

PROJECT MANUAL

FACADE RESTORATION FY2023-FY2025

GUARANTEED RATE FIELD CHICAGO, ILLINOIS

August 17, 2022 - Preliminary

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END OF SECTION

SECTION 01 04 10

COORDINATION

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all necessary supervision, planning, scheduling, and control to perform the work and meet the requirements of the Contract Documents.
- B. Contractor shall provide/allow for access by the Architect/Engineer to observe the work-in-progress throughout the project.

END OF SECTION

SECTION 01 15 10

UNIT PRICES

PART 1 GENERAL

1.1 PAYMENT OF UNIT PRICE QUANTITIES

- A. A portion of the work, concrete repairs and drain body replacement, will be paid for on a Unit Price basis. The basis of payment is listed below and corresponds to the work items listed in the Bid Form. These repairs are to be installed and completed per the drawings and specifications.

PART 2 - PRODUCTS

- A. Refer to specific technical sections

PART 3 - EXECUTION

3.1 MEASUREMENT OF QUANTITIES

- A. Work to be performed on a unit price basis shall be quantified using the unit defined on the estimated quantities table. The repair areas will be measured and quantified per square foot or per linear foot for the various repair types indicated on the drawings. The quantity will be measured to the nearest inch and the quantities will not be rounded up. Payment will be made for work actually performed, based on quantities recorded by the Contractor and approved by the Engineer. Unless stated otherwise, records described below shall consist of both repair type and location noted. Unless otherwise stated, the Engineer will verify the accuracy of the record by visual examination of the work performed.
- B. The Contractor shall notify the Owner's Representative and the Engineer at once in writing of any unit price work that deviates materially from the prescribed basis for bidding and for which an adjustment in Unit Price is desired. The Contractor shall quantify all such deviations, subject to verification by the Engineer or Owner's Representative, prior to any repair work, which might make verification impossible. No adjustments in Unit Prices will be considered unless supporting field notes are provided, and subject to the Owner's Representative's prior approval. Adjustments will only be considered if all repairs of a given type have been quantified and all deviations, both plus and minus have been included in the determination of the average deviation from the Unit Price basis. The same unit prices will apply to both additions and deductions to the contract value.
- C. Unit Price Items - The Contractor shall maintain a record of the location and type of installation used at each repair location and specifically for the unit price items outlined on the Bid Form. The Contractor shall submit this record to the Engineer on a weekly basis.

END OF SECTION

SECTION 01 30 00

SUBMITTALS

PART 1 GENERAL

1.1 SUMMARY

- A. General administrative and procedural requirements for submittals required for performance of the Work.

1.2 TIMING OF SUBMITTALS

- A. Submit all data and information required by the Contract Documents to the Engineer allowing ample time for his review, checking for conformance with the design concept, and approval, in any event allowing not less than 15 working days from date of receipt.

1.3 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- A. General: Except as otherwise specified, submit required shop, layout and setting drawings, product data and samples in accordance with requirements of the General Conditions.
- B. Contractor's Review of Submittals: Contractor shall review and approve all submittals before forwarding for Engineer's review.
 - 1. The Contractor's mark or stamp of approval shall constitute representation that he has, at a minimum, satisfied the review requirements of the General Conditions and shall, in effect, so state. The Contractor's stamp of receipt will not be acceptable for this purpose.
 - 2. Submittals which have clearly not been reviewed by the Contractor will not be checked and will be returned to the Contractor for completion of his review. No claim for delay due to Contractor's failure in this regard will be accepted.
 - 3. Any deviation from the Contract Documents shall be clearly identified in the submittal.
- C. Engineer's Review of Submittals: The Engineer will review Contractor's submittals for conformance with the design concept and requirements of the Contract Documents in accordance with the General Conditions and will approve or take other appropriate action as indicated by his stamp on the returned submittal.
- D. Any item which has been "Approved" or "Approved as Noted" and which is subsequently revised by the Contractor beyond noted corrections shall be resubmitted for review and approval.
- E. Partial Submittals: Submittals which are partial or contain only a portion of the data required to describe the item or installation will be rejected unless such partial submittal is coordinated with the Engineer prior to submission, and final approval of all such items will be withheld pending receipt of all required information.
- F. Resubmittal: Major deviations from design concepts or from the requirements of the Contract Documents will require complete resubmittal. If resubmittal is required, correct and resubmit in the same form as before.

- G. Shop Drawings: Process and submit required shop drawings required by the technical specifications.
1. Contractor's Review: Check and verify field measurements, and coordination requirements, and incorporate on drawings. Where items portrayed are to connect to or interface with other elements of the structure, drawings shall specifically show such connections or interfaces and the materials involved.
 2. Engineer's Review: The Engineer will review for conformance with design concept and requirements of the Contract Documents only and will mark corrections and comments on the submittal and return it to the Contractor. Distribute copies of the approved submittal as required for the execution of the Work.
- H. Product Data: Product data, where required by the Technical Specifications, shall be in the form of catalog cuts, performance characteristics, and/or other descriptive data sufficient for verification of compliance with requirements of the Contract Documents.
1. Form and Content of Submittal: Submittals shall be provided electronically in pdf format. Scanned copies will be rejected if not fully legible (photos, illustrations, graphs, screened data must be easily read).
 - a. Manufacturer's standard drawings and other data shall be modified to delete inapplicable information or supplemented to furnish additional information specifically applicable to the Work.
 - b. Catalog sheets, brochures, diagrams, schedules, performance charts and descriptions, illustrations and other standard descriptive data shall be clearly marked to identify pertinent materials, products, and models and shall include dimensions and clearances required. Product data which is not clearly marked to indicate inapplicable options will be rejected.
 2. Engineer's Review: The Engineer will review for conformance with design concept and requirements of the Contract Documents and will return one copy to the Contractor for revision or distribution as required.
- I. Samples: Where required by the technical specifications, submit physical examples to illustrate materials, equipment or workmanship and to establish standards by which the Work will be judged.
1. Form of Submittal: Submit samples in duplicate; sizes, types and requirements as specified in the Technical Specification and in as nearly the form in which the material will appear in the Work as practicable, unless otherwise noted. Samples shall show functional characteristics of product or material with integrally related parts and attachment devices, as applicable, and shall show proposed colors and textures or other finishes.
 2. Engineer's Review: The Engineer will review the submitted samples for compliance with requirements of the Contract Documents and compare them with file samples where applicable; will make final selection of colors and finishes, and will approve sample for application on the Work. Samples not in accordance with requirements will be returned to the Contractor for resubmittal in conformance with requirements.
 3. Disposition of Approved Samples: If approved, sample will be returned to the Contractor as a standard for approval of the completed work, two samples will be retained by the Engineer and Owner for project files.
 - a. Where permitted by the technical specifications, approved samples may be incorporated into the Work. In such instances, all samples will be returned. Note location of incorporated samples on project record documents prior to installation of sample unit.

PART 2 PRODUCTS

2.1 NOT APPLICABLE

PART 3 EXECUTION

3.1 NOT APPLICABLE

END OF SECTION

SECTION 01 40 00
QUALITY CONTROL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Inspection and testing laboratory services for materials, products and construction methods as specified hereinafter for the Work.
- B. Related Sections: For performance requirements of various portions of the Work, see applicable Technical Specification sections.
- C. Costs: The costs of the initial services for testing and inspection personnel will be paid by the Owner. If initial tests indicate noncompliance with Contract Documents requirements, any subsequent testing shall be performed by the same personnel and paid for by the Contractor. Schedule portions of the Work requiring testing and inspection services so the Work is as continuous and brief as possible.
- D. Code Compliance Inspections and Tests: Inspections and tests not specified herein and required by codes and ordinances, or by plan approval authorities, and made by a legally constituted authority, shall be the responsibility of the Contractor, unless otherwise specified.

1.2 SUBMITTALS

- A. Test and Inspection Reports: The independent testing and inspection agency or agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections, and deliver copies distributed as follows:
 - 1. One copy to the Owner
 - 2. One copy to the Engineer
 - 3. One copy to the General Contractor
- B. Other tests, certificates, and similar documents shall be obtained by the Contractor and delivered to the Engineer in such time as not to delay progress of the Work or final payment therefore.

1.3 QUALITY ASSURANCE

- A. Qualifications: All inspection and testing required to establish compliance with Contract Document requirements, except as may be otherwise specified, shall be made by a prequalified, independent professional testing agency provided and paid for by the Owner.

1.4 CONTRACTOR'S RESPONSIBILITY

- A. General: Coordinate quality control activities to avoid delay and to make it unnecessary to uncover Work for testing or inspection.
- B. Access: Furnish free access to the various parts of the Work and assist testing and inspection personnel in the performance of their duties at no additional cost to the Owner.

- C. Data: Furnish records, drawings, certificates, and similar data as may be required by the testing and inspection personnel to assure compliance with the Contract Documents.
- D. Notice: Furnish notice to Engineer and testing and inspection agency not less than 48 hours prior to any time required for such services.
- E. Defective Work: Remove and replace any Work found defective or not complying with Contract Document requirements at no additional costs to the Owner. Where testing personnel take cores or cut outs to verify compliance, repair prior to acceptance.
- F. Concrete: Should any concrete test results to meet design requirements, provide additional testing as directed by the Engineer; replace or repair all defective concrete as directed.
- G. Structural Steel: Should any weld or structural connection fail to meet design requirements, provide additional testing for structural connections as directed by the Engineer; replace or repair all defective connections as directed.

1.5 TESTING LABORATORY SERVICES

- A. General: Laboratory shall test or obtain certificates of tests of materials and methods of construction as described hereinafter or elsewhere in the technical specifications.
- B. Inspection Services: The inspection agency will have full authority to see that the Work is performed in strict accordance with requirements of the Contract Documents and the directions of the Owner.

