PROJECT MANUAL

FOR

M&T Bank Stadium

2020 Expansion Joint Replacement

by
Maryland Stadium Authority
THP Limited, Inc.
November 2019
MSA No. 20-033
THP #18556

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DIVISION 03 – CONCRETE

SECTION 030100

CONCRETE REPAIRS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. All labor, material, tools, equipment and services to perform concrete repairs at areas indicated on the Drawings and in the Specifications, including but not limited to:

1. Topping slab excavations and repairs.

2. Miscellaneous concrete topping slab repairs as directed by Engineer.

1.2 RELATED SECTIONS

A. Sheet Membrane Waterproofing – Refer Section 071300.

B. Expansion Joints – Refer Section 079000.

C. Sealants – Refer Section 079200.

1.3 UNIT PRICES

A. Unit prices are taken for the work items identified in the Drawings, with quantity allowances listed in the Bid Form spreadsheet.

B. Final adjustment to the contract amount will depend on actual quantities of repair performed.

C. Repair quantities will be determined by measurements made jointly by the owner or its representative and the contractor. The contractor will record the measurements with both parties signing the record to attest to its accuracy.

1.4 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 301 - Specification for Structural Concrete for Buildings.

2. ACI 305R - Hot Weather Concreting.

3. ACI 306R - Cold Weather Concreting.

4. ACI 318 - Building Code Requirements for Reinforced Concrete.

B. American Society for Testing and Materials (ASTM):

1. ASTM A185 - Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.

2. ASTM A615 - Specification for Deformed and Plain-Billet Steel Bars for Concrete Reinforcement.

3. ASTM A775 – Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

4. ASTM C31 - Method of Making and Curing Concrete Specimens in the Fields.

5. ASTM C33 - Concrete Aggregates.

6. ASTM C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.

7. ASTM C94 - Specification for Ready-Mixed Concrete.

8. ASTM C143 - Standard Test Method for Slump of Portland Cement Concrete.

9. ASTM C150 - Specification for Portland Cement Concrete.

10. ASTM C260 - Specification for Air-entraining Admixtures for Concrete.

11. ASTM C494 - Specification for Chemical Admixtures for Concrete.

12. ASTM C881 – Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

13. ASTM C882 – Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete.

C. Structural Steel Painting Council (SSPC):

1. Surface Preparation Specification No. 3 (SP3) – Wire Wheel Cleaning.

2. Surface Preparation Specification No. 6 (SP6) – Commercial Blast Cleaning.

D. American Association of State Highway and Transportation Officials (AASHTO): AASHTO M182 - Specifications for Burlap Cloth Made from Jute or Kenaf.

E. Keep a copy of the referenced specifications cited in this section in the on-site field office.

1.5 SUBMITTALS

A. Submit literature for manufactured products, including manufacturer's specifications, test data and installation instructions.

B. Letter stating this Contractor and supplier are familiar with the referenced standards.

C. Submit mix designs and test results conforming to the requirements of Section 4 of ACI 301. Submit request for approval to use admixtures, if any. A complete mix design submittal must be furnished at least three weeks before the planned use of that mix. The Contractor is cautioned to undertake mix design preparation and submittal procedures immediately after authorization to proceed with the project.

1. Submitted mix design shall address weather conditions which are expected to occur during the concrete repair phases. Concrete mixes shall not only be designed for average temperature and humidity conditions, but also for adverse conditions (hot and cold weather), as applicable to this project.

D. Provide the following in accordance with ACI 301.

1. Mill test for cement.

2. Admixture certification.

3. Aggregate certification.

4. Procedure for adding water to ready-mix at site, including method of measuring water.

5. Method of adding admixtures.

6. Materials and methods for curing.

7. Ready-Mix delivery tickets.

8. Certificate of Conformance for concrete production facilities by NRMCA (National Ready Mix Contractors Association).

9. Field and laboratory tests that are the Contractor's responsibility.

E. The Owner's review of details and construction operations shall not relieve this Contractor of his responsibility for completing the work successfully in accordance with the Contract Documents.

1.6 QUALITY ASSURANCE

A. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be

followed.

B. Concrete that does not conform to the specified requirements, including bond to substrate, strength, finish and tolerances shall be subject to removal and replacement, including necessary preparatory work, at no additional cost to the Owner and without extension to the Contract Time.

C. Contractor shall be responsible for restoration of other components of the Work damaged during placement of concrete or damaged during removal of unsatisfactory concrete.

D. ACI 301, ACI 305R and ACI 306R are a part of the Contract Documents, are incorporated herein as fully as if here set forth and are referred to as General Concreting Requirements.

E. Chloride Ion Limitations: Maximum acid-soluble chloride ion concentration, in hardened concrete shall not exceed .10% by weight of cement.

F. Concrete testing and certification shall be as described in ACI 301, Chapter 16.

1.7 WARRANTY

A. A warranty period of two (2) years shall be provided for concrete work performed under this Section against defects, as determined by the Owner, including but not limited to debonding, excessive cracking and surface scaling.

PART 2 PRODUCTS

2.1 MATERIALS

A. General:

1. Ready mixed materials used for concrete shall be furnished from the same source throughout the project unless otherwise approved by the Owner.

B. Cement:

1. Use ASTM C150, Type I cement unless noted otherwise. Air-entrained cement shall not be used. Air requirements shall be met by separate admixtures.

C. Admixtures:

1. Air-entraining admixtures meeting the requirements of ASTM C260.

2. High range water reducer meeting the requirements of ASTM C494.

3. Calcium chloride, calcium nitrate and thiocyanates are not permitted. Admixtures containing more than 0.05% chloride ions are not permitted.

4. Use approved admixtures in accordance with manufacturer's

recommendations.

D. Fine and Coarse Aggregates:

1. Meeting requirements of ASTM C-33.

E. Water:

1. Mixing water shall be potable meeting requirements of ASTM C-94.

F. Pre-packed Concrete Materials:

1. Horizontal Application – Typical Repair Areas (Patch Material Type A):

a. MasterEmaco T 310CI by BASF

b. SikaQuick 1000 by Sika Corp.

c. Planitop 18 ES by Mapei.

G. Bar Coating:

1. MasterEmaco ADH 326 by BASF

H. Bonding Agent (used for shallow floor patches if the patch is not deep enough for patch anchors; patch material must be placed while epoxy is still wet)

1. Sikadur 32, Hi-Mod LPL by Sika, Inc.

I. Welded Wire Reinforcement:

1. Conforming to ASTM A185.

J. Reinforcing Steel:

1. All reinforcing steel shall have a minimum Fy of 60 ksi.

2. Provide epoxy coated steel where shown on Drawings.

K. Curing Materials:

1. 10 oz. burlap meeting the requirements of AASHTO M-182.

2. Visqueen: 6 mil polyethylene (white).

L. Curing Compound:

1. VOCOMP-25 by W.R. Meadows.

2. MasterKure CC 1315WB by BASF

3. Liquid membrane forming curing compound shall conform to the requirements

of ASTM C1315, Type 1, Class A and have data from an independent laboratory indicating a maximum moisture loss of 0.40 grams per square cm. when applied at a coverage rate of 300 square feet per gallon.

M. Form Lumber:

1. New fire retardant material, grade and size to adequately form, support and brace concrete and to provide finishes that match adjacent surfaces.

N. Epoxy Grout:

1. Sikadur 32, Hi-Mod LPL epoxy mixed with silica sand.

O. Patch Anchors:

1. Stainless steel spikes by Powers Rawl.

2.2 MIX PROPORTIONING

A. General:

1. Ready Mix Producer, General Contractor, and those responsible for placing and finishing concrete shall review mix designs and agree on modifications to the proposed mixes listed below required to facilitate placing and achieve the desired results. No modifications reducing the cement content, increasing the chloride content or the W/C ratio will be acceptable. Both the General Contractor and Ready Mix Producer are responsible for design and production of concrete mix.

B. Concrete Mix: (Patch Material Type C)

1.	Strength at 28 days	5000 psi
2.	Minimum portland cement content	611 lbs./C.Y.
3.	Maximum percent of chloride by weight of cement	0.10
4.	Maximum water/cement ratio	0.40
5.	Percent of air entrainment (at point of placement)	5 to 7 percent
6.	Maximum aggregate size	3/8 inch

C. Slump:

1. Produce the concrete to have a maximum slump of 4 inches as delivered to the site. The maximum slump may not be exceeded except by the job site addition of High Range Water Reducer (Superplasticizer).

