**DOCUMENT 00003**

**TABLE OF CONTENTS**

<table>
<thead>
<tr>
<th>Document</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Document 00001 - Title Page</td>
<td>1 page</td>
</tr>
<tr>
<td>Document 00002 - Project Directory</td>
<td>1 page</td>
</tr>
<tr>
<td>Document 00003 - Table of Contents</td>
<td>1 thru 2</td>
</tr>
<tr>
<td>Document 00004 - Index of Drawings</td>
<td>1 page</td>
</tr>
</tbody>
</table>

**SPECIFICATIONS**

**Division 1 - General Requirements**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>01010 - Summary of Work</td>
<td>1 thru 2</td>
</tr>
<tr>
<td>01020 - Allowances</td>
<td>1 thru 3</td>
</tr>
<tr>
<td>01026 - Unit Prices</td>
<td>1 thru 2</td>
</tr>
<tr>
<td>01075 - Definitions</td>
<td>1 thru 3</td>
</tr>
<tr>
<td>01120 - Alterations Project Procedures</td>
<td>1 thru 4</td>
</tr>
<tr>
<td>01200 - Project Meetings</td>
<td>1 thru 3</td>
</tr>
<tr>
<td>01300 - Submittals</td>
<td>1 thru 4</td>
</tr>
<tr>
<td>01400 - Quality Control</td>
<td>1 thru 2</td>
</tr>
<tr>
<td>01500 - Temporary Facilities and Controls</td>
<td>1 thru 4</td>
</tr>
<tr>
<td>01600 - Material and Equipment</td>
<td>1 thru 3</td>
</tr>
<tr>
<td>- Substitution Request Form</td>
<td>SRF-1 thru SRF-3</td>
</tr>
<tr>
<td>01700 - Contract Closeout</td>
<td>1 thru 3</td>
</tr>
<tr>
<td>01710 - Cleaning</td>
<td>1 thru 2</td>
</tr>
</tbody>
</table>

**Division 2 - Sitework**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>02072 - Minor Demolition and Renovation Work</td>
<td>1 thru 2</td>
</tr>
</tbody>
</table>

**Division 3 - Concrete**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>03610 - Epoxy Resin Injection</td>
<td>1 thru 5</td>
</tr>
<tr>
<td>03730 - Concrete Rehabilitation</td>
<td>1 thru 5</td>
</tr>
</tbody>
</table>

**Divisions 4 through 6 - Not Used**
Division 7 - Thermal and Moisture Protection

<table>
<thead>
<tr>
<th>Section</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>07180 - Water Repellents</td>
<td>1 thru 7</td>
</tr>
<tr>
<td>07920 - Sealants and Caulking</td>
<td>1 thru 6</td>
</tr>
</tbody>
</table>

Divisions 8 through 16 - Not Used

END OF TABLE OF CONTENTS
UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER/ HOUSTON
MEDICAL SCHOOL BUILDING
HOUSTON, TEXAS

DOCUMENT 00004

INDEX OF DRAWINGS

SHEET EL1

ELEVATIONS

END OF INDEX OF DRAWINGS
SECTION 01010

SUMMARY OF WORK

PART ONE - GENERAL

1.01 SECTION INCLUDES:
A. Exterior wall restoration at the Medical School Building located at 6341 Fannin in Houston, Texas.
   1. Work includes, but is not limited to, the following:
      a. Remove and replace sealants in precast-to-precast sealant joints and window perimeter sealants, where required.
      b. Perform repairs to spalls in precast concrete panels, where required.
      c. Route and seal cracks in the precast concrete panels, where required.
      d. Repair cracks in precast concrete panels with epoxy resin injection, where required.
      e. Power wash the precast concrete panels.
      f. Apply a water repellent sealer to the precast concrete panels.

1.02 WEATHER PROTECTION:
A. Upon beginning work on the existing exterior walls, Contractor shall patch and protect existing exterior walls as required to prevent leaks.
B. Contractor shall have at the work site, a sufficient amount of moisture proof coverings to provide quick temporary protection to exposed exterior wall and deck excavations, penetrations, and openings in the event of a rapid change in the weather.

1.03 CONTRACTOR'S USE OF PREMISES:
A. Confine operations at site to areas permitted by law, ordinances, permits and to limits of Contract as shown on Contract Documents.
B. Do not unreasonably encumber site with materials or equipment.
C. Do not load structure with weight that will endanger structure.
D. Assume full responsibility for protection and safekeeping of products stored on premises.
E. Move stored products which interfere with operations of Owner.
F. Obtain and pay for use of additional storage or work areas needed for operations.
G. Coordinate use of premises under direction of Owner's Representative.
H. Use of Site for Work and Storage:
   1. Restrict Work to areas indicated on Drawings.
   2. Store materials off site except for minor amounts of material which may be stored at designated staging area as approved by Owner.
   3. Access site in areas approved by Owner.
4. Restrict parking to specific areas as approved by Owner.
5. Restrict debris removal to Owner-approved area of building site.
6. Restrict location of construction cranes to areas as approved by Owner.

I. Building Access: contractor will have access to building at designated locations as pre-arranged with Owner.

1.04 OWNER OCCUPANCY:
A. Owner will occupy premises during entire period of construction for the conduct of normal, daily operations. Cooperate with Owner's Representative in all construction operations to minimize conflict and to facilitate Owner usage.
B. Contractor shall conduct his operations so as to ensure least inconvenience to Owner's operations.
C. Contractor shall take precautions to avoid excessive noise or vibration that would disturb Owner's operations. When directed by Owner, Contractor shall perform certain operations at designated time of day or night in order to minimize disturbance to Owner's operations.
D. Contractor shall take all necessary precautions to assure a watertight condition in the operation portion of the building during construction.
E. Refer to Section 01120 for provisions on security, special sequence of Work, maintenance of access and operations, maintenance of existing utilities and services, and building access restrictions.

1.05 OVERTIME WORK:
A. Contractor shall include necessary overtime work on weekends and other times as required or as directed by Owner to complete the Work within the Contract Time.

PART TWO - PRODUCTS
Not Used.

PART THREE - EXECUTION
Not Used.

END OF SECTION 01010
SECTION 01020

ALLOWANCES

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Include allowances stated in Contract Documents in the contract sum.
   B. Designate delivery dates for Products specified under each allowance in the construction progress schedule.
   C. Designate quantities of materials required under each unit cost allowance in the Schedule of Values.

1.02 ALLOWANCES FOR PRODUCTS:
   A. Amount of Each Allowance Includes:
      1. Cost of product to Contractor or Subcontractor, less any applicable trade discounts.
      2. Delivery to site.
      3. Labor required under allowance, except when labor is specified to not be included in allowance.
   B. In addition to amount of each allowance, include in contract sum Contractor's costs for:
      1. Handling at site, including unloading, uncrating, and storage.
      2. Protection from elements and from damage.
      3. Labor for installation and finishing where labor is specified to not be a part of allowance.
      4. Other expenses required to complete installation.
      5. Contractor's and Subcontractor's overhead and profit.

1.03 SELECTION OF PRODUCTS UNDER ALLOWANCES:
   A. Consultant's Duties:
      1. Consult with Contractor in consideration of Products and suppliers or installers.
      2. Maintain log of unit pricing allowances and quantities.
      3. Make selection in consultation with Owner. Obtain Owner's written decision, designating:
         a. Product, model, and finish.
         b. Accessories and attachments.
         c. Supplier and installer, as applicable.
         d. Cost to Contractor, delivered to site or installed, as applicable.
         e. Manufacturer's Warranties.
      4. Transmit Owner's decision to Contractor.
      5. Prepare Change Orders as required.
B. Contractor's Duties:
   1. Assist Consultant and Owner in determining qualified suppliers or installers.
   2. Obtain proposals from suppliers and installers when requested by Consultant.
   3. Make appropriate recommendations for consideration of Consultant.
   4. Notify Consultant promptly of:
      a. Any reasonable objections Contractor may have against any supplier or party
         under consideration for installation.
      b. Any effect on Construction Schedule anticipated by selections under
         consideration.

1.04 CONTRACTOR RESPONSIBILITY FOR PURCHASE, DELIVERY, AND
INSTALLATION:
A. On notification of selection, execute purchase agreement with designated supplier.
B. Arrange for and process Shop Drawings, Product Data, and Samples, as required.
C. Make arrangements for delivery.
D. Upon delivery, promptly inspect products for damage or defects.
E. Submit claims for transportation damage.
F. Install and finish products in compliance with requirements of referenced
   Specification Sections.

1.05 ADJUSTMENT OF COSTS:
A. Should net cost be more or less than specified amount of allowance, adjust contract
   sum accordingly by Change Order.
   1. Amount of Change Order will recognize any changes in handling costs at site,
      labor, installation costs, overhead, profit, and other expenses caused by
      selection under allowance.
   2. For products specified under unit cost allowance, unit cost shall apply to quantity
      listed in Schedule of Values.
   3. For products specified under unit allowance, unit cost allowance shall apply to
      quantities actually used with nominal amount for waste, as determined by
      receipts, invoices, or by field measurement.
B. Submit any claims for anticipated additional costs at site, or other expenses caused
   by selection under allowance, prior to execution of work.
C. Submit documentation for actual additional costs at site or other expenses caused by
   selection under allowance within sixty days after completion of execution of Work.
D. Failure to submit claims within designated time will constitute waiver of claims for
   additional costs.
E. At contract closeout, reflect approved changes in contract amounts in final statement
   of accounting.
1.06 CONSTRUCTION CONTINGENCY:
   A. Include in the Contract amount Construction Contingency Allowance in the amounts shown in Paragraph 3.01.
   B. Construction Contingency Allowance:
      1. Use only to cover cost of hidden, concealed, or otherwise unforeseen conditions that develop during project.
      2. Work that is clearly changed in scope shall be authorized and paid for only by means of change order executed in accordance with established Owner procedures.
      3. Include in Base Bid, profit and overhead to cover amount of contingency, as each contingency authorization processed will not include any profit or overhead for Contractor.
      4. Proceed with accomplishing work only after receiving properly executed contingency authorization executed by Owner.
      5. Do not bill Owner for any work authorized by this procedure until work has been accomplished.
      6. Return to Owner any part of contingency allowance that is not used during construction of project.
      7. At completion of project, Contracting Officer will reconcile all work accomplished through properly executed contingency allowance authorizations and provide for refund of any unused portion of contingency to Owner through properly executed change order.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

3.01 SCHEDULE OF ALLOWANCES:
   A. Provide add/deduct unit price for material to adjust allowance for actual quantity of material installed/replaced.
   B. Allowance Items:
      1. Perform miscellaneous concrete repairs for 20 cubic feet within the Base Bid work.
      2. Perform miscellaneous routing and sealing of cracks in concrete for 400 linear feet within the Base Bid work.
      3. Perform epoxy resin injection of cracks in precast concrete panels for 200 linear feet within the Base Bid work.
      4. Replace deteriorated and/or disbonded sealants for 500 linear feet within the Base Bid work.

END OF SECTION 01020
SECTION 01026

UNIT PRICES

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Unit prices for calculation of work, complete in place, to be added or deleted from
      the project.

