depth of sealant.

3.2 Sealant Application

.1 Apply sealant materials in accordance with manufacturer's environmental and temperature requirements. Do not install sealant when temperature is at or below dew point. Do not install sealant when temperature is below 5°C. Do not prepare substrates or install sealants if substrate surfaces are wet. Moist joint substrates shall be permitted to air dry (visibly dry and to touch) prior to starting/continuing sealing operations. Drying joints with using direct flame shall not be permitted.

.2 Apply sealant in accordance with manufacturer's directions complete with manufacturer-approved primer and/or conditioner, using gun with proper size nozzle, to leave watertight, airtight installation. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.

.3 Form surface of sealant smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Sealant to be continuous, free of air voids, and applied such that it fills voids. Neatly tool joint to profile as indicated on project documents.

.4 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings, using recommended cleaners as work progresses. Remove masking tape after tooling of joints.

.5 Protect sealant joints until sufficiently cured. Protect sealant materials from dust, debris, and construction materials.

.6 Application procedures that result in toxic fumes or flammable solvents collecting or endangering workers or facility occupants are not permitted.

3.3 Clean Up

.1 Clean adjacent surfaces immediately, leaving work neat and clean.

.2 Remove excess sealants and droppings using recommended cleaners as work progresses.

3.4 Inspection and Testing

.1 Periodic inspection of various phases of work will be performed by Owner. Provide safe access in work areas.

.2 To ensure proper bonding of materials to substrate adhesion, tests may be performed, to test for adhesion, thickness, and width by Owner's appointed testing agency or Consultant.

.3 Repair test locations at no extra cost.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide all labour, equipment, material, and supervision to seal designated cracks and joints in pool deck slabs-on-grade and suspended slabs as follows:

.1 Removal of existing materials including sealants, caulking, backer rods, and contaminants at joints, cracks, and vertical and horizontal interfaces in area of work.

.2 Cleaning and preparation of substrate surfaces.

.3 Supply and installation of new sealant materials at cracks, joints, and heel bead locations including primers, backers, and bond-breaker tapes as required.

.4 Protection and clean up.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 British Columbia Building Code

.3	ASTM C920	Standard Specification for Elastomeric Joint Sealants
.4	ASTM C1193	Standard Guide for Use of Joint Sealants

1.3 Performance Requirements

.1 Sealant shall be totally waterproof, flexible, and thermally compatible with the substrate under applicable service conditions.

.2 Sealant assemblies to remain bonded and watertight and withstand active cyclical movements of at least ±25% of joint width, and no less than 6 mm across joint faces.

.3 Sealant shall remain fully bonded to the substrate surfaces.

.4 Sealed joint shall not leak.

.5 Sealant to be suitable for pedestrian and vehicle traffic.

1.4 Site Examination

.1 Bidders shall visit the Place of the Work and inspect the existing joints to receive new sealants. Substrate surfaces and joint nosing edges may require repairs and surface preparation after cleaning, and prior to installation of joint sealants and backers. Bid shall include all costs of surface preparation and patching of rough or damaged surfaces. No extras for substrate surface preparation or patching, or additional labour or materials will be entertained after bid closing.

.2 If desired, bidders may remove sections of existing joint seals and sealant materials in order to evaluate removal requirements, substrate conditions, and patching requirements. Bidders agree to accept existing substrate conditions at time of bid.

1.5 Submittals

.1 If requested, submit a certified statement from manufacturer attesting that all areas and surfaces were satisfactorily prepared to receive sealant per manufacturer instructions and requirements.

.2 If requested, submit statement from manufacturer attesting that all sealant was installed in accordance with manufacturer’s written instructions.

1.6 Delivery, Storage, and Handling

.1 Deliver, handle, store, and protect materials as recommended by material manufacturer.

.2 Deliver and store materials in original wrappings and containers with manufacturer’s seals and labels intact. Protect from heat, direct sunlight, freezing, moisture, water, and contact with ground or floor.

.3 Maintain containers and labels in undamaged condition.

2.0 PRODUCTS

2.1 Materials

.1 Single component urethane or polyurethane conforming to ASTM C920 Type S, complete with manufacturer's recommended primers, bond breakers, and backing rods. Approved products are:

.1 Crack and joint sealant at level surfaces:: Grade NS - Gun grade consistency complete with manufacturer's recommended primers.Approved products are:

.1 Tremco – Dymonic 100

.2 Sika – Sikaflex-1a

.3 Sika – Sikaflex NP1

.4 LymTal – Iso-Flex 830

.2 Primer: Non-staining type recommended by sealant manufacturer.

.3 Backer rod to be non-gassing.

2.2 Samples

.1 If requested by Consultant, apply samples of joint sealant on site to determine material application rates and final appearance.

3.0 EXECUTION

3.1 Surface Preparation – Crack Locations

.1 All slab surfaces to be cleaned prior to designation of cracks to be sealed. Locations of crack sealing shall be where directed by the Consultant.

.2 Unless otherwise noted on Drawings or in Specifications, cracks are to be routed, ground, or sawcut to provide a straight-sided joint that is 13 mm wide by 13 mm deep. Do not cut beyond actual extent of crack.

.3 Prime joints per sealant manufacturer recommendations.

.4 Clean substrate of all moisture, organics, dust, grease, oil, existing caulking, paint, loose, and other foreign material that may adversely affect sealant bond prior to priming and sealing.

3.2 Sealant Application

.1 Sealants, tapes, joint fillers, and back-up materials to be physically and chemically compatible with each other and with adjacent materials.

.2 Installation of sealant implies acceptance of surfaces. Notify Consultant in writing of existing conditions uncovered that may affect bonding of performance of sealant for resolution prior to sealant installation.

.3 Application procedures that result in toxic fumes or flammable solvents collecting or endangering workers or building occupants are not permitted.

.4 Mix components in accordance with manufacturer's instructions.

.5 Prime surfaces to manufacturer's instructions.

.6 Material application is to be in strict conformance with manufacturer's recommendations with proper application temperatures adhered to. Do not install primer or sealant when temperature is below 5˚C. Do not prepare substrates or install sealants if rain or other inclement weather is imminent or forecasted.

.7 Form surface of sealant at cracks and joints smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Sealant to be continuous, free of air voids, and applied such that it fills voids and joints solid to leave a watertight installation. Neatly tool surface to a slight concave profile unless otherwise indicated in Specifications and Drawings.

.8 Use dry tooling method. Do not use tooling agents such as soapy water or solvents that have not been approved by sealant manufacturer.

.9 Cure sealants in accordance with manufacturer's instructions. Protect sealant and caulked joints until sufficiently cured to allow traffic.

3.3 Clean Up

.1 Clean adjacent surfaces immediately, leaving work area neat and clean.

.2 Remove excess sealants and droppings using recommended cleaners as work progresses. Remove masking tape after tooling of joints.

3.4 Inspection and Testing

.1 Adhesion tests will be performed to ensure proper bonding of sealant material to substrate. Manufacturer's representative may also perform adhesion testing as required to satisfy themselves prior to issuance of manufacturer's warranty.

.2 Repair all test locations at no extra cost.

END OF SECTION