Project Manual

DeRoy Auditorium Reflecting Pool
Detroit, Michigan

Issue for Bids
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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PROJECT INFORMATION

A. Project Identification:

1. DeRoy Hall Pool Upgrades
2. WSU Project No. 023-339702
3. Detroit, Michigan

B. Owner:

1. Wayne State University
2. Design & Construction Services
3. Facilities Planning and Management
4. 5454 Cass Avenue
5. Detroit, MI 48202
6. Tel: 313-577-4310

7. Owner’s Representative: Ronald Kahle, 248-202-6082

C. Engineer:

1. Osborn Engineering
2. 30200 Telegraph Road, Suite 260
3. Bingham Farms, MI 48025
4. Tel: 313-915-4014

5. Engineer’s Representative: Jacob Longton, 313-915-4014

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:
1. The Work of this Project includes the renovation of the existing DeRoy Reflecting Pool, including but not limited to the following: the repair of the existing pond structure; installation of a new waterproofing coating; repair/replacement of historic exposed aggregate steps and paving; replacement of historic exposed aggregate landscape curbs; relocation of an existing air-intake that serves the DERoy building; and ancillary work related to the above scope.

1.4 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
   1. Limits: Confine construction operations to the DeRoy reflecting pool and adjacent sunken plaza, unless otherwise indicated on the Drawings to perform work.
   2. Adjacent Roads, Walkways and Entrances: Keep adjacent roads, walkways, and entrances serving premises and adjacent buildings clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials unless otherwise permitted by the Owner in writing.
   3.
      a. Schedule deliveries to minimize use of adjacent roadways by construction operations.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Condition of Existing Buildings and Adjacent Sites: Maintain portions of existing building areas affected by construction operations in a weathertight condition throughout construction period. Repair damage to adjacent buildings and site areas caused by construction operations.

1.5 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy adjacent buildings and the DeRoy auditorium during construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
   1. Maintain access to existing walkways, exits, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
   2. The University intends to hold classes in the DeRoy auditorium during construction. Coordinate and maintain exist access and all egress paths when in use.
   3. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.6 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing site to normal business working hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify Owner not less than five days in advance of proposed utility interruptions.
   2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
   1. Notify Owner not less than two days in advance of proposed disruptive operations.

2. Obtain Owner's written permission before proceeding with disruptive operations.

E. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations.
3. Keynoting: Materials and products are identified by reference keynotes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
   1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
   2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
   1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Exposed Aggregate Steps

1. Base Bid: Remove all exposed aggregate steps in their entirety at both the south perimeter of the reflecting pool and north perimeter of the sunken plaza. Provide new exposed aggregate steps to match existing historic finish.
2. Alternate: Patch and repair all existing, exposed aggregate steps where cracked, spalling, or otherwise deteriorated at both the south perimeter of the reflecting pool and north perimeter of the sunken plaza. All surfaces to remain shall be cleaned prior to patching. Repairs shall match existing historic finish in accordance with the Historic Treatment Specification. Refer to structural drawings.

B. Alternate No. 2: Polyurea Waterproofing System
1. Base Bid: Clean and prep existing concrete pool structure, including slab and all vertical walls. Prep concrete structure in accordance with manufacturer's requirements and install new polyurea waterproofing coating system in accordance with Specification Section 099653 Specialty Coatings. Refer to structural drawings.
2. Alternate: Clean and prep existing concrete pool structure, including slab and all vertical walls. Prep concrete structure in accordance with manufacturer's requirements and install new cementitious waterproofing coating and topcoat in accordance with Specification Section 071600 Cementitious Waterproofing System. Refer to structural drawings.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:
   1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
      b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      e. Samples, where applicable or requested.
      f. Certificates and qualification data, where applicable or requested.
      g. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners.
      h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
      i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
      j. Cost information, including a proposal of change, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
   a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
   b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
   1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied:
      a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
      b. Requested substitution provides sustainable design characteristics that specified product provided.
      c. Requested substitution will not adversely affect Contractor's construction schedule.
      d. Requested substitution has received necessary approvals of authorities having jurisdiction.
      e. Requested substitution is compatible with other portions of the Work.
      f. Requested substitution has been coordinated with other portions of the Work.
      g. Requested substitution provides specified warranty.
      h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Engineer will consider requests for substitution if received within 60 days after commencement of the Work.
   1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied:
      a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include

compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Requested substitution provides sustainable design characteristics that specified product provided.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. Coordination drawings.
   2. Requests for Information (RFIs).
   3. Project meetings.