1.02 MEASUREMENT AND PAYMENT:
   A. It is the intent of the Bid Form that aggregate bid amount as submitted shall cover
      work required by Contract Documents in place, complete, and ready for use.
   B. Unit prices include costs to fully complete work in place, including providing labor,
      materials, tools, equipment, services, supplies, incidentals, necessary operations,
      profit, taxes, overhead, maintenance, and warranties.
   C. No costs in connection with work required by Contract Documents for proper and
      successful completion of Contract will be paid outside of or in addition to prices
      submitted.
   D. Work not specifically set forth as pay items shall be considered subsidiary
      obligations of Contractor and costs shall be included in prices named.
   E. Method of measurement and basis of payment shall be as stipulated in following
      paragraphs.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

3.01 UNIT PRICE ITEMS:

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Concrete Repair:</td>
<td>$________ per cubic foot</td>
</tr>
<tr>
<td>2. Route and Seal Crack:</td>
<td>$________ per linear foot</td>
</tr>
<tr>
<td>3. Epoxy Resin Injection of Crack:</td>
<td>$________ per linear foot</td>
</tr>
<tr>
<td>4. Replace Sealant:</td>
<td>$________ per linear foot</td>
</tr>
</tbody>
</table>
3.02 AUTHORIZATION, RECORD KEEPING, AND PAYMENT FOR UNIT PRICE ITEMS:

A. Consultant's Field Representative will authorize Contractor when Unit Price Items are to be installed by Contractor. No payment will be made for any Unit Price Items installed by Contractor that is not authorized by Consultant's Field Representative or Owner.

B. Consultant's Field Representative will maintain a record of all installed Unit Price Items and this record shall be utilized to produce the Change Order to include the Unit Price Items in Contractor's contract.

END OF SECTION 01026
SECTION 01075

DEFINITIONS

PART ONE - GENERAL

1.01 SECTION INCLUDES:
A. Definitions for construction terminology not otherwise defined in Contract Documents.
B. Definitions for special terminology used for this Project.

1.02 ABANDONED - (NO LONGER NECESSARY OR IN USE):
A. "Remove" items so noted, or later defined, as an all inclusive responsibility within this contract. Pay for all work in connection with removal of these items, including municipal, disposal, utility, and service charges. Dispose of all "Excess".

1.03 ADDITION - (TO ADD TO AND BE INCORPORATED) ALSO TO "ADD":
A. Work supplementary to that indicated to accomplish that which is required by the Contract Documents. To bring to a new condition; to extend, fasten, patch, and match to that which is existing.

1.04 DEFECTIVE - (NOT ACCEPTABLE):
A. Refer to Conditions of the Contract, that which does not conform to the Contract Documents. As it applies to "Salvage", in addition to the above, shall mean "unsuitable".

1.05 EXCESS - (NOT REQUIRED):
A. More quantity than required to conform to the Contract Documents and not desired by the Owner. Debris shall be considered "Excess" and not be used as fill or be buried on this site. Remove "Excess" from the site and legally dispose of. "Excess" "Suitable" "Salvage" shall be property of Contractor unless otherwise specified.

1.06 EXISTING - (PRESENTLY THERE):
A. Also may be noted "original". Present conditions and assumed locations, if known, as of the Date of Contract Documents.

1.07 NEW - (TO BE INCORPORATED) NOT EXISTING:
A. Refer to various specification sections for requirements of Work to be incorporated.

1.08 REINSTALL - (TO INCORPORATE AS WAS ONCE DONE):
A. "Remove" and "salvage" existing from its location, if it does exist. "Restore", "Renovate", or "Remodel" and "Reinstall" in its existing location. Reincorporate and "re-work" the original work to the extent required by the Contract Documents.
B. If the "Existing" item, so indicated, is missing, defective, or unsuitable as "Existing", then "Reconstruct" only that portion with "New" products and incorporate as was original. Syn. Replace.

1.09 RELOCATE - ("REINSTALL" IN A NEW LOCATION):
A. "Reinstall" in a new location as indicated on Drawings.

1.10 REMAIN - (TO LEAVE WHERE IT IS EXISTING):
A. The final location of an item in its "existing" position, however, this shall not mandate the fact that this item will not move during this contract, specifically in order to "Preserve" or "Rework".

1.11 REMOVE - (TO TAKE FROM EXISTING LOCATION):
A. Work required to extract a portion or whole by one or a combination of methods and moved to a new location.
   1. "Abandoned": Remove items by dismantling, excavation, extraction, or demolition, if acceptable.
   2. Salvage: Remove by disassembly. "Relocate".
   3. Products: Where a specific portion of component of an assembly or whole is to be removed, take all precautions to prevent damage, defacement, and displacement to the "existing" to remain (i.e., mortar, bricks, and finishes).

1.12 RENOVATE - (TO REPAIR AND MAKE NEW):
A. The process required to bring an item to a present new standard of condition required by the Contract Documents (e.g., to "rework" "existing" "suitable" "salvage" "products" and perform "new" work and "additions" required). (Syn. rehabilitate, recondition, repair.)

1.13 REPLACE - (TO TAKE THE PLACE OF):
A. "Remove" "existing" unserviceable product and provide "new" product in place of unserviceable product.

1.14 REUSE - (TO USE AS ONCE WAS):
A. The use of "suitable" "salvage" for incorporation or re-incorporation in the Work. "Remove", "Relocate", and "Reinstall" as required for "Reuse".

1.15 SALVAGE - (TO BECOME ABANDONED):
A. "Remove", protect, "preserve" incomplete material condition as found "existing". Also to "Save". Determine suitability for incorporation in this Contract. Store at a location mutually agreed upon. Dispose of all "Excess".
1.16 Unknown - (Not shown on drawings):
   A. Products beneath surfaces indicated by drawings and encountered during the Work. Immediately support, shore, and protect. Immediately notify the Consultant and authority having jurisdiction. Allow free access for inspection. "Preserve" in proper condition until the Consultant determines definition and interpretation of Work. Take such measures as required for protection, reinforcement, or adjustment.

Part Two - Products

Not Used.

Part Three - Execution

Not Used.

End of Section 01075
SECTION 01120

ALTERATIONS PROJECT PROCEDURES

PART ONE - GENERAL

1.01 DESCRIPTION:
   A. Summary: The procedures and administrative requirements of this Section apply to all of the following Sections of the Specification which are involved in alterations to the existing building.
   B. Extent Notes: Cut into or partially remove portions of the existing building as necessary to make way for new construction. Include such work as:
      1. Cutting, moving, or removal of items shown to be cut, moved, or removed.
      2. Cutting, moving, or removal of items not shown to be cut, moved, or removed, but which must be cut, moved, or removed to allow new work to proceed. Work or items which are to remain in the finished work shall be patched or reinstalled after their cutting, moving, or removal, and their joints and finishes made to match adjacent or similar work.
      3. Removal of existing surface finishes as needed to install new work and finishes.
      4. Removal of abandoned items and removal of items serving no useful purpose, such as abandoned piping.
      5. Repair or removal of dangerous or unsanitary conditions resulting from alterations work.

1.02 SCHEDULING AND ACCESS:
   A. Work Sequence: Contractor shall submit detailed project plan with work sequence and phasing schedule.
   B. Security:
      1. Be solely responsible for job site security.
      2. Protect completed work and stored items from vandalism and theft.
      3. Contact Owner for access to all security areas.
   C. Maintenance of Access and Operations:
      1. During period of construction, Owner will continue to perform normal activities in existing building. Maintain proper and safe access to Owner-occupied areas, including existing buildings, facilities, parking, streets, walkways, driveways, and fire lanes at all times.
      2. Do not perform operations that would interrupt or delay Owner's daily operations.
      3. Schedule demolition and remodeling operations with Owner in such a manner as to allow Owner operations to continue with minimum interruption.
      4. During period of construction, do not obstruct existing exit ways of Owner-occupied areas in any manner.
   D. Maintenance of Existing Services:
      1. Maintain environmental control in existing building, especially temperature, humidity, and dust control.
      2. Provide temporary lines and connections as required to maintain existing mechanical and electrical services in building.
3. Equipment handling shall be limited to Owner-approved hours and may be limited to night time hours.

4. Notify Owner a minimum of forty-eight hours prior to each required interruption of mechanical or electrical service in building. Such interruptions shall be only at such times and for lengths of time as approved by Owner. In no event shall interruption occur without prior approval of Owner.

E. Temporary Barricades:
1. Provide and erect barricades as necessary to protect ground personnel, employees, passersby, etc., from hazards resulting from the Work during construction operation.
2. Prevent public access to construction activities, equipment, and storage areas.

F. Building Access:
1. Contractor will limit access to building interior except:
   a. To install temporary enclosures, protections, and equipment.
   b. For interior work or interior cleaning.
   c. For project or medical emergency.
2. Access to construction areas shall be by way of approved routes designated by Owner.

1.03 ALTERATIONS, CUTTING AND PROTECTION:
A. Extent:
1. Perform cutting and removal work so as not to cut or remove more than is necessary and so as not to damage adjacent work.
2. Conduct work in such a manner as to minimize noise and to minimize accumulation and spread of dirt and dust.
3. Perform cutting for ductwork and other rectangular openings with carborundum saw with approved dust arrestor.

B. Responsibility and Assignment of Trades:
1. Contractor shall assign the work of moving, removal, cutting, patching, and repair to trades under his supervision so as to cause the least damage to each type of work encountered, and so as to return the building as much as possible to the appearance of new work.
2. Patching of finish materials shall be assigned to mechanics skilled in the work of the finish trade involved.

C. Protection:
1. Protect remaining finishes, equipment, and adjacent work from damage caused by cutting, moving, removal, and patching operations. Protect surfaces which will remain a part of the finished work.
2. Provide temporary weather protection over open wall and deck penetrations until repairs are completed.
3. Cover existing walls and floors where necessary to prevent damage from construction operations.
4. During demolition, cutting, and construction, provide positive dust control by wetting dusty debris and by completely sealing openings to Owner-occupied areas with temporary seals so as to prevent spread of dust and dirt to interior areas.
5. After materials are installed, properly protect Work until final acceptance.
6. Repair any damage resulting from construction operations without cost to Owner.
7. Provide continuous security at openings cut into existing exterior walls and roofs during non-working hours. Prevent unauthorized entry into the existing facility through areas demolished or accessed as part of the Work.

D. Special Protection:
   1. Provide temporary weather protection over open penetrations until final flashing is completed.
   2. During equipment handling, provide an applicator at project with sufficient materials for temporary patching and sealing.
   3. Provide applicator at jobsite continuously during rainstorms which may occur while job is in progress to make temporary or emergency repairs.

E. Debris:
   1. Remove debris from the site daily. Removed material becomes property of the Contractor. Load removed material directly on trucks for removal from site. Dispose of removed material legally. Do not allow debris to enter sewers.
   2. Do not allow material accumulations to endanger structure.
   3. Cover and secure material accumulations as necessary to prevent the material from spreading or becoming airborne.
   4. Submit material storage and disposal plan for review prior to job start.

1.04 PATCHING, EXTENDING, AND MATCHING:

A. Patch and extend existing work using skilled mechanics who are capable of matching the existing quality of workmanship. The quality of patched or extended work shall not be less than that which exists.

B. In areas where any portion of an existing finished surface is damaged, lifted, stained, or otherwise made or found to be imperfect, patch or replace the imperfect portion of the surface with matching material.

C. Provide adequate support or substrate for patching of finishes.

D. Quality:
   1. In the Sections of the product and execution of Specifications which follow these General Requirements, no concerted attempt has been made to describe each of the various existing products that must be used to patch, match, extend, or replace existing work. Obtain all such products in time to complete the Work on schedule. Such products shall be provided in quality which is in no way inferior to the existing products.
   2. The quality of the products that exist in the building, as apparent during pre-bid site visits, shall serve as the Specification requirement for strength, appearance, and other characteristics.

E. Transitions:
   1. Where new work abuts or finishes flush with existing work, make the transition as smooth and workmanlike as possible. Patched work shall match existing adjacent work in texture and appearance so as to make the patch or transition invisible to the eye at a distance of no closer than 3 feet (1m).
2. Where masonry or other finished surface is cut in such a way that a smooth transition with new work is not possible, terminate the existing surface in a neat fashion along a straight line at a natural line of division and provide trim appropriate to the finished surface.

F. Restore existing work that is damaged during construction to a condition equal to its condition at the time of the start of the Work, and to satisfaction of Owner.

