GREATER DAYTON REGIONAL TRANSIT AUTHORITY
RTA Bus Garage | PROJECT MANUAL
R1-2017-257 (24172787.00) | October 2017 | Issued for Review
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SECTION 00 4513 – CONTRACTOR QUALIFICATIONS

PART 1 - GENERAL

1.1 Related Documents
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

1.2 Bidder Representation
   A. Contractor and/or selected Subcontractors must meet minimum qualification requirements as specified herein.
   B. By submitting a Bid, Bidder represents that minimum qualifications have been satisfied.
   C. Although Contractor’s and Subcontractor’s personnel qualifications are important, qualifications required within this section shall be qualifications of the Contractor, not specific Contractor personnel unless requested.

1.3 Minimum Contractor and/or Subcontractors Qualification Requirements
   A. Concrete Restoration
      1. Shall have not less than five (5) years experience in structural concrete restoration work with at least three (3) projects involving concrete repairs and slab post-tensioning repairs.
   B. Traffic-Bearing Membrane
      1. Installer shall meet experience requirements specified in Section 07 1800, Traffic Coatings.
   C. Joint Sealants
      1. Installer shall meet experience requirements specified in Section 07 9200, Joint Sealants.
   D. Expansion Joints
      1. Installer shall meet experience requirements specified in Section 07 9500, Expansion Joints Sealant Systems.

1.4 Minimum Superintendent Qualifications
   A. Superintendent for project shall have a minimum of five (5) years of supervisory experience on similar projects.
B. Superintendent shall have performed in supervisory role as Project Superintendent on at least two (2) projects, each with a construction budget of at least $1,000,000.

1.5 Contractor Qualification Statement

A. Contractor and selected Subcontractors shall complete the Qualification Statement provided in Section 00 4514, Contractor Qualification Statement, and submit to the Owner with Bid.

B. The Bidder must answer all questions in the Section. The questions relate to the Bidder's eligibility to enter into a contract with Owner and to conditions which may affect the Bidder's ability to perform all contractual responsibilities undertaken in connection with this contract.

C. The Owner will determine, prior to issuing documents for Bidding, from the above information and from other evidence obtained by it, whether the Bidder has satisfactorily prequalified to submit a Bid for this project. The Owner's experience with a Bidder who has previously performed work for the Owner will be considered in prequalification of such Bidder. Unsatisfactory performance on previous projects may be sufficient cause for not prequalifying a Bidder; and satisfactory performance on previous projects may be used in lieu of meeting all specific requirements of this Section. Should the Bidder be judged "not prequalified" on the basis of data submitted and/or investigation completed, they will be notified prior to issuing of contract documents.

D. Prequalification by a Bidder shall not constitute a final determination by Owner as to the responsibility of such Bidder. The Owner reserves the right to reevaluate the Bidder's qualifications and responsibility and to request additional information and substantiation at any time prior to the award of Contract.

E. Owner reserves the right to waive any informality or irregularity in the qualifications. Owner also reserves the right to waive requirements for any specific qualification.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used.

END OF SECTION 00 4513
SECTION 00 4514 – CONTRACTOR QUALIFICATION STATEMENT

PROJECT: Bus Garage, 2017 Restoration Repairs

SUBMIT ORIGINAL TO: See Request for Proposal solicitation

SUBMIT COPY TO: Email Adobe Acrobat Copy
(Project Engineer) Brenndan Torres
Brenndan.Torres@WGInc.com

Qualification Submitted by: ________________________________

Bidder: ________________________________

Date: ________________________________

Business Address: ________________________________
______________________________
______________________________

Phone: ________________________________

Notice: The qualification statement is to be submitted with bid.
PART 1 - GENERAL

1.1 GENERAL

A. How many years has your organization been in business as a General Contractor?

B. How many years has your organization been in business as a Structural Restoration Contractor?

C. Has the contractor ever completed work for (Owner)? [Yes / No] If yes, provide description of work, date and specific contract.

1.2 BUSINESS ORGANIZATION

A. Sole Proprietorship: If the bidder is an individual, list the proprietor’s name and address:

B. Partnership: If the bidder is a partnership, provide the following information:

1. Date of Organization: ______________________

2. Number of Partners authorized to submit proposals and sign contracts:

3. Names of all other partners:

   _______________________________________
   _______________________________________
   _______________________________________

C. Is your organization legally qualified to do business in the State of Ohio?

   Indicate register or license number: ________________

D. Corporation: If the bidder is a corporation, provide the following information:

1. Date of Incorporation: ______________________

2. State in which incorporated: ______________________

3. If incorporated in another state, are you authorized to do business in the State of Ohio?  
   ☐ Yes ☐ No
4. Name and address of corporation's registered agent in ________________:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

5. Name and titles of officers authorized to submit proposals and sign contracts:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

6. Name and address of parent company, if firm is a subsidiary:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

7. Name of shareholders having more than 10 percent ownership of the company:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
1.3 SUMMARY OF CONTRACTOR WORK EXPERIENCE

A. Similar contracts completed within the last five to ten years. See requirements in Section 00 4513, Contractor Qualifications.

<table>
<thead>
<tr>
<th>Project &amp; Location</th>
<th>Contract Type &amp; Final Amount</th>
<th>Start &amp; Completion Dates¹</th>
<th>Name &amp; Phone No. Owner &amp; A/E References</th>
<th>Identify Type of Repair²</th>
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¹ Month/year  
² Concrete repairs, traffic bearing membrane, etc.
B. Contracts under construction

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<thead>
<tr>
<th>Project &amp; Location</th>
<th>Contract Type, Current Amount &amp; % Complete</th>
<th>Start &amp; Completion Dates (^1)</th>
<th>Name &amp; Phone No. Owner &amp; A/E References</th>
<th>Identify Type of Repair (^2)</th>
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1. Month/year  
2. Concrete repairs, traffic bearing membrane, etc.

C. Contracts Pending

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<tr>
<th>Project &amp; Location</th>
<th>Contract Type, &amp; Amount</th>
<th>Expected Start &amp; Completion</th>
<th>Name &amp; Phone No. of Owner &amp; A/E References</th>
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1.4 CONTRACTOR SUPERINTENDENT WORK EXPERIENCE

A. Name of Proposed Superintendent _______________________

B. Provide a summary of appropriate projects completed within the last 5 years by the proposed superintendent; describe the level of responsibility for each project; provide at least two (2) Owner references.

1.5 PERFORMANCE AND PAYMENT BOND

A. Corporate Surety Name: The undersigned bidder hereby submits the name of the following surety company will provide a performance and payment bond to the Owner in the event that the bidder is awarded the contract. A signed statement from the surety and certificates of the authority of officer signing are attached.

Corporate Surety Name: ________________________________
Address: ____________________________________________

____________________________________________________

B. Surety's Rating in Best's Insurance Guide:


C. Local Agent:

Name: ________________________________
Agency: ______________________________
Phone: ______________________________

D. Maximum Bonding Available: ________

1.6 BUSINESS AND FINANCIAL INFORMATION

A. Company's Annual Business Volume: ______________
   (for each contract division of work which the bidder is prequalifying)
B. Number of years in business: __________

C. Company's Financial Institution References:
   1. Name and Address

   __________________________________________

   __________________________________________

   ________________________________

   Officer: ___________ Phone: ___________

   2. Name and Address

   __________________________________________

   __________________________________________

   ________________________________

   Officer: ___________ Phone: ___________

1.7 KEY PERSONNEL

A. Current Number of Project Managers: __________

B. Current Number of Superintendents: __________

C. Provide Construction Experience of key individuals within your organization.

1.8 DISCLOSURE AND GENERAL QUESTIONS

A. Judgments and Claims: Are there any judgments, ☐ Yes  ☐ No
claims, or suits pending or outstanding against
your firm?
1. If yes, will this affect ability to complete ☐ Yes ☐ No
this contract?

B. Violation of Labor and Employment Laws and Regulations:
1. Is this firm currently under suspension or otherwise ☐ Yes ☐ No
barred from bidding public works construction projects
in the State of Ohio by any such administrative
commission, hearing agency, or legal tribunal?

C. Receivership: Has the firm filed for bankruptcy, ☐ Yes ☐ No
receivership or reorganization within the last five years?

D. Conflict of Interest: Is any owner, partner, officer or ☐ Yes ☐ No
major stockholder or spouse thereof of agent, official,
or employee of (Owner).

If the response to any of the above questions is yes, provide a detailed explanation.

1.9 CERTIFICATION OF THE QUALIFICATION STATEMENT

The undersigned bidder certifies that all of the information provided by Bidder contained in this
qualification statement is true and complete.

By: __________________________

Date: ________________________

Title: _________________________

END OF SECTION 00 4514
PART 1 - GENERAL

1.1 Description

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

B. This Section specifies procedures for allowances which shall be included in the Contract Price Base Bid per the Contract Documents. Allowances have been established to defer to a later date the determination of the actual cost for work which the exact quantity cannot be determined at the time of bidding and to defer selection of actual materials and equipment.

C. The Contractor shall advise the Engineer of the date when the final selection and purchase of each product or system included as an allowance must be completed in order not to delay the project of performance of the work.

D. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated with related work.

E. The following descriptions of the allowances describe the extent of the work in general. Detailed requirements may be specified in the various sections of the Specifications.

1. Allowance No. 1: Include a lump sum of $8,000 for the repair and restoration of the floor drain system. This allowance does not include the cost included in the Contract Price Base Bid for any other Plumbing work item. This work will be performed using unit prices stated in the bid form, or using an approved proposal agreed to prior to work.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used.

END OF SECTION 01 2100
SECTION 02 4119 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

1.2 Work Included

A. The Work of this Section shall include furnishing all labor, materials, equipment, and supervision to demolish, haul, and dispose of concrete in accordance with the Drawings and as specified herein.

1. Concrete delaminations to the depth as indicated on the Drawings.

1.3 Related Work

A. The following Work is related to this Section:

1. Post-Tensioning Repair (Monostrand) Section 03 0126
2. Concrete Repair Section 03 0130
3. Concrete Reinforcement Section 03 2000

1.4 Quality Control

A. After demolition is complete but prior to final cleaning, the cavities and all exposed reinforcement (including tendons) shall be reviewed by the Engineer. The review shall include sounding the exposed concrete to determine completeness of delamination removals, examination of dressed edges to verify depth and vertical edge of cut, and uniformity of excavation to insure compliance with minimum limits specified.

B. The Engineer shall review all reinforcement, including tendons, exposed within the cavities for corrosion or damage resulting from Contractor's removal operations. Replacement of defective or damaged reinforcement bars shall be performed in accordance with Section 03 2000, Concrete Reinforcement.
1.5 Safety

A. The concrete slab is post-tensioned. USE EXTREME CAUTION WHEN REMOVING CONCRETE. DAMAGED TENDONS MAY RELEASE WITH EXPLOSIVE FORCE DURING CONCRETE DEMOLITION.

1. Slab post-tensioning consists of monostrand tendons. Tendons are greased and encased in plastic sheathing.

B. Locate post-tensioning tendons and electrical conduits prior to concrete demolition or sawcutting. Contractor shall take all necessary precautions to prevent damage to the post-tensioning tendons and the conduit. Contractor is solely responsible for training and monitoring his work force concerning the safety procedures that should be employed in the execution of this work. Contractor shall repair, at no cost to the Owner, all damage caused by his work.

C. The concrete slab has embedded electrical conduit. Contractor shall take all necessary precautions to prevent damage to the post-tensioning tendons and the conduit. Contractor shall coordinate with Owner to shut off power if repairs are located near conduit.

1.6 Submittals

A. Submit for review and approval prior to beginning Work a copy of the proposed restoration sequencing plan.

B. Submit upon request, record types of equipment proposed for use.

1.7 Basis of payment

A. Demolition cost to be included in repair costs, unless otherwise noted.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 Inspection

A. Examine areas and conditions under which the Work is to occur. Notify the Engineer immediately in writing as required in the General Conditions of any conditions detrimental to the proper and timely completion of this Work.
3.2 General

A. Review with the Owner and Engineer the types of equipment proposed for use.

B. Conduct demolition operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

C. Protect Owner's property which is to remain including; facades, signs, windows, doors, plantings, parking equipment, electrical and mechanical lines and fixtures.

D. Protect adjoining properties, public thoroughfares, sidewalks and utilities from damage due to this operation.

E. Take adequate precautions and provide protection as required to prevent damage to remaining existing elements of the parking structure and all adjoining building elements, and all vehicles using the facility.

F. At no cost to the Owner, promptly repair damage to adjacent facilities resulting from demolition operations.

G. Clean adjacent facilities of dust, dirt and debris resulting from demolition operations.

H. Authority for performing necessary work on public and private property adjoining Owner's property shall be obtained by the Contractor.

I. Remove all temporary protection and devices when no longer needed and when directed by the Owner.

3.3 Delaminated Concrete Surface Preparation

A. Location and Marking of Work Areas

1. Locate floor slab delaminations by sounding the surface with a hammer or rod, or dragging a chain. The Contractor shall sound all floor slabs. Delaminated areas once located by the Contractor will be further sounded to define their limits. These limits or "boundaries" shall be marked with chalk or paint.

2. Beam, column, and slab delaminations shall be located by sounding the appropriate member with a hammer or rod. Cracks, usually horizontal in orientation along beam faces and vertical in orientation near corners of columns, are reliable indicators of delaminated concrete. Delaminated areas once located by the Contractor will be further sounded to define their limits. These limits or "boundaries" shall be marked with chalk or paint.