1.6 TESTS AND INSPECTION REPORTS

- A. Laboratory Reports: Furnish reports of materials and construction as required; include:
 - 1. Description of method of test.
 - 2. Identification of sample and portion of the Work tested.
 - a. Description of location in the Work of the sample.
 - b. Time and date when sample was obtained.
 - c. Weather and climatic conditions at time when sample was obtained.
 - 3. Evaluation of results of tests including recommendations for action.
- B. Inspection Reports: Furnish "Inspection at Site" reports for each site visit documenting activities, observations, and inspections; included notation of weather and climatic conditions, time and date, conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
 - 1. Include the following in all structural steel test and inspection reports:
 - a. Welder's certification
 - b. Weld qualification tests
 - c. Visual inspections
 - d. Review of materials testing procedures, including electrodes used, item inspected
 - e. Magnetic particle tests
 - f. Radiographic tests
 - g. Ultrasonic tests
 - h. High-strength bolted connection tests

1.7 REPORTING TEST FAILURES

- A. Immediately upon Engineer determination of a test failure, the Inspector shall telephone results to the Contractor, Engineer and Owner. On the same day, Inspector shall send written test results to those named on the above distribution list.

1.8 TESTING AND INSPECTION

- A. Concrete: Refer to Sections 03 01 34 - Concrete Patching for testing requirements.
- B. Structural Steel
 - 1. Mill Certificates: Mill certificates or affidavits and manufacturer's certification shall be supplied to the Inspector for verification of steel materials. Testing Laboratory shall be notified at least three weeks in advance of fabrication and supplied with the reports so that shop inspection of the steel may be made.
 - 2. General Inspection:
 - a. Testing Laboratory shall be at the fabricator's plant to verify that materials used check with the mill tests of affidavits of test reports and that fabrication, welding procedures, surface preparation, and shop painting, meet Specifications and that the Work in progress conforms with the project requirements.
 - b. Testing Laboratory shall visually check fabricated steel delivered to the job against the working and approved shop drawings for compliance and he shall make any physical tests, measurements, etc., he believes necessary. All shop fillet welds shall be visually checked.
 - c. Testing agency shall witness and report all special corrections performed by the steel fabricator on his own initiative.
 - d. Welding Inspectors shall be AWS Certified.
 - 3. Welding Requirements: Special inspection shall be provided by the Testing Laboratory for all penetration welds (shop and field) and for all field fillet welding. Welding procedures and joint preparations will be checked.
 - a. Nondestructive testing shall be performed as required by the governing building code, and as specified herein.
 - b. All welds shall be visually inspected. Welds considered suspect shall be further checked by other means deemed necessary by the welding inspector.
 - c. Ultrasonically test 100 percent of all complete penetration welds in accordance with AWS D1.1, Section 6 by American Society of Nondestructive Testing (ASNT) level II technicians.
 - 1) Complete Penetration Welds:
 - Smaller than 5/16 in. - visually inspect root pass 100 percent then magnetic particle inspect final weld 100 percent
 - 5/16 in and larger - ultrasonic testing 100 percent
 - 2) Base metal thicker than 1 1/2 in., when subjected to through-thickness weld shrinkage strains, shall be ultrasonically inspected for discontinuities directly behind such welds after joint completion.
 - d. Any size frequency 1.0, 2.35, and 5.0 MHz and angle 45, 60, 70, and 90 may be used to indicate the size, orientation and type of discontinuity more accurately, where deemed desirable.
 - e. When ultrasonic indications arising from the weld root cannot be interpreted as either a weld defect or the backing strip itself, the backing strip shall be removed at the expense of the Contractor, and if no root defect is visible, the weld shall be re-tested. If no defect is indicated on this re-test, and no significant amount of the base

- and weld metal have been removed, no further repair of welding is necessary. If a defect is indicated, it shall be repaired at no expense to the Owner.
- f. The Inspector shall perform magnetic particle testing in accordance with ASTM E709 for any questionable welds.
 - g. Perform tests of fillet welds and flare bevel groove welds (shop/field) as follows:
 - 1) Fillet and Flare Bevel Groove Welds:
 - Smaller than 5/16 in. - visually inspect 100 percent
 - 5/16 in and larger - visually inspect root pass 100 percent and magnetic particle inspect final weld 25 percent
 - h. See Specification Section 05 12 00, for additional test/quality control requirements.
 - i. Exceptions:
 - 1) When approved by the Owner's representative/Engineer, the rate of testing for ultrasonic testing of complete-penetration welds may be reduced.
 - 2) Other ultrasonic or magnetic particle-testing may be reduced by approval of the Owner/Engineer upon presentation of satisfactory documentation submitted by the Contractor.
- 4. Bolting Requirements: Refer to Section 05 12 00 for inspection requirements.
 - a. All inspection shall conform to the requirements of the current edition of the "Specification for Structural Joints Using High Strength Bolts".
 - 5. Miscellaneous Metal: Where miscellaneous angles, channels, studs, and similar shapes are detailed for support of major components of the Work, the welds, bolts, and material are subject to the same testing equipment as other structural supporting members.
 - 6. Welders Identification: Contractor shall make provisions for the Inspector to refer back to the crew or individual making such connection.
 - 7. Visual Examination: conducted in accordance with AWS D1.1, Section 3.2.3, "Visual Inspection and Repair of Plate Cut Edges", with the following modifications and supplementary requirements. Add the following Section 3.2.3.3 (6): "Any repair procedures described in 3.2.3.3 (2) and (3) shall be subject to the review and written approval of the Engineer."

PART 2 PRODUCTS

Not applicable

PART 3 PRODUCTS

Not applicable

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 TEMPORARY FACILITIES

- A. Contractor shall provide temporary interior and exterior enclosures to keep the building air and water tight, temporary controlled, and insulated from construction related noise, during the course of the work.
- B. The Contractor shall arrange for, obtain, and pay for all temporary utilities necessary to complete the work except as stated otherwise in these Specifications.
- C. Water: The Owner shall provide access to water for the Contractor. The Contractor shall provide whatever valves, fittings, and lines as necessary to distribute water for his use.
- D. Electrical and lighting: The Owner shall provide access to the existing electric power receptacles. The Contractor shall provide any electrical conduit or lines needed for his operation.
- E. The Contractor shall provide temporary first-aid facilities on the site, in a readily accessible location, as required by Federal, state, and local laws and ordinances.
- F. The Contractor shall provide temporary fire protection as required by federal, state, and local laws and ordinances.

PART 2 CONTROLS

2.1 SECURITY

- A. The Contractor shall provide for the security of materials and equipment stored at the site.

2.2 SPECIAL CONTROLS

- A. Sanitary sewers: The Contractor shall not permit debris, or other contaminants that are deleterious to the sanitary sewer system in the building, or the City's sewer system, to be washed down drains.
- B. Debris control: The Contractor shall take all necessary steps to prevent injury to the public, damage to the building and damage to adjacent buildings or spaces. Specific requirements are discussed below:
 - 1. The Contractor shall be responsible for damage to vehicles in or near the building resulting from their operations. The Contractor shall be responsible for maintaining any means of egress required by the Owner and by governing codes for the continued use of the building.
 - 2. The Contractor shall be responsible for the installation of canopies, barricades, warning signs, etc. to protect pedestrian and vehicular traffic during the entire course of the work.

3. The Contractor shall be responsible for cleaning up all debris around the building, at the end of each workday. This includes both public and private areas.
 4. The Contractor shall submit a complete and detailed plan for complying with these requirements, to the Owner, and to the Architect/Engineer prior to the commencement of work. This submittal shall include specific details and plans for the construction of the sidewalk canopies, interior and exterior enclosures, etc. Work shall not commence until the Owner and the Architect/Engineer have reviewed this information.
- C. Noise control: The Contractor shall confine his hours of operations to those required by State, County and City laws and ordinances. Noise levels shall be held to a minimum considering the nature of the work, and as required by the Owner.
- D. Dust control: The Contractor shall take the necessary steps to keep dust within the levels established by the City of Chicago, the Environmental Protection Agency, and all relevant laws and ordinances.
- E. Water control: The Contractor shall install temporary waterproofing to prevent water infiltration into the building and tunnel structure during the course of the work. The Contractor shall not permit water to run uncontrolled off of his work or be carried airborne off the site or onto vehicles and persons occupying part of the site.
- F. Traffic Control: The Contractor shall provide signs, barricades, lights, and warning devices to control the orderly flow of traffic around the building and prevent pedestrians and cars from entering the areas of the Contractor's operations. Where possible, hoses, conduits, electrical cords, etc., shall be located overhead. Whenever such items are located in traffic paths, plywood coverings with adequate signs shall be provided. The traffic devices shall meet the requirements of the U.S. Department of Transportation Manual on Uniform Traffic Control Devices (ANSI D6-1-1971). The contractor shall move these signs, barricades, lights, and warning devices as necessary as the location of the work changes and previously worked-in areas are occupied by the Owner.
- G. Access Roads: All adjacent streets shall remain open at all times.

END OF SECTION

SECTION 01 63 00

SUBSTITUTIONS AND PRODUCT OPTIONS

PART 1 GENERAL

1.1 REQUIREMENTS

- A. All Bids shall be based upon providing all products exactly as specified.
- B. Where, in the specifications, the materials, products or equipment of a certain manufacturer are indicated, it is done for the purpose of establishing a standard or required function, dimension, appearance and quality and is not intended to limit competition.
- C. For products specified only by reference or performance standards, select any product which meets or exceeds standards, by any manufacturer, subject to the Architect/Engineer's approval.

1.2 SUBSTITUTIONS, BIDDER/CONTRACTOR OPTIONS

- A. PRIOR TO BID OPENING: The Architect/Engineer will consider written requests to amend the Bidding Documents to add products not specified provided such requests are received at least 10 calendar days prior to bid opening date. Requests received after that time will not be considered. When a request is approved, the Architect/Engineer will issue an appropriate addendum not less than five calendar days prior to bid opening date.
- B. AFTER AWARD OF CONTRACT: No substitutions will be considered after Notice of Award except under one or more of the following conditions:
 - 1. Unavailability of specified products, through no fault of Contractor.
 - 2. Subsequent information discloses inability of specified product to perform properly or to fit in designated space.
 - 3. Manufacturer/fabricator refusal to certify or guarantee performance of specified product as specified.
 - 4. When a substitution would be substantially to Owner's best interests.