1.05 REPAIR:
A. Replace work damaged in the course of alterations, except at areas approved by Owner for repair.
B. Where full removal of extensive amounts of almost-suitable work would be needed to replace damaged portions, then filling, straightening, and similar repair techniques, followed by finishing, will be permitted.
C. If the repaired work is not brought up to the standard for new work, Owner will direct that it be cut out and replaced with new work.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01120
PART ONE - GENERAL

1.01 PRE-CONSTRUCTION CONFERENCE:
A. A Pre-construction Conference will be held at the site at a time to be designated by Owner.
B. Representatives of Contractor, including project superintendent, foreman, and all subcontractors, shall meet with Owner or his appointed representative.

1.02 AGENDA:
A. As a minimum, the following items will be on meeting agenda:
   1. Designation of all personnel.
   2. Communication.
   3. Construction Schedule.
   4. Critical work sequencing and deck repair procedures.
   5. Existing facilities and maintenance of operation.
   7. Project record documents procedures.
   8. Processing Field and Change Orders.

1.03 AGENDA FOR PRE-CONSTRUCTION MEETING
A. Attendance:
   1. Owner (Representative, if desired by Owner).
   2. Consultant and On-site Inspector.
   3. Contractor (Manager, Superintendent, and Foreman).
   4. Subcontractors.
   5. Material Suppliers (if required).
B. Sign-in list for all attending including names, title, phone number, and company.
C. Contract Review:
   1. Execution.
   2. Insurance certificates.
   3. Bid review.
   4. Schedule of values and progress payment processing.
   5. Notice to proceed and start date.
   6. Bond, lien, and permit requirements.
   7. Project communications and problem resolution.
   8. Change order and additional work order processing.
D. Job Site Conditions and Requirements:
   1. Services (temporary):
      a. Water.
      b. Power (110, 220).
      c. Sanitary facilities.
      d. Parking areas.
1.04 AGENDA FOR PROJECT MEETING

A. Attendance:
   1. Owner (Representative, if desired by Owner).
   2. Consultant.
   3. Contractor (Manager, Superintendent, and Foreman).
   4. Subcontractors.

B. Sign-in list for all attending, including names, titles, phone numbers, and company name.

C. Project Review:
   1. Problem resolution.
   2. Project communication.
   3. Change order and/or additional work.
   4. Review projected work flow and schedule against work completed to date.
   5. Progress payment processing.

D. Job Site Conditions:
   1. Review set-up area, material storage, and handling.
   2. Review work to date against schedule.
   3. Review work by other trades.
   4. Review quality of work to-date with Contractor and Manufacturer.
PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01200
SECTION 01300

SUBMITTALS

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Submittals required by Specification Sections and as listed in attached List of Submittals.

1.02 REQUIRED SUBMITTALS:
   A. Applicator's License Certificate: Copy of the roofing material manufacturer's agreement/contract indicating date application was approved and expiration date.
   B. Copy of the Contractor's executed insurance certificate.
   C. Material manufacturer's written approval/acceptance of specified warranty for project, fastener pattern layout, details, insulation, and all related materials based upon existing site conditions.
   D. Copy of the Contractor's executed payment and performance bonds, if required.
   E. Manufacturer's product data sheets and Material Safety Data Sheets (MSDS) on each material proposed for usage.
   F. Sample of warranty that is to be issued upon project completion.
   G. Submit list of all subcontractors with evidence of subcontractor's insurance coverage in compliance with contract requirements.
   H. Detailed project schedule showing work phasing and proposed daily progress schedule.
   I. Permits, notices, and approvals of governing bodies or agencies.

1.03 PRODUCT DATA:
   A. Submit manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data for each material proposed for use in construction of roof assembly and related flashings and components.
      a. Clearly mark each copy to identify pertinent materials, products, or models.
      b. Show dimensions and clearances required.
      c. Show performance characteristics and capacities.
      d. Indicate the Specification Section and sub-paragraph that applies to each submittal.

1.04 SAMPLES:
   A. Physical examples to illustrate materials, equipment, and workmanship; and to establish standards by which completed Work is judged, if requested.

1.05 CONTRACTOR RESPONSIBILITIES:
   A. Review shop drawings, product data, and samples prior to submission. Initial, sign, or stamp, certifying the Contractor's review of the submittal.
B. Verify:
   1. Field measurements.
   2. Field construction criteria.
   3. Catalog numbers and similar data.
C. Coordinate each submittal with requirements of Work and of Contract Documents.
D. Contractor's responsibility for errors and omissions in submittals is not relieved by Consultant review of submittals.
E. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by the Consultant's review of submittals, unless Consultant gives written acceptance of specific deviations.
F. Notify Consultant, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
G. Begin no work which requires submittals until return of submittals with Consultant's stamp and initials or signature indicating review and indication to proceed as noted. Work performed prior to submission and approval of submittals may be subject for rejection.
H. Distribute copies after Consultant's approval.

1.06 SUBMISSION REQUIREMENTS:
A. Schedule submissions to the Consultant immediately after Contract award.
B. Submit five copies of submittals.
C. Submit three of each sample requested.
D. Accompany submittals with transmittal letter containing:
   1. Date.
   2. Project title and number.
   3. Contractor's name and address.
   4. The number of each submittal.
E. Provide each set of submittals bound together with a Cover and Table of Contents.

1.07 RE-SUBMISSION REQUIREMENTS:
A. Product Data and Samples: Submit new data and samples as required for initial submittal.

1.08 DISTRIBUTION OF SUBMITTALS AFTER REVIEW:
A. Consultant will retain two copies of approved or corrected submittals.
B. Consultant will forward one copy of approved or corrected submittals to Owner.
C. Consultant will return remaining copies to Contractor.
D. Contractor shall distribute remaining copies of submittals which carry Consultant's stamp as required for construction, including Contractor's file, jobsite file, subcontractors, suppliers, and fabricators.
1.09 LIST OF SUBMITTALS:

SECTION 01300 - SUBMITTALS

- Submittals - 5 copies.

SECTION 01600 - MATERIAL AND EQUIPMENT

- Substitution Request Form - 2 copies.

SECTION 01700 - CONTRACT CLOSEOUT

- Warranties and Bonds.
- Evidence of Payment and Release of Liens.

SECTION 02072 - MINOR DEMOLITION AND RENOVATION WORK

- Product Data.

SECTION 03610 - EPOXY RESIN INJECTION

- Product Data and MSDS.
- Test Results and Samples.

SECTION 03730 - CONCRETE REHABILITATION

- Product Data and MSDS.

SECTION 07180 - CLEAR WATER REPELLENT SEALER

- Product Data and MSDS.
- Application Instructions.

SECTION 07920 - SEALANTS AND CAULKING

- Product Data.
- Samples, if requested.
- Color Chart.

PART TWO - PRODUCTS

Not Used.
PART THREE - EXECUTION

Not Used.

END OF SECTION 01300
PART ONE - GENERAL

1.01 SECTION INCLUDES:
A. General Quality Control.
B. Manufacturers’ Field Services.

1.02 QUALITY CONTROL, GENERAL:
A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.
B. Contractor shall be approved by manufacturer to perform the work for the specified guarantee period. Contractor shall have completed previous projects utilizing same materials and provide same warranty as specified herein.
C. Examine each phase of Work and have defective conditions corrected before starting subsequent operations which would cover, or are dependent upon, work in question.
D. Where visual examination is not sufficient, use instruments with qualified operators to examine work.
E. Utilize Owner's testing laboratory when services are necessary to assist Contractor in evaluating quality.
F. Perform new material installation using full-time employees of the Contractor.

1.03 WORKMANSHIP:
A. Comply with industry standards, except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
B. Utilize qualified personnel who have experience with the specified materials to produce workmanship of specified quality.
C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
D. Provide finishes to match accepted samples.

1.04 MANUFACTURER’S FIELD SERVICES:
A. When specified in respective Specification Section, require manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, and to make appropriate recommendations.
B. Notify manufacturer’s representative a minimum of two weeks prior to date of final inspection. Manufacturer’s representative shall conduct an inspection of the completed work before the final inspection, or shall attend the final inspection.

PART TWO - PRODUCTS

Not Used.
PART THREE - EXECUTION

Not Used.

END OF SECTION 01400
SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART ONE - GENERAL

1.01 SANITARY FACILITIES:
   A. Provide adequate temporary chemical toilets at time Work is commenced.
   B. Maintain facilities in compliance with applicable health laws and regulations. Keep clean and unobtrusive.
   C. Upon completion of Work, remove these facilities and all traces thereof.

1.02 STORAGE OF MATERIALS:
   A. Provide suitable non-combustible, watertight coverings for storage of materials subject to damage by weather. Covering shall be of sufficient size to hold materials required on site at one time. Pallets shall be raised at least 6-inches (150mm) above ground, on heavy joists or sleepers.
   B. If temporary storage sheds are used, locate storage areas where directed, maintain in good condition, and remove storage sheds when so directed. Locate storage areas of combustible construction a minimum of 30 feet (10m) from existing building.
   C. Store materials on site unless otherwise approved by Owner.
   D. Cover and protect materials subject to damage by weather, including during transit.
   E. Do not use building as storage facility.
   F. Provide additional storage at no cost to Owner in the event that additional storage area is required beyond that provided at project site.
   G. Stored materials shall be available for inspection by Owner at all times.
   H. Store flammable and volatile liquids in sealed containers located a minimum of 20 feet from existing buildings.
   I. Transport flammable or volatile liquids in, and use from, U.L. listed safety cans.
   J. Deliver material and equipment in manufacturer's original packaging with all tags and labels intact and legible. Handle and store material and equipment in such a manner as to avoid damage. Liquid products shall be delivered sealed, in original containers. Store roll goods in an upright position.
   K. Proper storage of materials is the sole responsibility of Contractor. Protect all materials susceptible to moisture in above ground, watertight storage. Keep all labels intact and legible, clearly showing the product, manufacturer, and other pertinent information.
   L. Maintain products liable to degrade as a result of being frozen above 40 degrees Fahrenheit (4 degrees Celsius) in heated storage.
   M. Random samples of all materials susceptible to moisture will be taken at various stages of the installation to ensure no significant variations in moisture.
1.03 TEMPORARY WATER:
A. Make arrangements with Owner for water required for construction. Owner will pay for costs of water.
B. Provide hoses for conveyance.

1.04 TEMPORARY ELECTRICAL ENERGY:
A. Make arrangements with Owner for temporary electrical service for completion of the Work. Owner will pay energy charges for temporary power and lighting.
B. Provide all necessary temporary wiring (in conduit if requested by Owner), extensions, and temporary lighting devices.

1.05 TEMPORARY LADDERS, SCAFFOLDS, HOISTS:
A. Furnish and maintain temporary ramps, scaffolds, hoists, or chutes as required for proper execution of Work.
B. Such apparatus, equipment, and construction shall meet requirements of applicable federal, state, and local safety and labor laws.

1.06 GUARDRAILS, BARRICADES, AND TEMPORARY COVERINGS:
A. Provide barricades as required to protect natural resources, site improvements, existing property, adjacent property, and passers-by.
B. Where pedestrian traffic is through or adjacent to work areas, provide necessary guardrails and barricades to protect pedestrians and to prevent pedestrian access to Work areas.
C. Remove guardrails and barricades at completion of construction.
D. Provide suitable temporary watertight coverings over windows and other openings as required to protect from inclement weather.
E. Provide suitable protection for stairs, elevator, and/or walls and floors in areas used for contractor roof access.
F. Provide temporary 6-foot (2m) chainlink fence around setup areas.

1.07 PROTECTION:
A. Maintain bench marks, monuments, and other reference points. If disturbed or destroyed, replace as directed.
B. Protect existing adjacent streets, sidewalks, curbs, buildings, and property including trees, lawns, and plants.
C. Refer to Section 01120 for protection requirements of existing building.