3. Prior to concrete removal locate reinforcing bars, tendons, anchorages, and electrical conduits in the vicinity of the repairs. Take the necessary precautions to prevent damage to reinforcement, tendons, anchorages, and electrical conduits.

B. Concrete Removal and Surface Preparation

1. All concrete shall be removed from within the marked boundary to a minimum depth as indicated on the Drawings using 15 to 30 pound chipping hammers equipped with chisel
point bits. Larger chipping hammers with a maximum stroke of 4 inches shall not be used without approval from the Engineer. If delaminations exist beyond the minimum removal depth, then chipping shall continue until all unsound and delaminated concrete has been removed from the cavity.

2. Where reinforcing bars and tendons are exposed by concrete removal, extra caution shall be exercised to avoid damaging them during removal of additional unsound concrete. The minimum depth of concrete removal around and beyond the perimeter of the bar for the entire exposed length shall be as indicated on the Drawings.

3. If rust is present on reinforcing bars where they enter sound concrete, then additional removal of concrete along the reinforcement is required. Such additional removal shall continue until grey reinforcement is exposed. If rust persists beyond the removal limits, the Engineer shall be advised and will direct further removals.

4. Delaminated, spalled and unsound concrete shall have their marked boundaries sawcut to a depth as indicated on the Drawings. All edges shall be straight and patch areas polygon shaped. A diamond blade saw or grinder with abrasive disk suitable for cutting concrete is acceptable for performing this work. The edge cut at the delamination boundary shall be dressed perpendicular to the member face. It shall also be of uniform depth for the entire length of the cut.

C. Preparation of Concrete Bonding Surface
   1. Abrasive blast or high pressure waterblast all exposed concrete surfaces to remove laitance and any foreign material that may impair bonding prior to concrete placement.

D. Cleaning and Securing of Reinforcing
   1. Refer to Section 03 2000, Concrete Reinforcement. Existing reinforcing and miscellaneous metals shall be cleaned of rust and laitance to near white metal.

E. Final Preparation
   1. Airblasting is required as a final step to remove dust and debris.

3.4 Stain Removal
   A. Within 5-feet of ceiling, beam, and column repairs which have been stained by previous leaking or leaching shall be cleaned through abrasive blasting, water blasting, grinding, or other mechanical means. All evidence of previous leaking and leaching is to be removed.

3.5 Disposal
   A. Remove and properly dispose of concrete and debris from areas exposed to public view on a daily basis.

END OF SECTION 02 4119
SECTION 03 0126 – POST-TENSIONING REPAIR (MONOSTRAND)

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

B. The Construction Record Drawings by the General Contractor on Richard Levin Associates Inc. Architects drawings, Record Date May 11, 1977.


1.2 Work Included

A. The Work in this Section shall include design, materials, fabrication, delivery equipment, supervision, and installation for the repair and/or conditioning of monostrand post-tensioning tendons and anchorages as indicated on the Drawings and as specified herein.

1.3 Related Work

A. Related Work specified elsewhere:

1. Section 02 4119 Selective Demolition
2. Section 03 0130 Concrete Repair
3. Section 03 1100 Concrete Formwork
4. Section 03 2000 Concrete Reinforcement

1.4 Design

A. The effective post-tensioning forces after all losses have occurred shall be a minimum of 60 percent of the minimum ultimate tensile strength (.60 fpu).

B. The maximum tensile stress in the post-tensioning tendons due to jacking forces shall not exceed 80 percent of the specified tensile strength or 94 percent of the specified yield strength of the post-tensioning tendon, whichever is smaller, but not greater than the maximum value recommended by the manufacturer of the post-tensioning tendons.

C. The maximum tensile stress in the post-tensioning tendons immediately after anchorage shall not exceed 70 percent of the specified tensile strength.

1. Total maximum jacking force for 7-wire strand, nominal diameter:
0.6" 0.80 x 0.217 square inch cross section x 270 ksi = 46.9k
1/2" 0.80 x 0.153 square inch cross section x 270 ksi = 33k

2. Total maximum force immediately after anchorage:
0.6" 0.70 x 0.217 square inch cross section x 270 ksi = 41.0k
1/2" 0.70 x 0.153 square inch cross section x 270 ksi = 28.9k

3. Total minimum force, after losses:
0.6" 0.60 x 0.217 square inch cross section x 270 ksi = 35.2k
1/2" 0.60 x 0.153 square inch cross section x 270 ksi = 24.8k

D. Anchorage bearing to be designed for concrete strength of 3,000 psi.

1.5 Reference Standards

A. Comply with the Reference Standards specified in Section 03 3000, Cast-In-Place Concrete, and the latest edition of the following Codes and Standards:

B. Provide post-tensioning tendon systems supplied by recognized manufacturers and licensees only, meeting or exceeding all material and installation requirements of the "Specification for Unbonded Single Strand Tendons" by the Post-Tensioning Institute, for application in corrosive environments and as further specified herein.


1.6 Quality Assurance

A. The post-tensioning plant shall be certified by the PTI Program.

B. Contractor's superintendent or Subcontractor's supervisor shall have supervised five prior projects of similar magnitude and design. The responsible person shall be present during all post-tensioning work and exercise close check and rigid control of all operations as required for full compliance.

C. Personnel responsible for the post-tensioning installation shall have 2 years experience with work comparable to this Project.

D. Engineer shall review P/T installation prior to concrete placement, unless review requirement has been waived. Allow free access to facilities for this purpose. Provide 48 hours notice to inspect completed post-tensioning reinforcement.

1.7 Submittals

A. Certified Mill Test Reports

1. Submit for record manufacturer's certificates of mill test reports for each coil or pack of strand containing the following test information:
a. Heat number and identification  
b. Ultimate tensile strength  
c. Yield strength at 1 percent extension under load  
d. Elongation at failure  
e. Modulus of elasticity  
f. Diameter and net area of strand  
g. Type of material (low relaxation) or (stress-relieved)  

2. Submit for record manufacturer's strand relaxation losses (for low relaxation type material) on relaxation tests of representative samples per ASTM A421 (Supplement 1)  

B. Submit for review and approval Shop Drawings in accordance with Division 1 of this Specification, and as herein specified, showing the following information:  
   1. Type and chemical analysis of grease  
   2. Type, material and thickness of post-tensioning repair tape.  
   3. Detailing of anchorage and splicing devices, including methods and materials for connecting dead, intermediate and live anchorages.  

C. Submit for record certified jack calibrations and method of identification. Calibrate jacks, pumps, and gauges as a combination. Submit for record certificates of calibration from an acceptable testing laboratory to Engineer for all jacks used on Project.  

D. Submit for record sequence for detensioning, cutting, and restressing damaged tendons.  

E. Submit for record the post-tensioning experience of the Contractor who is to perform the post-tensioning work.  

F. Calculations: Submit for record calculations prepared by a qualified registered professional engineer in the state in which project is located to substantiate prestressing procedures. All losses shall be accounted for in calculations. Submit the following:  
   1. Jacking force and jacking pressure.  
   2. Maximum temporary jacking force and jacking pressure.  
   3. Sequence of tendon jacking for each different tendon layout.  
   4. Losses due to anchorage seating, elastic shortening, creep, shrinkage, relaxation, friction and wobble, used to determine tendon sizes and number.  
   5. Calculations or test results of adequacy of anchorage.  
   6. Final required jacking elongation corresponding to final jacking force of tendons.  
   7. Calculated elongation, based upon the elastic modules cross sectional area of the tendons used.  

1.8 Samples  

A. Submit for review and approval upon request samples of actual completed anchorage assemblies to be used.
1.9 Transportation and Handling

A. Assign all new post-tensioning tendons within every group or in the same member a heat number and tag accordingly.

B. Install and seal all dead end anchorages prior to shipping tendons to the site. The Engineer will review dead end anchorages to ensure waterproof construction.

C. The material shall be packaged at the source in a manner which prevents physical damage to the strand during transportation and protects the material from corrosion during transit and storage.

D. Remove and replace at no cost to the Owner new wires or strands which are broken or show fabrication defects.

E. Tendons shall be stored out of the weather by the manufacturer prior to shipping. Tendons shall be shipped in weatherproof enclosures such as weathertight semi-trailers. Tendons shall be stored at the job site off the ground in weatherproof enclosures, to ensure that the tendons remain dry until they are placed in the formwork. Covering tendons with tarps is not considered a weatherproof enclosure.

1.10 Basis of Payment

A. Pay unit for slab repair is square feet (SF), maximum size as specified in the drawings.

B. Pay unit for performing splice repair is each (EA.). One opening in slab is considered one splice.

C. Pay unit for performing splice and restressing of post-tensioning tendons (Center Pull) is each (EA.).

D. Pay unit for performing cable end and restressing of post-tensioning tendons is each (EA).

E. Pay unit for installing new tendon is lineal feet (LF).

F. The cost of the above work items shall include demolition, post-tensioning hardware, reinforcement and concrete.

PART 2 - PRODUCTS

2.1 Post-tensioning Tendons

A. Post-tensioning: ASTM A416: diameter as indicated on Drawings, seven-wire, low relaxation strand. Grade 270 with minimum ultimate stress of 270,000 psi; unbonded; greased and sheathed.
B. Based on the shop drawings, strand diameters of 0.60” and 0.50” were used. Contractor shall verify in field the diameter of each tendon.

2.2 Sheathing Materials

A. Sheathing materials shall be extruded seamless high density polyethylene 40 mil minimum thickness, or other material complying with the PT specifications.

B. The sheathing shall be connected to all stressing, intermediate and fixed anchorages and couplers in a watertight fashion, thus providing a complete encapsulation of the prestressing steel wire in the bundle.

2.3 Repair Tape

A. Adhesive high density polyethylene, 12 mils minimum thickness, 2 inches minimum width.

B. Approved repair tapes are:
   1. "Patch #145 Vinyl - Rubber Adhesive" by 3M, St. Paul, MN
   2. "Polyken, Type 826" by Kendall Co., Boston, MA
   3. "PWT-20" by Alltape, Hialeah, FL
   4. or Approved Equivalent.

2.4 Post-Tensioning Grease

A. Lithium-based, containing corrosion inhibitors, wetting agents, and meeting the requirements of Chapter 5 of the "Specification for Unbonded Single Strand Tendons."

B. Approved greases are:
   1. "Greasrex K218," Mobil Oil Company
   2. "Viscono Rust 3166" by Viscosity Oil Company, Chicago, IL
   3. "Unocal PTI Cable Grease" Unocal Corp., Schaumburg, IL
   4. "Shell PT Coating" Shell Oil Co., Oakbrook, IL
   5. or Approved Equivalent.

C. PT supplier shall provide installer with adequate quantity of grease for regreasing tendons with damaged sheathing, filling voids between end of sheathing, or waterproofing anchorages.

2.5 Anchorages and Splicing Hardware

A. Post-tensioning tendon anchorage hardware, field epoxy coated.

B. End anchorages are to be fabricated to match existing.
C. Provide all new anchors and hardware from the same manufacturer. Approved manufacturers are:

1. Prescon Corporation, San Antonio, TX
2. PSC, Chicago, IL
3. or Approved Equivalent.

PART 3 - EXECUTION

3.1 Inspection

A. Inspect area to receive the work and report immediately in writing to the Engineer, as required in the General Conditions, and unacceptable conditions. Do not proceed with work until unsatisfactory conditions have been corrected in an acceptable manner. Commencement of work implies acceptance of related work.

3.2 Preparation

A. Maintain post-tensioning equipment in safe, working condition.
B. Maintain spare jacks, tendons, and end anchorages on the site during post-tensioning operations.
C. During the removal of concrete delaminations, tendons shall be inspected by the Contractor for defects, damage or looseness. Prior to starting of the repairs to the tendons, all delaminated concrete shall be removed from the floor slabs between anchorages.
D. Avoid damaging transverse reinforcing and/or post-tensioning.

3.3 Installation

A. General

1. If tendon is loose, but no break is found within cavities, Engineer and Contractor shall review location to cut tendon. Determine location of tendon break by pulling both ends and extracting failed portion of tendon and measuring the length. Wrap all failed ends of tendons.
2. Splicing hardware can be installed at break if a concrete cover of one inch minimum can be achieved. Do not replace concrete prior to tendon stressing.
3. If one inch cover cannot be achieved, provide full depth openings in the slab near the quarter points (of the slab span) in the slab closest to the break or breaks and having the break or breaks in between the two openings. Temperature tendons shall be located prior to concrete removal. Locate openings to minimize interference with tendons. Size of
openings shall be sufficient to install splicing hardware. Do not replace concrete prior to tendon stressing.
4. Remove existing tendon between openings and rethread new tendon through existing sheathing.
5. Cut off tendon leaving sufficient length to allow splicing.
6. To re-stress, go to one end of tendon at anchorage and provide full depth opening in the slab sufficient to install anchorage and stressing jack.
7. Pour the concrete header to provide a bearing area for the anchorage. Reinforcing steel shall be installed in front of the anchor as indicated on the Drawings. Tendon shall be tensioned after the concrete has reached a compressive strength of 3000 psi.
8. After stressing records are approved, epoxy coat all exposed steel, grease and wrap exposed tendons, install rebar as indicated on the Drawings and pour concrete.
9. Repair tape shall be spirally wrapped around tendon for a minimum of 1-1/2 inches beyond damage or splice.
10. All epoxy coating shall be fully cured prior to concrete placement.
11. While tendons and anchorages are exposed they shall be protected from any moisture and rain.
12. Do not damage waterproofing assembly during concrete placement. Any damaged assembly will be replaced before continuing concrete placement.