1.3 SUBSTITUTION REQUIREMENTS

- A. Submit the quantity of documents required for return plus two (2) copies. Include in request:
 - 1. Complete data substantiating compliance of proposed substitution with Contract Documents.
 - 2. For products:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature:
 - i. Product description
 - ii. Performance and test data
 - iii. Reference standards
 - c. Samples
 - d. Name and address of similar projects on which product was used and date of installation.

3. For construction methods:
 - a. Detailed description of proposed method.
 - b. Name and address of similar projects on which product was used and date of installation.
 4. Itemized comparison of proposed substitution with product or method specified.
 5. Data relating to changes in construction schedule.
 6. Identify:
 - a. Other contracts affected.
 - b. Changes or coordination required.
 7. Accurate cost data on proposed substitution in comparison with product or method specified.
- B. In making request for substitution, Bidder/Contractor represents:
1. He has personally investigated the proposed product or method and determined that it is equal or superior in all respects to that specified.
 2. He will provide the same guarantee for substitution as for product or method specified.
 3. He will coordinate installation of accepted substitutions into work, making all changes for work to be complete in all respects.
 4. Cost data is complete and includes all related costs under his contract, but excludes:
 - a. Costs under separate contracts
 - b. Architect/Engineer's redesign
 - c. Administrative costs of Architect/Engineer
 5. Bidder/Contractor will assume full responsibility for all additional costs and expenses for Owner, Architect/Engineer, and other contractors.
- C. Substitutions will not be considered when:
1. They are indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with Paragraph 1.03.
 2. Acceptance will require substantial revision of Contract Documents.
 3. Specified product is available.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 74 00

WARRANTIES AND BONDS

PART 1 GENERAL

1.1 WARRANTIES

- A. All work shall be warrantied against defects in material and installation, for a period of one (1) year from the completion of installation, unless a longer warranty is specified for portions of the work in the project documents.
- B. Work warranted for a period greater than that described in the General Conditions shall have a written warranty. This warranty will be as described in the related specification sections governing that work.

1.2 SECTION INCLUDES

- A. Preparation and submittal.
- B. Time and schedule of submittals.

1.3 RELATED SECTIONS

- A. Section 01 30 00 - Submittals.
- B. Individual Specifications Sections: Warranties required for specific Products or Work.

1.4 FORM OF SUBMITTALS

- A. Provide electronic copy of all warranties in pdf format, and also provide two bound hard copies per requirements below.
- B. Bind in commercial quality 8-1/2 x 11 inch three D side ring binders with durable plastic covers.
- C. Cover: Identify each binder with typed or printed title WARRANTIES, with title of Project; name, address and telephone number of Contractor; and name of responsible company principal.
- D. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.
- E. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

1.5 PREPARATION OF SUBMITTALS

- A. Obtain warranties, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for

items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Warranty schedule to be provided within 15 business days after the award of the contract.

1.6 TIME OF SUBMITTALS

- A. Make submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
- B. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

DIVISION 2
SITE WORK AND DEMOLITION
SECTION 02 07 00
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes: The work under this section includes all labor, materials, equipment, and supervision to perform all work necessary and incidental to the specified repair work. Perform all work in accordance with the provisions of the Contract Requirements and completely coordinate with the work of other trades.
- B. This work shall consist of providing the necessary labor, materials, equipment and supervision for the selective demolition or removal of finishes and equipment necessary to accomplish the scope of the project.

1.2 SUBMITTALS

- A. The following shall be submitted in accordance with Section 01 30 00, Shop Drawings, Product Data and Samples:
- B. Required prior to the commencement of work:
 - 1. Permits and notices authorizing demolition.
 - 2. Permits for transporting and disposing of debris.
- C. Permits and notices authorizing demolition.
- D. Permit for transport and disposal of debris.
- E. Contractor shall submit for approval his proposed sequence of operations for the repairs, indicating areas which will be taken out of service, and the methods of maintaining circulation around the work, including the use of barriers, signs, warning lights and flagmen.

1.3 PROTECTION REQUIREMENTS

- A. The Contractor shall comply with all applicable laws, rules, and regulations relating to the work in this section.
 - 1. Keep dust and dirt pollution to a minimum. The Contractor shall limit dust or other fine particulate from entering the building interior during the work.
- B. Ensure safety of persons in demolition area. Provide temporary barricades as required.

- C. Provide adequate fire protection. Keep area clear of hazardous substances and debris.
- D. Maintain access to exits at all times.
- E. Cover demolition openings into existing building at end of each day, and protect for air and moisture infiltration.
- F. Verify adequacy of structure to support any concentrated or uniform loads associated with the work.
- G. The Contractor shall comply with all applicable laws, rules, and regulations relating to the work in this section.
- H. The Contractor shall exercise caution to minimize damage to the existing gutter prior to removal. If necessary, temporary repairs shall be performed to minimize water infiltration prior to installation of the new membrane.

1.4 QUALITY ASSURANCE

- A. Codes:
 - 1. Conform to requirements and codes of governing authorities
 - 2. Obtain and pay for all permits and fees for demolition, protection of public and private property, and transportation and disposal of debris.
- B. Certification:
 - 1. The Contractor shall issue a written certification to the Owner that all materials have been removed, handled, transported, and disposed of in conformance with the requirements and codes of the governing authorities.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent injury to the structure, other facilities, and persons. Provide temporary canopies, enclosures, and signage to protect building users at all times. When exits are temporarily blocked, an alternate evacuation plan shall be prepared, approved by the Owner, and posted.
- B. Use totally enclosed containers or chutes for roofing debris and cover containers when moving roofing debris from roof level to dumpster.
- C. Protect walls, paving and other adjacent areas from demolition and removal operations.
- D. Protect completed installation areas and installations in progress from damage resulting from demolition and removal operations.

1.6 PROJECT CONDITIONS

- A. Occupancy: The building will remain in use during the Work. All demolition activities shall be coordinated with the Owner to minimize disruption to building occupants. All means of egress shall be protected and remain clear during the work.
- B. Existing Conditions: The Owner and the Architect/Engineer assume no responsibility for actual conditions in the areas to be removed.

- C. Salvageable Items:
 - 1. Removal items of salvageable value shall become the property of the Contractor unless otherwise noted.
 - 2. Salvaged items must be transported from the site as they are removed.
 - 3. Storage and sale of removed items on the site will not be permitted.
- D. Explosives: The storage or use of explosives on the jobsite is not permitted.
- E. Traffic:
 - 1. Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
 - 2. Conduct demolition and removal operations in a manner to minimize traffic over areas to remain.
- F. Damage: Promptly repair any damage caused by demolition operations to structure and facilities to remain at no cost to the Owner
- G. Protection: Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent injury to the structure, other facilities, and persons.
- H. Coordinate any shut down of equipment, air handling and other mechanical items with owner. Minimize disruption to building occupants.
- I. Coordinate the moving and temporary relocation of satellite dishes and antennae with building owner. Minimize disruption to users of antennae equipment.
- J. Utility Services:
 - 1. Maintain existing services, keep in service, and protect against damage during demolition and removal operations.
 - 2. Do not interrupt existing utilities serving occupied or used facilities without prior notification to the Owner.
 - 3. Provide temporary services during interruptions to existing utilities.
- K. Do not remove existing materials when precipitation is imminent.
- L. Coordinate demolition and removal operations with Owner and, where possible, accommodate changes based on use of facilities.
- M. Protect building components to remain from damage during removal of existing roofing. Protect other roof membranes from damage during the work.

1.7 WORK SEQUENCE

- A. Do not remove more existing material than can be replaced with new material and made watertight by the end of the work day.

- B. Coordinate demolition and removal operations with new installation specified in other specification sections.
- C. Conduct demolition and removal operations in a manner to minimize traffic over newly installed areas.
- D. Coordinate work sequence with the Owner.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 COORDINATION

- A. Coordinate demolition and removal operations with new installation specified in other specification sections.

3.2 OPERATIONS

- A. Locate the dumpster(s) in the area designated, or as otherwise directed by the Owner.
- B. Fully loaded dumpsters shall be promptly covered and removed from the jobsite.
- C. At the end of the workday, all partially filled dumpsters shall be securely covered or removed from the jobsite.

3.3 DEMOLITION GENERAL

- A. Work systematically from the top down.
- B. Avoid excessive loads on supporting walls, floors, and framing by careful location of equipment and prompt removal of demolished materials.
- C. Exercise caution so as not to damage items that are designated for reuse.
- D. Exercise caution in performing demolition work so as not to damage surrounding surfaces.

3.4 POLLUTION CONTROL

- A. If necessary, use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.
- B. Do not use water when it may create hazardous or objectionable conditions such as flooding and pollution.
- C. Cover vents during demolition to limit dust into air handling system. Replace air filters after completion of the work.
- D. Clean adjacent structures and improvements of dust, dirt and debris caused by demolition operations.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Remove from the site, debris, rubbish, and other materials resulting from demolition operations.
- B. Removal: Transport materials removed from demolished portions and dispose of off-site.

3.6 REPAIRS AND RESTORATION OF EXISTING CONDITIONS

- A. Any elements that are located adjacent to existing parts or units to be removed shall be protected during the demolition work.
- B. Repair any areas of demolition in excess of that required and any damage to adjoining construction. Repairs must, as a minimum standard, restore the condition that existed prior to the start of demolition.

3.7 PREPARATION

- A. Provide temporary supports and protection for portions of the structure to remain. Protect fixtures and equipment to remain.
- B. Cap and disconnect utilities. If necessary provide bypass connections as necessary to maintain utility service to occupied areas of the building.

3.8 DISPOSAL

- A. Remove demolished materials from the site and legally dispose of debris, rubbish, and other materials resulting from demolition operations.