1.08 TEMPORARY FIRE PROTECTION:
A. During construction, Contractor and his subcontractors and sub-subcontractors and their agents and employees shall comply with fire safety practices as outlined in NFPA Pamphlet 241 and local fire protection codes, and in addition shall:
   1. Provide following stored pressure extinguishers during entire construction period:
      a. One U.L. rating 4A-60B:C dry chemical fire extinguisher.
      b. One U.L. rating 2A 2-1/2 gallon water fire extinguisher.
      c. One U.L. rating 10B:C carbon dioxide fire extinguisher with horn and hose assembly.
   2. Provide fire extinguishers together in each of following areas:
a. Each 3000 square feet of work area or fraction thereof.
b. Each temporary structure including construction office and storage and tool and workshop sheds.
3. Contractor's superintendent or other assistant superintendents shall be appointed as project fire warden for entire construction period.
4. Train workmen in proper use of each type fire extinguisher.
5. Post telephone number of fire department, specific information regarding location of on-site fire fighting equipment, and procedures to be followed in event of fire.
6. Maintain free access at all times to fire extinguisher equipment, street fire hydrants, and outside connections for standpipe hose systems.
7. Maintain all exit facilities and access thereto, free of material and other obstructions.

1.09 EMPLOYEE CONTROL:
A. Do not allow construction employees to enter Owner-occupied areas. Maintain construction traffic in designated access routes.

1.10 PARKING FACILITIES:
A. Parking area for a designated number of construction personnel vehicles will be made available at the site by Owner.

1.11 CLEANING DURING CONSTRUCTION:
A. Oversee cleaning and ensure that building and grounds are maintained free from accumulations of waste materials and rubbish.
B. Sprinkle dusty debris with very fine water mist to control accumulation of dust. Do not use water in quantity so as to puddle.
C. At not less than every day during progress of work, clean up work areas and access areas and dispose of waste materials, rubbish, and debris.
D. At Contractor's option, on-site dump containers may be used for collection of waste materials, rubbish, and debris. Locate containers a minimum of 30 feet (10m) away from building entrances at a location acceptable to Owner. If used, remove containers when filled.
E. Do not allow waste materials, rubbish, and debris to accumulate and become an unsightly or dangerous condition.
F. Remove waste materials, rubbish, and debris from site and legally dispose of at public or private dumping areas off Owner's property.
G. Keep streets and access to site free of rubbish and debris.
H. Lower waste materials in a controlled manner with as few handleings as possible. Do not drop or throw materials from heights.
1.12 PERMITS:
A. Obtain and pay for all required local and state permits, licenses, and registrations. Work may be subject to ordinances, laws, codes, and regulations.
B. Prior to bidding, notify Owner and Consultant of any violation, omission, or questions of compliance. Required corrections to Specifications will be made via Addenda prior to receipt of Bids.
C. Be responsible for full compliance and bear cost of additional work not specified that may be required by authorities having jurisdiction.

1.13 REGULATORY REQUIREMENTS:
A. International Building Code (IBC), latest edition; as amended by the City of Houston, Texas.
B. Occupation Safety and Health Administration (OSHA) requirements, as applicable.
C. United States Environmental Protection Agency (EPA) requirements, as applicable.
D. Adhere to all limitations, cautions, and regulatory standards referenced by the manufacturer of each material provided.

PART TWO - PRODUCTS
Not Used.

PART THREE - EXECUTION
Not Used.

END OF SECTION 01500
SECTION 01600

MATERIAL AND EQUIPMENT

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Material and Equipment Incorporated Into Work:
      1. Conform to applicable specifications and standards.
      2. Comply with size, make, type, and quality specified, or as specifically approved in writing by Owner.
      3. Manufactured and Fabricated Products:
         a. Design, fabricate and assemble in accordance with recognized industry standards.
         b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
         c. Two or more items of same kind shall be identical, by same manufacturer.
         d. Products suitable for service conditions.
         e. Adhere to equipment capacities, sizes, and dimensions shown or specified unless variations are specifically approved in writing.
   B. Do not use material or equipment for purposes other than that for which it is designed or is specified.

1.02 REUSE OF EXISTING MATERIAL:
   A. Except as specifically indicated or specified, materials and equipment removed from existing structure shall not be used in completed Work.
   B. For material and equipment specifically indicated or specified to be reused in Work:
      1. Use special care in removal, handling, storage, and reinstallation to assure proper function in completed Work.
      2. Arrange for transportation, storage, and handling of products which require off-site storage, restoration, or renovation. Pay costs for such work.

1.03 MANUFACTURER'S INSTRUCTIONS:
   A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in installation, including two copies to Consultant.
      1. Maintain one set of complete instructions at jobsite during installation and until completion.
      2. Submit two copies to Consultant with appropriate Product Data submittal.
      3. Consultant will forward one copy to Owner.
   B. Handle, install, connect, clean, condition, and adjust products in strict accordance with such instructions and in conformity with specified requirements.
      1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Consultant for further instructions.
      2. Do not proceed with work without clear instructions.
C. Perform Work in accordance with manufacturer's instructions. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.

1.04 TRANSPORTATION AND HANDLING:
A. Arrange deliveries of products in accordance with construction schedules. Coordinate to avoid conflict with work and conditions at site.
1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.
B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.05 SUBSTITUTIONS AND PRODUCT OPTIONS:
A. Contractor's Options:
1. For products specified only by reference standard, select any product meeting that standard, by any manufacturer.
2. For products specified by naming several products or manufacturers, select any product and manufacturer named.
3. Products specified by naming only one product and manufacturer are to establish a quality standard. For products other than the named product, submit request for substitution as specified below.
B. Substitutions:
1. During Bidding, Consultant will consider written requests from Bidders and manufacturers for substitutions of products in place of those specified. Such requests must be received at least two days prior to Bid Date. Requests received after that time will not be considered. Approval of proposed substitutions will be set forth in an Addendum or letter of approval. Requests for substitutions shall include data listed below.
2. Submit two copies of request for each substitution, supported with complete data, drawings, and appropriate samples substantiating compliance of proposed substitution with Contract Documents, including:
   b. Name and address of similar projects on which product was used and date of installation.
   c. Itemized comparison of qualities of proposed substitution with that specified.
   d. Changes required in other elements of Work because of substitution.
   e. Affect on construction schedule.
   f. Availability of maintenance service and source of replacement materials.
C. Contractor's Representation: Request for substitution constitutes a representation that Contractor:
1. Has investigated proposed product and determined that it is equal to or superior in all respects to that specified.
2. Will provide same warranties for substitution as for product specified.
3. Will coordinate installation of accepted substitution into Work and make such other changes as may be required for Work to be complete in all respects.
4. Waives all claims for additional costs, under his responsibility, related to substitution which subsequently becomes apparent.
D. Substitutions will be not be considered if:
1. They are indicated or implied on Shop Drawings or Product Data submittals without formal request submitted in accordance with this Section.
2. They are submitted after time limit specified above.
3. Acceptance will require substantial revision of Contract Documents.
E. If substitution is not approved or accepted, Contractor shall furnish specified product.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01600
SUBSTITUTION REQUEST FORM

TO: ____________________________

PROJECT NO.: 10394.07

FROM (CONTRACTOR/BIDDER):

Owner

CONTRACTOR (BIDDER) HEREBY REQUESTS ACCEPTANCE OF THE FOLLOWING PRODUCT OR SYSTEM AS A SUBSTITUTION IN ACCORDANCE WITH PROVISIONS OF DIVISION ONE OF THE SPECIFICATIONS:

1. SPECIFIED PRODUCT OR SYSTEM:
   Substitution request for (Generic Description): ____________________________
   Specification Section No. __________ Article(s) __________ Para.(s) __________

2. SUPPORTING DATA:
   Product data for proposed substitution is attached (description of product, reference standards, performance and test data).
   □ Sample is attached  □ Sample will be sent if requested

3. QUALITY COMPARISON:

<table>
<thead>
<tr>
<th>SPECIFIED PRODUCT</th>
<th>SUBSTITUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name, Brand:</td>
<td></td>
</tr>
<tr>
<td>Catalog No.:</td>
<td></td>
</tr>
<tr>
<td>Manufacturer:</td>
<td></td>
</tr>
<tr>
<td>Vendor:</td>
<td></td>
</tr>
<tr>
<td>Significant Variations:</td>
<td></td>
</tr>
</tbody>
</table>

   Maintenance Service Available: □ Yes  □ No

   Spare Parts Source: _________________

4. PREVIOUS INSTALLATIONS:
   Identification of similar projects on which proposed substitution was used:
   Project: ____________________________  Architect: ____________________________
   Address: ____________________________  Owner: ____________________________
   ____________________________  Date Installed: ____________________________

5. REASON FOR NOT GIVING PRIORITY TO SPECIFIED ITEMS:
   __________________________________________

6. EFFECT OF SUBSTITUTION:
   __________________________________________
Proposed substitution affects other parts of Work: □ No  □ Yes
(If yes, explain)

Substitution changes contract time: □ No  □ Yes
Add/Deduct _______ days

Substitution requires dimensional revision or redesign of structure or M & E Work: □ No  □ Yes (If yes, attach complete data.)

Saving or credit to Owner, if any, for accepting substitution: $__________.
Extra cost to Owner, if any, for accepting substitution: $__________.

7. CONTRACTOR’S (BIDDER’S) STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENTS:
I/we have investigated the proposed substitution. I/we:
• believe that it is equal or superior in all respects to specified product, except as stated above;
• will provide the same warranty as specified for specified product;
• will pay redesign and special inspection costs caused by the use of this product;
• will pay additional costs to other contractors caused by the substitution;
• will coordinate the incorporation of the proposed substitution in the Work;
• will modify other parts of the Work, as may be needed, to make all parts of the Work complete and functioning;
• waive future claims for added cost to Contract caused by the substitution.

Contractor (Bidder): ________________    Date:______________
By: ________________________________

Answer all questions and complete all blanks - use "NA" if not applicable.

CONSULTANT’S REVIEW AND ACTION

☐ Resubmit Substitution Request Form:
Provide more information in the following categories: ________________

☐ Sign Contractor’s (Bidder’s) Statement of Conformance.

☐ Substitution is accepted.
□ Substitution is accepted with the following comments: _____________________

□ Substitution is not accepted.

□ Substitution Request Form received too late.

Consultant _____________________

Title _____________________

Date _____________________

Owner _____________________
SECTION 01700

CONTRACT CLOSEOUT

PART ONE - GENERAL

1.01 GENERAL:
A. Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.

1.02 SUBSTANTIAL COMPLETION:
A. Contractor: Shall notify Consultant that Project is substantially complete and schedule time for inspection.
B. Consultant will make an inspection after notification.
C. Should Consultant consider Work not complete:
   1. He will immediately notify Contractor, in writing, stating reasons.
   2. Contractor shall complete Work and send second written notice to Consultant certifying Project is substantially complete.
   3. Consultant will reinspect Work.

1.03 FINAL INSPECTION:
A. Contractor shall submit written certification that:
   1. Contract Documents have been reviewed.
   2. Project has been inspected for compliance with Contract Documents.
   3. Work has been completed in accordance with Contract Documents.
   4. Equipment and systems have been tested in presence of Owner's Representative and are operational.
   5. Project is complete and ready for final inspection.
B. Consultant will make final inspection after notification from Contractor.
C. Should Consultant consider Work complete in accordance with requirements of Contract Documents, he will request Contractor to make Project Closeout submittals.
D. Should Consultant consider Work not complete:
   1. He will notify Contractor in writing, issuing inspection list to Contractor with noted items requiring further consideration.
   2. Contractor shall take immediate steps to remedy the stated deficiencies and submit initialed inspection list to Consultant certifying Work is complete.
   3. Consultant will reinspect Work.