B. Tensioning

1. Take safety precautions to prevent workers from standing behind, below or above the jacks during tensioning. Provide physical protection barrier during stressing.
2. Full tensioning will not be permitted unless the post-tensioning tendons are free and unbonded in the enclosure.
3. Stress all post-tensioning tendons by means of hydraulic jacks, equipped with accurate reading, calibrated hydraulic pressure gauges to permit the stress in the post-tensioning steel to be computed at any time.
4. If a deviation greater than 5 percent occurs between the measured elongation and the computed elongation for a given jack gauge pressure, detension jack and proceed to locate possible areas where the tendon may be bound within the sleeve.
5. If friction loss is determined to be cause for binding the slab area above the tendon length may be vibrated while the tendon is under partial tension. This vibration may be accomplished by using a soil type plate vibrator.
6. Anchor the prestressing steel at an initial force that will result in effective forces, after all losses occur, of not less than those required.
7. No tensioning will be permitted unless the post-tensioning tendons are reasonably free and unbonded in the enclosure.

C. Concrete Placement

1. Refer to Section 03 0130, Concrete Repair.

D. Cutting Tendons after Stressing

1. Do not cut tendons or cover pockets until elongation records are reviewed by the Engineer.
2. Apply waterproof end assembly as required over exposed end of tendon and chucks and fill with approved grease as specified in Paragraph 2.4
3. Tape ends of assembly to complete seal.
4. Tendon cutting operations shall not damage the epoxy coating on the anchors nor damage the assembly required to provide a waterproof anchorage.

END OF SECTION 03 0126
TENDON SURVEY LOG

Floor Level:
Tendon Identification:
Exposed Tendon Locations:

UNCOVERED CONDITION DATA

Number of Wires:
Number of Wires Broken:
Number of Wires Showing Section Reduction:
Location of Break:
Tendon Repaired: Yes or No
Notes:
Contractor Date Engineer Date
_________________________ ________ __________________ _______
# Tendon Repair Log

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<tr>
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**Notes:**

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<th>Engineer</th>
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SECTION 03 0130 – CONCRETE REPAIR

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

1.2 Work Included

A. The Work of this Section shall include providing and installing concrete patching materials, as indicated on the Drawings and as herein specified.

1.3 Related Work

A. Related work specified elsewhere:

1. Section 02 4119 Selective Demolition
2. Section 03 2000 Concrete Reinforcement
3. Section 07 1800 Traffic Coatings
4. Section 07 9200 Joint Sealants
5. Section 07 9500 Expansion Joint Sealant Systems

1.4 Reference Standards

A. Comply with the following reference Standards; except where more stringent requirements are indicated on the Drawings or specified herein:

1. American Concrete Institute (ACI)
   b. ACI 201.2R Guide to Durable Concrete.
   c. ACI 222R Corrosion of Metals in Concrete.
   d. ACI-301 Specifications for Structural Concrete for Buildings.
   e. ACI-302.1R Guide for Concrete Floor and Slab Construction.
   f. ACI 304R Guide for Measuring, Mixing, Transporting and Placing Concrete.
   g. ACI 305R Hot Weather Concreting.
   h. ACI 306R Cold Weather Concreting.
   i. ACI 306.1 Standard Specification for Cold Weather Concreting.
   j. ACI 318 Building Code Requirements for Structural Concrete and Commentary.
   k. ACI 347R Guide to Formwork for Concrete.
2. International Concrete Repair Institute (ICRI)
   a. ICRI Concrete Repair terminology
   b. ICRI Technical Guideline No. 320.2R “Guide for Selecting and Specifying Materials for Repair of Concrete Surfaces”.
   c. ICRI Technical Guideline No. 320.1R “Guide for Surface Preparation for the Repair of Deteriorated Concrete from Reinforcing Steel Corrosion”.

1.5 Quality Control

A. The patched areas shall be sounded with a hammer 7 days after placement. Repair all detected hollowness by removing and replacing the patch or affected area at no extra cost to the Owner.

B. If shrinkage cracks appear in the repair material within 72 hours after placement, the repairs shall be considered defective, and shall be removed and replaced at no extra cost to the Owner.

C. Plan drawings shall be maintained locating all repairs performed under this Section. Location and size of patches, overlays, etc. must be located on clean drawings. Separate drawings shall be maintained for each Level and Ceiling plan. These drawings shall be incorporated into record set required per Division 1.

D. The Contractor, or Restoration Subcontractors, shall have not less than five (5) years experience in the field of structural concrete restoration work.

1.6 Environmental Requirements

A. Cold weather concreting: In accordance with ACI 306.1 or as specified herein.

B. Hot weather concreting: In accordance with ACI 305 or as specified herein.

C. Inclement Weather:

   1. Unless adequate protection is provided, concrete shall not be placed during rain, sleet or snow.
   2. Rain water shall not be allowed to increase the mixing water nor to damage the surface finish.

1.7 Submittals

A. Submit for record the Manufacturer's Spec Data Sheets and Health and Safety Data Sheets.

B. Submit for record upon request, a written description of the Contractor's concrete repair ability, including equipment, facilities, personnel, and a list of similar completed projects.
1.8 Transportation and Handling
   A. Store materials on platforms off ground, protected from the elements.
   B. Handle and store aggregates in a manner to prevent intrusion of foreign material. Protect all materials until used.
   C. Material which has deteriorated or which has been damaged shall not be used.

1.9 Basis of Payment
   A. All concrete repair quantities as identified in details post-tensioned (P/T) details are incidental to Post Tensioned Repairs as identified in the Bid Table.
   B. Concrete repairs unrelated to P/T repairs, quantities shall be measured on a square foot (SF), cost basis.
   C. Depth of patches are as indicated on the Drawings.
   D. Submit copy of drawings identifying current quantities with each payment request. Work being invoiced must be properly identified. These drawings shall be incorporated into the Record Set.

PART 2 - PRODUCTS

2.1 Horizontal Repair Mortar
   A. Repair mortar to be traffic bearing, polymer modified with corrosion inhibitor, cementitious, type and thickness to meet conditions as indicated on the Drawings.
   B. For deeper patches add aggregate per Manufacturer’s recommendation.
   C. Acceptable repair mortar with corrosion inhibitor for patching horizontal surfaces is:
      1. Sikatop 111 Plus or Sikacrete 211 SCC Plus, Sika Corp., Lyndhurst, NJ.
      2. MasterEmaco S 466CI or S 477CI, BASF, Shakopee, MN.
      3. Eucocrete Supreme, Euclid Chemical Co., Cleveland, OH
      4. Planitiop 15 or FD, Mapei, Deerfield Beach, FL
      5. Meadow-Crete GPS, W.R. Meadows, Inc., Hampshire, IL
      6. Or Approved Equivalent

2.2 Vertical Overhead Repair Mortar
   A. Repair mortar to be polymer modified cementitious, with corrosion inhibitor, type and thickness to meet conditions as indicated on the Drawings.
B. Trowel Applied - Acceptable repair mortar with corrosion inhibitor for patching vertical surfaces is:
   1. MasterEmaco S 488Cl, BASF, Shakopee, MN.
   2. Sikatop 122 Plus or 123 Plus, Sika Corp., Lyndhurst, NJ.
   3. Verticoat Supreme, Euclid Chemical Co., Cleveland, OH
   4. Planitop 23, or X, Mapei, Deerfield Beach, FL
   5. Meadow-Crete GPS, W.R. Meadows, Inc., Hampshire, IL
   6. Or Approved Equivalent

C. Form and Pour - Acceptable repair mortar with corrosion inhibitor for patching vertical surfaces is:
   1. MasterEmaco S 466CI or S 477CI, BASF, Shakopee, MN.
   2. Sikatop 111 Plus or Sikacrete 211 SCC Plus, Sika Corp., Lyndhurst, NJ
   3. Eucocrete Supreme, Euclid Chemical Co., Cleveland, OH
   4. Planitop 15 or FD, Mapei, Deerfield Beach, FL
   5. Or Approved Equivalent

PART 3 - EXECUTION

3.1 Inspection
   A. Before commencing work, examine all adjoining work on which this work is dependent and report in writing to the Engineer any condition which prevents Contractor from performing the work. Starting work constitutes acceptance of adjoining work.

3.2 Surface Preparation
   A. Refer to Section 02 4119, Selective Demolition

3.3 Existing Reinforcement
   A. Refer to Section 03 2000, Concrete Reinforcement

3.4 Placing Concrete Patching Materials
   A. The mixing and installing of the concrete patching materials and the priming of the existing concrete surface shall be in accordance with the Manufacturer's recommendations.
   B. Concrete patching materials shall be cured according to the Manufacturer's recommendations.

END OF SECTION 03 0130
SECTION 03 1100 - CONCRETE FORMWORK

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The latest editions of ACI 301, “Standard Specification for Structural Concrete” and ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials are hereby a part of this Section. Specific project requirements or modifications are specified herein.

C. A copy of ACI SP-15 Field Reference Manual; Standard Specifications for Structural Concrete ACI 301 with selected ACI and ASTM references shall be kept in Contractor's field office.

1.2 Work Included

A. Work of this Section shall include design, material, delivery, labor, equipment, and supervision to install formwork and shoring systems for cast-in-place concrete as indicated on Drawings and as specified herein.

B. Formwork installation items furnished by others, including but not limited to following:
   1. Anchor bolts
   2. Anchorages
   3. Sleeves
   4. Inserts
   5. Frames
   6. Nosings
   7. Other miscellaneous items required to be embedded in concrete, but not including reinforcing steel.

1.3 Related Work

A. Related Work specified elsewhere:
   1. Section 03 0126 Post-Tensioning Repair (Monostrand)
   2. Section 03 0130 Concrete Repair
   3. Section 03 1500 Concrete Accessories
   4. Section 03 2000 Concrete Reinforcement
1.4 Reference Standards

A. Comply with following reference standards, except where more stringent requirements are indicated on Drawings or specified herein:

1. American Concrete Institute (ACI):
   b. ACI SP-4, Formwork for Concrete, latest edition.
   c. As indicated in Section 03 3000 “Cast-In-Place Concrete”

2. American Welding Society (AWS):

3. American Iron and Steel Institute (AISI):
   a. AISI Cold-Formed Steel Design Manual, latest edition.

4. Occupational Health and Safety Administration (OSHA):
   a. Safety Standards, latest revisions.

1.5 Quality Control

A. Formwork materials and installation work may be reviewed by the Engineer at any time during the progress of the Work. Allow free access to facilities for this purpose.

1.6 Submittals (ACI 301 2.1.2)

A. Upon request, formwork product data including facing materials.

B. Upon request, shop drawings for formwork (including installation instructions) and shoring system (including sequence of shoring, removal, and reshoring.) Shop drawings shall be sealed by a Professional Engineer registered in state in which the project is located.

C. Upon request, formwork release agent product data.

1.7 Transportation and Handling

A. Store all formwork materials clear of ground, protected, so as to preclude damage.

1.8 Basis of Payment

A. Formwork and shoring are to be included in cost of concrete placement and demolition.
PART 2 - PRODUCTS

2.1 Materials (ACI 301 2.2.1) Additional requirements as follows:

A. Form-facing materials (ACI 301 2.2.1.1)
   1. Formwork for exposed finish concrete to provide smooth form finish.
      a. Unless otherwise indicated, construct with plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system indicated on Drawings. Provide formwork material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

   2. Formwork for unexposed finish concrete to provide rough form finish.
      a. Construct with plywood, lumber, metal, and other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 Formwork Accessories (ACI 301 2.2.1.2) Additional requirements as follows:

A. Ties exposed to view or exposed to weather:
   1. Ties shall be one of following:
      a. stainless steel AISI 302/304 or
      b. “snap off” type or
      c. removable.

   2. “Snap off” metal ties shall have cones and be designed to break back to allow a minimum 1-1/2 inch cover over ends or portions of ties remaining.
   3. “Snap off” area shall not leave a hole larger than one inch diameter in concrete surface.

B. Ties used in areas which will not be exposed to view or are below grade shall be commercially manufactured with no minimum requirements regarding stainless steel/snap-off/removeability.

2.3 Form Release Agent (ACI 301 2.2.1.3) Additional requirements as follows:

A. Form release agent shall be non-toxic, VOC compliant, environmentally safe compatible with formwork material and shall not dust, contribute to bug holes nor adversely affect concrete surfaces, and shall not impair subsequent treatment of concrete surface.

2.4 Shores

A. Shores shall consist of wood or steel posts.
PART 3 - EXECUTION

3.1 Inspection

A. Inspect area to receive Work and report immediately in writing to Engineer, as required in General Conditions, any unacceptable conditions.

3.2 Construction and Erection of Formwork (ACI 301 2.3.1) Additional requirements as follows:

A. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

B. Formwork openings at expansion joints may need to be adjusted in order to produce cured concrete expansion joint width as indicated on the Drawings.

C. Re-tighten forms immediately after concrete placement as required to eliminate mortar leaks.

D. Set anchorage devices and other embedded items that are attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by Suppliers.

E. Do not thin form release agent.

3.3 Tolerances (ACI 301 2.3.1.2) Additional requirements as follows:

A. Construct formwork to provide completed concrete surfaces complying with tolerances specified in ACI 117, Sections 3 and 4.

B. Check lines and levels of completed formwork for all exposed columns, spandrels, etc. before concrete is placed.

C. Make corrections or adjustments to formwork that will be required to correct any deviation which exceeds specified tolerances.