3.9 CLEAN-UP

- A. All areas of the building and the surrounding site shall be left broom-clean.

END OF SECTION

SECTION 02 21 20

REMOVAL OF EXISTING CONCRETE AND SURFACE PREPARATION

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This work shall consist of providing the necessary labor, materials, equipment and supervision for the removal of unsound concrete or unsound previous repairs, examination of all exposed reinforcing steel bars and welded wire fabric, sandblasting of existing reinforcing steel and embedded structural steel, selected replacement of deteriorated reinforcing steel with new reinforcing steel, and the cleaning of the newly exposed underlying sound concrete.

1.2 RELATED WORK

- A. Section 03 10 00: Formwork
- B. Section 03 60 30: Epoxied-in Anchors and Field Coating of Reinforcing Bars

1.3 PAYMENT

- A. The Work of this Section shall be on a lump sum basis in accordance with the Contractor's bid.

PART 2 PRODUCTS

2.1 EQUIPMENT

- A. Power chipping hammers of nominal 15-lb class or less for removal of concrete.
- B. Sandblasting equipment capable of removing all rust from the exposed reinforcement, and laitance from exposed concrete surfaces after chipping. This will require equipment capable of maintaining at least 100 psi.
- C. Compressed air equipment capable of removal of dust and dirt from concrete repair areas, and exposed concrete surfaces.

PART 3 EXECUTION

3.1 CONCRETE REMOVAL

- A. Areas which require removal of unsound concrete will be identified and marked by the Architect/Engineer. Unsound concrete shall be removed to sound concrete.
- B. Remove concrete in an area extending a minimum of 3/4 in. beyond the outer boundary mark of unsound concrete. The shape of each patch shall not be irregular. Angles between adjacent saw cuts around the perimeter of the patch shall not be less than 90 degrees, in any case. Edges shall be saw cut on a beveled plane, with the base of the cut slanted outward away from the center of the patch.

- C. During the concrete removal (chipping) process, care shall be exercised to avoid cracking of the underlying sound concrete.
- D. During the removal of unsound concrete, if more than half of a reinforcing bar circumference is exposed, or if the bar is not firmly bonded to the surrounding concrete, then the remaining concrete around the bar shall be removed. The clearance between the bar and the concrete shall be a minimum of 3/4 in., measured radially from the surface of the bar.
- E. The newly exposed sound concrete shall be cleaned by blowing away loose material with a sandblast, followed by cleaning with a compressed air jet. The saw cut edges around the perimeter of the patch area should be thoroughly sandblasted.
- F. The Architect/Engineer shall be allowed a minimum of 24 hours for the inspection of properly prepared concrete surfaces and reinforcement, before the scheduled concrete placement.
- G. If more than 48 hours has elapsed since the patch area was sandblasted and cleaned with high pressure compressed air at the point in time when the patch material is to be replaced, then the patch area must be blown clean again with high pressure compressed air immediately prior to placement of the patch material.

3.2 CLEANING OF REINFORCEMENT AND EMBEDDED STEEL SHAPES (AND REPLACEMENT OR SUPPLEMENTAL REINFORCEMENT)

- A. Exposed reinforcing and embedded steel shapes shall be thoroughly cleaned by sandblasting to remove all rust and unsound concrete.
- B. Engineer will inspect the existing reinforcing steel to remain following the removal of unsound concrete and sandblasting. Contractor shall install supplemental reinforcement and stainless steel dowels at locations required by Engineer.
- C. Reinforcing bars that are damaged or that have lost more than 20 percent of their original cross-sectional area at any point shall be brought to the attention of the Architect/Engineer for inspection. The Architect/Engineer will determine if the bars should be removed and replaced, or if supplemental reinforcing bars should be added.
- D. Where portions of reinforcing bars are exposed, the Architect/Engineer will determine if the embedded portion of the bar is soundly bonded to the remaining concrete. If, in the Architect/Engineer's judgment, the bar is not soundly bonded, the Contractor shall remove concrete around and under the bar for a length as determined by the Architect/Engineer.
- E. If during removal of unsound concrete, the Contractor encounters existing reinforcing with less than 1/2 in. cover from the existing concrete surface he shall notify the Architect/Engineer before repairs are implemented. A decision can then be made by the Architect/Engineer on whether to remove or modify that reinforcing, or to build out the patch over the bar(s) to provide additional cover. The Contractor shall at no time remove existing reinforcing steel without the prior approval of the Architect/Engineer.

3.3 CLEAN-UP

- A. The Contractor shall be responsible for the safe removal of all loose concrete from the building, and for proper and legal disposal of that loose concrete, off site.

- B. All areas of the building and the surrounding site shall be left broom clean at the end of each working day.

END OF SECTION

SECTION 02 80 00
SITE RESTORATION

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Repair and/or replace in-kind areas of the site damaged during construction operations including sidewalks, roofing, waterproofing, pavers, entryways, curbs, pavements, site furnishing, lighting fixtures, mechanical equipment, windows, etc., immediately after completion of all operations in that area. Repairs must, as a minimum standard, be equal to or exceed the condition which existed prior to the start of work under this Contract, and utilize materials that are equal to or exceed those originally in place in accordance with the requirements of General Conditions of the Contract and completely coordinated with the work of all other trades.

1.2 QUALITY ASSURANCE

- A. Qualifications
 - 1. Contractor shall employ subcontractors and/or tradesmen with a minimum of two (2) years' experience in performing the work required.

1.3 SUBMITTALS

- A. The following shall be submitted in accordance with Section 01 30 00, Submittals.
- B. The Contractor shall submit to the Owner and Architect/Engineer for approval, three (3) copies of a statement detailing the restoration work required.
- C. The statement shall as a minimum contain the following:
 - 1. Description of work.
 - 2. Location and quantity of work.
 - 3. Materials and standard for workmanship.
 - 4. Schedule of operations.
- D. Approval of this statement by the Owner and/or Architect/Engineer shall not constitute approval of methods or materials. No work shall proceed until the Owner and/or Architect/Engineer has approved the statement.

PART 2 PRODUCTS

2.1 PAVING, SURFACING AND ENTRYWAYS

- A. Replacement of all damaged paving, walks, curbs, entryways, and other surfacing on the site shall match the adjacent material to remain in color, shape and texture.

2.2 WINDOWS AND DOORS

- A. All windows and window frames that are broken or damaged during construction operations shall be repaired or replaced in-kind at the sole discretion of the Owner's Representative. In the event of a disagreement between the Owner and Contractor as to the extent of repair or replacement required, the Architect/Engineer shall render a final opinion that will be binding on all parties involved.

2.3 INTERIOR FINISHES

- A. Damage to interior plaster, wallpaper, paint, carpets, or other interior finishes, shall be cleaned, restored, or replaced in kind by a contractor qualified to perform the work, at no additional cost to the Owner. Owner reserves the right to select a contractor, or contractors, to perform this work.

2.4 MECHANICAL EQUIPEMENT

- A. Damaged mechanical equipment shall be cleaned, restored, or replaced in kind by a contractor qualified to perform the work at no additional cost to the Owner. Owner reserves the right to select a contractor, or contractors, to perform this work.

PART 3 - EXECUTION

3.1 REPAIR WORK REQUIRED

- A. Means and methods for the installation of replacement pavings, walks, curbs and other surfacing shall be in accordance with local construction standards, and shall be subject to the approval of the Owner and Architect/Engineer, prior to the start of work.
- B. Materials, means, and methods for the installation of replacement materials, or repair of existing materials, shall be submitted in advance, in writing, to the Owner and the Architect/Engineer, for review and approval.
- C. All work shall be coordinated with Owner.

END OF SECTION

DIVISION 3
CONCRETE
SECTION 03 01 34
CONCRETE PATCHING

PART 1 GENERAL

1.1 SUMMARY

- A. This work shall consist of providing the necessary labor, materials, equipment and supervision to place, cure and finish polymer-modified concrete and patching mortar which is placed over properly prepared existing concrete surfaces in repair areas.

1.2 RELATED WORK

- A. Section 02 21 20 - Removal of Existing Concrete and Surface Preparation
- B. Section 03 60 30 - Epoxied-In Anchors and Field Coating of Reinforcing Bars

1.3 STANDARDS

- A. American Society for Testing and Materials
 - 1. Specification for Concrete Aggregates (ASTM C33)
 - 2. Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete (ASTM C42)
 - 3. Standard Test Method for Slump of Portland Cement Concrete (ASTM C143)
 - 4. Specification for Portland Cement (ASTM C150)
 - 5. Test for Air Content of Freshly Mixed Concrete by the Pressure Method (ASTM C231)
 - 6. Specification for Chemical Admixtures for Concrete (ASTM C494)
 - 7. Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction (ASTM E329)
- B. American Concrete Institute
 - 1. Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete, ACI Committee 211 (ACI 211.1)
 - 2. Specification for Structural Concrete in Buildings (ACI 301)
 - 3. Recommended Practice for Hot Weather Concreting (ACI 305R)
 - 4. Recommended Practice for Cold Weather Concreting (ACI 306R)
 - 5. Building Code Requirements for Reinforced Concrete (ACI 318)

1.4 SUBMITTALS

- A. Submit reports of concrete tests at the end of each day's testing as described in this section.
- B. Submit a list of all proposed materials and material sources for the polymer-modified concrete and patching mortar to the Architect/Engineer at the start of the job, as detailed in subsection 2.5, of this section of the Specifications.

1.5 UNIT PRICES

- A. The Contractor shall submit unit prices as required on the Bid Proposal Form.
- B. For the portion of work to be performed on a unit price basis, quantities shall be measured.

1.6 WARRANTY

- A. All concrete repairs shall be guaranteed for a period of three years after the completion of the Contract Work against all surface defects, delamination of the patch material from the substrate concrete, delamination within the patch material itself, and patch deterioration.