1.04 REINSPECTING COSTS:
A. Should Consultant be required to perform subsequent inspections of the Work due to the failure of the Contractor to correct deficient work, Owner will compensate Consultant for additional services and deduct amount paid to Consultant from the final payment to Contractor.
1.05 CLOSE-OUT SUBMITTALS:
   A. Evidence of compliance with requirements of governing authorities.
   B. Warranties and Bonds: Refer to requirements of this Section.
   C. Evidence of Payment and Release of Liens: Refer to requirements of General and Supplementary Conditions.

1.06 WARRANTY/GUARANTEE:
   A. Submit original and duplicate copies of both Contractor's Warranty and Manufacturer's Guarantee to Consultant for review. After review, Consultant will forward Warranty and Guarantee to Owner. Consultant shall approve final pay application (retainage) upon receipt of both Contractor's Warranty and Manufacturer's Guarantee.

1.07 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS:
   A. Final Release and Waiver of Liens:
      1. Contractor's Waiver of Liens.
      2. Separate waivers of liens for subcontractors, suppliers, and others with lien rights against property of Owner, together with complete list of those parties.
   B. All submittals shall be notarized and sealed before delivery to Consultant.

1.08 FINAL ADJUSTMENT OF ACCOUNTS:
   A. Submit final statement of accounting to Consultant.
   B. Statement shall reflect all adjustments.
      1. Original Contract Sum.
      2. Additions and Deductions resulting from:
         a. Previous Change Orders.
         b. Deductions for uncorrected Work.
         c. Deductions for Reinspection Payments.
      3. Total Contract Sum, as adjusted.
      4. Previous payments.
      5. Sum remaining due.
   C. Consultant will prepare final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

1.09 FINAL APPLICATION FOR PAYMENT:
   A. Submit final application in accordance with requirements of General Conditions.
   B. Consultant shall review all data supplied for conformance with Contract Documents. When approved, Owner will accept the Work, release Contractor (except as to conditions of the Performance Bond, any legal rights of Owner, required guarantees, and correction of Faulty Work after final Payment), and make final payment to Contractor.
   C. Final payment will not be approved or released until receipt of proper close-out documents.
PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01700
SECTION 01710

CLEANING

PART ONE - GENERAL

1.01 GENERAL:
   A. Maintain premises free from accumulations of waste, debris, and rubbish caused by construction operations.
   B. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials. Clean all sight-exposed surfaces. Leave project clean and ready for occupancy.

1.02 REQUIREMENTS OF REGULATORY AGENCIES:
   A. Codes and Standards: Applicable federal, state, and local codes and regulations relative to environmental safety regulations.
   B. Hazards Controls: Store volatile waste in covered metal containers and remove from premises daily. Prevent accumulation of wastes which create hazardous conditions.
   C. Pollution Control: Conduct clean-up and disposal operations to comply with local ordinances and anti-pollution laws.
      1. Burning or burying of rubbish and waste materials on the project site is prohibited.
      2. Disposal of volatile fluid wastes (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is prohibited.

PART TWO - PRODUCTS

2.01 CLEANING MATERIALS:
   A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
   B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART THREE - EXECUTION

3.01 DURING CONSTRUCTION:
   A. Keep work area and all occupied property in neat and orderly condition at all times. Oversee cleaning and ensure that building and grounds are maintained free from accumulations of waste materials and rubbish. Sprinkle dusty debris with very fine water mist to control accumulation of dust. Do not use water in quantity so as to puddle. Do not allow waste and other materials such as rubbish, debris, wrappers, etc., to accumulate and become unsightly or hazardous. Promptly remove equipment and excess materials as they become no longer needed for the progress of the work. At not less than every day during progress of work, clean up work and access areas and dispose of waste materials, rubbish, and debris. Legally dispose of waste materials, rubbish, and debris at public or private dumping areas off Owner's
property. At the completion of work, restore work area to its original condition. Lower waste materials in a controlled manner with as few handleings as possible; do not drop or throw materials from heights. Keep street and access to site free of rubbish and debris.

B. Contractor shall be responsible for damage to or destruction of property of any sort resulting from the work or caused by defective work, or the use of unsatisfactory materials or workmanship.

C. Contractor shall be responsible for the preservation of all private property, trees, fences, etc., along the adjacent street, right-of-way, etc., and shall use every precaution necessary to prevent damage or injury thereto. Use suitable precautions to prevent damage to pipes, conduits, and other structures.

D. If damage to any structures, utilities, or other improvement occurs by reason of Contractor's operations even though special precautions have been employed, Contractor shall be entirely responsible for such damage and shall make all repairs as required to the satisfaction of Owner.

E. Do not injure, destroy, or trim landscaping without authorization by Owner. Landscaping damage will be replaced by Contractor with new stock or with other stock satisfactory to Owner at the expense of Contractor.

3.02 FINAL CLEANING:

A. Employ skilled workmen for final cleaning.

B. Remove grease, mastics, adhesives, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior surfaces.

C. Repair, patch, and touch-up marred surfaces to match adjacent finishes.

D. Broom clean paved surfaces; rake clean other surfaces of grounds.

E. Clean stairwell, freight elevator, and loading dock area.

F. Prior to final completion or Owner occupancy, conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that entire Work area is clean.

END OF SECTION 01710
SECTION 02072
MINOR DEMOLITION AND RENOVATION WORK

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Removal of deteriorated and/or disbonded sealants at window perimeters and wall panel joints.
   B. Washing windows after completion of repairs.
   C. All other miscellaneous and incidental work required to install complete system as specified and to obtain specified manufacturer's warranty.

1.02 RELATED SECTIONS:
   A. 03610 - Epoxy Resin Injection.
   B. 03730 - Concrete Rehabilitation.
   C. 07180 - Water Repellent Sealers.
   D. 07920 - Sealants and Caulking.

1.03 REFERENCES:
   B. Corps of Engineers (CRD).

1.04 PROJECT CONDITIONS:
   A. Environmental Requirements:
      1. Do not remove existing sealant or waterproofing materials in inclement weather or when rain is predicted with 30 percent or greater possibility.
      2. When ambient temperature is below 60 degrees Fahrenheit, expose only enough waterproofing materials required within four hour period.
      3. Do not expose waterproofing materials and accessories to constant temperature in excess of 120 degrees Fahrenheit.
   B. Emergency Equipment: Maintain on-site materials necessary to apply emergency temporary seal in event of sudden storms or inclement weather.
   C. Smoking is prohibited on roof areas, in existing building, and all of Owner's property.

1.05 SEQUENCING AND SCHEDULING:
   A. Sequence minor demolition and renovation with sequence of new work to maintain facility in dry, watertight condition.
   B. Coordinate material removal work so that no more existing materials are removed in one day than can be replaced with new materials in same day.
   C. Coordinate work with Owner's operational requirements.
   D. Coordinate demolition work and removal with waterproofing work to maintain facility in dry, watertight condition.
1.06 WARRANTY:
   A. Provide Contractor's warranty covering defects in installed materials and
      workmanship for period of two years from date of final acceptance.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

3.01 EXAMINATION:
   A. Examine existing building to determine existing physical conditions that affect removal
      and installation of new waterproofing.
   B. Verify that required barricades and other protective measures are in place.

3.02 PREPARATION:
   A. Take measures to maintain watertight conditions during term of Contract.
   B. Protect adjacent surfaces.

3.03 MINOR DEMOLITION OPERATIONS:
   A. Execute demolition in careful and orderly manner with least possible disturbance or
      damage to adjoining surfaces and structure.
   B. Avoid excessive vibrations in demolition procedures that would be transmitted through
      existing structure and finish materials.

3.04 MINOR RENOVATION WORK:
   A. Prepare substrates in accordance with waterproofing manufacturer's
      recommendations.

3.05 CLEANING:
   A. Materials, equipment, and debris resulting from demolition operations shall become
      property of Contractor. Remove and dispose of demolition debris in accordance with
      applicable city, state, and federal laws at authorized disposal site.
   B. Leave substrate clean and dry, ready to receive waterproofing system.

END OF SECTION 02072
SECTION 03610

EPOXY RESIN INJECTION

PART ONE - GENERAL

1.01 SECTION INCLUDES:
A. Furnishing all materials, tools, equipment, appliances, transportation, labor, and supervision required to repair cracks and joints by the injection of an epoxy resin, where required.
B. Preparing existing substrates and installing surface seals.
C. Installing injection resin to completely fill cracks to be repaired.
D. Removing or dressing surface seal to a finished condition.

1.02 RELATED SECTIONS:
A. 02072 - Minor Demolition and Renovation Work.
B. 03730 - Concrete Rehabilitation.
C. 07920 - Sealants and Caulking.

1.03 SUBMITTALS:
A. Provide submittals in accordance with Section 01300 - Submittals.
B. Submit for approval to Owner and Consultant, a complete written description of epoxy resin material, pressure injection system, and application methods to be used. Include equipment used in the process, calibration procedures, field pressure and ratio test procedures, and materials to be used. Do not commence work until Consultant has reviewed the submittal.
C. Submit preliminary progress schedule indicating approximate start and completion dates and planned sequence for epoxy resin injection work. Address areas which will be closed or restricted from normal use, and the times the areas will be restricted.
D. Submit manufacturers' descriptive product data and literature, substrate preparation instructions, and application instructions for each product used.
E. Submit Material Safety Data Sheets (MSDS) for each product used.
F. Submit to Consultant a report of injection results for each injected crack. Include the following information:
   1. Technician's name.
   2. Date and time.
   3. Pump number.
   4. Ratio equipment number.
   5. Lot number of materials.
   6. Location of crack.
   7. Number of ports and lineal feet of injection.
   8. Noted problems with the injection process.
G. Submit list of five projects similar in nature which have been performed by Contractor, including project name, location, and date.
PART TWO - MATERIALS AND EQUIPMENT

2.01 EPOXY INJECTION RESIN:
   A. Two-component, low viscosity injection resin material which is moisture insensitive and
      solvent free for cracks ranging in width from 0.005-inch to 0.020-inch.
      4. Or approved equal.
      5. Injection resin must be capable of penetration and performance in concrete cracks
         0.005-inches or greater in width. Furnish a certificate from the injection resin
         manufacturer which states that the components are manufactured to meet the
         requirements set forth below:
            a. Minimum Pot Lift: Twenty minutes.
            b. Maximum Viscosity: 175 centipoise (cps).
            c. Minimum Compressive Strength: 8,400 pounds per square inch (psi) at twenty-
               eight days.
            d. Minimum Tensile Strength: 5,100 psi at fourteen days.
            e. Minimum Tensile Modulus of Elasticity: 1.88 by 10^5 psi.
   B. Two-component, low viscosity injection resin material which is moisture insensitive and
      solvent-free, for cracks ranging from 0.020-inch to 0.125-inch.
      4. Or approved equal.
      5. Injection resin shall meet the following requirements:
         a. Minimum Pot Lift: Twenty-five minutes.
         b. Maximum Viscosity: 750 CPS.
         f. Minimum Compressive Strength: 10,500 psi at twenty-eight days.
         g. Minimum Tensile Strength: 7,100 psi at fourteen days.
         h. Minimum Modulus of Elasticity/Tension: 4.1 X 10^5 psi at seven days.

2.02 SURFACE SEAL:
   A. Provide a surface seal material to confine the injection resin in the fissure during
      injection and cure, typified by:
      2. "EpoGel", Sonneborn.
      4. Or approved equal.
      B. Provide a surface seal material which has adequate strength to secure injection ports
         firmly in place, resist injection pressures adequately to prevent leakage during
         injection, and be capable of application, adhesion, and curing when applied to wet
         surfaces.
2.03 EQUIPMENT FOR INJECTION:
A. Provide portable, positive displacement type pumps with interlock with provisions for positive ratio control of exact proportions of the two resin components at the nozzle to meter and mix the two resin components and inject the mixture into the crack. Provide electric or air powered pumps with provisions for in-line metering and mixing and a counter attached to the pump to measure the quantity of material discharged.
B. Provide injection equipment with automatic pressure control capable of discharging the resin mixture at any pre-set pressure up to 200 psi plus or minus 5 psi, and a manual pressure control override.
C. Provide injection equipment capable of maintaining the volume ratio for the injection resin prescribed by the material manufacturer within a tolerance of plus or minus 5 percent by volume at any discharge pressure up to 200 psi.
D. Provide injection equipment equipped with sensors on both the component A and B reservoirs that will automatically stop the machine when only one component is being pumped to the mixing head.