D. Check formwork during concrete placement to ensure that forms, shores, falsework, ties, and other features have not been disturbed by concrete placement methods or equipment.

E. The offset between adjacent formwork facing material shall not exceed ACI 117 Class A 1/8 inch.
3.4 Installation of Reinforcement

A. Refer to Section 03 2000, Concrete Reinforcement.

3.5 Removal of Formwork (ACI 301 2.3.2) Additional requirements as follows:

A. Formwork removal shall be coordinated with curing requirements as specified in Section 03 0130 Concrete Repair.

3.6 Re-Use of Forms

A. Clean and repair surfaces of forms to be re-used. Remove fins and laitance, and tighten forms to close joints. Align and secure joints to avoid offsets. Split, frayed, delaminated or otherwise damaged form facing material shall not be acceptable for exposed surfaces.

B. Apply new form-release agent as specified.

C. Do not use “patched” forms for exposed concrete surfaces, unless approved by Engineer.

END OF SECTION 03 1100
SECTION 03 2000 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

B. ACI 301 Standard Specifications for Structural Concrete and ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials are hereby a part of this Section. Specific project requirements or modifications are specified herein.

1.2 Work Included

A. Work of this Section shall include materials, fabrication, delivery, and installation of reinforcement for cast-in-place concrete.

B. Field epoxy coating of exposed reinforcement in concrete cavities.

1.3 Related Work

A. Related work specified elsewhere:

1. Section 03 0126 Post-Tensioning Repair (Monostrand)
2. Section 03 0130 Concrete Repair

1.4 Reference Standards

A. Comply with following reference standards, except where more stringent requirements are indicated on Drawings or specified herein.

1. American Concrete Institute (ACI)
   a. As indicated in Section 03 3000, Cast-In-Place Concrete and as specified herein.

2. American Welding Society (AWS)

   a. Placing Reinforcing Bars
   b. Reinforcement Anchorages and Splices
   c. Fabrication of Epoxy-Coated Rebar
d. Field Handling Techniques for Epoxy-Coated Rebar at the Job Site

e. Manual of Standard Practice

b. Structural Detailing Manual

a. As specified herein.

1.5 Quality Control

A. Materials and installed Work may be reviewed by Engineer at any time during progress of Work. Allow free access to facilities for this purpose. Provide 48 hours notice to inspect completed reinforcing prior to placement of concrete.

B. If in opinion of Engineer, cross-sectional area loss of bars is greater than 15 percent, Contractor shall splice as directed by Engineer. Minimal splice lap shall be as indicated on Drawings.

1.6 Submittals (ACI 301 3.1.1) Additional requirements as follows:

A. For review and approval placing drawings complying with ACI SP-66 Detailing Manual.

B. For review and approval, Health and Safety Data Sheets and Manufacturer's Spec Data Sheets for field-applied epoxy coating and cold galvanizing compound.

C. For review and approval upon request certification that epoxy coating for steel reinforcement meets applicable standards.

D. For review and approval certification that epoxy coating meets CRSI Epoxy Coating Plant Certification Program.

1.7 Samples

A. Submit minimum of one sample upon request for review and approval of each type and grade of bar support and splice device.

1.8 Transportation and Handling (ACI 301 3.12) Additional requirements as follows:

A. Deliver all reinforcement to project site bundled, tagged and marked. Tags shall indicate bar sizes, lengths and other information corresponding to markings indicated on placing drawings.

B. Store reinforcement on supports above ground level. Protect from weather.
C. Deliver and store welding electrodes in accordance with AWS D1.4.

D. Epoxy-coated reinforcement
   1. Comply with requirements of ASTM D 3963/D 3963M-96 Fabrication and Jobsite Handling of Epoxy-Coated Reinforcing Steel Bars and CRSI Field Handling Techniques for Epoxy-Coated Rebar at the Job Site.

E. If reinforcement is to be stored on site for more than 1 month before placement, cover reinforcement with opaque polyethylene sheeting, properly secured. Do not store reinforcement at job site unprotected over winter.

1.9 Basis of Payment

A. Reinforcement is to be included in cost of concrete placement.

B. Provide additional 100 lbs. of epoxy coated #3 or #4 reinforcement, bent as directed, for inclusion in project as Engineer directs, and is at unit cost per pound.

PART 2 - PRODUCTS

2.1 Materials (ACI 301 3.2.1) Additional requirements as follows:

A. Reinforcement
   1. ASTM A615, grade 60, unless noted.

B. Reinforcement to be welded.
   1. ASTM A706, Grade 60.

C. Epoxy-Coated Reinforcement
   1. ASTM A775.

D. Welded Wire Fabric Reinforcement (rolls not accepted)
   1. ASTM A1064, Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed
   2. ASTM A884, Epoxy-Coated Steel Wire and Welded Wire Reinforcement.

E. Wire Reinforcement Supports (ACI 301 3.2.1.8)
   1. Provide CRSI Class 1 plastic-protected wire bar supports for reinforcement in contact with formwork, including bolsters, chairs, spacers and other devices for spacing, supporting, and fastening reinforcing bars in place.
2. Provide CRSI Class 1-A epoxy, vinyl, or plastic-coated bright basic wire bar supports for epoxy reinforcement in contact with formwork, including bolsters, chairs, spacers and other devices for spacing, supporting, and fastening reinforcing bars in place.

F. Tie Wire

1. Tie wire shall be plastic or vinyl coated for all epoxy coated reinforcement, and post-tensioning tendons.

G. Epoxy-Coating for Reinforcement

1. Location of epoxy-coated reinforcement is described in General Notes.
2. Brown or red coatings are not permitted.
4. Acceptable shop-applied fusion-bonded epoxy coatings are:
   a. Scotchkote 413, The 3M Company
   b. NAP-GARD 7-2709 Rebar, DuPont Power Coatings
   c. or Approved Equivalent.

H. Epoxy Patch Compound

1. Use patching compounds recommended by epoxy powder Manufacturer, compatible with shop applied epoxy coating and inert in concrete.
2. Acceptable patching compounds are:
   a. Scotchkote 413PC, The 3M Company
   b. NAP-GARD Rebar Repair Material 7-2727, DuPont Powder Coatings

I. Field-Applied Epoxy Modified Coating

1. Field-applied epoxy modified coating with Anti-Corrosion Agent (two coats at 10 mils) for existing reinforcement and miscellaneous metals embedded in concrete.
2. Acceptable field applied epoxy modified coatings are:
   a. Sika Armatec 110 Epo Cem, Sika Corporation.
   b. MasterEmaco P 124, BASF, Shakopee, MN.
   c. Mapei Mapefer 1k, Mapei, Deerfield Beach, FL
   d. Dualprep A.C., Euclid Chemical Company, Cleveland, OH.

J. Field-Applied Cold Galvanizing

1. Acceptable Cold Galvanizing compounds are:
   a. Z.R.C. Cold Galvanizing Compound, ZRC Worldwide, Marshfield, MA.
   b. or Approved Equivalent.
2. Note: Cold galvanizing is not a substitute for epoxy coating. Use only where indicated on Drawings and Specifications.

K. Reinforcement Chemical Anchorages

1. Provide sizes and types of anchorages as indicated on Drawings.
2. Acceptable embedded anchor systems are:
   b. HILTI HVZ Adhesive Anchors, HILTI, Inc. Fastening Systems.
   c. Power-Fast +, Power Fasteners.
   d. Chem Stud, Power Fasteners.
   e. or Approved Equivalent.

PART 3 - EXECUTION

3.1 Inspection

A. Inspect area to receive Work and report immediately in writing to Engineer, as required in General Conditions, any unacceptable conditions.

3.2 Fabrication

A. Fabrication tolerances shall be in accordance with ACI 117 2.1.

3.3 Placement (ACI 301 3.3.2) Additional requirements as follows:

A. Tolerances (ACI 301 3.3.2.1)
   1. Comply with Concrete Reinforcing Steel Institute's recommended practice for Placing Reinforcing Bars, for details and methods of reinforcement placement and supports, and as herein specified.

B. Reinforcement supports (ACI 301 3.3.2.4)
   1. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces so that concrete cover for tie wire matches cover for reinforcement.
   2. Supports for bars shall be placed at 4'-0" maximum spacing. Supports shall be placed a maximum of 6 inches from ends of the reinforcement.

C. Welded wire reinforcement (ACI 301 3.3.2.5)
1. Install in lengths as long as practical. Offset end laps in adjacent widths to prevent continuous laps in either direction.
2. Supports for welded wire fabric shall be placed at 2'-0" maximum spacing.

D. Splices

1. Mechanical splices shall be used in lieu of lap splices where specifically detailed on Drawings.
2. Welded splices approved by Engineer may be used provided following conditions are met:
   a. Welders shall be AWS qualified.
   b. Welded splices to be in accordance with AWS D1.4.
   c. Contractor shall bear expense of hiring an independent testing agency (approved by Engineer) to inspect and verify quality of field welds.

3.4 Epoxy Coating Inspection and Repair

A. Uncoated ends of reinforcement must be coated at job site.

B. Repair is required of all visible damaged areas, if one percent or less of surface area of coating in any three (3) foot length of reinforcement is damaged. If more than one percent of surface area is damaged, reinforcement shall be replaced.

C. Repair damaged epoxy coating as Engineer directs. Repair shall be performed a minimum of 24 hours prior to concrete placement, unless Contractor submits Manufacturer's data indicating lesser curing time.

D. Repair of epoxy coating shall not be carried out when temperature of reinforcement or ambient air is 5 degrees C. or below, or when moisture is present.

E. Inspection and acceptance of epoxy coated reinforcement will be per CRSI Guidelines for Inspection and Acceptance of Epoxy-Coated Reinforcing Bars at the Job site.

3.5 Existing Reinforcement

A. Existing reinforcement and miscellaneous metal to remain shall be cleaned of rust and laitance to Near White Metal and field epoxy coated in accordance with epoxy coating Manufacturer's recommendations.

B. Loose reinforcement bars shall be secured by either tying to bonded reinforcement or drilling supplemental anchors and installing tie downs. Lead anchors are not permitted.

C. Field-applied epoxy cure time must be extended as directed by Engineer during cold weather application.
D. Field-applied epoxy must be properly cured in a non "tacky" condition prior to concrete placement.

E. Remove epoxy spillage from adjacent concrete surfaces.

END OF SECTION 03 2000
SECTION 04 0100 – MASONRY RESTORATION AND CLEANING

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

1.2 Work Included

A. The Work of this Section shall include providing all labor, materials, equipment, and supervision to rebuild and to clean, repair, and repoint the masonry walls as indicated on the Drawings.

1.3 Related Work

A. The following Work is related to this Section:

1. Joint Sealants Section 07 9200

1.4 Quality Control

A. All masonry work shall be performed by a mason experienced in the class of required work. Workmanship shall be of the highest quality.

1.5 Submittals

A. Submit for record Manufacturer’s Spec Data Sheets and Health and Safety Data Sheets for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with local, state, and federal environmental and worker’s safety laws and regulations.

B. Submit for record written program of procedures to be used in complying with this specification, including written description of cleaning methods, working pressures, materials and equipment proposed.

C. Submit for record disposal plan including location of acceptable disposal site; and detailed description of methods to be employed to control pollution.

1.6 Samples
A. Submit upon request for review and approval, samples of masonry units.

1.7 Transportation and Handling

A. Store masonry units on wood skids or pallets. Distribute weight of masonry units evenly to prevent breakage or cracking. Protect stored masonry units from weather with waterproof, non-staining covers or enclosures, but allowing for circulation of air.

B. Protect mortar materials and masonry accessories from weather, moisture and contamination with earth and other foreign materials.

1.8 Basis of Payment

A. All repair quantities shall be measured on a square foot (SF) or linear foot (LF) cost basis.

PART 2 - MATERIALS

2.1 Masonry

A. Reuse existing brick units and concrete masonry units which have been removed from the walls due to construction operations.

B. Whenever masonry units are not sufficient, either in supply or quality, Contractor shall furnish new masonry units matching existing.

2.2 Mortar and Grout

A. Mortar for masonry units, ASTM C270, non-staining and non-air entrained.

B. Material shall match existing color of mortar and grout. Color to be modified in accordance with manufacturer's recommendation.

2.3 Ties

A. Acceptable materials are:
   1. At concrete back-up, Dur-O-Wall Repair Anchor #5005554. At CMU back-up, Dur-O-Wall Repair Anchor #5005554.
   2. AA900 Retro Tie by AA Wire Products Company.
   3. or Approved Equivalent.
2.4 Cleaning Materials

A. Cleaning compounds shall not contain acids, nor cause scratching of surface, or staining.

PART 3 - EXECUTION

3.1 Inspection

A. Inspect area to receive the work and report immediately in writing to the Engineer, as required in the General Conditions, any unacceptable conditions. Do not proceed with work until unsatisfactory conditions have been corrected in an acceptable manner. Commencement of work implies acceptance of related work.

3.2 Preparation

A. Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site and surrounding buildings from injury resulting from masonry restoration work.

B. Erect additional temporary protection as required over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of masonry restoration work.

C. Remove all loose and unsound mortar and loose masonry units from existing walls.

3.3 Installation

A. Handle masonry units in a manner to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges of masonry with wood or other rigid materials.

B. Install ties at 16 inches maximum on center each way.

C. Cut all masonry units to provide accurate fit and to lie within plane of existing masonry. Material shall be full uniform thickness. Provide uniform distribution of size and shape of masonry units to match existing surface.