1.7 MOCKUPS

- A. All work procedures and materials shall be demonstrated in mockups for review and approval prior to beginning any production work. Mock-ups shall match color, appearance, and texture of existing precast concrete.
- B. Contractor shall make field samples and mock-ups for all methods and materials to be used in concrete patching for review prior the pre-installation conference.
- C. Adjust or repeat installation until mockup meets with Owner's approval.

PART 2 PRODUCTS

2.1 CONCRETE TYPES, STRENGTHS, AND USES

- A. The strength indicated is the minimum 28-day design compressive strength.
 - 1. Polymer-modified concrete, 5,000 psi
 - 2. Patching mortar, 5,000 psi (for shallow repair areas)

2.2 MATERIALS

- A. Portland Cement, ASTM C150, Type I. Convertible Portland Cements and Portland Cement Type III are not permitted.
- B. Calcium chloride shall not be permitted as an additive in the polymer-modified concrete or in the patching mortar or in any admixture.
- C. Fine and coarse aggregate shall be clean and conform to the requirements of ASTM C33, 4S.
- D. Water shall be potable and free from substances known to be harmful to Portland Cement.

2.3 POLYMER-MODIFIED CONCRETE MIX DESIGN

- A. The primary requirements for the polymer-modified concrete are the compressive strength as specified herein; workability that facilitates placement and the achievement of the desired finish; and proper finishing and curing practices to ensure achievement of a low permeability.
- B. The entrained air content shall be no more than 6.5 percent, as measured according to ASTM C231. No air-entraining agent shall be added to the mix. Defoaming agent shall be used to control air content.

- C. Water/cement ratio (including water in the latex emulsion and the aggregate) shall not exceed 0.40.
- D. Pre-packaged mixes may be used in lieu of site mixing. The following pre-packaged mixes are approved for use at locations where lightweight ready-mixed concrete is not required per Engineer. Contractor shall submit data sheets for review and approval prior to use.
 - 1. Polymer Modified Concrete (at colored architectural precast concrete repair areas)
 - a. TintCrete Concrete, manufactured by JE Tomes (custom color matched to existing architectural precast concrete).
 - 2. Polymer Modified Concrete (at regular plain concrete repair areas)
 - a. Form Flo P-38, as manufactured by J.E. Tomes
 - b. MasterEmaco S440 CI, as manufactured by BASF
 - c. Or approved equal.

2.4 PATCHING MORTAR MIX DESIGN

- A. The primary requirements for the patching mortar mix are a minimum compressive strength as specified herein, and workability that facilitates placement and achievement of the desired finish.
- B. The patching mortar shall not be installed in layers, and shall not be installed in depths exceeding 2 inches.
- C. Pre-packaged mixes may be used in lieu of site mixing. The following pre-packaged mixes are approved for use. Contractor shall submit data sheets for review and approval prior to use.
 - 1. Patching Mortar (at regular plain concrete repair areas):
 - a. MasterEmaco N400, as manufactured by BASF Corporation, or approved equal.

2.5 TESTING OF POLYMER-MODIFIED CONCRETE MIX DESIGNS

- A. The contractor shall submit a list of all proposed materials, and material sources, to the Architect/Engineer at the initiation of the project. The following data shall be submitted to the Architect/Engineer:
 - 1. Sieve analysis for the fine and coarse aggregate
 - 2. Proposed mixing methods
 - 3. Mill certificates from the cement supplier
 - 4. List of materials and sources
- B. At least (3) weeks prior to the start of concrete placement the Contractor shall manufacture four (4) separately mixed test batches of concrete under job conditions, in quantities large enough to accommodate production of the following samples and tests:
 - 1. Four sets of 4 in. x 8 in. test cylinders for use in determining compressive strength of the concrete
 - 2. Two slump tests
 - 3. Two air content tests
- C. All samples and tests will be conducted by the Architect/Engineer or the Owner's testing agency. The Contractor is responsible for providing the labor and materials to manufacture the concrete for the samples, and for disposal and cleanup of surplus materials.

- D. The Owner and the Architect/Engineer reserve the right to request production of additional test batches of polymer-modified concrete if the material produced does not comply with these Specifications.

2.6 TESTING OF PATCHING MORTAR AND GROUT MIX DESIGNS

- A. The Contractor shall notify the Architect/Engineer at least four (4) weeks in advance of the start of placement of patching mortar, in writing, of the type of patching mortar proposed for use on the project. The following data shall be submitted to the Architect/Engineer at that time.
 - 1. List of material sources
 - 2. Proposed mixing methods
- B. At least (3) weeks prior to the start of placement of patching mortar, the Contractor shall manufacture four (4) separately mixed test batches of patching mortar under job conditions in quantities large enough to accommodate the following samples and tests:
 - 1. Eight, 2 in. cube specimens, for testing to determine compressive strength of the mortar, in accordance with ASTM C109, "Standard Test Method for Compressive Strength of Hydraulic Cement Mortars."

PART 3 EXECUTION

3.1 BATCHING AND MIXING

- A. All batching and mixing operations shall be performed in a manner such that quality control is guaranteed, accurate mix proportions are maintained and all ingredients are combined and mixed to a uniform consistency.
- B. Mix components shall be measured and partially combined in a controlled environment prior to final mixing and placing at the repair location.
- C. No polymer-modified concrete, patching mortar, or grout shall be placed at surface and ambient temperatures lower than 40 degrees F, or when the temperature is projected to fall below 40 degrees F in the 24 hours following placement.
- D. At temperatures above 85 degrees F, the Architect/Engineer may require placements to be made at night or early morning hours, if in his opinion a satisfactory placement is not being achieved during normal working hours.
- E. Water may be added to the polymer-modified concrete to obtain slump within the prescribed limits. Concrete with a slump less than 3 in. may be rejected if it is not placed satisfactorily, with a closed tight surface. Retempering of concrete is not permitted.

3.1 SURFACE PREPARATION

- A. Surface preparation shall be in accordance with Section 02 21 00, Removal of Existing Concrete and Surface Preparation.

3.2 PLACING AND FINISHING CONCRETE

- A. Before placing concrete, all equipment for mixing and transporting concrete shall be cleaned. Vibrators shall be checked for workability. All frost, ice, mud, debris, and water shall be

removed from equipment. Forms shall be thoroughly wetted. Reinforcement shall be securely tied in place and thoroughly cleaned of ice and other coatings which may destroy or reduce bonding with concrete. No concrete shall be placed until the Architect/Engineer has observed the forms and condition and placement of reinforcement. Conveying the concrete from mixer to place of deposit shall not cause separation or loss of materials.

- B. Placing of concrete shall be such that it shall be deposited as nearly as possible in its final position to avoid segregation due to rehandling or flowing. Placing shall be at such a rate that at all times concrete shall be plastic and flow readily into corners of forms and into spaces between rebars. No concrete that has partially hardened or that has been contaminated by foreign materials shall be deposited. When being deposited, concrete shall not be allowed to fall a vertical distance greater than 2 ft. from point of discharge to point of deposit. Internal vibrators shall be used, as appropriate, to ensure that proper consolidation of the concrete is achieved.
- C. Placement of the polymer-modified concrete shall be a continuous operation at each patch location. Materials sufficient to complete a patch shall be available prior to commencing a repair.
- D. For areas where new concrete will be cast against existing concrete surfaces, wet the existing surface one hour prior to placement but do not allow puddles to form. At time of placement of concrete, existing concrete surfaces shall be in a saturated, surface dry condition.
- E. The concrete shall be continuously rodded or vibrated during placement to consolidate the pour and fill all corners of the patch. External vibration of the formwork may also be used (or be used in lieu of internal vibration), by placing the internal vibrators against the wood forms for short periods of time.

3.3 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Maintain concrete above 55 degree F and in a moist condition for at least 7 days after placing.
- B. Unformed Top Surfaces: Begin curing immediately after finishing concrete. Use a moisture-retaining cover, as follows:
 - 1. Cover concrete surfaces with a moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches.
 - 2. Seal sides and ends of cover by holding them down with soil, concrete pieces, or some other weight, or by using waterproof tape or adhesive.
 - 3. Immediately repair any holes or tears in cover during curing period using cover material and waterproof tape.
 - 4. Re-wet concrete surface at least twice daily or as necessary to maintain moist concrete surface.
- C. Protect concrete from falling below 55 deg F with insulating blankets or enclosures with heaters.

3.4 FIELD QUALITY CONTROL

- A. At the time of the first field placement of concrete, mortar, and grout and at least four appropriate intervals as directed by the Architect/Engineer, six standard 4 in. x 8 in. cylinders will be made, cured and tested in accordance with ACI 301, except as noted herein.

- B. All cylinders shall be tested by a qualified approved testing laboratory which meets the requirements of ASTM E329, and their reports sent to the Architect/Engineer and the Contractor. Costs for these tests will be paid for by the Owner. The Contractor or Testing Lab will be responsible for making these cylinders and for seeing that they are transmitted to a testing laboratory. The Contractor shall provide the necessary concrete to make the cylinders.
- C. All four cylinders shall be cured under field conditions for a minimum of one day. The cylinders shall then be transported to the testing agency laboratory and cured in air at 73 degrees F, 50 percent relative humidity. Two cylinders shall be tested for compressive strength at seven days and two at 28 days. Two cylinders shall be stored for potential future testing.
- D. For each set of cylinders made, a slump and air content test shall also be made. The temperature of the concrete shall be taken at the same time cylinders are made. Slump tests shall be made in accordance with ASTM C143. Air content tests shall be made in accordance with ASTM C231.
- E. Testing of cylinders shall be in accordance with ASTM C39, and shall be conducted by the Owner's testing agency. Each test report shall contain the following information for each set of cylinders:
 - 1. Individual test specimen strength, type of failure
 - 2. Slump
 - 3. Air content
 - 4. Concrete and air temperature
 - 5. Specimen number
 - 6. Portion of structure represented by the concrete tested
 - 7. Date cast
 - 8. Date tested
 - 1. Concrete properties specified
 - 2. Notice if tests indicate concrete is not in conformance with Specifications
- F. Strength shall be considered satisfactory if the average of the two 28-day tests meets or exceeds 5,000 psi, and neither of the 28-day tests is below 4,500 psi.
- G. Ongoing Testing During Construction: Additional cylinder testing shall be performed during the course of the work at a minimum of once per every five days of concrete repair material placement, or at other interval requested by Engineer.
- H. Coring
 - 1. If tests results are not in conformance with Specifications, the Contractor shall take 3-in. diameter core samples from completed patches. This additional testing of the concrete mortar will be performed under the direction of the Architect/Engineer. The cost of these additional tests will be borne by the Contractor.
- I. Hammer tap concrete patches to verify their soundness. Remove and recast any unsound patch areas at Contractor's expense.