PART THREE - EXECUTION

3.01 PREPARATION:
A. Cracks to be injected include cracks in precast concrete wall panels.
B. Cleaning:
   1. Clean surfaces adjacent to cracks or other areas of application by grinding or other mechanical means to remove existing paint, waterproof coatings, dirt, dust, grease, oil, efflorescence, or other foreign matter detrimental to bond of epoxy injection surface seal system. Acids and corrosive materials are not permitted for cleaning.
   2. Use gentlest means possible to clean interior and exterior architectural concrete surfaces.
C. Flush all cracks larger than 0.015-inches in width alternately with water and air (to create turbulence and aid in cleaning the cracks).
D. Provide entry ports along the crack at intervals not greater than the approximate crack depth. Spacing is determined by the tightness of the crack to permit travel of injected epoxy resin between ports and to fill cracks completely. Recess drilled ports, if required by injection resin manufacturer, a minimum of 1/2-inch (13mm).
E. Apply surface seal material to the face of the crack between the entry ports. Install ports and apply surface seal material on both sides of a concrete element, when both sides of the element are accessible. Stagger the port locations for through cracks.
F. For cracks in the exterior side of architectural precast concrete panels, route the crack a minimum of 3/8-inch wide by 1/2-inch deep. Install silicone sealant at the bottom of the routed crack. Allow sealant to cure prior to start of injection.
G. Provide polyethylene sheet protection for architectural concrete adjacent to and below routed and sealed crack to prevent staining of the concrete surface in the event of a leak in the sealant surface seal.
H. Temperature of concrete substrate and ambient temperature must range from 40 degrees Fahrenheit to 85 degrees Fahrenheit.
I. Surface seal material and sealant must gain adequate strength before proceeding with the injection.

3.02 EPOXY RESIN INJECTION:
A. Temperature of concrete substrate shall range from 40 degrees Fahrenheit to 85 degrees Fahrenheit.
B. Begin injection of epoxy resin at lowest entry port or at one end of the crack, and continue until flow of epoxy resin is observed at the next closest port. Pumping must continue under constant pressure until clear resin flows out of the next port with no milky residue indicative of the presence of moisture.
C. When epoxy resin travel is verified by flow from the adjacent port, discontinue injection at the entry port and transfer injection to the port from which the epoxy resin flowed.
D. Manifold: Inject epoxy resin in multiple ports simultaneously, using a manifold, at locations approved by Consultant. Verify flow of epoxy resin at adjacent ports.
E. Perform epoxy resin injection continuously until cracks are completely filled.
F. Terminate the Work and notify Consultant if port-to-port travel of epoxy resin is not obvious, or leaks in surface seal are observed.
G. Maintain injection pressure as low as practical with maximum injection pressure of 50 psi. Notify Consultant if injection pressures exceed 50 psi.
H. Re-inject epoxy resin into ports within twenty minutes of first injection procedure to completely fill the crack.

3.03 FINISHING:
A. When cracks are completely filled, cure the epoxy resin for sufficient time to allow removal of surface seal without any loss of epoxy material from the cracks.
B. Remove all drips, stains, or spills caused by surface seal materials and epoxy resin from concrete surfaces, using removal method that will not alter the surface appearance of the architectural concrete.
C. Grind or finish the face of the crack flush with adjacent concrete in crack locations which are not concealed by a suspended ceiling system, fireproofing, gypsum wallboard, or other architectural finish material so that no indentations or protrusions caused by the placement of entry ports or surface seal are visible.

3.04 FIELD QUALITY CONTROL:
A. Pressure Test Method and Frequency:
   1. Disconnect the mixing head of injection equipment and attach the two epoxy resin component delivery lines to the pressure check device. Provide a pressure check device consisting of two independent valved nozzles capable of controlling flow rate and pressure by opening or closing the valve. Provide a pressure gauge behind each valve. Close the valves on the pressure check device and operate equipment until the gauge pressure on each line reads 160 psi. Stop the pumps and confirm the gauge pressure does not drop below 150 psi within three minutes.
2. Conduct a pressure test for each injection unit at least once every four hours and no less than twice each work day, or at the direction of the Consultant.

B. Ratio Test Method and Frequency:
1. Disconnect the mixing head of the injection equipment and simultaneously pump the two epoxy resin components through the ratio check device. Provide a ratio check device consisting of two independent valved nozzles capable of controlling back pressure by opening or closing the valve. Provide a pressure gauge capable of measuring the back-pressure behind each valve. Adjust discharge pressure to 160 psi for both epoxy resin components. Simultaneously discharge both epoxy resin components into separate calibrated containers. Compare the amounts simultaneously discharged into the calibrated containers to determine that volume discharged conforms to manufacturer's recommended ratio for the material.

2. Conduct a ratio test for each injection unit at least once every four hours and no less than twice each work day, or at the direction of Consultant.

C. Obtain samples of the injection epoxy resin before beginning each shift and at hourly intervals during injection work by depositing the mix material from the injection nozzle into a small container to observe appearance and time of set. Suspend injection work until corrective measures are taken and notify Consultant if the samples exhibit any evidence of improper proportioning, mixing, or material defects.

D. Consultant, at any time without prior notification to Contractor, may be present to observe the injection procedure and document Work is in accordance with these Specifications.

END OF SECTION 03610
PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Furnishing all materials, tools, equipment, labor, and supervision to perform preparation and concrete rehabilitation as specified herein, and as required for a complete and proper installation.
   B. Reconstructing or repairing spalled concrete and corrosion of reinforcing steel.
   C. Providing for the structural integrity and performance of the concrete repair, while maintaining the overall aesthetics of the facility.

1.02 RELATED SECTIONS:
   A. 03610 - Epoxy Resin Injection of Cracks in Concrete Members.
   B. 07180 - Water Repellent Sealer.
   C. 07920 - Sealants and Caulking.

1.03 SUBMITTALS:
   A. Provide Submittals in accordance with Section 01300 - Submittals.
   B. Product Data: Submit manufacturer's technical data for each product, including recommendations for product application and use.
   C. Submit manufacturer's written Material Safety Data Sheet (MSDS) for each material used in this Section.
   D. Submit concrete repair material samples demonstrating exposed aggregate profile size, color, appearance, and texture; and surface finish of completed concrete repairs.
   E. Prepare on-site, in-place samples or mock-ups, depicting repaired concrete.

1.04 WARRANTY AND GUARANTEE:
   A. Provide written materials guarantee for the longest period available, agreeing to repair or replace materials which fail to perform or appear to deteriorate in any manner not clearly specified as an inherent quality of the material according to the manufacturer's published data.
   B. Provide two-year Contractor's warranty for labor and materials repaired or installed.

PART TWO - PRODUCTS

2.01 CONCRETE REPAIR MATERIAL:
   A. Horizontal Surfaces: Multi-component, polymer modified Portland cement mortar, trowel grade:
      3. Or approved equal.
4. Aggregate for Applications Greater Than 1-inch (25mm) in Depth: Clean, well graded aggregate with low absorption and high density. Provide aggregate in a saturated surface dry condition with a maximum size less than 3/8-inch. Maximum addition rate is 42 pounds per bag, or as recommended by the mortar manufacturer.

B. Vertical and Overhead Surfaces: Multi-component, polymer modified Portland cement mortar, non-sag:
   3. Or approved equal.

4. Aggregate for Applications Greater Than 1-inch (25mm) in Depth: Clean, well graded aggregate with low absorption and high density. Provide aggregate in a saturated surface dry condition with a maximum size less than 3/8-inch. Maximum addition rate is 35 pounds per bag, or as recommended by the mortar manufacturer.

2.02 REINFORCING STEEL COATING:
A. Multi-component, polymer modified cementitious coating:
   3. Or approved equal.

2.03 ARCHITECTURAL CONCRETE REPAIR MATERIAL:
A. Portland Cement: White, non-staining Portland cement, ASTM C 150, Type I.
B. Tinted Portland Cement: As required to match existing concrete paste color.
C. Aggregate: Blend of natural stone coarse aggregate and manufactured sand aggregate; matching existing concrete aggregate in size, color, appearance, and texture.

2.04 EPOXY ADHESIVE:
A. Two-component epoxy resin adhesive, typified by:
   4. Or approved equal.

2.05 DOWELS:
A. Stainless steel dowels, Type 304, 1/4-inch diameter. Furnish hook as required equal to ten times diameter of dowel.

2.06 FORMWORK:
A. Provide molds, forms, and, where required, form-facing materials of metal, plastic, wood, or acceptable material that is non-reactive with concrete and will produce required finish surfaces without form marks on exposed surfaces.
2.07 WATER:
   A. Clean, potable, free of oil, acid, alkali, and organic matter.

PART THREE - EXECUTION

3.01 PREPARATION:
   A. Report in writing to the Owner and Consultant, any conditions or surfaces which may adversely affect the installation. Do not proceed with Work until unsatisfactory conditions are corrected. Commencement of work implies acceptance of substrate and environmental conditions.
   B. Use mechanical means to break out and remove all deteriorated, loose, or spalled material.
   C. Chip remaining intact concrete in repair area until sound, clean concrete substrate is obtained. Remove loose concrete and dust with water or air under pressure.
   D. Provide surfaces to be repaired free of defects and all laitance, dirt, dust, grease, efflorescence, paint, or other foreign material, with a minimum surface roughness profile of 1/16-inch.
   E. Sawcut or undercut edges of spalled areas as necessary to eliminate feather edges and to provide a keyed patch.
   F. Undercut exposed steel reinforcing if present. Provide clearance between reinforcing bars and adjacent concrete equal to one bar diameter, with a minimum clearance of 1/2-inch (13mm). Provide 1/2-inch (13mm) clearance between welded wire fabric and adjacent concrete.
   G. If corroded steel reinforcing extends beyond repair area, chip out adjacent concrete until uncorroded steel is uncovered. Use special care to prevent loss of bond to steel in remaining sound concrete.
   H. Mechanically clean exposed steel reinforcing by means of power tool equipment, chipping, sandblasting, or high pressure water blasting to remove corrosion products.

3.02 APPLICATION OF PROTECTIVE COATING TO REINFORCING STEEL AND CONCRETE:
   A. Mix coating material in accordance with manufacturer's written instructions.
   B. Provide adjacent concrete surfaces in a saturated surface dry condition with no standing water.
   C. Brush apply coating material 10 mils thick to all surfaces of clean, exposed reinforcing steel. Overlapping onto the concrete surface is expected.
   D. Allow coating to dry approximately two to three hours, and apply second 10 mil coat to reinforcing steel.
   E. Brush apply 20 mil coating to prepared concrete substrate.
   F. Do not apply protective coating when ambient and surface temperatures are less than 40 degrees Fahrenheit, or greater than 85 degrees Fahrenheit.
   G. Allow coating to dry in accordance with manufacturer's written instructions prior to applying repair material.
3.03 APPLICATION OF CONCRETE REPAIR MATERIAL:
A. Mix concrete repair material in accordance with manufacturer’s written instructions.
B. Saturate clean substrate to receive repair material. Provide a surface in a saturated
   surface dry condition. Remove all standing water.
C. Apply mortar to substrate with a stiff brush, filling all voids and pores, forcing material
   against substrate surface.
D. Trowel apply repair material in successive lifts in accordance with manufacturer's
   written instructions. Score intermediate lifts and allow repair material to reach final
   set before applying successive lift (approximately thirty minutes). Saturate surface
   with water (removing any standing water) and brush (scrub) on new mortar onto
   substrate surface. Repeat process until flush with surface.
E. Screed off and trowel repair to level or to match existing lines. Use soft sponge to
   float surface if required.
F. Keep repairs damp for thirty minutes after installation to complete curing if required
   by the manufacturer. Protect repair from rapid drying due to high heat or wind.
G. After material has hardened, place wet burlap bags or construction paper over
   repaired area.
H. Do not apply material in direct heat of sun, frost-filled substrates, or when the
   ambient and surface temperatures are less than 45 degrees Fahrenheit.