1.2 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.

1.4 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's construction schedule.

2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.5 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
   1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
      a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
      b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
   1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
   2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
   1. Project name.
   2. Project number.
   3. Date.
   4. Name of Contractor.
   5. Name of Architect.
   6. RFI number, numbered sequentially.
   7. RFI subject.
   8. Specification Section number and title and related paragraphs, as appropriate.
   9. Drawing number and detail references, as appropriate.
   10. Field dimensions and conditions, as appropriate.
   11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   12. Contractor's signature.
   13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: AIA Document G716 or Software-generated form with substantially the same content as indicated above, acceptable to Architect.

D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow 10 working days for Architect's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.
   1. The following RFIs will be returned without action:
      a. Requests for approval of submittals.
      b. Requests for approval of substitutions.
      c. Requests for coordination information already indicated in the Contract Documents.
      d. Requests for adjustments in the Contract Time or the Contract Sum.
      e. Requests for interpretation of Engineer's actions on submittals.
      f. Incomplete RFIs or inaccurately prepared RFIs.
   2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
   3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal.
      a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 5 working days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
   1. Project name.
   2. Name and address of Contractor.
   3. Name and address of Architect.
   4. RFI number including RFIs that were dropped and not submitted.
   5. RFI description.
   6. Date the RFI was submitted.
   7. Date Engineer's response was received.
   8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
   9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within 5 working days if Contractor disagrees with response.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
   3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than 10 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
    a. Tentative construction schedule.
    b. Critical work sequencing and long-lead items.
    c. Designation of key personnel and their duties.
    d. Procedures for processing field decisions and Change Orders.
    e. Procedures for RFIs.
    f. Procedures for testing and inspecting.
    g. Procedures for processing Applications for Payment.
    h. Distribution of the Contract Documents.
    i. Submittal procedures.
    j. Use of the premises and existing building.
    k. Work restrictions.
    l. Working hours.
    m. Owner's occupancy requirements.
    n. Responsibility for temporary facilities and controls.
    o. Procedures for disruptions and shutdowns.
    p. Construction waste management and recycling.
    q. Parking availability.
    r. Office, work, and storage areas.
    s. Equipment deliveries and priorities.
    t. First aid.
    u. Security.
    v. Progress cleaning.
3. Minutes: Contractor shall record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
    1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Engineer of scheduled meeting dates.
    2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
        a. Contract Documents.
        b. Options.
        c. Related RFIs.
        d. Related Change Orders.
        e. Purchases.
        f. Deliveries.
        g. Submittals.
        h. Review of mockups.
        i. Possible conflicts.
        j. Compatibility problems.
        k. Time schedules.
        l. Weather limitations.
        m. Manufacturer's written instructions.
        n. Warranty requirements.
        o. Compatibility of materials.
        p. Acceptability of substrates.
        q. Temporary facilities and controls.
        r. Space and access limitations.
        s. Regulations of authorities having jurisdiction.

t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at regular intervals and when directed by the Owner or Architect.
1. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
1) Review schedule for next period.
b. Review present and future needs of each entity present, including the following:
1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.
3. Minutes: Contractor shall record and distribute the meeting minutes to each party present and to parties requiring information.
a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013591 - HISTORIC TREATMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general protection and treatment procedures for the entire Project.

B. The DeRoy Auditorium, which includes the surrounding reflecting pool, is listed on the National Register of Historic Places.

1.2 DEFINITIONS

A. Existing to Remain: Existing items that are not to be removed or dismantled.

B. Historic: Spaces, areas, rooms, surfaces, materials, finishes, and overall appearance which are important to the successful restoration and reconstruction as determined by Architect.

C. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

D. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.

E. Remove: Specifically for historic spaces, areas, rooms, and surfaces, the term means to detach an item from existing construction to the limits indicated, using hand tools and hand-operated power equipment, and legally dispose of it off-site, unless indicated to be salvaged or reinstalled.

F. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

G. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

H. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.

I. Retain: To keep existing items that are not to be removed or dismantled.

J. Salvage: To protect removed or dismantled items and deliver them to Owner or retain for reinstallation.

1.3 INFORMATIONAL SUBMITTALS

A. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's historic treatment operations.

B. Historic Treatment Program: Submit before work begins.

C. Fire-Prevention Plan: Submit before work begins.

1.4 QUALITY ASSURANCE

A. Historic Treatment Program: Prepare a written plan for historic treatment for whole Project, including each phase or process and protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures specified in this and other Sections. Plan shall include, but is not limited to, the following:
   1. Protection: Include procedures and methods of protecting adjacent buildings and existing materials during construction.
   2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
   3. Procedures and methods required to perform the Work.
   4. Procedures and methods of protecting adjacent and existing construction and site elements while performing the Work.

B. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-prevention devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include each fire watch's training, duties, and authority to enforce fire safety.

C. Regulatory Requirements: Comply with notification regulations of authorities having jurisdiction before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Standards: Comply with ANSI/ASSE A10.6.

E. Historic Treatment Preconstruction Conference: Conduct conference at Project site to review methods and procedures related to historic treatment including the following:

F.
   1. Protection of adjacent buildings and existing construction.

1.5 STORAGE AND PROTECTION OF MATERIALS

A. Materials for Reinstallation:
   1. Identify each item with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
   2. Repair and clean items as indicated and to functional condition for reuse.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make item functional for use indicated.

B. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work.

1.6 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to removal and dismantling area. Conduct removal and dismantling work so Owner's operations will not be disrupted.

B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

C. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.
   1. Verify that affected utilities have been disconnected and capped.
   2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
   3. Before removal or dismantling of existing site elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
   4. Engage a professional engineer to survey condition of structural and non-structural elements to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures as a result of removal and dismantling work.

B. Perform surveys as the Work progresses to detect hazards resulting from historic treatment procedures.

3.2 PROTECTION, GENERAL

A. Comply with temporary barrier requirements in Section 015000 "Temporary Facilities and Controls."

B. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from historic treatment procedures.
   1. Use only proven protection methods, appropriate to each area and surface being protected.
   2. Provide barricades, barriers, and temporary directional signage to exclude public from areas where historic treatment work is being performed.

3. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of historic treatment work.
4. Contain dust and debris generated by removal and dismantling work and prevent it from reaching the public or adjacent surfaces.
5. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
6. Protect floors, walks, and other surfaces along haul routes from damage, wear, and staining.
7. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.

C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

D. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Engineer immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is in working order.
1. Prevent solids such as stone or mortar residue from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from historic treatment work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS & COATINGS

A. Protect motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemical cleaners, paint removers, and coatings.

B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in historic treatment program. Use covering materials and masking agents that are waterproof, UV resistant, and will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials staining.

C. Do not apply chemicals or coatings during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize and collect alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.4 PROTECTION FROM FIRE

A. General: Follow fire-prevention plan and the following.
1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties entitled "Owner's Responsibility for Fire Protection."

2. Remove and keep area free of combustibles including, rubbish, paper, waste, and chemicals, except to the degree necessary for the immediate work.
    a. If combustible material cannot be removed, provide fire blankets to cover such materials.
3. Prohibit smoking by all persons within Project work and staging areas.

B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or highly combustible materials, including welding, torch-cutting, soldering, brazing, paint removal with heat, or other operations where open flames or implements utilizing high heat or combustible solvents and chemicals are anticipated:
1. Obtain Owner's approval for operations involving use of open-flame or welding or other high-heat equipment. Notify Owner at least seventy-two hours before each occurrence, indicating location of such work.
2. As far as practical, restrict heat-generating equipment to shop areas or outside the building.
3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
6. Fire Watch: Before working with heat-generating equipment or highly combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows.
    a. Train each fire watch in the proper operation of fire-control equipment and alarms.
    b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
    c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
    d. Have fire watch perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work at each area of Project site to detect hidden or smoldering fires and to ensure that proper fire-prevention is maintained.
    e. Maintain fire-watch personnel at each area of Project site until 60 minutes after conclusion of daily work.