D. All masonry shall be set in full bed of mortar. If not thoroughly wet at a time of setting, drench or sponge masonry. Provide plastic setting buttons as required to prevent extrusion of mortar. Do not set additional courses until mortar in courses below is set sufficiently to maintain alignment and prevent extrusion.

E. The space between masonry and back-up shall be completely filled with mortar.
F. Rod the mortar and tap face of masonry to eliminate voids. Tool joints to match existing joints.

3.4 Repointing Existing Masonry

A. Joint Raking

1. Rake out mortar from joints to depths equal to their widths but not less than 1 inch nor less than that required to expose sound, unweathered mortar. Rake out the entire width of the joint.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum or flush joints to remove dirt and loose debris.

B. Joint Pointing

1. Rinse joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.
2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.
3. After joints have been filled to a uniform depth, place remaining pointing mortar in 3 layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in a damp condition for not less than 72 hours.
6. Where repointing work precedes cleaning of existing field stone walls allow mortar to harden not less than 30 days before beginning cleaning work.

3.5 Cold Weather Protection

A. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to touch.

B. Remove masonry units determined to be damaged by freezing conditions.

C. Perform the following construction procedures while work is progressing:

1. When air temperature is from 40 deg. F. to 32 deg. F., heat sand or mixing water to produce mortar temperatures between 40 deg. F. and 120 deg. F.
2. When air temperature is from 32 deg. F. to 25 deg. F., heat sand or water to produce mortar temperatures between 40 deg. F. and 120 deg. F.; maintain temperature of mortar on boards above freezing.
3. When air temperature is from 25 deg. F. to 20 deg. F., heat sand and mixing water to produce mortar temperatures between 40 deg. F. and 120 deg. F.; maintain temperature of mortar on boards above freezing; use other heat sources on both sides of walls under construction; use wind breaks when wind is in excess of 15 mph.

4. When air temperature is 20 deg. F. and below, heat sand and mixing water to produce mortar temperatures between 40 deg. F. and 120 deg. F.; provide enclosures and auxiliary heat to maintain air temperature above 32 deg. F.; do not lay units which have a surface temperature of 20 deg. F.

D. Protect partially completed masonry not being worked on and completed masonry as follows:

1. When mean daily air temperature is from 40 deg. F. to 32 deg. F., protect masonry work from rain or snow for at least 24 hours by covering with weather-resistive membrane.

2. When mean daily temperature is from 32 deg. F. to 25 deg. F., completely cover masonry work with weather-resistance membrane for at least 24 hours.

3. When mean daily air temperature is from 25 deg. F. to 20 deg. F., completely cover masonry work with insulating blankets or similar protection for at least 24 hours. When mean daily temperature is 20 deg. F. and below, maintain masonry temperature above 32 deg. F. for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps, or other acceptable methods.

E. Do not use frozen materials or materials mixed or coated with ice or frost. Do not use salt to thaw ice in anchor holes or slots. Do not lower the freezing point of mortar by use of admixtures or antifreeze agents, and do not use calcium chloride in mortar or grout.

3.6 Protection

A. During all seasons, protect partially completed stonework against weather when work is not in progress. Cover top of walls with strong waterproof, non-staining membrane extending at least 2 feet down both sides of walls and anchor securely in place.

3.7 Cleaning

A. Clean all masonry of stains, mortar, dirt, etc. Tools and cleaning material used shall not cause scratching of surface or staining. Cleaning compounds used shall not damage plantings.

B. Exposed surface of wall and mortar shall be cleaned by waterblasting.

C. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings and other surfaces which could be injured by such contact.

D. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
E. Dispose of run-off from cleaning operations by legal means and in a manner which prevent soil erosion, undermining of paving foundations, damage to landscaping, and water penetration into building interiors.

END OF SECTION 04 0100
SECTION 04 0513 – MASONRY MORTAR

PART 1 - GENERAL

1.1 Related Documents
   A. Conditions of Contract for Construction and General Requirements of Division 1 of these Specifications apply to Work in this Section.

1.2 Work Included
   A. Work of this Section includes furnishing all labor, materials, equipment and supervision to install mortar and grout for masonry walls.

1.3 Related Work
   A. Related Work specified elsewhere:
      1. Masonry Restoration and Cleaning Section 04 0100

1.4 Reference Standards
   A. Comply with following reference standards except where more stringent requirements are indicated on Drawings or as specified herein.
      1. American Concrete Institute
      2. National Concrete Masonry Association
         a. NCMA, Specifications for the Design and Construction of Load-Bearing Concrete Masonry
      3. Brick Institute of America
      4. American National Standards Institute, Inc.
      5. Portland Cement Association
         a. Concrete Masonry Handbook
      6. ASTM, American Society for Testing and Materials
1.5 Submittals
   A. For review and approval product data and design mixes for mortar and grout.
   B. Upon request, for review and approval grouting procedures including lift heights, and method of consolidation.

1.6 Samples
   A. Submit upon request for review and approval samples.

1.7 Transportation, Storage, and Handling
   A. Store materials off ground, under cover, and in a dry place.
   B. Protect packaged materials from freezing.

PART 2 - PRODUCTS

2.1 Mortar
   A. Mortar for masonry units - ASTM C 270, non-staining, Type S, compressive strength as indicated on Drawings.
   B. Colored Mortar Pigments shall be proportioned to achieve the approved mortar color, but not to exceed Manufacturer's recommended pigment to mortar ratio.
   C. Aggregates for masonry mortar - ASTM C 140.

2.2 Grout
   A. Masonry Grout - ASTM C 476, strength as indicated on Drawings.
   B. Aggregates for masonry grout ASTM C 404.

2.3 Cement
   A. Portland Cement - ASTM C 150, Type I
2.4 Aggregate

A. Aggregate for mortar - ASTM C 144
B. Aggregate for masonry grout - ASTM C 404

2.5 Water

A. Mixing water shall be potable - clean and free from oil, acids, alkali, or organic matter.

2.6 Admixtures

A. Compounds to lower freezing point of mortar, accelerators, or other admixtures are prohibited unless approved by Engineer.

PART 3 - EXECUTION

3.1 Inspection

A. Inspect area to receive Work and report immediately in writing to Engineer, as required in General Conditions, any unacceptable conditions. Do not proceed with Work until unsatisfactory conditions have been corrected in an acceptable manner. Commencement of Work implies acceptance of related Work.

3.2 Mixing

A. Mortar - ASTM C 270
   1. Mix all cementitious materials and sand in a mechanical batch mixer for 5 minutes minimum.
   2. Adjust consistency of mortar for workability.
   3. Use all mortar within 2-1/2 hours of initial mixing. Do not retemper mortar by adding water after it has begun to set or beyond 2-1/2 hour time limit.

B. Grout - ASTM C 476, ACI 530.1
   1. Adjust consistency of grout for workability.
2. Use fine grout in spaces with less than 2 inches in horizontal direction, unless otherwise approved by Engineer.

3. Use coarse grout in spaces 2 inches or more in least horizontal dimension, unless otherwise approved by Engineer.

4. Use grout within 1-1/2 hours of initial mixing. Do not retemper grout by adding water after the 1-1/2 hour time period has passed or it has begun to set.

END OF SECTION 04 0513
SECTION 07 1800 – TRAFFIC COATINGS

PART 1 - GENERAL

1.1 Related Documents

A. Conditions of Contract for Construction and General Requirements of Division 1 of these Specifications apply to Work in this Section.

1.2 Work Included

A. Work of this Section shall include furnishing all labor, materials, equipment and supervision to install a deck coating system, including surface preparation and crack and joint detailing.

B. Deck coating Installer shall be specifically responsible for providing all preparation Work and joint sealants specified in Section 07 9200, Joint Sealants.

1.3 Related Work

A. Following Work is related to this Section:
   1. Concrete Repair Section 03 0130
   2. Joint Sealants Section 07 9200
   3. Pavement Markings Section 32 1723

1.4 Quality Control

A. General
   1. Deck coating Installer shall be approved by deck coating Manufacturer.
   2. Installer shall have a minimum of five (5) years experience in application of one of the approved deck coating systems and have experience with five projects in size of 50,000 SF or greater.
   3. Installer and Manufacturer shall review slope of slabs and condition of surfaces prior to bidding.
   4. Manufacturer shall make available a qualified Manufacturer's Representative to assist the Installer and Engineer as specified herein. Representative shall be experienced in placement of deck coating systems. As a minimum, Representative shall be on site to review following procedures:
      a. Surface preparation and deck coating installation in trial area.
      b. Installation of deck coating from primer to top coat for first phase.
5. A preconstruction/preapplication meeting shall be held to discuss detailing, surface preparation, application techniques and procedures, phasing and scheduling. Foreman and lead laborer for Installer will be required to attend meeting along with Contractor, Manufacturer’s Representative and Engineer.

B. Testing Requirements
1. Installer shall check deck coating wet film thickness and record test results by taking five wet film readings within a 1 SF area. Wet film thickness testing shall be completed a minimum of once per every 5,000 SF of deck coating placed or per individual section placed per day. Average film thickness shall be at or above wet film thickness equivalent of specified dry film thickness.
2. Manufacturer and Installer in presence of Engineer shall perform adhesive pull-off strength testing on base membrane and completed system in accordance with ASTM D 4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers. Testing is to be performed every 50,000 SF. For each 50,000 SF area, three tests shall be taken in a single 100 SF area. This testing can be performed in conjunction with dry film thickness testing. All test results shall be greater than 100 psi.
3. If thickness and pull-off strength testing do not meet above requirements, corrective action will be required and more frequent testing will be required on remainder of project as directed by Engineer.
4. Test damage is to be repaired by Installer per Manufacturer’s recommendations.

C. Submit copy of drawings (11x17 inches) identifying current quantities with each payment request. The quantity for the given pay request shall be distinguishable from previous payment requests. Work being invoiced must be properly identified. These drawings shall be incorporated into record set required per Division 1.

1.5 Submittals
A. Action Submittals
1. System Description: Submit complete description of proposed traffic coating system including materials, surface preparation, joint treatments, terminations, and cure times. Include aggregate materials and repair materials for pitting, bug holes, popouts, and shallow scaling.
2. Product Data: For each type of product, including installation instructions.
   a. Traffic Coating System
   b. Substrate Repair Material
   c. Primer
   d. Base Coat
   e. Intermediate Coat (grit coat)
   f. Top Coat
   g. Aggregate
3. Shop Drawings: For traffic coatings.
   a. Include details for treating substrate joints and cracks, flashings, deck penetrations, and other termination conditions.
b. Include proposed plan for grid layout to install each coat. Include quantities of materials, square footages, and yield calculations.
c. Include proposed location of mockup area.

4. Color: Submit Manufacturer’s standard color chart.
5. Sample Warranty: Submit sample warranty for approval prior to application.
6. Samples for Verification: For each type of exposed finish, prepared on rigid backing.
   a. Provide stepped Samples on backing to illustrate buildup of traffic coatings. Samples shall be representative of color, thickness, and surface texture.

B. Informational Submittals

1. Qualification Data:
   a. For Installer including projects, size, location, owner, and contact, engineer/architect and contact for projects that traffic coating system has been applied.
   b. Certification that Manufacturer has approved Installer.
   c. For Manufacturer’s Representative.
2. Certificates: For each type of traffic coating.
   a. Certification of Manufacturer’s approval of surface preparation.
   b. Certification of Manufacturer’s approval of mockup area.
   c. Certification of Manufacturer’s project review and that traffic coating installation is in accordance with written recommendations.
3. Field quality-control reports:
   a. Results of slab moisture testing completed in accordance with ASTM D 4263 Standard Test Method for Indicating Moisture in Concrete by Plastic Sheet Method.
   b. Results of wet film thickness testing and adhesive testing. Include date, weather, and other pertinent information.
4. Applicator’s Manual: For each type of traffic coating.
5. Material Safety Data Sheets: For each product, solvent, or related chemicals to be used and certification that materials conform to local, state, and federal environmental and worker’s safety laws and regulations.
6. Maintenance Data: Manufacturer’s “Snow Removal Guideline” stating procedures the City is to follow during snow removal from traffic coated slabs.
7. Copies of purchase order and invoices indicating quantities and dates of material purchased.

1.6 Environmental Requirements

A. Manufacturer and Installer are required to confirm that all deck coating materials used in accordance with this Section conform to local, state, and federal environmental and workers’ safety laws and regulations.

1. VOC content of materials shall not exceed limits per Environmental Protection Agency Natural Volatile Organic Compound Emission Standards for Architectural Coatings (40CFR59).
B. Installer is solely responsible for fume control and shall take all necessary precautions against injury to personnel or adjacent building occupants during application. As a minimum, Installer shall take the following precautions:
1. Provide and maintain barricades.
2. Locate and protect building air intakes during application.
3. Follow all state, federal, and local safety regulations.
4. Follow all Manufacturers' safety requirements.
5. Dispose empty containers immediately and properly.
6. Use protective equipment.
7. Ensure Work area is well vented to outside.