3.04 ARCHITECTURAL CONCRETE REPAIR:
A. Prepare remaining architectural concrete surface adjacent to repair area.
B. Pre-drill dowel holes in substrate.
C. Install new steel dowels with epoxy adhesive. Provide hook on dowel.
D. Construct forms around repair areas to prevent the loss of architectural concrete
   repair materials.
E. Apply epoxy adhesive to prepared concrete substrate immediately prior to placing
   new architectural concrete repair material.
F. Place architectural concrete repair material into form while epoxy adhesive is still
   wet.
G. Completely fill forms with architectural concrete repair material. Ensure all voids and
   entrapped air are eliminated.
H. Brush, wash, and/or perform light grit sandblasting of repair areas to provide finished
   appearance of repair area to match existing.

END OF SECTION 03730
 SECTION 07180  
WATER REPELLENT SEALERS  

PART ONE - GENERAL  

1.01 SECTION INCLUDES: 
A. Cleaning existing precast concrete wall panels.  
B. Application of a Volatile Organic Content (VOC) compliant clear water-repellent sealer to exposed concrete surfaces.  

1.02 RELATED SECTIONS: 
A. 02072 - Minor Demolition and Renovation Work.  
B. 03610 - Epoxy Resin Injection.  
C. 03730 - Concrete Rehabilitation.  
D. 07920 - Sealants and Caulking.  

1.03 REFERENCES: 
A. American Society for Testing and Materials (ASTM):  
   2. C-672, Scaling Resistance of Concrete.  
   3. E-96-80, Water Vapor Transmission.  
   5. G 53-84, Weathering and UV Stability.  

1.04 SUBMITTALS: 
A. Provide submittals in accordance with Section 01300 - Submittals.  
B. Product Data: Submit manufacturer's technical information, including label analysis, application instructions, and MSDS for each material proposed for use. Do not proceed with test application or with work until technical information is approved by Consultant.  
C. Test areas will be selected by Owner's Representative.  
D. Clean and otherwise prepare test areas, as necessary, a minimum 4 feet by 4 feet in dimension, depicting cleaned concrete surfaces, concrete repairs, and application of clear water repellent sealer, for the inspection and approval of Owner's Representative.  
E. Conduct testing on each surface exposure in unobtrusive locations on representative surface conditions employing the proposed application procedures.  
F. Test adjacent surfaces for possible detrimental effect or aesthetic alteration created by exposure to the specified surface treatment and protect as deemed necessary.  
G. Test procedures include evaluation of proposed protection and ventilation techniques and equipment associated with the application of specified water repellent sealer.
H. Apply tests using the same equipment and application procedures as proposed for overall application. Allow test application to dry a minimum of three days prior to inspection and approval. Test areas will remain available for inspection by Owner's Representative throughout the job application.

I. Test application will verify compatibility of the specified water repellent sealer with the concrete substrate surfaces and corrosion inhibiting coating.

J. Owner's Representative will approve all test areas and application procedures prior to the start of full scale application of clear water repellent sealer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturers supplying products shall have been regularly engaged and specializing for the preceding ten years in the formulation, manufacture, and distribution of water repellent sealer product for buildings.

B. Performance Requirements: Provide clear water repellent sealers that have been produced and installed to treat concrete and masonry substrates.

C. Installation Qualifications: Work must be performed by a firm having not less than five years successful experience in comparable water repellent sealer application procedures and employing personnel skilled in application of water repellent sealers. Contractors shall possess all necessary certifications, licenses, and other written approvals as required by the manufacturer and as necessary for the execution of the work specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original unopened containers and packaging, bearing labels including manufacturer's name, product name, type of material, batch number, date of manufacture, shelf life, and instructions for use.

B. Consultant reserves the right to inspect containers prior to their being opened, to review the accompanying bills of lading, and to reject materials in opened containers.

C. Protect water repellent sealer materials during storage and application from wetting by rain, snow, or ground water and from staining or intermixture with earth or other types of materials.

D. Protect materials from deterioration by moisture and temperature. Store in dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

E. Remove damaged, deteriorated, or out-of-date material from site.

1.07 PROJECT CONDITIONS:

A. Protect persons, motor vehicles, glass, landscaping, vegetation, adjacent surfaces, building site, and surrounding buildings from injury resulting from spillage, overspray, contamination, soiling, and damage resulting from water repellent sealer application.

B. Prevent chemical solutions from coming into contact with pedestrians, motor vehicles, landscaping, vegetation, buildings, and other surfaces which could be damaged by contact.
C. Do not clean concrete and masonry surfaces or apply water repellent sealer during winds of sufficient force to spread cleaning products and sealer to unprotected surfaces.
D. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of water repellent sealer application.
E. Surfaces to receive water repellent sealer application should be in a surface dry condition. Surface should be absorbent to assure good penetration of the specified water repellent sealer.
F. Apply water repellent sealer to concrete and masonry surfaces only when ambient air and surface temperatures are greater than or equal to 50 degrees Fahrenheit, or less than or equal to 95 degrees Fahrenheit, and will remain so at least forty-eight hours after application.
G. Do not apply water repellent sealer within 48 hours of anticipated rain.
H. Dispose of runoff from cleaning operations by legal means and in manner to prevent soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

1.08 SEQUENCING AND SCHEDULING:
A. Perform Work in Following Sequence:
   1. Schedule work starting at bottom of wall and working to top.
   2. Install protective covers to protect landscaping, entrances, and dissimilar materials.
   3. Complete and obtain approval for all cleaning, restoration, concrete repair, sealant installation work, and corrosion inhibiting coating in the designated area prior to the water repellent sealer application.
   4. Clean windows as necessary after application of water repellent sealer.

1.09 WARRANTY:
A. Manufacturer's Warranty: Provide manufacturer's five year warranty for water repellent sealer material.
B. Contractor's Warranty: Provide written warranty against defects in material and workmanship for a period of two years from date of substantial completion.

PART TWO - PRODUCTS

2.01 WATER REPELLENT PRODUCTS:
A. Acceptable Manufacturers for VOC compliant Water Repellent Sealer: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to:
   1. Hydrozo, Incorporated.
   2. ProSoCo, inc.
   3. Huls America, Inc.
   4. Others require written approval from Consultant.
B. Water Repellent Sealer: Clear penetrating siloxane or silane suitable for use on concrete and masonry surfaces, with Volatile Organic Content less than 600 grams per liter:
   1. "ENVIROSEAL 40", Hydrozo.
   2. "Weather Seal SL40 < 600 g/L", ProSoCo.
   4. Or approved equal.

2.02 CLEANING MATERIALS AND EQUIPMENT:
A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
B. Warm Water: Heat water to temperature of 140 degrees Fahrenheit to 180 degrees.
C. Brushes: Fiber bristle only.
D. Cleaning Products: Low acidic, concentrated cleaner for removal of atmospheric soiling and subsurface staining on precast concrete panels.
   1. "Sertec", Sermac, a Division of Service Master Industries, Inc.
   3. Or approved equal.

PART THREE - EXECUTION

3.01 PRECAUTIONS:
A. Do not use water repellent sealers near fire or extreme heat. Provide adequate ventilation to prevent build up of solvent fumes.
B. Applicators shall wear cartridge type respirators approved for solvent fumes by the sealer manufacturer.
C. Stop air handling equipment and cover air conditioning intakes in the vicinity of the application of water repellent sealer to prevent fumes and odors being drawn into the building. Obtain owner approval before shutting down air conditioning and ventilation equipment.

3.02 PREPARATION:
A. Clean all surfaces to receive water repellent sealer of dust, surface dirt, oil, grease, rust stains, efflorescence, biological growth, and other surface contaminants.
B. Comply with recommendations of cleaner and sealer manufacturers for protecting building surfaces and for application procedures.
C. Protect glass, unpainted metal trim, painted surfaces, and stone from contact with acidic chemical cleaners, overspray, and spillage by covering them with polyethylene film and waterproof masking tape. Protect all surrounding and adjacent surfaces not to be cleaned and receive an application of water repellent sealer from contact with the specified cleaners and sealers.
D. Immediately remove inadvertent spillage using mineral spirits, or as recommended by the sealer manufacturer.
E. Install all concrete repair materials and sealants prior to application of the water repellent sealer.
F. Inspect all surfaces to verify that they are properly prepared to receive the specified water repellent sealer. Do not proceed with application until all unsatisfactory conditions have been corrected.

3.03 CLEANING EXISTING CONCRETE, CMU, AND BRICK MASONRY:
A. Clean concrete in preparation for application of water repellent sealer.
B. Determine method of cleaning based upon adjoining materials, site conditions, and manufacturer's requirements.
C. Use water blasting or hand method to clean substrate and open pores.
D. Verify surfaces to be restored are clean, free of efflorescence, stains, mildew, mold, biological growth, grime, dirt, tar, oil, grease, or other foreign matter and discoloration detrimental to application.
E. Cleaning:
   1. Proceed with cleaning in an orderly manner; work from top to bottom and from one end of each elevation to the other.
   2. Determine method of cleaning based upon adjoining materials, site conditions, and manufacturer's requirements.
   3. Use water blasting, sandblasting, or hand method which will clean substrate and open pores.
   4. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to concrete, surfaces.
   5. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area.
F. Water Cleaning Methods:
   1. Spray Applications: Spray-apply water to concrete surfaces to comply with requirements indicated for location, purpose, water temperature, pressure, volume, and equipment. Unless otherwise indicated, hold spray nozzle not less than 6-inches from surface of concrete and apply water from side to side in overlapping bands to produce uniform coverage and an even effect.
   2. Low Pressure Spray: 100 to 400 psi; three to six gallons per minute.
   3. Medium Pressure Spray: 400 to 800 psi; three to six gallons per minute.
   4. High Pressure Spray: 800 to 1200 psi; three to six gallons per minute.
   5. Steam Wash: Apply steam to concrete surfaces at pressures not exceeding 80 psi. Hold nozzle no less than 6-inches from surface of concrete and apply steam from side to side or in direction of tooling in overlapping bands to produce uniform coverage and an even effect.
G. Chemical Cleaner Application Methods:
   1. Apply chemical cleaners to concrete surfaces to comply with chemical manufacturer’s recommendations using brush or spray application methods, at Contractor’s option, unless otherwise indicated. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.
   2. Spray Application; Apply to pressures not exceeding 50 psi, unless otherwise indicated.
   3. Reapplication of Chemical Cleaners: Do not apply chemical cleaners to same concrete surfaces more than twice. If additional cleaning is required, use steam wash.