2. When superplasticizer is used, the maximum superplasticized slump shall be

8". Superplasticizer may not be added to a batch of concrete after initial slump adjustments are made and discharge has started.

3. Method of measuring and adding superplasticizers to the truck mixer at the site shall be approved by the Engineer.

4. Mix designs incorporating superplasticizer must be accompanied by test results from cylinders made from previous field test data in which the superplasticizer was added to a 6 c.y. (min.) batch in a truck mixer.

2.3 PRODUCTION OF CONCRETE

A. Furnish to the Project Superintendent 2 delivery tickets for each load of Ready-Mixed concrete. Tickets shall contain the following information:

1. Date.

2. Producer and plant.

3. Job.

4. Contractor.

5. Truck No. and time dispatched.

6. Concrete designation and cement type.

7. Admixtures description and content.

8. Time discharge started and completed.

9. Amount of concrete in load.

10. Amount of water in mix at plant.

11. Amount of material(s) added at the site and authorized signature.

B. Site-mixed concrete is prohibited.

C. High Range Water Reducers (Superplasticizers) shall be premeasured and added at the site in accordance with the manufacturer's written instructions and specifications, using truck-mounted power injection equipment capable of rapidly and uniformly distributing the admixture to the concrete. Alternatively, the superplasticizer may be added manually to the back of the truck by a trained technician, if this procedure is confirmed by historical data to yield a uniform and acceptable product. Mix the concrete a minimum of six minutes after addition of the superplasticizer and before discharge.

D. Re-tempering with superplasticizer is prohibited.

E. When concrete arrives at the project with slump below that suitable for placing and below the slump specified, water may be added only if neither the maximum specified water/cement ratio nor the maximum slump is exceeded, provided that:

1. The approved mix design has allowed for on-site addition of water.

2. The amount of water added at the site is accurately measured to ± 1 gallons of the desired added amount.

3. That water addition is followed by 3 minutes of mixing at mixing speed prior to discharge.

4. Standard cylinder samples as required by these Specifications are taken after addition of water.

5. The person authorized to add water shall be mutually approved by Engineer, Contractor, and Ready Mix Producer.

F. All concrete arriving at the site above the maximum slump will be rejected.

G. Addition of cement at the site is prohibited.

H. Discharge concrete from mixer within 1-1/2 hours after the introduction of mixing water to the cement and aggregates.

1. During hot weather or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required. When air temperature is between 85˚F (30˚C) and 90˚F (32˚C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90˚F (32˚C), reduce mixing and delivery time to 60 minutes.

2. Maximum temperature of concrete mixes delivered to site: 85˚F.

PART 3 EXECUTION

3.1 GENERAL

A. Prior to the start of work, the Contractor shall survey areas to receive repair concrete to determine locations and approximate quantity of material.

B. Prior to start of excavations, perform an on-site review of the work areas with the Owner. Provide a minimum of 2 working days notice prior to the requested review day.

C. Prior to performing operations such as jack hammer work, the Contractor shall make a careful and thorough survey of the underside of the level on which he intends to work and shall remove all loose soffit concrete which may fall as a result of those operations. The Contractor shall also be responsible for posting all signs and erecting all barricades as necessary to prevent pedestrians and vehicles from

entering the area below hazardous work.

D. During concrete removal work, Contractor shall not damage existing mild steel reinforcement. Mild steel reinforcement that is damaged by the Contractor, as determined by the Owner, shall have a new reinforcing bar the same size as the damaged bar lapped to each side of the damaged area. Lap lengths shall be determined by ACI 318. Cost of new reinforcing bar, concrete removal and patching for lap length shall be borne by the Contractor.

E. It is intended that the existing reinforcement steel exposed during the work shall remain in place (unless noted on Drawing for removal) and undamaged during removal of the unsatisfactory concrete. Tie loose reinforcement bars in place in an approved manner prior to placing patch mix. If the reinforcement is deteriorated, as determined by the Owner, the Owner may direct that it be replaced and spliced in accordance with ACI splice and development requirements for reinforcement bars. Additional concrete removal may be required to expose undamaged reinforcing. If required, compensation will be made in accordance with the established Unit Prices.

F. Concrete placement for patches on sloping surfaces shall begin on the low elevation end and proceed upwards to the high elevation end.

G. Control joints to be either tooled or sawed into concrete slab. Confirm control joint pattern with Owner prior a minimum of 24 hours prior to placement of concrete. Tooled joints are to be cut while concrete is wet. Sawed joints to be cut within 6 hours of slab placement before slab begins to crack.

3.2 PROTECTION

A. Contractor shall protect all open excavations, and reinforcing therein, from damage due to mechanical disturbance, weather conditions or other causes.

B. Contractor shall protect occupied areas below the work area during all phases of the work including removal, preparation and placement of materials.

C. Provide barricades to close areas immediately below the work area. Coordinate the time closing of required areas with the Owner.

3.3 FLOOR REPAIR PROCEDURE

A. Refer to the Drawings for repair details. Contractor shall sound the concrete floor areas hammer survey to identify the limits of deteriorated concrete within the Work Area. Mark with paint each area to be repaired. Location of paint marks must be approved by the Owner’s representative.

B. Remove floor concrete within the Work Area by conventional chipping methods.

C. Conventional Chipping Method:

1. Sawcut the concrete deck surface along the perimeter of the paint marks which define the removal area. Do not cut existing reinforcement. Depth of sawcuts shall be 3/4 inch. Cut perimeter of removal area before beginning chipping hammer work. Do not over cut corners of patch area.

2. Perform concrete removal with no larger than 18 pound chipping hammers.

3. Begin concrete removal at the center of the removal area and work towards the sawcut perimeter. Maintain vertical sawcut edge at perimeter. Re-saw if necessary to maintain required edge.

4. Contractor shall use due diligence to perform concrete chipping operation in a manner to avoid punching through slab. Means such as utilizing wide chipping blades and performing chipping procedures on a low angle are recommended.

D. The surface of the sound, exposed concrete shall be relatively flat with 1/4" amplitude over the repair area for new concrete patches and overlays. Contractor is responsible for insuring that the final concrete repair area is sound.

E. Within 24 hours of concrete repair material placement, media blast the excavation and the immediately adjacent surface. Reinforcing steel shall be cleaned to a SSPC-SP6 condition unless otherwise indicated.

F. After completion of all cleaning operations, blow-out excavations with oil-free and water-free compressed air. Previously cleaned excavations that are subjected to contamination must be re-cleaned.

G. The Owner will inspect excavations prior to coating reinforcing steel. Final touch-up of excavations and reinforcing steel shall be performed before proceeding.

H. Within 8 hours after cleaning, coat all surfaces of exposed steel with one coat of bar coating. Allow coating to become tack free before proceeding with second coat.

I. Apply second coat of bar coating to previously coated steel. Do not apply coating to substrate or allow coating to puddle in low areas of excavation.

J. Thoroughly saturate all concrete surfaces to be in contact with new concrete as necessary to provide a saturated surface dry condition.

K. Just prior to concrete placement blow-down area with oil-free compressed air to remove standing and puddled water.

L. Place Patch Material Type A or Type C in the excavations. Vibrate new patch material to ensure consolidation in maximum-depth areas and at the excavations perimeter. Screed material flush with adjacent surfaces and finish with a float or light trowel.

M. After finishing, fog concrete surfaces with water using approved fog spray device (hose not permitted) to prevent surface drying prior to start of curing.

N. Cure Patch Material Type A in accordance with manufacturer's written instructions.

O. Cure Patch Material Type C with a 4 day wet cure:

1. As soon after finishing as possible without marking concrete, cover with wet, clean burlap followed by a minimum 6 mil polyethylene sheet (free of holes) which overlaps existing concrete on all sides.

2. Weight curing material to hold in place.

3. Maintain burlap in a wet condition during the wet curing period.

3.4 EPOXY GROUT INSTALLATION PROCEDURE

A. Saw cut the concrete deck surface along the perimeter of the paint marks which define the removal area. Do not cut existing reinforcement. Depth of saw cuts shall be ¾ inch. Cut perimeter of removal area before beginning chipping hammer work.