C. Deck coating shall be installed between 6:00 p.m. and 6:00 a.m. on weekdays and anytime during weekends.

1.7 Transportation and Handling

A. Deliver all materials to site in original, unopened containers, bearing following information:
   1. Name of product
   2. Name of Manufacturer
   3. Date of Manufacturer
   4. Lot or batch number
   5. UL Labels

B. Store materials under cover, protected from weather, within Manufacturer's recommended temperatures ranges.

C. Replace containers or materials showing any signs of damage with new material at no additional cost to Owner.

D. At no time shall weight of stored material placed on a slab area exceed 30 PSF or 2,000 lbs. over 20 square inches.

1.8 Warranty

A. Provide to Owner a Warranty by Installer and Manufacturer that deck coating system will be free of defects, water penetration, and chemical damage related to system design, workmanship or material deficiency, consisting of, but not limited to:
   1. Surface crazing of other weathering deficiency (including ultraviolet light exposure).
   2. Abrasion or tear failure resulting from normal traffic use.
   3. Tear failure resulting from new or existing cracks in substrate not exceeding 1/16 inch in width.
   4. Debonding from substrate or delaminating between layers.
   5. Defective installation.
   6. Debonding or damage of repair material used for filling in pitting, bug holes, popouts, and shallow scaling with concrete or deck coating material.
B. Installer and Manufacturer will warrant and provide at no charge to Owner materials and labor needed to properly repair or replace product and replace parking stripes within duration of Warranty. In event of either party's non-performance, full burden and responsibility for any Warranty repair shall fall upon remaining party.

C. Vandalism, abrasive maintenance equipment, and construction traffic are not normal traffic use and are exempt from Warranty.

D. Normal traffic is considered to include mechanical floor sweepers and bus traffic as described in National Parking Association publication, "Parking Garage Maintenance Manual".

E. New concrete may experience shrinkage. Installer shall provide system suitable for such application. Warranty shall cover deck coating damage due to new concrete slab cracking not exceeding 1/16 inch.

1.9 Warranty Duration

A. Bid price shall include a five (5) year Warranty commencing with date of Substantial Completion.

B. Although completed areas of facility may be reopened to traffic and parking, commencement of Warranty period will not occur prior to Substantial Completion.

C. A single Warranty commencement date will apply to all waterproofing.

D. Warranty shall include a transfer clause that allows Warranty to be transferred to a new Owner upon sale of property within Warranty period.

1.10 Basis of Payment

A. Removing the Existing Coating will be paid on a square foot (SF) unit price basis.

B. Deck Coating preparation and applications will be paid on a square foot (SF) unit price basis.

PART 2 - PRODUCTS

2.1 Deck Coating - General

A. Deck coating system shall be a fluid applied, waterproof, traffic bearing elastomeric membrane capable of preventing penetration of concrete by water, gasoline, oils, greases, salts, deicer chemicals, battery acids and radiator coolants.

B. Color of deck coating shall be gray with Owner selecting shade of gray from standard color chart submittal.
C. Material to fill in pitting, bug holes, popouts, and shallow scaling shall be in accordance with Manufacturer's written recommendations.

D. Same Manufacturer's deck coating system shall be used throughout.

E. Deck coating thicknesses specified herein are minimum dry film thicknesses and do not include the aggregate. Specified thicknesses may vary from Manufacturer's literature. A coat may have to be installed in more than one layer to achieve minimum thickness or on ramps a slope grade version of deck coating material shall be used. Install each coat in accordance with Manufacturer's recommended yield for required thickness.

F. Thinner or solvent shall not be added to deck coating materials.

G. All deck coating shall utilize a UV stable topcoat.

H. Top coat shall be seeded with aggregate and back rolled.

2.2 Deck Coating System (Solvent Free System)

A. Provide a heavy duty deck coating system as indicated on Drawings.

B. Approved heavy duty epoxy solvent free deck coating systems are:

1. Iso-Flex 760 EU HL (extreme duty), LymTal International, Inc., Orion, MI. Primer, base coat at 25 mils, epoxy grit coat at 25 mils, and a top coat at 18 mils
2. Auto-Gard E Severe Duty, Neogard Corp., Dallas, TX. Primer, epoxy grit coat at 25 mils, and a top coat at 18 mils.
5. Flexdeck System, RPM Company, Cleveland, OH. Primer, epoxy grit coat at 25 mils, and top coat at 18 mils.

2.3 Deck Coating Aggregate

A. Approved aggregates for heavy duty deck coating systems shall be a size of 12/20 and approved by coating manufacturer.

B. Top coat thickness shall meet or exceed thickness specified as recommended by manufacturer.
PART 3 - EXECUTION

3.1 General

A. Inspect surfaces to receive Work and report immediately in writing to Engineer as required in General Conditions any deficiencies in surface which render it unsuitable for proper execution of this Work. Do not proceed with Work until unsatisfactory conditions have been corrected in an acceptable manner in accordance with Engineer.

B. Coordinate and verify that related Work meets following requirements:
   1. Concrete surfaces are finished, cleaned and prepped, and have completed required curing period.
   2. Previous surface treatments have been removed or are compatible with the systems to be installed.
   3. Systems selected for use are compatible with each other.
   4. All concrete repairs are completed.
   5. Sealant installation may occur several months prior to deck coating. Installer to repair damaged or defective sealants prior to deck coating installation.

3.2 Preparation

A. Remove all oil, grease spots, and contaminates in accordance with Manufacturer's recommendations.

B. Remove all existing striping.

C. Shotblast all concrete surfaces to receive deck coating. Shotblast equipment performance requirements are as follows:
   1. Equipment shall be capable of traveling at a constant speed to provide uniform profile. Speed and size of equipment and size of steel shot shall be selected to provide desired preparation without causing unnecessary damage to concrete surface.
   2. Equipment shall vacuum up, or otherwise retain all dirt, dust, and debris from blasting operation.
   3. Areas inaccessible to shotblaster (i.e. vertical surfaces, against walls, columns, stairways, etc.) are to be abrasive blasted or abraded to same performance.
   4. Remove debris immediately after surface preparation. Debris includes, but is not limited to, shot, aggregate and dust. Debris shall be placed in a covered dumpster or a covered area where it will not be rebroadcast by wind or weather.

D. Metal surfaces that are to be deck coated shall be abrasive blasted to near white metal, SSPC SP10 in accordance with Steel Structures Painting Council Painting Manual. Rust inhibitive primer shall be installed in accordance with Manufacturer's recommendations within 8 hours of abrasive blasting.
E. Rout and seal cracks greater than 20 mils in accordance with Section 07 9200, Joint Sealants or as required by the Manufacturer. Cracks, coves, terminations and all unusual situations shall be detailed per Manufacturer's recommendations.

F. Installer shall be responsible for repair or replacement of all materials damaged by surface preparation operations.

G. Surfaces shall be air blown with sufficient pressure to remove excess dirt, dust and debris, and to assure that concrete is clean prior to application of deck coating.

H. After shotblasting and abrasive blasting and prior to first coat of deck coating, pitting, bug holes, popouts, and shallow scaling shall be prepared in accordance with Manufacturer's recommendations. As a minimum, a thin epoxy mortar shall be used to fill voids.
   1. Grind surfaces, removing high amplitude areas.
   2. Fill low areas with a squeegee applied thin layer of epoxy loaded with silica flour (or equivalent); or a squeegee applied firm urethane membrane loaded with aggregate. All materials are to be compatible with total system, and are to be recommended/approved by coating Manufacturer.
   3. Installer to certify that surface preparation will not impact five (5) year Warranty provided by Manufacturer, and Installer.

3.3 Installation/Application

A. Do all Work in strict accordance with Manufacturer’s written instructions and specifications and as indicated herein.

B. Do not apply deck coating materials until concrete has been air dried at temperatures at or above 40 degrees F. for at least 28 days after curing period specified in Section 03 0130, Concrete Repair, or as otherwise approved by Manufacturer.

C. Concrete shall be dry prior to application of deck coating. Installer shall perform slab moisture testing in accordance with ASTM D 4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method. Testing must be performed in at least 1 location for every 10,000SF of coating. Use of heat lamps for performing tests may be required in areas not exposed to sunlight.

D. Do not apply deck coating material until concrete and air temperature is at or above 40 degrees F. Provide appropriate enclosures and necessary heating for application. Air temperatures directly below and above the slab being coated must be maintained at a minimum of 45 degrees F up to 48 hours prior to coating and at 45 degrees F for a minimum of 72 hours after coating, or as required for full curing of material. Provide high/low thermometers within Work area. As a minimum, provide two thermometers directly below slab and two directly above slab being coated.

E. All deck coating shall maintain straight edges at terminations.
F. Surfaces to be deck coated shall be divided into areas in accordance with the Manufacturer's recommended yield for the specified thickness and for specific container size of material. Area is to be divided by keel marks, or another Engineer approved method.

G. All sealants to be provided adequate cure time, minimum 8 hours, to be tack free prior to deck coating. All construction joints, control joints, joints at perimeter of patches, cold joints and cracks (sealed and unsealed) shall receive a detail coat, minimum of 4 inches wide. Detail coat shall be same thickness as base coat unless Manufacturer's requirements are stricter. Detail coat shall cure a minimum of 12 hours prior to base coating.

H. Extend deck coating up vertical surfaces as indicated on Drawings.

I. Incorporate aggregate until refusal. Aggregate until refusal will result in a surface that is tan in color. Additional aggregate may have to be added after first pass. Seed topcoat with aggregate and backroll.

J. Complete all Work under this Section before painting line stripes.

3.4 Damage and Repairs

A. Any necessary repairs for deck coating resulting from dry film testing are to be repaired by Installer.

B. Pinholing of deck coating will be cause for rejection. Installer shall repair and take necessary steps to prevent pinholing to occur at no additional expense to Owner.

3.5 Cleanup

A. Remove all excess primer, sealant, deck coating, and masking materials from structure.

END OF SECTION 07 1800
SECTION 07 9200 – JOINT SEALANTS

PART 1 - GENERAL

1.1 Related Documents
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

1.2 Work Included
A. Work of this Section shall include furnishing all labor, materials, equipment, and supervision to install joint sealants, including surface preparation.
B. Work included by joint sealant Installer shall include deck coatings specified in Section 07 1800, Traffic Coatings.

1.3 Related Work
A. Following Work is related to this Section:
   1. Concrete Repair Section 03 0130
   2. Traffic Coatings Section 07 1800
   3. Expansion Joint Sealant Systems Section 07 9500
   4. Pavement Markings Section 32 1723

1.4 Quality Control
A. General
   1. Joint sealant Installer shall be approved by joint sealant Manufacturer.
   2. Joint sealant Installer shall have a minimum of five (5) years experience in application of one of approved joint sealant systems and have experience for a project in size of 5,000 LF or greater.
   3. Manufacturer shall make available a qualified Representative to assist Installer and Engineer as specified herein. Representative shall be experienced in placement of sealant material.
B. Testing Requirements
   1. Installer to perform adhesion test in presence of Engineer at rate of one test per 1,000 lineal feet of joint. Adhesion test to be performed a minimum of 7 days after installation. Procedure per Manufacturer’s standard or as follows:
      a. Make a knife cut from one side of joint to other.
b. Make two cuts approximately two inches long at sides of joint, meeting first cut at top of two-inch cuts.

c. Grasp two-inch piece of sealant and try to pull uncut sealant out of joint.

d. If adhesion is adequate, sealant should tear cohesively in itself or be very difficult to adhesively remove from surface.

e. Sealant shall be replaced by applying more sealant in same manner as original.

2. If test results are unsatisfactory, more frequent testing will be required until satisfactory results are consistently obtained.

3. Replace all sealant which proves defective per above test at no additional cost to Owner.

1.5 Submittals

A. Action Submittals:
   1. Manufacturer’s Spec Data Sheets of each product to be used.
   2. Samples of joint sealants, including color(s). Samples may also be requested for chemical analysis.
   3. Complete description of the joint sealant system including primer, sealant material, and backer rods or bond breakers. Also indicate placement and installation procedures along with material working requirements, shelf life, and performance data.
   4. Qualifications of Manufacturer’s representative.
   5. Qualification statement of Installer stating projects, size and location.
   6. Sample Warranty prior to application.

B. Informational Submittals:
   1. Sequence of sealant placement in structure. The sealant installation shall be coordinated to allow required minimum concrete cure times.
   2. Material Safety Data Sheets of each product, solvent, or related chemicals to be used and certification that materials conform to local, state and federal environmental and worker’s safety laws and regulations.

1.6 Samples

A. Submit for review and approval, samples of joint sealants, including color(s). Samples may also be requested for chemical analysis.

1.7 Environmental Requirements

A. Manufacturer and Installer are required to confirm that all materials used in accordance with this Section conform to local, state, and federal environmental and workers’ safety laws and regulations.

   1. VOC content of materials shall not exceed the limits per Environmental Protection Agency National Volatile Organic Compound Emission Standards for Architectural Coatings (40CFR59).
1.8 Transportation and Handling

A. Deliver all materials to site in original, unopened containers, bearing following information:
   1. Name of product
   2. Name of Manufacturer
   3. Date of manufacture
   4. Lot or batch number
   5. UL labels

B. Store materials under cover and protected from weather, within Manufacturer's recommended temperature ranges.

C. Replace packages or materials indicating any signs of damage with new material at no additional cost to Owner.

D. At no time shall the weight of stored material placed on a slab area exceed 30 PSF or 2,000 lbs. over 20 square inches.

1.9 Warranty

A. Provide to Owner a Warranty by Installer and Manufacturer that joint sealant system will be free of defects, water penetration, and chemical damage related to design, workmanship, or material deficiency, consisting of, but not limited to:
   1. Surface crazing or other weathering deficiency.
   2. Abrasion or tear failure resulting from normal traffic use.
   3. Tear failure resulting from anticipated movement.
   4. Debonding from substrate or delaminating between layers.
   5. Defective installation.

B. Installer and Manufacturer will warrant and provide at no charge to Owner materials and labor needed to properly repair or replace product within duration of Warranty. In event of either party's non-performance, full burden and responsibility for any Warranty repair shall fall upon remaining party.