C. Fire Extinguishers, Fire Blankets, and Rag Buckets: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire watch are trained in fire-extinguisher and blanket operation.

3.5 GENERAL HISTORIC TREATMENT

A. Perform work as indicated on Drawings and in accordance with the relative specifications and historic treatment program. Follow the procedures in subparagraphs below and procedures approved in historic treatment program:
1. Retain as much existing material as possible; repair and consolidate rather than replace.
2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
3. Use reversible processes wherever possible.
4. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.

B. Notify Engineer of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.
   1. Do not proceed with the work in question until directed by Engineer.

C. Where Work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.

D. Anchorages:
   1. Remove anchorages associated with removed items.
   2. Dismantle anchorages associated with dismantled items.
   3. In historic surfaces, patch or repair holes created by anchorage removal or dismantling according to Section specific to the historic surface being patched.

END OF SECTION 013591

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:
   1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.

1.3 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.

2.2 TEMPORARY FACILITIES

A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
   1. Locate facilities to limit site disturbance and as approved by the Owner.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Coordinate use of existing utilities with the Owner prior to Construction.

B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

3.3 SUPPORT FACILITIES INSTALLATION

A. Traffic Controls: Comply with requirements of authorities having jurisdiction.
   1. Protect existing site improvements to remain including curbs, pavement, and utilities.
   2. Maintain access for fire-fighting equipment and access to fire hydrants.

B. Parking: Contractor parking is not provided. The Contractor may purchase parking cards from the University. Street parking is available on a first come first serve basis.

C. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
   1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
   2. Remove snow and ice as required to minimize accumulations.

D. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
   1. Identification Signs: Provide Project identification signs as required by the Owner.
   2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
      a. Provide temporary, directional signs for construction personnel and visitors.
   3. Maintain and touchup signs so they are legible at all times.

E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
   1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
   1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
   2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire prevention program.
   1. Prohibit smoking in construction areas.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
   3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
   2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. Field engineering and surveying.
   3. Installation of the Work.
   4. Cutting and patching.
   5. Coordination of Owner-installed products.
   6. Progress cleaning.
   7. Starting and adjusting.
   8. Protection of installed construction.
   9. Correction of the Work.

B. Related Requirements:
   1. Section 011000 "Summary" for limits on use of Project site.
   2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.2 INFORMATIONAL SUBMITTALS

A. Certified Surveys: Submit two (2) copies signed by land surveyor showing existing conditions and all Work performed as part of this Project.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
   1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
   2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
   3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
5. Historic Finishes: cutting and patching of historic finishes, including but not limited to exposed aggregate surfaces, shall match the original finish, including the size, texture, color, and percent of aggregate exposed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   1. Examine roughing-in for pool, utility, and electrical systems to verify actual locations of connections before equipment and fixture installation.
   2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.

B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   3. Conceal pipes, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Utility and Electrical Services: Cut off pipe or conduit to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
3. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.
   5. Repair of the Work.

1.2 ACTION SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.

3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number where applicable.
5. Submit test/adjust/balance records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
2. Complete startup and testing of systems and equipment.
3. Perform preventive maintenance on equipment used prior to Substantial Completion.
4. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
5. Complete final cleaning requirements, including touchup painting.
6. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment.
2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
   1. Submit list of incomplete items in the following format:
      a. MS Excel electronic file. Engineer will return annotated copy.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
   1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
   4. Provide digital copies of all warranties in a single, assembled PDF format.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Comply with manufacturer's written instructions.
   1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including plenums, shafts, trenches, equipment vaults, , and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Remove labels that are not permanent.
j. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
k. Clean pool fixtures and equipment to a sanitary condition, free of stains, including stains resulting from water exposure.
l. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
m. Leave Project clean and ready for occupancy.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
    a. Do not paint over required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

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.

1.2 SUMMARY

A. Section Includes:
   1. Demolition and removal of selected site elements.
   2. Salvage of existing items to be reused.
   3. Salvage of existing items for Owner.