END OF SECTION

SECTION 03 10 00

FORMWORK

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Forms for cast-in-place repairs of areas of concrete.

1.2 RELATED WORK

- A. Section 03 01 34: Concrete Patching

1.3 QUALITY ASSURANCE

- A. Reference Standard: American Concrete Institute "Recommended Practice for Concrete Formwork" (ACI 347).

1.4 SUBMITTALS

- A. Submit samples of all anchorage devices proposed for use in anchoring formwork systems, in accordance with Section 01 30 00.
- B. Submit sketches of typical formwork systems, in accordance with Section 01 30 00.

1.5 PAYMENT

- A. The Work of this Section shall be on a lump sum basis in accordance with the Contractor's bid.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Design and construction of formwork shall be the responsibility of the Contractor and shall be performed in accordance with ACI 347, and as supplemented and modified herein.
- B. Forms shall conform to shape, lines, grade, and dimensions of existing members and shall be braced and tied together to maintain position and shape during placement of concrete. Supports shall be spaced sufficiently close to prevent deflection of form material.
- C. Forms shall be readily removable without hammering, prying or damage to concrete. Metal tools shall not come in contact with concrete surfaces during form removal. All exposed concrete corners shall be finished to match existing corners.
- D. Forms for surfaces exposed to view shall be constructed of new 5/8 in. or 3/4 in. 5-ply structural plywood of concrete-form grade. Plywood may be reused for formed surfaces exposed to view as long as it is in good condition.

- E. Wood forms used with latex-modified concrete shall first be coated with two coats of shellac or polyurethane varnish on the surface(s) to receive concrete. No form release agents shall be used on the forms.
- F. All devices used to anchor formwork to the existing concrete members shall be stainless steel, drilled-in anchors, subject to the approval of the Architect/Engineer prior to use. Samples should be submitted to the Architect/Engineer for each type of anchor proposed for use.

PART 3 EXECUTION

3.1 FORMWORK INSTALLATION

- A. Formwork must be securely fastened to the building and supported, and shall not place load against the existing granite cladding. The method of attachment is subject to the review and approval of the Architect/Engineer prior to the start of construction. The Contractor shall submit sketches of the method of installation of all typical formwork setups to the Architect/Engineer for approval, prior to the start of construction. All portions of the anchors that will remain in place should be recessed 1/2 inch back from the exposed concrete surface, and the recessed hole should be filled with mortar after removal of the loose components of the anchorage device.
- B. The Contractor shall be responsible for seeing that no pieces of formwork become dislodged. The Contractor shall bear full responsibility for any injuries and/or property damage that may result should any pieces of formwork fall from the building.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Work of this Section includes furnishing, fabricating, and placing reinforcing steel.
- B. Related sections:
 - 1. Section 03 01 34 - Concrete Patching

1.2 STANDARDS

- A. ASTM A185, Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement, latest edition.
- B. ASTM A615/A615M, Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement, latest edition.
- C. ACI SP-66, Detailing Manual, latest edition.
- D. ACI 318, Building Code Requirements for Structural Concrete, latest edition.
- E. CRSI Manual of Standard Practice, latest edition

1.3 PAYMENT

- A. The work of this section shall be on a lump sum basis in accordance with the Contractor's bid.

PART 2 PRODUCTS

2.1 REINFORCEMENT AND ACCESSORIES

- A. Reinforcing Steel:
 - 1. New steel reinforcing bars shall conform with requirements of ASTM A615, Grade 60. Provide diameter and shape specified on drawings.
 - 2. Epoxy coated bars shall be provided at locations specified by Engineer. Epoxy coating shall conform to ASTM A775.
 - 3. For dowels that will be epoxied-in using adhesion, the epoxy coating shall be removed from the portion of the dowel that will be embedded in the adhesive.
- B. Stainless Steel Anchors: 1/4 or 3/8 in. diameter Type 304 stainless steel threaded rods cut and bent to shape as directed by Engineer.
 - Maximum yield strength - 30 ksi
 - Minimum tensile strength - 75 ksi
- C. Accessories:

1. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI Manual of Standard Practice from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete.
 - a. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
 - b. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
2. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A775/A775M.

2.2 FABRICATION

- A. All bends and hooks shall conform to bend dimensions defined as "ACI Standard Hooks" in the CRSI Manual of Standard Practice unless otherwise shown on the plans.
- B. Reinforcing bars shall conform to the dimensions shown on the Drawings, within the fabricating tolerances as shown in the CRSI Manual of Standard Practice.

PART 3 EXECUTION

3.1 PLACING

- A. Prior to placing concrete, all reinforcing bars located partially or completely within the pour area shall be supported and securely tied.
- B. Runways or another approved protection scheme shall be provided for reinforcing located in a pour or which extends into the pour, in order to prevent damage from moving equipment or pumping equipment.
- C. Unless permitted by the Engineer, reinforcing shall not be bent after being embedded in hardened concrete.

END OF SECTION

SECTION 03 60 30

EPOXIED-IN ANCHORS AND FIELD COATING OF REINFORCING BARS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This work shall consist of providing the necessary labor, materials, equipment and supervision to install epoxied-in anchors and to epoxy coat exposed reinforcing bars.
- B. Definition
 - 1. Epoxied-in anchor: The completed composite of reinforcing bar or stainless steel dowel surrounded by epoxy within the drilled hole.

1.2 RELATED WORK

- A. Section 02 21 20: Removal of Existing Concrete and Surface Preparation
- B. Section 03 01 34: Concrete Patching

1.3 STANDARDS AND QUALITY ASSURANCE

- A. Applicator Qualifications
 - 1. The Contractor shall have three years of experience in performing work similar to that shown on the drawings and described in these specifications.
 - 2. An on-site supervisor shall be provided by the Contractor for the duration of the epoxied-in anchor work. This supervisor shall have had 2 years documented supervisory experience with the products to be used.
- B. Source quality control
 - 1. The material supplier shall provide (via the Contractor) the following test data for each production run or batch of epoxy formulation to be used:
 - a. Tensile strength by ASTM D638
 - b. Elongation at break by ASTM D638
 - c. Flexural strength by ASTM D790
 - d. Flexural modulus by ASTM D790
 - e. Compressive yield strength by ASTM D695
 - f. Compressive modulus by ASTM D695
 - g. Heat deflection temperature by ASTM D648
 - h. Slant shear by AASHTO
- C. Reference standards
 - 1. American Society for Testing Materials Standards
 - a. Test for Sag Flow of Highly Viscous Resins (ASTM D2730)
 - b. Test for Gel Time and Peak Exothermic Temperature of Reacting Thermosetting Resins (ASTM D2471)
 - c. Test for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading) (ASTM C78)

- d. Test for Compressive Properties of Rigid Plastics (ASTM D695)
- e. Test for Deflection Temperature of Plastics Under Flexural Load (ASTM D648)
- f. Test for Tensile Properties of Plastics (ASTM 638)
- g. Tests for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials (ASTM D790)
- h. Specifications for Stainless and Heat-Resisting Steel Bars and Shapes (ASTM A276)
2. American Association of State Highway and Transportation Officials Test for Slant Shear Strength of Epoxy Bonding Agent (AASHTO 237)
3. American Concrete Institute "Manual of Standard Practice for Detailing Concrete Structures" (ACI 315)
4. Concrete Reinforcing Steel Institute "Manual of Standard Practice"

D. Allowable tolerances:

1. The epoxied-in dowels shall be installed such that the ends of dowels and the clear cover fall within 1/4 in. of that specified.

1.4 SUBMITTALS

A. The Contractor shall submit the following to the Architect/Engineer:

1. Technical data sheets for each epoxy product or formulation to be used showing that his products meet the requirements of the specifications. Technical data shall include:
 - a. Intended use
 - b. Pot life (neat)
 - c. Initial cure time (1000 psi)
 - d. Tack free (thin film)
 - e. Final cure (75% ultimate strength)
 - f. Tensile strengths by ASTM D638 (14 days)
 - g. Tensile elongation by ASTM D638 modified (14 days)
 - h. Flexural strength and modulus per ASTM D790 at 24 hrs, 3 days, and 7 days at 77°F.
 - i. 24-hr compressive strength by ASTM C109 modified (1 part epoxy to 3-1/4 parts aggregate)

1.5 PRODUCT DELIVERY

A. The product shall be delivered and handled according to the manufacturer's recommendations.

B. Damaged, open containers shall not be used.

1.6 JOB CONDITIONS

A. Existing and environmental conditions: The Contractor shall examine the condition of surfaces where epoxied-in anchors are required. He shall follow the recommendations of the manufacturer with regard to limitations of the materials in various moisture and temperature conditions.

1.7 PAYMENT

A. The Work of this Section shall be on a lump sum basis in accordance with the Contractor's bid.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Epoxy for Anchors: The Epoxy shall be Hilti HY-200 or an approved equal.
- B. Epoxy coating for existing steel reinforcing bars shall be "MasterEmaco 8100 AP," manufactured by BASF/Master Builders, or an approved equal.
- C. Stainless Steel Anchors: Type 304 1/4 in. diameter stainless steel threaded rods cut and bent to shapes indicated on drawings. Maximum yield strength = 30 ksi. Minimum tensile strength = 75 ksi.
- D. Reinforcing Steel Dowels: ASTM A615/A615M, Grade 60, epoxy coated No. 3 or No. 4 bars bent to shapes required. The epoxy coating shall be removed from the portion of the dowel to be embedded in the epoxy, unless otherwise approved by the engineer.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine surfaces where epoxied-in anchors are to be installed for unsound concrete that would adversely affect the execution and quality of work.
- B. Where such conditions are found, notify the Architect/Engineer and proceed with work at other locations.