B. Begin concrete removal at the center of the removal area and work towards the saw cut perimeter. Maintain vertical saw cut edge at perimeter. Resaw if necessary to maintain required edge.

C. Prior to epoxy grout placement, media blast the excavation and the immediately adjacent surface. Reinforcing steel shall be cleaned to a SSPC-SP6 condition unless otherwise indicated.

D. Mix epoxy mortar using 2 parts epoxy and 1 part clean over dried silica sand.

E. Apply neat epoxy worked into substrate for positive adhesion. Immediately follow with application of the epoxy mortar. Follow manufacturer's instructions for mixing and installation.

F. Do not allow traffic on epoxy mortar patch for a minimum of 24 hours.

3.5 FIELD QUALITY CONTROL

A. All excavations shall be inspected and approved prior to placing concrete. The Contractor shall notify the Owner 2 working days in advance of required inspection.

B. Notify the Owner at least 2 working days prior to placing concrete.

C. Site Tests for Ready Mixed Concrete:

1. The Owner will provide and pay for a testing agency to prepare and secure cylinders for off-site testing and perform on-site slump and air tests for

concrete specified to be air entrained to insure compliance with Specifications.

2. The Contractor shall coordinate and arrange for the Owner's testing agency to perform all testing as specified for concrete overlay materials.

3. Age of concrete for testing for acceptance shall be 28 days.

4. Determine the slump (ASTM C143) for each batch of concrete to which superplasticizer is being added. This slump testing shall be by the Owner's testing agency.

5. Compression, slump and air content tests (for air-entrained concrete) shall be made on the first load of concrete delivered each day. Also, anytime during progress of the work where the Owner may request such a test due to the change in consistency or appearance of the concrete. The slump test for mixes in which superplasticizers are being added shall include two slump tests, one before and one after the addition of the superplasticizer.

6. Testing agency shall make compression tests as follows:

   a. Mold four (4) specimens (cylinders) for each sample in accordance with ASTM C31-84 "Standard Method of Making and Curing Concrete Specimens in the Field." Lab cure all cylinders.

   b. Make tests of lab cured cylinders, one (1) specimen at seven (7) days, two (2) at twenty-eight (28) days and one (1) for reserve. Tests shall comply with ASTM C39 "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens."

   c. Report in writing all test results to Owner, and the Contractor on same day tests are made. Report by phone results of early break cylinders to both the Contractor and Owner, and report to the Owner via phone results less than the required strength. Written reports of tests shall contain the name of the project, date of placement, location of concrete placement, breaking strength and type of break, size of aggregates, unit weight per cu. ft. type of cement, types of admixtures, percentage of entrained air, slump and required strength.

   d. If concrete strength test results do not exceed required 28 day strength, the Owner's acceptance of the affected area shall be in accordance with Paragraph 3.06 of ACI 301.

7. Air content tests shall be taken from each truck at the point of placement in addition to standard tests at the point of discharge.

8. Unless better definition of the placement location of the concrete is provided, the location in the work represented by a test or series of test shall be defined as the entire concrete placement for the work shift in question.

D. Acceptance of Structure:

1. Acceptance of Structure shall be in accordance with ACI 301 Chapter 18.

2. Contractor shall bear all costs of correcting rejected work, including the cost of Owner's services thereby made necessary.

3.6 CLEANING

A. Empty containers shall be removed from the Stadium at the end of each working day. Cloths soiled with adhesive materials that might constitute a fire hazard shall be placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage of disposal of flammable materials. Comply with health, fire and environmental regulations.

B. All spilled materials shall be completely removed from hardware, adjacent floor areas, metal work, etc. Remove spilled coating by approved methods.

C. Repaint in matching color all curbs, columns, walls, etc., where existing paint was removed during preparation of adhesive materials installations.

D. All hardware, adjacent floor areas, metal work, etc., and the general premises shall be left clean and free of all construction dust, dirt and debris.

END OF SECTION

DIVISION 04 MASONRY

SECTION 040100

MASONRY REPAIR

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. All labor, material, equipment, tools and services to complete masonry work required for the project, as indicated on the drawings and the specifications, including but not limited to:

a. Temporary removal of brick or CMU walls for new expansion joint installations then rebuild of walls to match existing conditions.

b. Cleaning of all affected brick surfaces after completion of work.

c. Painting of all affected wall surfaces after completion of work.

d. Provide temporary support as required for support of existing masonry to remain.

1.2 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 530 – Building Code Requirements for Masonry Structures.

2. ACI 530.1 – Specifications for Masonry Structures.

B. American Society for Testing and Materials (ASTM):

1. ASTM C90 – Standard Specification for Load Bearing Concrete Masonry Units.

2. ASTM C91 – Standard Specification for Masonry Cement.

3. ASTM C144 – Standard Specification for Aggregate for Masonry Mortar.

4. ASTM C150 – Standard Specification for Portland Cement.

5. ASTM C216 – Standard Specifications for Facing Brick (Solid Masonry Units Made from Shale or Clay).

6. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Mortar.

7. ASTM C270 - Standard Specifications for Mortar in Unit Masonry.

8. ASTM C404 – Standard Specification for Aggregate for Masonry Grout.

9. ASTM C780 – Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

C. Brick Institute of America (BIA):

1. Technical Note 20 - Cleaning Brick Masonry.

2. Technical Note 46 – Maintenance of Brick Masonry.

D. Structural Steel Painting Council (SSPC):

1. Surface Preparation Specification No. 3 (SP3) – Wire Wheel Cleaning.

2. Surface Preparation Specification No. 6 (SP6) – Commercial Blast Cleaning.

1.3 SUBMITTALS

A. Product:

1. Brick samples.

2. Submit manufacturer's standard literature for all manufactured products specified herein or on Drawings.

3. Submit samples for new brick. Obtain approval from Owner prior to ordering materials.

4. Submit mix design for masonry mortar.

B. Mason:

1. Resume of Mason foreman per Paragraph 1.4.B.

C. Closeout:

1. Upon completion of the Work and prior to final payment, provide fully executed warranties.

1.4 QUALITY ASSURANCE

A. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

B. Bidder's Qualifications:

1. Contractor shall have at least 3 years experience doing work of scope and size

specified herein and indicated on Drawings.

2. Mason foreman shall have supervised at least three prior projects of similar magnitude and type.

C. Regulatory Requirements:

1. Comply with applicable laws, ordinances, and the Maryland Building Performance Standards (MBPS).

2. Comply with the referenced standards in Paragraph 1.2 above.

D. Installation:

1. Mason foreman shall be on site during 90% of all masonry work. Masonry work identified as not being installed under the direct supervision of Mason foreman shall be subject to removal and replacement, at the direction of the Owner.

E. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.

F. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

G. Contractor will provide access to all work areas during normal working hours for the Owner and the Engineer to review the progress and quality of work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing, shipping, Handling and Unloading:

1. Deliver materials to job site in sealed, undamaged containers/packaging.

B. Storage and Protection:

1. Protect materials in a dry place, off ground and under cover to protect them from wetting, staining, chipping and other damage.

2. Do not use materials showing evidence of water or other damage.

1.6 PROJECT CONDITIONS

A. Environmental Requirements

1. Maintain materials, building surfaces and surrounding air to a minimum temperature of 40 degrees F. for a period of 48 hours before the start of work and 72 hours after completion of work.

2. Conform to manufacturer's specific requirements.

B. Existing Conditions:

1. The building's interior HVAC system cannot be used for temporary heating or cooling in performance of the facade restoration work.

1.7 WARRANTY

A. Provide two (2) year warranty on all workmanship and materials unless otherwise specified.

PART 2 PRODUCTS

2.1 MATERIALS

A. Brick Masonry Units:

1. Salvage brick.

a. At contractor's option, salvage brick may be utilized for portions of the work.

2. New Units:

a. Units conforming to ASTM C216, Grade SW.

b. Size, color, blend and texture to match existing as selected by Owner.

B. Concrete Masonry Units (CMU):

1. 8 inch wide units: Conforming to ASTM C90, Grade N-1, Normal Weight.

2. 4 inch wide units: Solid units conforming to ASTM C90 and having an equivalent thickness of 3.6 and providing a 2 hour fire resistance rating.