C. Normal traffic is considered to include snow removal equipment with rubber tipped blades as described in the National Parking Association publication, Parking Garage Maintenance Manual.

D. Vandalism, abrasive maintenance equipment, and construction traffic are not normal traffic use and are exempt from Warranty.

1.10 Warranty Duration

A. Bid price shall include a five (5) year Warranty commencing with date of Substantial Completion.
B. Although completed areas of facility may be opened to traffic and parking, commencement of Warranty period will not occur prior to acceptance of entire project.

C. A single Warranty commencement date will apply to all waterproofing.

D. Warranty shall include a transfer clause that allows Warranty to be transferred to a new Owner upon sale of property within Warranty period.

1.11 Basis of Payment

A. Construction joint sealants, cove joint sealants, vertical joint sealants, and crack sealants will be paid on a linear foot (LF) basis.

B. Joint widening or other necessary modifications shall be incidental to system cost.

PART 2 - PRODUCTS

2.1 Joint Sealant System - Polyurethane

A. Horizontal Joint Sealant (except cove joints)
   1. Traffic-bearing, multi-component, self-leveling or non-sag unmodified polyurethane sealant, gray in color unless noted otherwise, containing no coal tar, asphalt, or other adulterants and conforming to ASTM C 920, Standard Specification for Elastomeric Joint Sealants, Type M, Grade P or NS, Class 25, use T and Federal Specification TT-S-00227, Type I or II, Class A.
   2. On slopes greater than 2%, slope grade versions of specified self-leveling sealants or non-sag sealants, as specified for vertical and cove joint sealants, are to be used per Manufacturer’s recommendations.
   3. Approved Horizontal Joint Sealants are:
      a. Iso-Flex 880GB or 881, LymTal International, Inc., Orion, MI.
      b. Urexpan NR-200 or Dynatred, Pecora Corp., Harleysville, PA.
      c. Sikafoex - 2c NS/SL, Sika Corp., Lyndhurst, NJ.
      d. MasterSeal SL2, Sonneborn Building Products, BASF Building Systems, Shakopee, MN.
      e. THC-901, Tremco Inc., Cleveland, OH.
      f. Vulkem 445SSL, Tremco Inc., Cleveland, OH.

B. Cove Joint Sealants
   1. Multi-component, non-sag unmodified polyurethane sealant, gray in color unless otherwise noted, containing no coal tar, asphalt, or other adulterants and conforming to ASTM C 920, Type M, Grade NS, Class 25, use NT and Federal Specification TT-S-00227E, Type II, Class A.
   2. Approved Vertical and Cove Joint Sealants are:
b. Dynatrol II, Pecora Corp., Harleysville, PA.
c. Sikaflex - 2c NS, Sika Corp., Lyndhurst, NJ.
d. MasterSeal NPZ, Sonneborn Building Products, BASF Building Systems, Shakopee, MN.
e. Dymeric 240 FC, Tremco Inc., Cleveland, OH.

2.2 Joint Sealant System – Silicone, Masonry

A. Joint sealant for masonry.

1. Exterior one part moisture-curing silicone sealant.
2. Approved Silicone Sealants are:
   a. Dow Corning 790, Dow Corning Corp., Midland, MI.
   b. Spectrum 1, Tremco Inc. Cleveland, OH.
   c. Sikasil WS-295, Sika Corp, Lyndhurst, NJ
   d. Pecora 864 NST, Pecora Corp., Harleysville, PA.

3. Supply sealant in sausage tubes only.
4. Submit manufacturer’s standard colors to Owner for selection Submit manufacturer’s standard colors for Owner selection.
5. Use primer as recommended by manufacturer.

2.3 Backer Rod

A. Backer rod diameter shall be as recommended by Manufacturer for joint sizes indicated on Drawings.

B. Backer rod shall be extruded round, closed cell or bi-cellular, low-density polyethylene or polyolefin foam material with a skin-like outer texture.

C. Approved closed cell backer rods are:

1. Mile High Foam Backer Rod, Backer Rod Manufacturing, Inc., Denver, CO.
2. ITP Standard Backer Rod Insulation, Industrial Thermo Polymers Limited, Buffalo, NY.
3. HBR, Nomaco, Inc., Zebulon, NC.
4. MasterSeal 920 Closed-Cell Backer-Rod, BASF Building Systems, Shakopee, MN.

D. Approved bi-cellular backer rods are:

1. ITP Soft-Type Backer Rod, Industrial Thermo Polymers Limited, Buffalo, NY.
2. SOF Rod, Nomaco, Inc., Zebulon, NC.
PART 3 - EXECUTION

3.1 Inspection

A. Inspect surfaces to receive Work and report immediately in writing to Engineer as required in General Conditions any deficiencies in surface which render it unsuitable for proper execution of this Work. Do not proceed with Work until unsatisfactory conditions have been corrected in an acceptable manner. Commencement of Work implies acceptance of related Work.

3.2 General

A. Coordinate and verify that related Work meets following requirements.
   1. Concrete surfaces are finished, cleaned and prepped, as specified by Manufacturer for system to be installed.
   2. Curing compounds used on concrete surfaces are compatible with Work to be installed.
   3. Systems selected for use are compatible with each other.

B. Installer shall take necessary precautions against injury to personnel or adjacent building occupants during installation of joint sealants. Installer personnel shall use protective equipment and area shall be well vented to outside.

3.3 Preparation

A. Grind joint edges smooth and straight prior to installation.

B. All surfaces that are to receive joint sealant shall be dry and thoroughly cleaned by mechanical means of all loose particles, existing joint sealant, laitance, dirt, dust, oil, grease or other foreign matter. Mechanical methods, such as grinding or sandblasting, shall be used to clean joint surfaces to sound, virgin concrete.

C. Check preparation of substrate to ensure adhesion of joint sealant.

D. Correct unsatisfactory conditions in a manner acceptable to Manufacturer and Engineer before installation of joint sealant system.

E. Rout cracks with a grinding tool to produce the profile indicated on Drawings. Crack must be centered in the routed notch.

3.4 Installation/Application

A. Do all Work in strict accordance with Manufacturer’s written instructions and specifications and as indicated on Drawings.
B. Do not apply joint sealant system until concrete has been air dried at temperatures at or above 40 degrees F. for at least 28 days after curing period specified in Section 03 0130, Concrete Repair, or as otherwise approved by Manufacturer.

C. Install bond breaker or backer rod as indicated on Drawings.

D. Prime all joints and cracks.

E. Completely fill joint with sealant, without sagging or smearing onto adjacent surfaces.

F. In areas not receiving deck coating, fill horizontal joints and cracks until slightly recessed to avoid direct contact with wheel traffic.

G. Cease installation under adverse weather conditions, or when temperatures are below 40 degrees F or below or above Manufacturer’s recommended limitations.

H. Protect joint sealant as required until sealant is fully cured.

3.5 Cleanup

A. Remove all excess primer, sealant, and masking materials from structure.
SECTION 07 9500 – EXPANSION JOINT SEALANT SYSTEMS

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

1.2 Work Included

A. Work of this Section shall include furnishing all labor, materials, equipment, and supervision to install expansion joint systems.

1.3 Related Work

A. Following Work is related to this Section:

1. Concrete Repair Section 03 0130
2. Traffic Coatings Section 07 1800
3. Joint Sealants Section 07 9200

1.4 Quality Control

A. General

1. Expansion joint system Installer shall be approved by expansion joint Manufacturer. Installer shall be a licensed Installer, factory trained and certified in proper installation.
2. Installer shall have a minimum of five (5) years experience in application of one of approved expansion joint systems and have experience for a project in size of 600 LF or greater.
3. Manufacturer shall make available a qualified Manufacturer’s Representative to assist the Installer and Engineer. Representative shall be experienced in installation of their system. As a minimum, Representative shall be on site to review following:
   a. Trial area preparation and expansion joint installation.
4. Existing expansion joints shall be repaired in accordance with the Drawings and Manufacturer’s recommendations. The new materials to be used shall be compatible with existing and approved by the Manufacturer.
5. Installer and Manufacturer shall periodically review size and quality of expansion joint blockouts during concrete construction. Contractor shall be promptly notified of any noted deficiencies and shall correct prior to expansion joint installation.

6. A preconstruction/pre installation meeting shall be held to discuss blockout detailing, gap widths, application techniques and procedures, phasing, and scheduling. Foreman and lead laborer for Installer shall be required to attend meeting along with Contractor, Concrete Subcontractor, Manufacturer’s Representative and Engineer.

1.5 Submittals

A. For review and approval Manufacturer’s Spec Data Sheets of each product to be used.

B. For record Material Safety Data Sheets of each product, solvent, or related chemicals to be used, and certification that materials conform to local, state, and federal environmental and worker's safety laws and regulations.

C. For review and approval upon request qualifications of Manufacturer’s Representative.

D. For record complete description of expansion joint sealant system along with pertinent test and design data.

E. For review and approval shop drawings of joint system general layout, required dimensions (including blockout) and tolerances for installation and details indicating end conditions and procedures around columns, up curbs, and any other unusual conditions.

F. For record temperature vs. joint width installation chart.

G. For record Manufacturer’s written certification of expansion joint trial area acceptance.

H. For record a preventive maintenance guideline for parking structure expansion joints.

I. For record “Snow Removal Guidelines” stating procedures Owner is to follow during snow removal over expansion joints.

J. For review and approval prior to installation proposed Warranty.

1.6 Samples

A. For review and approval upon request samples of expansion joint systems.

1.7 Environmental Requirements

A. Manufacturer and Installer are required to confirm that all materials used in accordance with this Section conform to local, state, and federal environmental and workers' safety laws and regulations.
1.8 Transportation and Handling

A. Deliver all materials to site in original, unopened containers, bearing following information:

1. Name of product
2. Name of Manufacturer
3. Date of manufacture
4. Lot or batch number
5. UL labels

B. Store materials under cover and protected from weather, within Manufacturer’s recommended temperature ranges, as a minimum above 40 degrees F.

C. Replace packages or materials indicating any signs of damage with new material at no additional cost to Owner.

D. At no time shall weight of stored material placed on a slab area exceed design loads.

1.9 Warranty

A. Provide to Owner a Warranty from Installer and Manufacturer that expansion joint system will be free of leaks and defects related to design, workmanship, or material deficiency for duration of Warranty.

B. Installer and Manufacturer will warrant and provide at no charge to Owner materials and labor needed to properly repair or replace product within duration of Warranty. In event of either party’s non-performance, full burden and responsibility for any Warranty repair shall fall upon remaining party.

C. Vandalism, abrasive maintenance equipment, and construction traffic are not normal traffic use and are exempt from Warranty.

D. Normal traffic is considered to include snow removal equipment with rubber-tipped blades as described in the National Parking Association publication, "Parking Garage Maintenance Manual."

1.10 Warranty Duration

A. Bid price shall include a five (5) year Warranty commencing with date of Substantial Completion.

B. Although completed areas of facility may be opened to traffic and parking, commencement of Warranty period will not occur prior to acceptance of entire project.

C. A single Warranty commencement date will apply to all waterproofing.
D. Warranty shall include a transfer clause that allows Warranty to be transferred to a new Owner upon sale of property within Warranty period.

1.11 Basis of Payment

A. Expansion joint preparation and installation will be paid on a linear foot (LF), unit price basis.
B. Joint widening, filler material or other necessary modifications shall be incidental to system cost.

PART 2 - PRODUCTS

2.1 Expansion Joints – General

A. All expansion joint systems and glands to accept pedestrian traffic shall comply with Americans with Disabilities Act guidelines.
B. For each type of expansion joint, the same Manufacturer’s system shall be used throughout.
C. Design of expansion joint system shall be for a maximum ambient temperature range of –30 degrees F to +120 degrees F.

2.2 Expansion Joint System – Preformed Expanding Foam

A. Expanding foam sealant to consist of laminations of acrylic impregnated expanding foam sealant and closed cell polyurethane foam with one sided mounting adhesive.
B. Exterior coating, if applicable, of factory applied and cured silicone sealant at a width in excess of maximum anticipated joint size.
C. Joint system shall be supplied precompressed to less than joint size at mean temperature.
D. Color, if applicable, will be selected from color chart supplied by Manufacturer.
E. Depth of joint sealant to be as recommended by Manufacturer.
F. Approved Preformed Expanding Foam Expansion Joint Systems with Factored Applied Silicone Sealant (+/- 50% movement) Above Grade Applications are:

1. Horizontal Colorseal, Emseal Joint Systems, LTD., Westborough, MA.
3. EIS Series Foam System, MM Systems Corp., Pendergrass, GA.
5. Wabo HSeal, Watson Bowman Acme Corp., Amherst, NY.
8. Iso-Flex Precom C Type II, LymTal International, Inc., Orion, MI.
9. JointMaster 1175 Series, Inpro Corp., Muskego, WI.
10. JointMaster 1200 Series, Inpro Corp., Muskego, WI.
11. Or Approved Equivalent.

PART 3 - EXECUTION

3.1 General

A. Inspect surfaces to receive Work and report immediately in writing to Engineer as required in General Conditions any deficiencies in surface which render it unsuitable for proper execution of this Work. Do not proceed with Work until unsatisfactory conditions have been corrected in an acceptable manner. Commencement of Work implies acceptance of related Work.

B. Verify following requirements.

1. Concrete surfaces are finished, cleaned, and prepared, as specified by Manufacturer.
2. Curing compounds used are compatible or have been removed.
3. Concrete surfaces have completed proper curing period.
4. Systems are compatible with each other.