3.04 APPLICATION:
   A. Comply with instructions and procedures established at the pre-installation job meeting, and as tested and approved.
   B. After cleaning, sealant work and concrete repairs are complete, verify surfaces are clean and dry.
   C. Apply water repellent sealer as packaged, without dilution or alteration. Mix or prepare the material in strict accordance with manufacturer’s recommended procedures prior to application.
   D. Test Applications: Test prior to beginning application of clear water repellent sealer to assure compatibility and desired results. Test area should be a minimum 4 feet by 4 feet area. Test using same equipment and procedures proposed for general application. Allow test application to dry for a minimum of three days before inspection.
   E. Application:
      1. Equipment: Application may be by low pressure (20 psi) airless sprayer, garden sprayer, or saturated brush or roller as recommended by manufacturer. When spray applying, use fan type spray tips and adjust pressure to avoid atomization of the material. Spray equipment must be fitted with solvent-resistant fittings, gaskets, and hoses. Fit sprayer with stainless steel or brass fittings and gaskets suitable for handling alkaline solutions. Brushes and rollers should be of nylon or other synthetic materials resistant to alkaline solutions.
      2. Application:
         a. General: Apply from the "bottom up" with a 4-inch to 8-inch rundown to assist in a uniform distribution.
         b. Spray Application: Thoroughly saturate the treated surface without rundown or flooding at rates recommended by manufacturer or approved by prior testing. Apply sufficient material to provide uniform, saturating coverage. Apply only to the point of saturation, taking care not to over apply the material. Immediately brush out heavy runs or drips to avoid a buildup of material on the surface.
c. Brush or Roller Application: Apply sufficient material to thoroughly saturate the surface. Avoid excessive overlapping and take care to brush out runs and drips immediately to prevent a buildup of material on the surface.

3. Coverage: Coverage rates will vary from 80 to 150 square feet per gallon, depending upon surface texture and porosity. Actual coverage should be determined during test applications and based on manufacturer's recommendation for warranty coverage.

F. Hot Weather Application:
   1. Surface and air temperatures should not exceed 95 degrees Fahrenheit for proper application. Higher temperatures will cause rapid evaporation of water carrier resulting in reduced penetration and formation of surface film or crust.
   2. When surface temperatures exceed 95 degrees Fahrenheit, clear sealer may be successfully applied by cooling the surface with a water mist before applying the repellent. Mist the surface lightly with clear water - do not saturate. Allow surface to dry until surface is once again absorbent (appears dry) and immediately apply sealer.

3.05 CLEANING:
   A. Immediately clean surfaces not scheduled to receive water repellent sealer according to manufacturer's recommendations.
   B. Correct damage to other work by cleaning, repairing, or replacing as directed by Owner. Leave work in an undamaged condition.
   C. Clean spattered surfaces. Remove overspray materials by proper methods of washing and scraping, using care not to damage finished surfaces.
   D. Remove all masking, protective sheeting, equipment, and materials.
   E. Clean all surrounding and adjacent surfaces of tape and masking residues.
   F. Dispose of all waste products, rags, empty containers, and trash off site in a legally approved manner.

END OF SECTION 07180
SECTION 07920

SEALANTS AND CAULKING

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Remove and replace deteriorated and/or disbonded joint sealants in precast-to-precast concrete joints and at window frame locations.

1.02 RELATED SECTIONS:
   A. 02072 - Minor Demolition and Renovation Work.

1.03 REFERENCES:
   B. Federal Specifications (FS).

1.04 SUBMITTALS:
   A. Provide submittals in accordance with Section 01300 - Submittals.
   B. Product Data: Submit manufacturer's product data, joint preparation and installation instructions, color charts, and MSDS for each product required.
   C. Submit manufacturer's certification that products meet specified requirements and are appropriate for project applications.
   D. Samples for Initial Selection Purposes: Submit manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available for each product exposed to view.
   E. Submit proposed joint backer rod and bond breaker material samples to be used with each type of sealant.

1.05 QUALITY ASSURANCE:
   A. Product Labels: Include manufacturer's name, type of sealant, and color on labels of containers.
   B. Single Source Responsibility for Joint Sealer Materials:
      1. Obtain joint sealer materials from single manufacturer for each different product required.
      2. Provide primers, joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience as supplied and warranted by one manufacturer.
      3. Provide joint sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.
   C. Installer Qualifications: Installer having not less than five years successful experience in comparable projects and employing personnel skilled in operations required for project.
D. Field Sample: Upon directions of Owner, prepare 12-inch (300mm) samples in presence of Owner demonstrating removal and cleaning process and application of sealant on all substrate and application conditions affected by the Work of this Section.

E. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion and compatibility of joint sealants to joint substrates under environmental conditions that will exist during actual installation.

F. Installer to perform field adhesion in peel testing using hand pull method. Perform a minimum of one test on every type of substrate and joint condition.

1. Test Method: Test joint sealers by hand pull method described below:
   a. Install joint sealants in 4 feet joint lengths using same materials and methods for joint preparation and joint sealant installation required for complete work. Allow sealants to cure fully before testing.
   b. Make knife cuts as follows: A horizontal cut from one side of joint to the other followed by two vertical cuts approximately 2-inches (50mm) long at side of joint and meeting horizontal cut at top of 2-inch (50mm) cuts. Place a mark 1-inch (25mm) from top of 2-inch (50mm) piece.
   c. Use fingers to grasp 2-inch (50mm) piece of sealant just above 1-inch (25mm) mark; pull firmly down at a 90 degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for ten seconds.

2. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.

3. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of non-compliance with requirements, will be considered satisfactory. Do not use sealants which fail to adhere to joint substrate during testing.

4. Repair test cut areas immediately after completion of testing work.

5. Notify in advance and conduct adhesion testing in presence of Consultant.

G. Owner reserves the right to perform testing of the installed work. Contractor shall repair all installed work found to be deficient and pay for repairs and additional testing as necessary until satisfactory test results are achieved.

1.06 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials in original containers with seals unbroken and bearing labels that include manufacturer's name, type of sealant or material, color, batch number, date of manufacture, shelf life, and instructions for use.

B. Store materials in a single lockable area of project site.

C. Protect materials from extreme temperatures and exposure. Store in accordance with manufacturer's recommendations.
D. Remove damaged, deteriorated, or out-of-date material from site.
E. Store materials within temperature range of 40 degrees Fahrenheit and 90 degrees Fahrenheit.

1.07 PROJECT CONDITIONS:
A. Environment: Comply with sealant manufacturer's recommended minimum and maximum temperatures and other weather protection for storage and installation.
B. Do not install sealant when surface and ambient temperature are below 40 degrees Fahrenheit.

1.08 SEQUENCING AND SCHEDULING:
A. Do not remove more sealant than can be replaced in same day.

1.09 WARRANTY:
A. Manufacturer's Warranty: Provide manufacturer's standard warranty for type of sealant specified.
B. Contractor's Warranty: Provide written warranty against leakage and defects in workmanship for a period of two years from date of final acceptance by Owner.

PART TWO - PRODUCTS

2.01 SEALANT:
A. Type C: Single-component, neutral curing, medium modulus silicone sealant:

2.02 RELATED MATERIALS:
A. Cleaner: Noncorrosive, nonstaining type, compatible with joint forming materials as recommended by sealant manufacturer.
B. Joint Backing:
   1. Closed cell non-gassing polyethylene foam rod, compatible with sealant, sized and shaped to provide proper compression upon insertion in accordance with manufacturer's recommendations.
   2. Acceptable Products:
      b. “SofRod” by Namaco.
      c. Or approved equal products.
C. Bond Preventive Materials: Pressure sensitive adhesive polyethylene strip recommended by sealant manufacturer to suit application.
D. Primer: Nonstaining type as recommended by sealant manufacturer to suit application.
E. Masking Tape: Nonstaining, nonabsorbent type compatible with sealant and surfaces adjacent to joints.
2.03 MIXING:
A. Mix multi-component products as directed by manufacturer.

PART THREE - EXECUTION

3.01 PREPARATION:
A. Removing Existing Sealants:
   1. Cut out and remove existing sealants, backer rods, bond breaker tapes, and other loose materials to depth as required by sealant manufacturer or to 1/2-inch (13mm) minimum.
   2. Remove foreign matter from joint substrates which could interfere with adhesion of joint sealant.
   3. Remove debris from jobsite.
   4. Solvent wipe existing wet seal sealant joints to be removed.
   5. Solvent wipe prepared surfaces and glass prior to applying sealant.
B. Cleaning:
   1. Clean joints receiving sealant and adjacent surfaces in manner not to damage existing materials. Perform cleaning of joints the same day sealant is to be installed in cleaned joint.
   2. Remove dust and debris by blowing clean with high pressure air.
   3. Wipe nonporous surfaces clean with solvent such as MEK, toluene, xylene, or isopropyl alcohol (IPA) and clean, lint free, 100 percent cotton cloths.
   4. Wipe non-porous surfaces with a second clean, lint free, 100 percent cotton cloth before solvent evaporates.
C. Cleaning Metal Substrates:
   1. All corrosion, scale, old sealant, and existing paint coatings must be removed to clean, bright metal.
   2. Solvent clean contact surfaces with clean cloth and solvent such as MEK, or as required by sealant manufacturer.
   3. Wipe clean with a second clean, lint-free cloth before solvent evaporates.
   4. Prime substrate if required by the sealant manufacturer.
D. Priming:
   1. Prime concrete and metal substrates and other substrate materials where recommended by sealant manufacturer based upon preconstruction sealant substrate tests or prior experience.
   2. Prime all horizontal joints and prepared cracks in concrete decks.
   3. Apply primer to comply with joint sealant manufacturer's recommendations. Apply primer to surfaces the same day sealant is to be installed onto primed surfaces.
   4. Confine primers to area of joint sealant bond. Do not allow spillage or migration onto adjoining surfaces.
E. Masking: Mask areas adjacent to joints to prevent sealant contact with surfaces which would be permanently stained or damaged by sealant or by cleaning methods required to remove excess sealant.
F. Mix sealants in accordance with manufacturer's instructions.
3.02 APPLICATION:
A. Joint Backing:
1. To achieve required joint depths, restrict depth of joints by use of joint backer rod.
   a. Provide joint width-to-depth ratio equal to approximately 2-to-1 where practical.
   b. Provide joint depth equal to 1/4-inch minimum of 3/8-inch maximum.
   c. Provide a minimum sealant joint width of 1/4-inch to all substrates.
   d. Provide 1/4-inch minimum adhesion on all sealant joint and wet seal joint substrates.
2. Size backer rod to allow for 30 percent minimum compression of the backer rod when installed.
3. Where joint backing material is not feasible due to insufficient clearance or depth, install bond preventive material in joint.
4. Three-sided adhesion of sealant is not permitted.
B. Sealant:
1. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates.
2. Apply sealant in uniform continuous bead without gaps or air pockets, following manufacturer's instructions for each specific type of sealant.
3. Provide uniform cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.
C. Tooling:
1. Tool joints to required configuration in accordance with manufacturer's recommendations.
2. Tooling Non-sag Sealants:
   a. Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration required.
   b. Eliminate air pockets and ensure contact and adhesion of sealant with sides of joint.
   c. Remove excess sealant from surfaces adjacent to joint.
   d. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by manufacturer.
D. Remove masking immediately after tooling without disturbing joint sealant.

3.03 ADJUSTING:
A. If damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

3.04 CLEANING:
A. Remove excess sealant from adjacent surfaces immediately after contact with xylene, toluene, or sealant recommended by the sealant manufacturer.
B. Remove debris and containers from jobsite.
C. Clean adjacent surfaces of other soiling due to sealant application.
3.05 PROTECTION:
   A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion.

3.06 SCHEDULE:
   A. Sealant C; Medium Modulus Silicone:
      2. Window frame perimeters.
      3. Wet seal joints.

END OF SECTION 07920
**SCOPE OF WORK**

1. **POWER WASHING EXPOSED PRECAST CONCRETE**
2. **ROUTING AND SEALING CRACKS IN PRECAST CONCRETE**
3. **REPAIRING SPALLS IN PRECAST CONCRETE**
4. **REPLACING DETERIORATED AND/OR DISBONDED SEALANT AT CONCRETE-TO-CONCRETE JOINTS, CONCRETE-TO-WINDOW FRAME JOINTS, AND OTHER EXTERIOR JOINTS**
5. **APPLYING CLEAR WATER REPELLENT SEALER TO CONCRETE**