3. Solid concrete brick units conforming to ASTM C90 and having an equivalent thickness of 3.6 and providing a 2 hour fire resistance rating.

C. Mortar:

1. Prepackaged Mortar: ASTM C270, type N.

a. Acceptable Manufactures

1) Fairborn Cement, Xenia, OH

2) WORKRITE Cements, York, PA

2. Mortar Aggregate: ASTM C144, standard masonry type.

3. Water: Clean and potable.

4. Mortar Color: As selected by Owner from manufacturer's standard colors to match existing.

5. Masonry cements are prohibited.

D. MASONRY GROUT

1. Grout materials to comply with ASTM C476 as follows:

2. Portland Cement: ASTM C150, Type 1.

3. Hydrated Lime: ASTM C207, Type S.

4. Aggregates: ASTM C404, 3/8 inch maximum aggregate size.

E. Water: Clean and potable.

2.2 ACCESSORIES

A. Wall Ties:

1. Exterior Brick Repair:

a. Adjustable 304 Stainless steel triangle wire tie, type reinforcing with tapcon screw. Wire tie size shall be standard weight: 3/16" diameter.

b. Basis of Design: Heckmann Building Products, Inc., Pos-I-Tie for masonry backup.

B. Flashing:

1. Acceptable materials:

a. Carlisle Pre-Cleaned 40 mil EPDM Thru-Wall Flashing.

b. Firestone FlashGard Dust Free 40 mil EPDM Thru-Wall Flashing.

2. Termination Bar: 1" wide by 1/8" thick stainless steel bar prepunched at 6" on center to accept ¼" diameter anchors.

C. Anchors for Attachment of Veneer Brick Ties and Termination Bars to:

1. Masonry: Hilti HIT anchor – ¼" by 1 ¼" long with stainless steel drive pin.

2. Steel: Kwik-Pro Self-Drilling Screw by Hilti. 12-24 HWH #5 with Kwik-Cote finish.

D. Weep Cords: 3/8 inch diameter cotton blend woven cord without plastic jacket or core. Minimum 60% cotton content.

E. Reinforcing bar: #4 Bar. All reinforcing steel shall have a minimum of Fy of 60 ksi.

F. Rolled Steel Plates, Shapes and Bars: ASTM A36.

G. Masonry Cleaner:

1. General Masonry Cleaner:

a. ProSoCo Inc., Restoration Cleaner

b. Diedrich Technologies, 101G

2. Repointing Cleaner:

a. ProSoCo., Inc., Sure Klean Vana Trol.

b. Diedrich Technologies, 202V Vana-Stop.

2.3 MIXES

A. Mortar:

1. Batch Control: Measure and batch materials either by volume or weight, such that the required proportions for mortar can be accurately controlled and maintained. Measurement of sand materials by shovel will not be permitted.

2. Mix mortars with the maximum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of the mortar.

3. Do not use mortar that has begun to set, or if more than 2 hours has elapsed since initial mixing. Retemper mortar during 2 hour period as required to restore workability.

4. Do not lower freezing point of mortar by use of admixtures or anti-freezing agents.

5. Chloride containing additives are prohibited.

6. Air content shall not exceed 12 percent.

B. Grout:

1. Slump: 8” plus or minus 1”.

2. Strength: 3000 psi minimum at 7 days, 4000 psi minimum at 28 days.

PART 3 EXECUTION

3.1 EXAMINATION

A. Prior to the start of work, examine surfaces intended to receive the specified work and note conditions or defects that will adversely affect the execution and/or quality of the work.

B. Notify Owner in writing of any such conditions or defects. Do not begin work until unsatisfactory conditions are corrected. Failure to notify Owner prior to beginning work constitutes acceptance by Contractor of the surfaces and conditions under which the work is to be performed, and acceptance by Contractor for the performance of the work.

3.2 PREPARATION

A. Protection

1. Provide temporary protection during the course of the work to prevent water entry into the building and walls and to maintain the building in a weather tight condition. Ensure that protection is in place and water tight before ending day's work.

2. Be prepared for unexpected weather changes so that temporary protection can be quickly installed.

3. Protect all existing adjacent surfaces that are to remain and are not included in the work of this Section.

4. Provide safeguards from work of this Section for pedestrian traffic and adjacent property. Do not permit drift of dust or liquids.

5. Use safeguards recommended by manufacturers of products specified herein for personnel handling and applying said materials.

6. Protect surrounding areas from construction activities, dirt, dust and debris.

3.3 MASONRY WORK

A. General

1. Cut masonry units with motor-driven saw designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full unit without cutting wherever possible. Use dry cutting saws to cut concrete masonry units.

2. Lay out walls in advance for accurate spacing of surface running bond patterns with uniform joint widths and to properly locate openings, movement type joints, returns and offsets.

3. Wet clay brick that have ASTM C67 initial rates of absorption (suction) of more than 0.71 gm/square inch per minute.

4. During construction, cover top of work with waterproof sheeting at end of each day’s work. Extend cover down face of work and hold securely in place.

5. Prevent mortar or soil from staining face of masonry to be left exposed. Immediately remove mortar in contact with such masonry. Protect base of walls from mortar splatter by means of coverings spread on and over wall surface.

Protect sills, ledges and projections from mortar droppings.

6. Tolerances:
    a. Maximum Variation from Plumb: 1/8 inch maximum.
    b. Maximum Variation from Level Coursing: 1/8 inch in 3 ft. and ¼ inch in 10 ft; ½ inch in 30 ft.
    c. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
    d. Maximum Variation from Cross Sectional Thickness of Walls: ¼ inch.
7. Coursing:
    a. Establish lines, levels, and coursing indicated. Protect from displacement.
    b. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
    c. Brick Masonry Units:
        1) Coursing: match existing.
        2) Exposed Mortar Joints: match existing.

B. Mortar Mixing
1. Mix mortar in accordance with manufacturer's instructions.
2. Maintain sand uniformly damp immediately before mixing process.
3. Add admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

C. Mortar Bedding and Jointing:
1. Lay masonry units with completely filled bed and head joints. Butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
2. Remove excess mortar as work progresses.
3. Interlock intersections and external corners unless otherwise indicated.
4. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
5. Rack back ½ unit length in each course; do not tooth unless otherwise shown on Drawings.
6. Keep cavity between brick and substrate clean and free of debris, mortar fins and

droppings.

7. Keep vertical control and expansion joints clear of mortar and debris.

D. Anchoring of Masonry Work:

1. Provide one anchor attached to backup masonry per 1.8 sq. ft. of wall area (16 inches vertically and horizontally).

2. Brick anchors to extend minimum of 2-1/2", maximum of 3" into mortar joint.

3. Portion of anchors extending into masonry shall be completely embedded in mortar.

E. Damaged Flashing:

1. If flashing is encountered and damaged repair per the following methods:

a. Install flashing per manufacturer's recommendations and published details.

b. Seal flashing around penetrations to provide a watertight installation with materials recommended by the flashing manufacturer.

c. Maintain flashing watertight at inside and outside corners. Fabricate corners with materials and methods as detailed by the manufacturer.

d. Provide watertight end dams per manufacturer's details where flashing terminates at existing construction.

e. Terminate top edge of flashing with sealant as provided by the manufacturer and with a continuous termination bar. Refer to detail on Drawings.

3.4 BRICK SALVAGE (OPTIONAL)

A. Carefully remove existing masonry units from area designated on the drawings or Engineer.

B. Do not damage existing wall components such as but not limited to ties, flashing, water proofing, and backup materials. Notify engineer immediately if wall components is damaged. Engineer will provide a fix and Contractor to complete fix at no cost to the Owner.

C. Clean masonry unit of all existing mortar.

D. Do not chip or damage exterior finished face during cleaning of brick.

E. Palletized cleaned brick for use on the project. Unused brick to be turned over to the Owner at the end of the job.

3.5 MASONRY REPOINTING

A. During the repointing of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar.

B. Cut out mortar in joints to a minimum depth of 3/4” or until sound mortar is encountered, whichever is greater. Remove mortar with hammer and chisel, or with grinders equipped with integral dust extraction system. Dust and debris created by mortar removal must be contained and collected.

C. When cutting is complete, hand wire bush joint and remove remaining residual dust and loose material by vacuuming.

D. Premoisten joint and install new mortar. Pack tightly in two, 3/8 inch layers. Where depth of new mortar exceeds one inch, install in maximum 3/8 inch layers.