B. Related Requirements:
   1. Section 013591 “Historic Treatment Procedures” for administrative and procedural requirements related to all Work of this Project.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

D. Work in Historic Areas: The entire Project site is considered a historic space containing historic elements, materials, and surfaces. The terms "demolish" or "remove" shall mean historic "removal" or "dismantling" as specified in Section 013591 "Historic Treatment Procedures."

1.4 INFORMATIONAL SUBMITTALS

A. Inventory: Submit a list of items to be removed to the Owner prior to start of demolition.
   1. Owner will review list to determine if any materials, assemblies, or equipment shall be salvaged and turned over to the Owner as Owner Property.

1.5 MATERIALS OWNERSHIP

A. Unless otherwise indicated or retained by the Owner, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
   1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.6 PRE-DEMOLITION MEETINGS

A. Pre-demolition Meeting: Conduct conference at Project site to review with Owner the extent of all demolition prior to performing the Work of this Section.
   1. Review with Owner all materials, assemblies, equipment to be removed and confirm with Owner any salvage requirements.

1.7 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

1.8 FIELD CONDITIONS

A. Owner will occupy existing buildings immediately adjacent to Project site. Conduct selective demolition so Owner's operations will not be disrupted.
   1. Comply with requirements specified in Section 011000 – “Summary”

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
   1. Before selective demolition, Owner will remove the following items:
      a. Existing surface-mounted mechanical units located east of the upper plaza deck, immediately west and adjacent to the McGregor Pond.
      b. Existing electrical meter located east of the upper plaza deck, immediately west and adjacent to the McGregor Pond.
      c. Existing bronze sculptures located on Islands 1, 2 and 3.

C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities in service and protect them against damage during selective demolition operations.

1.9 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain all services/systems to adjacent buildings and protect them against damage.
   1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Owner will arrange to shut off indicated utilities with utility companies when requested by the Contractor.
   2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to adjacent buildings.
   3. Disconnect, demolish, and remove systems, equipment, and components indicated to be removed.
      a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material
      b. Equipment to Be Removed: Disconnect and cap services and remove equipment.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.4 SELECTIVE DEMOLITION, GENERAL

A. Contractor shall not remove any demolished material or equipment until after confirming with the WSU Project Manager whether the item should be salvaged.
   1. Any demolished material or equipment not salvaged by the Owner or reused for construction shall be disposed of by the Contractor.

B. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
   4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or adjacent structures.
   5. Dispose of demolished items and materials promptly.

C. Work in Historic Areas: The entire Project site is considered a historic space containing historic elements, materials, and surfaces. The terms "demolish" or "remove" shall mean historic "removal" or "dismantling" as specified in Section 013591 "Historic Treatment Procedures."

D. Removed and Salvaged Items: Comply with requirements specified in Section 013591 "Historic Treatment Procedures."
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area designated by Owner.
   5. Protect items from damage during transport and storage.

E. Removed and Reinstalled Items: Comply with requirements specified in Section 013591 "Historic Treatment Procedures."
   1. Number and tag items prior to removal to record original locations and sequencing. Items to be tagged include the following:
      a. Exposed-aggregate concrete bridges.
      b. Granite coping stones at pool and island perimeters.
   2. Clean and repair items to functional condition adequate for intended reuse.
   3. Pack or crate items after cleaning and repairing. Identify contents of containers.
   4. Protect items from damage during transport and storage.
   5. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
      a. Reinstall bridges and granite coping stones in original locations.

F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
   1. Comply with requirements specified in Section 013591 "Historic Treatment Procedures."

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete Pavement: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then break-up and remove concrete between saw cuts.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, reinstalled, salvaged, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 030130 - PATCHING OF CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

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

B. Section includes:

1. Concrete Delamination Repairs - Removal of deteriorated concrete and subsequent patching and rebuilding.

C. Unit Prices:

1. Refer to the Bid Form to provide Unit Prices for each of the items identified on the drawings. Include labor, material, equipment costs, and the like necessary to install, complete and in place, the Work described by each of the following items and this Section.
2. Payment:

    a. The Contractor's repair area quantities will be verified after preparation – but prior to the placement of repair materials.
    b. Payment for repairs will be considered upon completion of the Work.

1.2 REFERENCES

A. Reference Standards:

1. American Concrete Institute (ACI):

    a. Standard Specifications for Structural Concrete (ACI 301-05).
    b. Cold Weather Concreting (ACI 306R-88 [Reapproved 2002]).