C. Installer shall take necessary precautions to protect building occupants during installation.

D. Installer personnel shall use protective equipment and area shall be well vented to outside.

E. Prior to ordering material, Contractor shall remove existing joint system to measure size of gap and review this information with Manufacturer and Engineer to determine the proper gland size. Joints shall be temporarily covered if located in pedestrian area until new system is installed.

3.2 Preparation

A. Contractor shall provide a properly formed, solid, straight, parallel concrete blockout per Manufacturer’s requirements and as indicated on Drawings.

B. Grind joint edges smooth and straight prior to installation.

C. Abrasive blast expansion joint blockout to receive bonded nosing material. Remove all contaminates, including laitance. Expose fine aggregate, however, do not expose coarse aggregate.

D. All surfaces shall be dry and thoroughly cleaned of all loose particles, laitance, dirt, dust, oil, grease, or other foreign matter.
E. Expansion joint blockouts requiring widening or other necessary modifications shall be incidental to system cost.

F. Actual field conditions of existing expansion joint blockouts may be deeper and wider than proposed new expansion joint system as detailed on Drawings. Contact Engineer prior to ordering materials about any discrepancies.

3.3 Installation

A. Do all Work in strict accordance with Manufacturer's written instructions and specifications and as indicated on Drawings.

B. Do not install expansion joint systems until concrete has been air dried at temperatures at or above 45 degrees F. for at least 28 days after the curing period specified in Section 03 0130, Concrete Repair, or as otherwise acceptable by Manufacturer. Blockouts requiring use of patching compounds must be cured for seventy-two hours prior to installation.

C. Cease installation of expansion joints under adverse weather conditions, or when temperatures are below or above Manufacturer's recommended limitations for installation.

D. Mask adjacent concrete and gland surfaces to provide neat, workmanlike appearance.

E. Membrane seal or gland shall be unpacked and laid in a relaxed position to relieve any temporary coiling from shipment prior to installation.

F. Ambient temperatures shall not be lower than 40 degrees F during installation.

G. All terminations of joints shall have a minimum upturn of six inches.

3.4 Cleanup

A. Remove all excess primer, nosing material, and masking materials, and dispose of in a proper manner.

END OF SECTION 07 9500
SECTION 22 1400 – STORM DRAINAGE

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

1.2 Work Included

A. The Work of this Section shall include furnishing all permits, labor, materials, fabrication and installation of the supplementary storm drain system and the replacement of the existing floor drains as indicated on the Drawings.

1.3 Related Work

A. Related Work specified elsewhere:

1. Selective Demolition Section 02 4119
2. Concrete Repair Section 03 0130
3. Traffic Coatings Section 07 1800
4. Joint Sealants Section 07 9200

1.4 Reference Standards

A. Comply with the following reference standards except where more stringent requirements are indicated on the Drawings or specified herein:

1. American Society of Mechanical Engineers (ASME)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)

B. Contractor will be held responsible to complete all work necessary to meet the building codes. Should any change in the Drawings and Specifications be required to comply, notify the Engineer.

1.5 Quality Control

A. Test the storm drain system under normal conditions of use per the requirements of the authorities having jurisdiction.
B. Provide all instruments for making the tests.

C. Test all parts of the system in the presence of the General Contractor and Engineer, for a sufficient period of time to permit a complete examination and inspection.

D. Remedy all defects in materials or workmanship which appear during the test and retest the system.

1.6 Submittals

A. Submit for record Manufacturer’s Spec. Data Sheets.

B. Submit for record schedule of operations.

C. Submit for review and approval shop drawings for the following:
   1. Floor drains
   2. Cleanouts
   3. Plumbing line layout
   4. Plumbing line supports
   5. Pipes

D. Prepare and submit plan drawing for record indicating location of ponding and condition of each existing floor drain.

E. Submit for record results of storm drain system testing.

1.7 Transportation and Handling

A. Deliver materials to the project in good condition. Store materials off the ground and protected from vandalism.

1.8 Basis of Payment

A. Pay unit for cleaning and testing the floor drains is (LS).

B. Pay unit for supplementary floor drains is each (EA.). The demolition and patching of the concrete shall be included in the cost.

C. Pay unit for replacing the existing floor drains is each (EA.). The demolition and patching of the concrete shall be included in the cost.

D. Pay unit for piping is lineal feet (L.F.) and shall include all miscellaneous hardware and hangers.
E. Pay unit for large pipe is lump sum (LS), and shall include all miscellaneous hardware, shoring, bracing, seals, and any other requirement to replace the broken pipe.

F. No extra compensation will be allowed because of differences between actual measurements and dimensions indicated on the Drawings.

PART 2 - PRODUCTS

2.1 Pipe

A. Cast iron pipe: No-hub or Service weight bell and spigot type to match existing, ASTM A74, 3-inch minimum inside diameter or as indicated on the Drawings.

B. Large Diameter Pipe: Repair is to replace the existing with equivalent new pipe, with equivalent paint protection.

2.2 Floor drains

A. Acceptable heavy duty materials are:
   1. 2320, Jay R. Smith, Montgomery, AL
   2. W1340, Wade, Tyler, TX
   3. Z-520, Zurn, Erie, PA
   4. or Approved Equal

B. Provide connection hardware as required to complete installation and as indicated on the Drawings.

2.3 Cleanouts

A. Cast iron.

2.4 Hangers

A. Adjustable malleable galvanized hangers of clevis type with adjustable galvanized steel rods.

PART 3 - EXECUTION

3.1 General
A. Inspect area to receive the work and report immediately in writing to the Engineer, as required in the General Conditions, any unacceptable conditions. Do not proceed with work until unsatisfactory conditions have been corrected in an acceptable manner. Commencement of erection implies acceptance of related work.

3.2 Preparation

A. Take out all necessary permits, arrange for all required inspections and pay all fees and expenses associated with performing the Mechanical Work.

B. Contractor shall locate objects suspended below ceiling, embedded electrical conduit and reinforcement. Cored holes shall be offset to miss existing items. Offset dimensions shall be approved by Engineer prior to coring.

C. Before starting Work, prepare and submit to the General Contractor a schedule of operations outlining the proposed order of procedure giving the dates of execution and the estimated time required for the completion of each step.

D. Verify dimensions in the field.

E. Verify ceiling heights or other architectural and structural details before installing any piping.

F. Contractor shall flood each floor slab column bay prior to installation in order to locate ponds and determine which existing drains are currently functioning (at slab low point). Coordinate flooding with Owner and Engineer.

G. Coordinate Work so as to avoid interferences with other trades. Due to the small scale of the Drawings, it is not possible to indicate all offsets, fittings or valves which may be required. Investigate the structural and finish conditions affecting this Work. Plan accordingly, furnish such offsets, fittings and valves as may be required.

3.3 Installation

A. This Contractor will be responsible for cutting openings in the slabs as required to install new floor drains.

B. Install all piping parallel to building walls and column lines, maintaining clear height as to not interfere with doorways, stairway or traffic, while keeping a neat appearance.

C. Install piping so as to occupy a minimum of space, close to walls, ceiling, columns, or other members providing proper space for covering or removal of pipes.

D. Work pipe into place without springing.

E. Install all piping such that it will drain and vent as indicated on the Drawings or required. Pitch all horizontal lines 1/8-inch per foot minimum at a uniform grade.
F. Connect piping to existing drain system.

G. Properly support all piping installed on suitable pipe hangers and supports. All equipment for permanent hangers, supports, and anchors shall be fabricated from durable materials suitable for the service conditions and in accordance with the details indicated on the Drawings.

H. Base required strength of hangers on the combined weight of the piping filled with water.

3.4 Cleanup

A. At the completion of Work under this Contract, remove from the building all rubbish and accumulated materials.

B. Provide the entire installation thoroughly free from all oil and grease after successfully completing all tests and before the Work is turned over to the Owner.

END OF SECTION 22 1400
SECTION 32 1723 – PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and requirements per the Request for Proposals, apply to this Section.

1.2 Work Included

A. The Work of this Section includes furnishing all material, labor, equipment and services to paint the following items of the types, patterns, sizes and colors as indicated on the Drawings.

1. Parking stripes
2. Bus Lanes
3. Walkway stripes
4. Text

1.3 Related Work

A. The following Work is related to this Section:

1. Concrete Repair Section 03 0130
2. Traffic Coatings Section 07 1800

1.4 Submittals

A. Action Submittals

1. Manufacturer’s Spec Data Sheets of each product to be used.
2. Shop Drawings: Indicating stall size, spacing, tolerances, etc.

B. Informational Submittals

1. Material Safety Data Sheets of each product, solvent, or related chemicals to be used, and certification that the materials conform to local, state, and federal environmental and worker’s safety laws and regulations.
2. Standard color chip for each color.
1.5 Environmental Requirements

A. Manufacturer and Installer are required to confirm that all materials used in accordance with this Section conform to local, state, and federal environmental and workers’ safety laws and regulations.

1. VOC content of materials shall not exceed the limits per Environmental Protection Agency National Volatile Organic Compound Emission Standards for Architectural Coatings (40CFR59).

B. The Installer is solely responsible for fume control and shall take all necessary precautions against injury to personnel or adjacent building occupants during application. As a minimum, Installer shall take the following precautions:

1. Provide and maintain barricades.
2. Locate and protect building air intakes during application.
3. Follow all state, federal, and local safety regulations.
4. Follow all Manufacturers’ safety requirements.
5. Dispose empty containers immediately and properly.
6. Use protective equipment.
7. Ensure work area is well vented to the exterior.

1.6 Transportation and Handling

A. Deliver all materials to site in original, unopened containers bearing the following information:
   1. Name of Product
   2. Name of Manufacturer
   3. Date of Manufacture
   4. Lot or Batch Number

B. Store materials under cover and protected from the weather.

C. Replace containers showing any signs of damage with new material at no additional cost to Owner.

D. Mix and prepare coatings only in areas designated by the Contractor for that purpose.

E. Take precautions to prevent fire in or around coatings materials. Provide and maintain hand fire extinguisher near storage and mixing area.

F. At no time shall the weight of the stored material placed on a slab area exceed 30 PSF or 2,000 lbs. over 20 square inches.

1.7 Basis of Payment

A. Pavement marking preparation and application will be paid on a lump sum basis.
PART 2 - PRODUCTS

2.1 Pavement Markings – Alkyd (Solvent Based)

A. All materials shall meet Federal Specification TT-P-115F

B. Provide pavement markings as indicated on the Drawings.

C. Approved acrylic alkyd traffic marking paint are:

1. Pro Industrial, Pro-Park Waterborne Traffic Marking Paint, The Sherwin Williams Company, Cleveland, Ohio.
   a. B97 Series

2. Or approved equivalent

D. Approved alkyd pavement markings are:

   a. A300 White
   b. A303 Lead-Free Yellow
   c. A302 Red
   d. A305 Black
   e. Handicap Blue Use A300 White as base and tint

2. Alkyd Zone Marking Paint, ICI Paints, Cleveland, Ohio.
   a. 22694/22693 White
   b. 20086/20126 Lead-Free Yellow
   c. 43619/43620 Red
   d. 20085/28744 Black
   e. 20083/20084 Handicap Blue

3. Or approved equivalent

PART 3 - EXECUTION

3.1 Inspection

A. Inspect surfaces to which paint will be applied and report immediately in writing to the Engineer as required in the General Conditions any conditions detrimental to the proper execution of this work.
B. Do not proceed until unsatisfactory conditions are acceptably remedied. Commencement of work implies acceptance of related work.

3.2 Preparation

A. Before commencing work, make certain that surfaces are thoroughly cleaned, dry, and in sound condition. The cleaning of concrete floor surfaces shall meet the requirements of ASTM Designation: D 4258 for Water Cleaning and Detergent Water Cleaning.

B. Any existing paint stripes shall be removed by grinding or scarifying so that no visible paint stripe remains.

C. Do not paint any surface that is wet or damp.

D. Remove all oil, dust, grease, dirt, and other foreign material to ensure adequate adhesion.

E. Lay out all striping on each level, using dimensions indicated on the Drawings. Report any discrepancies, interferences or changes in striping due to field conditions to the Engineer prior to painting. Paint Contractor shall be required to remove paint, repair surface and repaint stripes not applied in strict accordance with the Drawings.

F. Verify compatibility with concrete sealer, joint sealant, traffic bearing membrane, and all other surface treatments as specified in Division 7.

3.3 Mixing

A. Do not mix different types of materials or materials from different Manufacturers.

B. Do not thin material except as recommended by Manufacturer for spray application.

C. Mix paint thoroughly by boxing, stirring or power agitation before use.

3.4 Application

A. Apply painting and finishing materials in accordance with the Manufacturer's directions. Use techniques best suited for the material and surfaces to which applied. Apply at 15 mils wet thickness.

B. Do not apply paint when the air and/or surface temperature is below 50 degrees F, when relative humidity exceeds 85%, when rain is threatening or late in the evening when dew might form before drying.

C. Parking space striping dimensions indicated on the Drawings are nominal dimensions. Tolerances shall be as follows:
1. Parking space length shall equal indicated length ± 2 inches.
2. Parking space width (or base line dimension) shall equal indicated width ± 1 inch.
3. A string of parking spaces shall equal indicated dimension ± 2 inches per run.
4. Stripe width shall equal 4 inches ± 1/4 inch.

3.5 Cleaning

A. Immediately upon completion of work, clean up all paint spots, remove excess materials and equipment, and repair all paint damage to other finishes.

END OF SECTION 32 1723