E. Finish to a smooth, compact, joint to match existing surrounding joints.

F. Remove excess mortar and mortar smears as work progresses. Dry brush at the end of each day's work. Do not allow excess mortar or mortar smears to dry on the face of new or existing brick.

3.6 RE-ESTABLISH AND NEW CONTROL JOINTS

A. Supplemental Wall Ties:

1. Prior to beginning work on control joint install supplemental wall ties.

2. Install wall ties as indicated on the Drawings.

B. Re-established and new control joints.

1. Provide ½” wide control joint for installation of sealant as indicated on the drawings.

2. Control joint shall be cut using a method approved by the Engineer.

a. Cutting method shall include a mechanical device or guide to provide straight and plum line.

b. Cutting the joint by hand or without a guide is prohibited.

3. Control joints shall be straight, plum, aligned with joints above and below (where applicable) and of consistent width over their length.

4. Prior to cutting control joint remove bricks above and below metal coping cap, ledge angles, and flashing. Removed brick to be cut with a saw and “tooth in” after control joint is cut. Tooth in per approved procedures.

5. Prior to cutting control joint complete installation of supplemental anchors.

6. Do not allow water, dust and debris to coat adjacent windows, doors, and louvers

during work.

7. Cut control joint depth of face brick.

8. Existing brick damaged during cutting shall be replaced at no cost to the Owner.

9. The same day of cutting the joint clean all affected areas of splatter, dust and debris caused by the work.

3.7 CLEANING

A. General:

1. Prior to cleaning review with manufacturer’s representative masonry substrate condition. Notify Engineer immediately if conditions exist that may be detrimental to the success of the cleaning and possible damage to substrate.

2. Clean all face brick with cleaning solution per manufacturer's recommendations and instructions.

a. Comply with BIA Technical Note 20 for cleaning of brick.

b. Provide a general and masonry repair cleaning.

3. Protect building surfaces and landscaping below during cleaning.

4. Provide adequate protection of all surrounding surfaces not intended to be cleaned from damage (surface blemish, staining, etching, etc.) due to preparation and cleaning procedures. Repair damage at no cost to the Owner.

5. Provide adequate protection of adjacent brick not being cleaned during a specific cleaning operation. Repair damage at no cost to the Owner.

B. Façade Masonry Cleaning:

1. Prior to the start of all masonry repairs within a work area, clean all brick surfaces with general cleaner to remove existing dirt and stains from facade.

2. General cleaning to remove all surface contamination such as dirt, foreign matter, rust, rust stains, mold, mildew, and efflorescence. Cleaned surface to meet or exceed mock-up area.

C. Masonry Repair Cleaning:

1. Unless noted otherwise, clean all brick surfaces with repointing cleaner to remove excess mortar, mortar smears and stains after completion of repointing and repair work.

2. Use non-metallic tools in cleaning operations. Remove large pieces of mortar using wood paddles and scrappers.

3. Clean areas of new mortar no earlier than 14 days nor later than 28 days after completion of work.

4. Clean ground area of masonry materials, rubble and debris.

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE PRETECTION

SECTION 071300

SHEET MEMBRANE WATERPROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: All labor, material, equipment, special tools, and services required to install a sheet waterproofing system as required by the Drawings and this Specification, including but not limited to the following:

1. Preparation and cleaning of substrates.

2. Crack and other detailing work.

3. Waterproofing system including primer or liquid applied surface conditioner, sheet membrane waterproofing, and drainage mat.

B. Related Sections:

1. Concrete Repairs – Refer to Section 030100

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D-4491: Standard Test Method for Water Permeability of Geotextiles by Permittivity.

2. ASTM D 4632: Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

3. ASTM D 4751: Standard Test Method for Determining Apparent Opening Size of a Geotextile.

4. ASTM D 4833: Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.

1.3 DEFINITIONS

A. The term "manufacturer's recommendations," or variations thereon shall mean "manufacturer's recommendations which are found in publications available to and commonly used by the general architectural and consulting professions.

1.4 SUBMITTALS

A. Literature for manufactured products, including manufacturer's specifications, test data, installation instructions and applicator's manual.

B. Letter of applicator approval from the manufacturer per Paragraph 1.5.B.

C. Letters of experience per Paragraph 1.5.C.

D. Letter from manufacturer stating their system as specified is suitable for use in this project per Paragraph 3.4.A.

E. Material Safety Data Sheets on all materials.

F. Upon completion of the work and before final payment provide fully executed warranties.

1.5 QUALITY ASSURANCE

A. Applicable Codes:

1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

2. If the above laws, codes or ordinances conflict with the Specification, then the laws, codes or ordinances shall govern, excerpt in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

B. The membrane system applicator shall be approved by the manufacturer prior to the start of work.

C. Membrane applicator's lead personnel (field superintendent and foreman) in charge of the work shall each have the following experience:

1. Three (3) verifiable years of experience supervising the application of the membrane system being provided on this project.

2. Successfully installed three (3) membrane projects of similar size, type and using the same membrane system being provided on this project.

D. Membrane applicator's lead personnel shall be present for all field operation pertaining to this waterproofing system installation.

E. The Owner reserves the right to request different lead personnel if, in the Owner’s opinion, those assigned to the project are not qualified by way of experience or ability to perform the Work. Comply with the Owner's request at no additional cost.

F. Substrate Compatibility:

1. The manufacturer and contractor shall:

   a. Jointly review and inspect the substrate materials to which the new waterproofing membrane is intended to be applied.

   b. Perform tests as necessary to ensure compatibility and verify the absence of materials - visible and invisible - detrimental to the application or performance of the waterproofing membrane.

   c. Review materials specified elsewhere in the Construction Documents to which the waterproofing membrane is intended to be applied.

2. If inspections, tests or review of materials and substrate reveal conflicts of compatibility with the intended waterproofing membrane provide written evidence of the compatibility conflict to the Owner prior to ordering of materials.

3. By beginning the waterproofing system (including substrate preparation), the Contractor accepts the responsibility for ensuring the performance of the waterproofing system.

4. If the Contractor fails to submit proof of incompatible materials, and if failure of the waterproofing system is a result of chemical or physical incompatibilities with existing or specified products or materials, the Contractor is responsible for all costs related to correcting the deficient work and for all direct and indirect costs to the Owner.

G. Testing:

1. The Owner may perform tests to ensure compliance with the Contract Documents and manufacturer's requirements.

2. If tests reveal noncompliance, correct deficiencies in a manner approved by the Owner and the manufacturer at no additional cost.

3. Except as otherwise specified, the Owner will pay the cost of the tests, including repair and patching of test areas.

4. Where tests reveal deficiencies in the membrane materials or installation, the costs of the tests, and repair and patching of the test areas shall be borne by the Contractor.

H. Air compressors shall be equipped with functional oil and water separators.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials to job site in sealed, undamaged containers. Identify each container with the material's name, lot number and date of manufacture.

B. Store membrane materials in a place specifically assigned for that purpose and

which is well ventilated, lighted and not subject to direct sunlight.

C. Heat or cool the storage area to maintain temperatures within the range recommended by the membrane manufacturer.

D. Keep membrane materials sealed in original containers when not in use.

E. Keep storage area neat and clean.

F. Do not overload or otherwise distress the structure.

G. Handle membrane system materials in strict accordance with safety and weather limitations required by product literature or as modified by applicable rules and regulations of Local, State and Federal authorities having jurisdiction.

H. When using toxic or flammable solvents, take necessary precautions as recommended by the manufacturer. The handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

1.7 WARRANTY

A. The completed installation shall be warranted by the manufacturer against defects of materials, and by the Contractor for defects in workmanship for a period of five (5) years, beginning with the date of substantial completion for the Project.

B. The warranty shall not require the signature of the Owner.

PART 2 PRODUCTS

2.1 MEMBRANE MATERIALS

A. Sheet applied waterproofing membrane, approved manufacturers:

1. Bituthene 3000 by GCP Applied Technologies.

2. Polyguard 650 Membrane by Polyguard Products, Inc.

3. CCW Miradri 860/861 by Carlisle Coatings and Waterproofing Co.

B. Primer:

1. Bituthene Primer WP-3000 or Primer B2 by GCP Applied Technologies.

2. Polyguard 650 LT Liquid Adhesive, by Polyguard.

3. CCW Contact Adhesive, or alternative manufacturer recommended primer by Carlisle.

C. Surface Treatment:

1. Bituthene Deck Prep or Bituthene Liquid Membrane by GCP Applied

Technologies.