3.2 PREPARATION

- A. Lay out the locations of epoxied-in anchors according to the drawings and specifications.
- B. The Contractor is advised to use a reinforcing steel detector to avoid drilling into existing embedded reinforcing. He should also refer to the original drawings for information on the approximate size, number and location of existing reinforcing bars. These drawings are available from the Owner.

3.3 INSTALLATION OF STAINLESS STEEL ANCHORS

- A. Drilling holes:
 - 1. Holes may be wet-or dry-drilled using either percussive or rotary machines.
 - 2. Wet-drilled holes shall be flushed with clean water to remove residue, then blown out using oil-free compressed air, or allowed to air dry.
 - 3. Dry-drilled holes shall be brushed and blown out using oil-free compressed air to remove all loose concrete debris.
- B. Anchors shall be dry and free from contaminants, such as dirt, oil, and grease.
- C. Installation:
 - 1. The epoxied-in anchors shall be installed by mixing and injection of a pre-measured quantity of epoxy to the back of the hole and insertion of the anchor.

2. The method of installation is intended to achieve 100 percent filling of the annular space between the anchor and the drilled hole.
3. Hole diameter shall be as required by the epoxy manufacturer for the bar diameter being used.
4. The Contractor shall use one of the following methods:
 - a. Suction tube: This is a simple tube of a size that will fit inside the anchor hole. The tube is fitted with an inner tube, or plunger, that has a screw, approximately 3 in. long, attached to one end. Approximately 3 rubber washers, alternated with smaller metal washers are attached to the end of the machine screw. The rubber washers must be in contact with the inner surface of the outer tube to provide an air-tight seal.
 - 1) Place the open end of the outer tube into the mixed grout and suck the material into the tube by slowly pulling out the plunger tube. When filled, remove the tube, leaving the plunger in place and wipe off excess epoxy.
 - 2) Insert the filled tube to the back of the anchor hole. Slowly withdraw the outer tube with one hand while keeping firm pressure on the plunger with the other hand. Note: Only partially fill the hole. Calibrate the tube for the estimated volume of grout for the hole with a piece of tape around the outside of the plunger tube.
 - 3) Insert the anchor into the filled hole while slowly working it back and forth to assist removal of air. Insert small wooden edges into the hole opening to position the anchor temporarily until the grout has set or gelled.
 - b. Hand Operated Caulk Gun. The caulk gun should be fitted with a wide tip opening and a length of polyethylene or copper tubing matching the depth of the anchor hole.
 - 1) Fill the gun with epoxy in the same manner as for sealant.
 - 2) Place the extension tube to the back of the anchor hole. Begin injection evenly, while slowly with-drawing the tube.
 - 3) Insert the anchor as above.

3.4 FIELD COATING EXISTING REINFORCING BARS WITH EPOXY

- A. Segments of existing bars with more than 2 in. cover from the original concrete surface which are partially or fully exposed in concrete removal operations shall receive one coat of epoxy which fully covers the bar with no pin holes or holidays. A touch-up coat shall be applied if pin holes or holidays remain after the first coat. The dry film thickness of the coating shall be approximately 10 to 12 mils. A second coat of epoxy shall be applied to existing bars with 1/2 in. or less of cover from the original concrete surface.

3.5 CLEAN-UP

- A. The epoxied-in anchors shall be cleanly installed and squared up as shown on the drawings. Excess epoxy shall be cleaned up. Wood shims shall be removed.
- B. Safety of Personnel:
 1. Avoid skin contact with epoxy materials, solvents and epoxy strippers. Epoxy resins and particularly epoxy hardeners may cause skin sensitization.
 2. Wear rubber gloves (preferably with a cloth liner) and protective clothing. Where splashing may occur, wear goggles or face shields. Barrier creams are recommended but do not substitute for protective clothing.

3. If skin contact occurs, wash immediately with a waterless cleaner, followed by soap and water. Should eye contact occur, flush immediately with plenty of water for 15 minutes and call a physician.

END OF SECTION

SECTION 07 91 10
EXPANSION JOINT SEALS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Surface preparation and installation of expansion joint seals in concrete structures.

1.2 RELATED WORK

- A. Section 07 95 10 - Sealants

1.3 SUBMITTALS

- A. Product Data: Joint seal manufacturer's literature including written instructions for evaluating, preparing, and treating substrate; technical data including material descriptions and dimensions of individual components; and installation instructions and construction details.
- B. Template Drawings: Showing typical expansion joint cross-sections indicating dimensions and relationship to adjacent construction.
- C. Shop Drawings: For each joint system specified.
 - 1. Fabrication drawings showing steel retainer rail lengths and stud spacing and attachment.
 - 2. Placement drawings showing steel retainer rail splice and installation details.
- D. Installer Qualifications:
 - 1. Certificate signed by joint seal manufacturer, certifying that Installer complies with requirements.
 - 2. Submit evidence that Installer's *existing company* has minimum of 5 years continuous experience in application of specified materials. Submit list of at least five completed projects of similar scope and size, including:
 - a. Project name.
 - b. Owner's name.
 - c. Owner's Representative name, address, and telephone number.
 - d. Description of work.
 - e. Expansion joint seals used.
 - f. Project supervisor.
 - g. Total cost of expansion joint seal work and total cost of project.
 - h. Completion date.
- E. Submit in writing joint locations, joint width measurements, date and time of measurements, high and low daily temperatures for week preceding measurements, and recommended joint seal size.
- F. Following completion of Work, submit completed joint seal warranty.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by joint seal manufacturer to install joint seal. Must have installations of specified materials in local area in use for minimum of five years.
 - 1. Employ foreman with minimum of 5-years' experience as foreman on similar projects, to be on site at all times during Work.
- B. Mockups: Install first 10 feet of each joint type to demonstrate installation procedures and as standard for Work.
 - 1. Architect/Engineer and Owner's Representative will observe installation and completed seal. Notify Architect/Engineer 7 days in advance of mockup installation.
 - 2. Architect/Engineer and Owner's Representative shall be allowed to perform adhesion testing of the mock-ups for evaluation purposes.
 - 3. If Architect/Engineer determines mockup does not comply with requirements, modify mockup or construct new mockup until mockup is approved.
 - 4. Approved mockups may become part of completed Work if undisturbed at time of Substantial Completion
- C. Pre-installation Meeting:
 - 1. Conduct meeting at Project site.
 - 2. Review requirements for expansion joint seal, including:
 - a. Construction schedule and availability of materials, Applicator's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Site use, access, staging, and set-up location limitations.
 - c. Surface preparation and substrate condition.
 - d. Temporary protection.
 - e. Winter application methods and procedures.
 - f. Application procedures.
 - g. Special details and flashings.
 - h. Minimum curing period.
 - i. Forecast weather conditions.
 - j. Testing and inspection requirements.
 - k. Site protection measures.
 - l. Governing regulations if applicable.
 - 3. Contractor's site foreman, expansion joint seal manufacturer's technical representative, expansion joint seal Applicator, Owner's Representative, and Architect/Engineer shall attend.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with joint seal manufacturer's name, product brand name and type, date of manufacture, lot number, and directions for storing and mixing with other components.
- B. Store materials in original, undamaged containers in clean, dry, protected location on raised platforms with weather-protective coverings, within temperature range required by joint seal manufacturer.
- C. Limit stored materials on structures to safe loading of structure at time materials are stored, and to avoid permanent deck deflection.

- D. Handle materials to avoid damage.

1.6 PROJECT CONDITIONS

- A. Verify existing dimensions and details prior to installation of materials. Notify Architect/Engineer of conditions found to be different than those indicated in Contract Documents. Architect/Engineer will review situation and inform Contractor and Installer of changes.
- B. Comply with Owner's limitations and restrictions for site use and accessibility.
- C. Environmental Limitations: Install joint seals when existing and forecast weather conditions permit joint seal system to be installed according to joint seal system manufacturer's written instructions and warranty requirements.
 - 1. Verify joint gap at installation will permit proper functioning of joint seal.

1.7 CHANGES IN WORK

- A. During rehabilitation work, existing conditions may be encountered which are not known or are at a variance with drawings and specifications. Such conditions may interfere with Work and may consist of damage or deterioration of substrate or surrounding materials or components that could jeopardize integrity or performance of new joint seals.
- B. Notify Architect/Engineer of conditions that may interfere with proper execution of Work or jeopardize integrity of new joint seals prior to proceeding with Work.

1.8 WARRANTY

- A. Contractor's Warranty
 - 1. Written warranty, signed by Contractor, including:
 - a. Repair or replace joint seal components that do not comply with requirements; that do not remain watertight; that fail in adhesion, cohesion, or general durability; or that deteriorate in manner not clearly specified by submitted joint seal manufacturer's data as inherent quality of material for application indicated.
 - b. Labor and materials to perform warranty work.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 JOINT SEALS

- A. Base Bid
 - 1. Vertical expansion joint shall consist of one of the following systems:
 - a. LymTal International Inc.
 - 1) Precompressed Seal: Iso-Flex Precom C, manufactured by LymTal International, Inc.
 - b. Watson Bowman Acme Corporation
 - 1) Precompressed Seal: Wabo SeismicWeatherSeal, manufactured by Watson Bowman Acme Corporation
- B. Joint Seal Size:
 - 1. Seal sizes to be determined by Contractor based on joint locations and actual joint widths, and approved by Architect/Engineer.