2. Liquid Membrane as recommended by Polyguard.

3. CCW-703, CCW-703V or alternative surface treatment as recommended by the manufacturer.

D. Drainage Sheet/Protection Layer, approved manufacturers:

1. Hydroduct 660 by GCP Applied Technologies.

2. Polyguard Flow 18-H by Polyguard.

3. Mira Drain drainage matt as recommended by Carlisle.

E. Filter Fabric, approved manufacturers:

1. Mirafi 180N by TenCate Geosynthetics Americas.

2. Alternative Woven drainage fabric with the following characteristics:

d. Grab Strength per ASTM D4632: 205 lbs.

e. CBR Puncture Strength per ASTM D6241: 500 lbs.

f. Equivalent Opening Size per ASTM D4751: 80 U.S. Sieve.

g. Water Flow Rate per ASTM D4491: 95 gal/min/SF.

F. Adhesives and Sealants: As recommended and approved by the membrane manufacturer.

G. Termination Bar: One inch wide by one-eighth inch thick stainless steel bar, pre-drilled at six inches on center to receive fasteners.

H. Anchors: ¼" diameter stainless steel Metal Hit Anchor by Hilti Corp.

I. Sheet Metal Flashing:

1. 26 ga. stainless steel.

2. Size as indicated on Drawings.

J. Insulation: High-compressive strength (minimum 60 psi) Styrofoam Plazamate insulation by Dow Chemical Do., Midland, Michigan. Thickness as required or indicated on the Drawings.

PART 3 EXECUTION

3.1 PREPARATION

A. Surface Preparation:

1. Perform final surface preparation and cleaning procedures in accordance with this Section unless the waterproofing system manufacturer has more stringent requirements. Apply membrane only to clean, dry prepared surfaces.

2. Existing surfaces scheduled to receive membrane shall be clean having all dirt, debris, concrete, water and saw cutting slurry, protection sheet and existing insulation removed from the surface.

3. Do not use acids or water blasting in surface preparation work.

B. Protection:

1. Do not allow construction equipment or other trades on prepared and cleaned substrate.

2. Do not store materials or equipment on prepared and cleaned substrate.

3. Do not allow construction traffic personnel to traverse across prepared and cleaned substrate.

3.2 DETAIL APPLICATION

A. Before final surface preparation, examine exposed substrates intended for adhered liquid flashing for cracks and joints. Detail all such cracks and joints after surface preparation in accordance with manufacturer's recommendations.

3.3 SHEET APPLIED MEMBRANE APPLICATION

A. Do not apply new membrane system to damp or wet surfaces.

B. Provide a continuous layer of Surface Treatment over the entire horizontal deck surface. Terminate horizontal surface treatment at vertical walls, curbs, and other vertical projections. Minimum thickness to be 20 dry mils.

C. After curing of horizontal surface treatment, provide a coat of liquid membrane on walls, curbs, drains, pipes and other vertical projections and protrusions. Minimum thickness to be 20 dry mils. Terminate membrane below top of the new topping slab or plaza finishes.

D. Provide Liquid Membrane fillet where vertical surfaces and horizontal surfaces meet.

E. After proper cure of surface treatment materials, apply self-adhering membrane. Install in shingle fashion from low point to high point. Maintain overlap at edges per manufacturer’s recommendations. Terminate membrane on vertical surfaces 1” below top of new topping slab or plaza finishes.

F. After completion of the membrane, secure all vertical terminations at walls and curbs with termination bar. Secure bar to concrete with anchors at 12” o.c. Locate termination bar along top of membrane.

G. Drainage Mat:

1. Install drainage mat on all horizontal and near horizontal sloped surfaces of completed membrane system in accordance with manufacturer's recommendations.

2. Install pieces in as large of size possible. Overlap ends of separate pieces as appropriate based on the configuration of the drainage mat. Butt adjoining pieces of mat tight and overlap salvage edge of fabric onto adjoining piece. Spot adhere filter fabric to hold in place during construction.

3. Ensure the drainage mat lies flat and in contact with the membrane.

4. Where drainage mat terminates at vertical wall, curbs and protrusions wrap end of open drainage core with filter fabric and extend a minimum of 2" under mat.

3.4 FIELD QUALITY CONTROL

A. Site Tests:

1. Water Test:

a. Prior to installation of drainage mat, plug drains, and water test completed membrane by ponding a minimum of 2 inches for a period of 24 hours to insure a watertight system.

b. Provide means of water containment during water testing to prevent flooding of adjoining areas.

c. If leaks occur, drain area and repair membrane. Retest repair area only.

d. Construct water containment barriers as approved by the membrane manufacturer.

B. Manufacturer's Field Service:

1. A technically competent employee of the waterproofing membrane manufacturer (the technician), not associated with the Contractor or the installation crew shall be on site before the first installation of the membrane system. Provide resume of experience and credentials for Approval to Owner.

2. The technician shall remain on site for the length of time necessary to observe the preparation and installation of 20% of waterproofing system, including the drainage mat.

3. Do not begin application of the waterproofing membrane system until the technician has approved the preparation, cleanliness, and surface texture of the substrate.

4. The technician shall review all Contractor application techniques and

procedures and shall advise the Contractor when, where and as required to obtain specification compliance.

3.5 CLEAN-UP

A. During the progress of the work, remove from the project all discarded materials and debris.

B. Clean all surfaces affected by work of this Section and repair all damage caused to adjacent construction or property, at no cost to the Owner.

C. Leave adjacent premises clean and free of construction dirt and debris that resulted as part of the construction process.

D. Remove empty containers from the facility at the end of each working day.

E. Place soiled cloths that constitute fire hazards in suitable metal safety containers or remove them from the site at the end of each working day. Take special care in storage or disposal of flammable materials. Comply with health and fire regulations.

END OF SECTION

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 079000

EXPANSION JOINTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. New compressible expansion joint seal and seal/cover plate installation.

B. Existing expansion joint seal repairs.

1.2 RELATED SECTIONS

A. Section 030100 - Concrete Repairs.

B. Section 079200 – Sealants.

1.3 SUBMITTALS

A. Joint and Several Warranty Form meeting the requirements of Paragraph 1.7.

B. Letter of inspection approving blockout or noting unacceptable conditions per Paragraph 1.4F.

C. Shop drawings of all expansion joint conditions, including typical section, factory manufactured splices and each termination detail.

D. Literature for manufactured products, including manufacturer's specifications, test data and installation instructions including temperature limitations and joint opening recommendations.

E. Letter of approval per Paragraph 1.4.B.

F. Prior project experience per Paragraph 1.4.C.

G. Joint System Sample per Paragraph 1.4.E.

H. Name and resume of persons per Paragraphs 1.4.D and 1.4.F.

I. Letter from expansion joint manufacturer per Paragraph 1.6.

1.4 QUALITY ASSURANCE

A. Applicable Codes:

1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National

Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

2. If the above laws, codes or ordinances conflict with the Specification, then the laws, codes or ordinances shall govern, excerpt in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

B. The expansion joint installer shall be approved by the manufacturer.

C. All work under this Section shall be performed by Contractors which have successfully performed at least three verifiable years of projects that are similar in magnitude and type to those involved in this Contract and three or more prior projects in a climate similar to that for this project.

D. All work under this Section shall be under the immediate control of the Contractor's non-working superintendent(s) experienced in this type of work. The person(s) shall have supervised three prior projects of similar magnitude and type, and shall be present during all operations. This person(s) shall be approved by the Owner.

E. The Owner may submit material samples to an independent testing laboratory for verification of material properties and/or conformance to performance standards.

F. A technically competent employee of the expansion joint manufacturer (not associated with the installation crew or Contractor) shall be present before and during the installation of the initial lengths of the joint system (minimum 50% of total joints) on this project. This person shall be approved by the Owner.

G. The expansion joint manufacturer and installer must inspect the completed block-outs prior to the start of new joint system installation. Unacceptable conditions must be reported, in writing, to the Owner prior to start of work. Starting installation of the new expansion joints constitutes acceptance of the completed block-out conditions.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver all materials to job site in sealed, undamaged containers. Each container shall be identified with materials' name, date of manufacture, lot and batch number.

B. Store materials when not in actual use in a place specifically assigned for that purpose which is well ventilated and lighted and not subject to direct sun rays. Materials shall be kept or packaged when not in use. Keep storage area neat and clean and secure from vandalism and theft.

C. Perform work in strict accordance with all safety and weather conditions required

by product literature or as modified by applicable rules and regulations of Local, State and Federal authorities having jurisdiction.

D. When toxic or flammable solvents are used, the seal installer shall take all necessary precautions as recommended by the manufacturer. In all cases, the handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

1.6 SEQUENCING

A. The expansion joint seal manufacturer shall provide a written procedure for installation of new expansion joint seals within 10 days after placement of cementitious material used for the modification of expansion joint block-outs and overlays.

1.7 WARRANTY

A. A warranty of five (5) years shall be provided for all types of new expansion joint seals. The manufacturer and approved installer shall jointly and severally maintain the joint in a safe, waterproof condition for the warranty period at no additional cost to the Owner. The Contractor is responsible for compliance of both the manufacturer and approved installer for the warranty period.

B. A warranty of two (2) years shall be provided by the contractor for all existing expansion joint system repairs against problems, including debonded repair materials, deterioration of repair materials, and excessive leakage at repair locations.

PART 2 PRODUCTS

2.1 WINGED COMPRESSION SEAL EXPANSION JOINT SYSTEM REPAIRS:

A. Emseal Joint Systems Materials

2.2 HORIZONTAL COMPRESSIBLE EXPANSION JOINT SEAL

A. DSM seal by Emseal, Inc.

1. Assume 2-3/4” width for bidding. Verify seal size prior to ordering.

B. Willseal 250R by Willseal, Inc.

1. Assume 2-3/4” width for bidding. Verify seal size prior to ordering.

2.3 HORIZONTAL COMPRESSIBLE SEAL/COVER PLATE EXPANSION JOINT SYSTEM

A. SJS System by Emseal, Inc.

1. Assume 2-3/4” width for bidding. Verify seal size prior to ordering.

2.4 VERTICAL COMPRESSIBLE EXPANSION JOINT SEAL

A. DSM Seal by Emseal, Inc.

1. Assume 2-1/4” width for bidding. Verify seal size prior to ordering.

B. Wilseal 250 by Willseal, Inc.

1. Assume 2-1/4” width for bidding. Verify seal size prior to ordering.

PART 3 EXECUTIONS

3.1 GENERAL

A. Where scheduled for replacement, remove existing expansion joint systems and perform minor concrete repairs as required to perform the work. Refer to Drawings and Section 030100 as appropriate.

B. If found, remove styrofoam or any other form of joint filler material in expansion joint openings.

C. Cure all expansion joint system nosing and adhesive materials in accordance with manufacturer's recommendations. Allow nosing to cure for minimum time period based on temperature conditions required by the manufacturer. Verify nosing and adhesive material is cured, prior to allowing vehicular traffic across the joint. Use traffic plates if necessary, temporarily anchor to the deck side of the joint, to accommodate traffic.

D. Accelerated curing by heating of nosing and adhesive material is not permitted.

E. Do not install seals or associated materials over or on wet substrate materials.

F. Cease installation of seals under adverse weather conditions, or when temperatures (deck or ambient) are outside the allowable temperature limits.

G. Install seals as soon during the Work as substrate temperatures permit.

3.2 NEW COMPRESSIBLE EXPANSION JOINT SEAL INSTALLATION

A. Preparation of concrete joint openings:

1. Where appropriate, perform all necessary repairs to establish consistent joint openings across the entire deck surface. Use manufacturers approved epoxy based repair materials for minor joint edge or block-out repairs, or alternative concrete repair materials for larger repair areas. Refer to Specification Section 030100.

2. Rout and seal adjacent construction joints or cracks that intersect the block-out for a length of 8 inches. Refer to Specification Section 079200.

3. Grind and vacuum clean all concrete surfaces to be in contact with seal system no sooner than 24 hours before seal installation. Contact surfaces shall be clean, dry and sound. Re-grinding is required if contact surfaces become contaminated after the initial blasting. This includes contamination by rainwater runoff. Wet sand blasting followed by adequate drying is approved if conditions warrant, as approved by manufacturer.

4. Coordinate preparation procedures to avoid damage to vehicles on levels below or adjacent to work area. Remove all dirt and debris from joint opening and adjacent floor areas on both levels immediately after work is complete.

B. Seal Installation:

1. Install new seal per manufacturer's installation instructions. For locations directly exposed to weather, perform work during coolest portion of day. Complete work at least 4 hours prior to anticipated rising deck temperatures. Cease installation of joint system under adverse weather conditions.

2. Install manufacturer's approved adhesive or bonder to compression seal and concrete, nosing or metal surfaces which will be in contact.

3. Install seals per manufacturer's installation instructions.

4. Install the seals in continuous lengths with no splices in the horizontal plane of the seal. Recess seals slightly from adjacent floor surfaces.

5. Turn seals up onto and across curbs and up 4 inches at adjoining vertical wall and column surfaces. Vertical installation to be flush with adjoining wall and column surfaces.

6. As appropriate, provide heat welds or adhesive at direction changes from horizontal to vertical. Execute welds per manufacturer's requirements.

7. Before installation, test splices with a 150# axial tension load.

8. Seal splices at end conditions as recommended by the manufacturer if those conditions are not shown on the Drawings.

9. Install any supplemental cap seal materials in the same work shift, or no later than the next day if no inclement weather is predicted.

3.3 REPAIR OF EXISTING WINGED COMPRESSION SEAL EXPANSION JOINT SYSTEMS

A. Via visual examination, hammer sounding and observations, locate and paint nosing length of existing joints requiring repair. Confirm repair locations with Owner's representative or Engineer prior to commencement of work. Using electric chipping hammers and hand held tools, carefully remove painted nosing length without damaging the existing gland seal. Extend nosing removal 4 inches beyond end of painted length, in each direction.

B. Cut wing of gland seal perpendicular to joint length approximately three inches from ends of nosing removal. Without damaging, pull wing up and out of blockout bedding material, using flat hand held tools to aid in breaking bonded interfaces.

C. Clean exposed blockout surfaces without damaging adjacent seal. Clean and solvent wipe down all blockout and seal surfaces in repair area in conjunction with manufacturer requirements.

D. Install epoxy bedding repair material per manufacturer's recommendations and lay down seal wing into wet epoxy. Weight seal wing if necessary to assure contact while epoxy is curing.

3.4 CLEAN-UP

A. During the progress of the Work, remove from the project all discarded materials, rubbish, cans and rags.

B. Clean all surfaces of drops or spills of nosing materials with manufacturer approved solvents which are not deleterious to the concrete surface.

C. All hardware, adjacent floor areas, metal work, etc., and the premises shall be lift clean and free of all construction dirt and debris. This includes the removal of debris from pipes, etc., which resulted as part of the construction process.

D. Empty containers shall be removed from the building at the end of each working day. All cloths soiled with solvent or other materials that might constitute a fire hazard shall be placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage or disposal of flammable materials. Comply with health and fire regulations.

END OF SECTION

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 079200

SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

1. Miscellaneous sealant repairs and installations with new compressible seal expansion joints.

1.2 RELATED SECTIONS

A. Section 030100 - Concrete Repairs.

B. Section 079000 – Expansion Joints.

1.3 DEFINITIONS

A. Where the term "manufacturer's recommendations," or variations thereon, are found in this Specification, it shall mean "manufacturer's recommendations which are found in publications available to and commonly used by the general architectural and consulting professions."

1.4 SUBMITTALS

A. Copies of literature for all manufactured products, including manufacturer's specifications, test data and installation instructions or applicator's manual.