2. Measure average, maximum, and minimum joint widths at every joint.
 3. Submit in writing joint locations, joint width measurements, date and time of measurements, high and low daily temperatures for week preceding measurements, and recommended joint seal size to Architect/Engineer for approval. Assume 160-degree thermal change, from -20 to 140 degrees, in sizing seal.
- C. Accessories: Primers, bedding materials, bonding agents, lubricants, adhesives, sealants, and other accessories supplied or approved by joint seal manufacturer.
- D. Fasteners: Provide stainless steel fasteners for attachment of plates, gutter and other related items.

2.2 FABRICATION

- A. Prior to fabrication, field measure existing conditions to ensure proper fit.
- B. Provide continuous joint seals in longest practical lengths, with minimum number of end joints.
1. For straight sections, provide continuous lengths.
 2. Fabricate directional changes in shop whenever possible; use mitered and adhered or heat-welded corners.
 3. Fabricate with end closures, transitions, and intersections to provide continuous assembly.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions with Installer and joint seal manufacturer's representative for compliance with requirements and for other conditions affecting performance of joint seal.
1. Ensure that Work done by other trades is complete and ready to receive joint seal, including concrete construction and patching.
 2. Notify Architect/Engineer in writing of conditions which may adversely affect joint seal installation or performance. Do not proceed with joint seal installation until these conditions have been corrected and reviewed by Architect/Engineer.
 3. Installation of joint seal indicates acceptance of surfaces and conditions.

3.2 SURFACE PREPARATION

- A. Prepare substrates according to joint seal manufacturer's written instructions.
- B. Provide clean, sound, dry concrete surfaces.
1. Remove existing joint seals.
 2. Sound concrete and repair unsound concrete along joints to provide solid surface of clean, sound concrete, free of voids and honeycombing. New concrete repair shall match existing joint profile.
 3. Clean concrete surfaces by sandblast, mechanical abrasion or other means recommended by joint seal manufacturer, to remove contaminants including form release agents, laitance, surface dirt and rust, and old sealant. Remove dust and other contaminants with compressed air.
 4. Allow concrete and patching compounds to fully cure prior to joint seal installation.

3.3 INSTALLATION

- A. Install joint seal according to joint seal manufacturer's written instructions. Field splices to be coordinated with and approved by joint seal manufacturer.
- B. Verify that joint widths are suitable for seal size and movement capability.

3.4 FIELD QUALITY CONTROL

- A. Water Test:
 - 1. Water test 20 percent of joints on 100 and 500 Levels. Water test shall be performed after installation of secondary seal but before installation of outer sealant.
 - 2. Construct water-retention barriers along sides of joints or cascade water over joints.
 - 3. Pond or cascade water over joint for a period of 4 hours minimum. Observe underside of for leakage.
 - 4. Repair leaking portions of joint seal and re-test.
 - 5. Protect interior finishes from water damage during test.

3.5 CLEANING AND PROTECTION

- A. Clean excess primer, adhesive, sealant, and other products from components and adjacent surfaces.
- B. Protect joint seals from traffic until materials have cured.
- C. Protect joint seals from damage by construction activities.

END OF SECTION

SECTION 07 92 00
SEALANTS AND CAULKING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Furnish all labor, materials, tools and equipment and perform all Work necessary for and incidental to providing sealants and caulking as shown on the Drawings and specified herein; in accordance with the provisions of the Contract.

1.2 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Contractor must have a minimum of five (5) years' experience in installation of caulking and sealants.
 - 2. The sealant manufacturer must have a minimum of ten (10) years' experience in the manufacturing of the specified sealants.

1.3 SUBMITTALS

- A. Submit the following in accordance with Section 01 30 00:
 - 1. 1. Manufacturer's Literature: Materials description, and preparation and installation instructions for each compound and filler.
 - 2. 2. Samples: Cured samples of each compound and filler for verification of color to installed.
- B. Laboratory Data: Submit results of laboratory adhesion testing for all sealant and substrates per ASTM C 794 "Adhesion-in-Peel of Elastomeric Joint Sealants".
- C. Warranty
 - 1. The Contractor shall warrant the sealing and caulking of joints to be free of faults and defects in accordance with the General Conditions, except that the warranty shall be for ten years instead of one year. The warranty is intended to insure that the installation meets the standards contained in these specifications for the ten-year period and any corrective work to maintain the performance in this accord shall be performed by the installation contractor at no cost to the owner.

1.4 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. All materials shall be delivered to the jobsite in manufacturer's sealed packaging and stored in and enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from premises.
- B. Store and condition the specified products as recommended by the product manufacturer.

1.5 JOB CONDITIONS

- A. Environmental Conditions: Do not apply if precipitation appears imminent. Do not apply any compound when ambient or surface temperature is less than or equal to 40°F.

- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to the mixing and handling of the sealant.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Silicone Sealant (to be used at all concrete-to-metal, concrete-to-concrete, glass-to-metal, and metal-to-metal joints): One Part Silicone, Nonsag, \pm 50 Percent Movement, color to match existing.
 - 1. Silpruf NB SCS9000 sealant, manufactured by Momentive.
 - 2. DOWSIL 756 SMS sealant, manufactured by Dow Corning.
 - 3. Approved equal. Color sample shall be submitted to Architect/Engineer for approval.
- B. Joint Backer Rod: Non Gassing Closed Cell: "Sof Rod" manufactured by Applied Extrusion Technologies, Inc., or approved equal, with configuration as shown on Drawings.
- C. Joint Cleaner: Type recommended by the manufacturer of the sealing or caulking compound for the specific joint surface and conditions.
- D. Joint Primer and Sealer: Type recommended by the manufacturer of the sealing or caulking compound for the specific joint surface conditions.
- E. Bond Breaker: Type recommended by the manufacturer of the sealing or caulking compound for the specific joint surface and conditions.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Select only sealing compounds of manufacturers who agree to have a qualified representative visit the site at the beginning of the joint sealing work and periodically thereafter as necessary to ensure the proper installation of the sealing compounds.
- B. Examine all surfaces to receive the parts of the Work specified herein. All surfaces must be clean, dry, sound and free of frost. At all times, follow the manufacturer's recommendations. Application or installation of material constitutes acceptance of the substrate.
- C. Clean surfaces and remove all sealant and protective coatings which might fail in adhesion or interfere with bond of compound so that surfaces are free of deleterious substances which might impair the Work. Except as otherwise approved by the manufacturer, elastomeric sealants shall not be applied to joint surfaces previously treated with paint, lacquer, sealer, curing compound, water repellent or other coatings unless such coatings have been entirely removed.
- D. Where steel anchorage occurs, do not reduce steel cross section during joint preparation. In no case shall any existing component be reduced more than 1/32 in.
- E. Prime surfaces in accordance with the instructions of the sealant manufacturer. Primer is to be applied to all substrates unless manufacturer states in writing to Architect/Engineer that this is not necessary after inspecting the particular conditions at the site.

- F. Install bond breakers in locations and of type recommended by the sealant manufacturer to prevent bond of sealant to surfaces where such bond might impair the performance of the sealant.
 - 1. In all joints to receive sealant, except for cap beads, install bond breaker specified over backup unless otherwise recommended by sealant manufacturer.
- G. Install spacer tape at cap bead joints and bridge seals to provide formwork for sealant application and backing for tooling.
- H. Verify dimensions of sealant joints at the project site by field measurement so that all proper sealant profiles will be accurately maintained.

3.2 INSTALLATION

- A. Install all materials in accordance with the manufacturer's printed instructions. Unless otherwise directed, confirm with the following.
 - 1. Compounds shall not be installed at or below an ambient or surface temperature of 40° F. All sealant installed contrary to this requirement are subject to rejection by Architect/Engineer.
 - 2. Confine compounds to joint areas shown. Use masking tape to prevent staining of adjoining surfaces or spillage and migration of compound out of the joints. Tool surface to shape shown or, if none is shown, to flush or slightly concave surface.
 - 3. Use power driven equipment wherever possible to install compounds so as to ensure uniformity of application and the highest quality of workmanship.
 - 4. Daily records will be maintained by Contractor where exterior sealant applications have been made.

3.3 MOCK-UPS AND FIELD ADHESION TESTING

- A. Perform trial sealant applications for all substrates and joint conditions in mock-up area selected by the Owner and Architect/Engineer prior to complete mobilization for review to determine the adhesive strength of the sealant and any necessary revisions to sealant application procedures. Sealant supplier is to be present. Only based upon test results can further activity proceed. The initial sealant application in the test area shall be made in accordance with written instructions from the sealant manufacturer indicating cleaning, priming and application procedures. These written instructions should be based upon wet and dry laboratory adhesion tests. After an appropriate cure period, a field adhesion test is to be performed as indicated below.
- B. As a check for adhesion, at least one hand pull test shall be conducted after the sealant is fully cured (usually within 14 to 21 days) in accordance with ASTM C1521, Evaluating Adhesion of Installed Weathering Sealants. This will be done at each joint in the mock-up and at other locations at Architect/Engineer's discretion. Adhesion in peel tests on the mock-up shall be performed following successful completion of ASTM C1521 tests specified in Paragraph 3.04. The adhesion test shall be performed in accordance with the following procedure:
 - 1. Make a knife cut horizontally from one side of the joint to the other.
 - 2. Make two vertical cuts approximately 2 in. long at the sides of the joint meeting the horizontal cut at the top of the 2 in. cuts.
 - 3. Grasp the 2 in. piece of sealant firmly between the fingers and pull down at a 90 degree angle or more and try to pull the uncut sealant out of the joint.
 - 4. If adhesion is proper, the sealant should tear cohesively (within itself) before releasing from the substrate.

5. Areas experiencing failures will be examined and these areas will have the existing sealant removed and then the surfaces recleaned, primed and reapply sealant.
- C. Test areas will be selected by Owner and Architect/Engineer. Areas experiencing failure will have all material removed and released as necessary to assure good adhesive bond of the sealant.

3.4 CLEAN UP

- A. As Work progresses remove excess compound and clean adjoining surfaces as may be required to eliminate any indication or soiling or migration.
- B. At the conclusion of sealing and caulking work remove all scaffolding and equipment used in the Work, clean up all debris and surplus material and remove same from the premises.

END OF SECTION