B. Letter per Paragraph 1.5.B.

C. Resume of contractor superintendent or employee per Paragraph 1.5.D.

D. Manufacturer's certification per Paragraphs 1.5.F.

E. Proof samples of sealants intended to be installed per Paragraph 1.5.G.

F. If requested, Field samples of sealants installed on site per Paragraph 1.5.H.

G. Material Safety Data Sheets on all materials which are classified as hazardous materials.

H. Upon completion of the Work and prior to final payment, provide written recommendations for routine care and maintenance. Provide list of three Contractors nearest the project location who are qualified to perform repairs to the sealants. Identify common causes of damage and include instructions for temporary patching until permanent repair can be made by qualified personnel.

I. Upon completion of the Work and prior to final payment, provide a fully executed

warranty.

1.5 QUALITY ASSURANCE

A. Applicable Codes:

1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with the Specification, then the laws, codes or ordinances shall govern, excerpt in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

B. The sealant installer must be acceptable to the manufacturer. Provide written confirmation that the intended sealant installer is acceptable to the manufacturer.

C. The Contractor shall review locations where joint sealant work is specified, and shall submit in writing existing conditions and newly specified details which would cause sealant material to fail. Failure to review existing conditions or identify details or procedures which will cause failure of sealant material to perform as specified, the Contractor shall become responsible for all costs relating to correcting the deficient work, including all direct and indirect costs to the Owner.

D. The Contractor's superintendent, or another technically competent employee of the Contractor approved by the Owner and Manufacturer, shall be on site and supervise installation of all sealant on this project. Sealant identified as being installed not under the direct supervision of this person shall be subject to removal and replacement, at the direction of the Owner. This person identified for supervision of the work shall have supervised at least three prior projects of similar magnitude and type.

E. The Owner may, at his discretion, choose to remove up to a six-inch length of sealant in locations at a time after installation and initial curing of sealant to verify installation as specified. The Contractor shall include in his Bid the costs to repair one such location for each 100 ft. of sealant installation. If inspections of these locations by the Owner reveal deficient installation of sealant, the Owner may remove additional sealant to further quantify the length of deficient sealant. The Contractor shall repair all deficient locations of sealant found by the Owner at no additional cost and no extension of time for the work.

F. Sealant materials shall be certified to be compatible by the manufacturer for use with the membrane system.

G. Proof Samples of all sealant materials used on the job site shall be prepared in advance of the work by the Contractor and submitted to the Owner for purposes of testing and examination. Samples shall be manufactured with a unit of material

from the first batch intended for use on the project. Samples (4 total) shall be at least 2 inch x 2 inch square and 1/2 inch thick, with troweled top surfaces, identified with manufacturer's batch numbers, date and location of preparation.

H. The Owner may, at his discretion, direct the Contractor to prepare and submit Field Samples of sealant materials used on the job site during the work. Samples shall be manufactured on site, from a unit of material from the same batch in use that day. Samples (2 total) shall be at least 2 inch x 2 inch square and 1/2 inch thick, with troweled top surfaces, identified with manufacturer's batch numbers, date and location on the project where the sealants represented in the samples were installed. Up to three sets of Field Samples may be requested on this project in the Base Bid.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to job site in sealed, undamaged containers. Each container shall be identified with material's name, date of manufacture and lot number.

B. Only those materials being used during any one work shift may be stored in the Work area. Coordinate location of storage area with the Owner.

C. Sealant materials shall be kept sealed when not in use.

D. Storage and handling of materials shall conform to the requirements of the applicable safety regulatory agencies.

E. Storage areas shall be heated or cooled as required for maintaining the product temperatures within the range recommended by the manufacturer.

1.7 PROJECT CONDITIONS

A. Install sealant materials in strict accordance with all safety and weather conditions required by product literature or as modified by applicable rules and regulations of Local, State and Federal authorities having jurisdiction.

B. Fumes and debris shall be controlled to prevent harmful or undesirable effects in surrounding areas.

C. When toxic or flammable solvents are used, the Contractor shall take all necessary precautions as recommended by the manufacturer. In all cases, the handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

1.8 SEQUENCING

A. Install sealants after any required concrete repairs.

B. Install sealants after adequate cure of concrete repairs. Confirm required cure time

with sealant manufacturer.

C. Install all sealants prior to installation of membrane systems.

1.9 WARRANTY

A. New exposed sealant work shall be warranted for a period of five (5) years against defects due to installation or material deficiencies, including but not limited to excessive softness, excessive entrapped air in cured cross sections, disbonding, cohesive failure, leakage and ultra violet exposure degradation.

B. All required testing and quality assurance operations necessary to furnish the warranty are Contractor and manufacturer's responsibility.

PART 2 PRODUCTS

2.1 SILICONE SEALANTS

A. Approved for horizontal or vertical sealant installations. Products and manufacturers include:

1. Dow 795 by Dow Corning, Inc.

B. Minimum compression or extension of 50% of the nominal joint width without adhesive or adhesive failure.

C. Primer(s) as recommended by the sealant manufacturer for each substrate.

D. Sealants shall be gun grade (non-sag) unless otherwise noted on the Drawings or in this Section.

E. Backer Rod. Backer Rod shall be closed-cell, polyethylene in sizes to maintain 50 percent compression. Backer rod shall not be used except where indicated on the Drawings or unless approved for each intended application location is obtained by the Owner.

F. For joint edge repairs refer to Specification Section 030100.

PART 3 EXECUTIONS

3.1 GENERAL

A. Remove existing sealants in joint cavities, coves and other locations and clean surfaces to remove residue. Rout any new joint cavities scheduled for new sealant. Grind and vacuum clean all joint cavities, coves and other locations scheduled for new sealant as required by the sealant manufacturer within 24 hours of sealant installation.

B. Primer shall be used for all sealant installations regardless of manufacturer's

requirements, unless a letter from the manufacturer states use of a primer is detrimental. Allow primer to cure per manufacturer's recommendation prior to sealant installation.

C. Joint cavities that become contaminated by dirt or moisture after initial preparation, shall be cleaned again at no additional cost to the Owner.

D. Modify the depth of existing joints by additional routing or positioning of backer rod to maintain a width to depth ratio of 2 to 1 unless otherwise noted on the drawings. At no location is the sealant width allowed to exceed 1-1/2".

E. In areas indicated on the Drawings or otherwise directed by the Owner, remove existing failed and deteriorated sealant, all existing cove sealants and existing sealants to be covered by urethane traffic membrane.

F. Reinstall new sealant where existing sealant is removed. Refer to Article 3.2 for new sealant installation requirements in membrane areas and Article 3.3 for repair sealant requirements.

G. Where necessary, square up joint edges and execute repairs with epoxy repair mortar in accordance with manufacturer's recommendations.

H. Rout cracks per details in surfaces at locations directed by the Owner.

I. Rout joints per details.

3.2 NEW SEALANT

A. Refer to Article 3.1 for joint cavity preparation requirements.

B. Clean joint cavity and apply primer as recommended by the sealant manufacturer.

C. Install backer rod or bond-breaker tape where required. Vary size of backer rod if necessary based on field conditions per Article 2.1.F or Article 2.2.F.

D. Install sealant as indicated in details on the Drawings.

3.3 JOINT EDGE REPAIRS

A. Identify joint edge spalls which are too large to be filled with new sealant. Review repair locations with Owner in advance of the work.

B. Square edges of spall with diamond blade as indicated on Drawings.

C. Clean cavity per Article 3.1.

D. Mix epoxy and clean, dry sand to form grout material, and install per Specification Section 030100.

E. Allow for cure prior to sealant installation.

3.4 MISCELLANEOUS SEALANTS

A. Install miscellaneous sealants around drains, pipe penetrations in floors, and elsewhere. Install per Article 3.2 and as indicated on the Drawings.

3.5 CLEAN-UP

A. During the progress of the Work, remove from the project all discarded coating materials, rubbish, cans and rags.

B. All sealant material and drops shall be completely removed from hardware, adjacent floor areas, metal work, etc., and the premises shall be left clean and in orderly condition.

C. All hardware, adjacent floor areas, metal work, etc., and the general premises shall be left clean and free of all construction dirt and debris. This includes removal of all debris from pipes, etc., which resulted from work specified herein.

D. Repaint in matching color all curbs, columns, walls, etc., where existing paint was removed during preparation for sealant installation. Refer to Section 321723.

E. Empty containers shall be removed from the garage at the end of each working day. All cloths soiled with coating that might constitute a fire hazard shall be placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage or disposal of flammable materials. Comply with health and fire regulations.

END OF SECTION