2. ASTM International:

    a. Standard Specification for Concrete Aggregates (ASTM C-33-03).
    b. Standard Specification for Portland Cement (ASTM C-150-05).
    c. Standard Specification for Chemical Admixtures for Concrete (ASTM C-494-05a).
    d. Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear (ASTM C-882-05).
    e. Standard Practice for Measuring Delaminations in Concrete Bridge Decks by Sounding (ASTM D-4580-03).

3. Concrete Reinforcing Steel Institute (CRSI): Standard Specifications.
4. International Concrete Repair Institute (ICRI): Printed guidelines for the repair of deteriorated concrete resulting from oxidation of reinforcing steel.

1.3 SUBMITTALS

A. Certificates: The Repair Materials Manufacturer's Certificate of Compliance.

B. Manufacturers' Instructions: Installation instructions.

C. Product Date: Include material descriptions, chemical composition, physical properties, test data, and mixing and application instructions.

D. 1. Include Material Safety Data Sheets, if applicable

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Repair Materials Manufacturer: A company specializing in type of materials specified, with no less than ten years of documented experience similar to the Work specified.
2. Applicator: A contractor with no less than ten years of documented experience similar to the Work specified. The Contractor shall be approved or certified by the respective Repair Materials Manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver the specified products in original, unopened containers with the respective Repair Materials Manufacturer's names, labels, and identification intact.

B. Comply with the respective Repair Materials Manufacturer's instructions for storage, shelf life, and handling.

1.6 PROJECT CONDITIONS

A. Environmental Requirements: Place repair materials within the temperature and weather limitations given by the respective Repair Materials Manufacturer.

1.7 QUANTIFYING REPAIRS

A. Provide anticipated work schedule to the Owner prior to commencement of operations. Schedule work to minimize inconvenience to the Owner.

1. After Examination (prior to removal operations): Verify quantity of repairs with the Owners representative in each section before proceeding to other sections. The Owners representative will review and approve the Contractor's outline of repair areas prior to commencement of removal operations.
2. After Preparation (prior to the placement of repair materials): Verify quantity of repairs with the Owners representative in each section before proceeding to other sections.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Master Builders Solutions, MBSS, Shakopee, MN (Website: www.master-builders-solutions.com, Voice: 800.433.9517).

B. The Euclid Chemical Company (EUCO), Cleveland, OH. (Website: www.euclidchemical.com, Voice 800.321.7628).

C. Sika Corporation (USA), Lyndhurst, NJ (Website: www.sikausa.com, Voice: 800.933.7453).

D. MAPEI Corporation, Deerfield Beach, FL (Website: www.MAPEI.com Voice: 1-800-992-6273

E. ChemMasters, Madison, OH (Website: www.chemmasters.net Voice: 440-428-2105

2.2 MATERIALS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to the following:

1. Bonding Agent: Slurry coat of batch material mixed to a slightly wetter consistency, per the Repair Materials Manufacturer's recommendations.

2. Cementitious Epoxy Bonding Agent & Anti-Corrosion Coating.

a. MAPEI Corporation Planibond 3C or MAPEFER 1K for rebar only
b. Master Builders Solutions; MasterEmaco P124
c. Sika Corporation; Sika Armatec 110
d. Euclid Chemical Company; DUALPREP AC
e. ChemMasters: Polyweld EPXci

3. Cementitious Patching Mortar Vertical / Overhead – (Limited to Area Less Than 5 SF).

a. MAPEI Corporation, Planitop X/XS, Planitop 23, Planitop 12SR
b. Master Builders Solutions; MasterEmaco S 488 CI
c. Sika Corporation; SikaQuick VOH, Sikarepair 224 or Sikatop 123 plus
d. Euclid Chemical Company; Tamms Structural Mortar
e. ChemMasters: Chempatch VO1 or Chempatch Fast VO

4. Cementitious Patching Mortar - Form and Pour/Pump

a. MAPEI Corporation Planitop 15, Planitop 11SCC
b. Master Builders Solutions; MasterEmaco S 466CI or S 477CI
c. Sika Corporation; Sika Monotop 611, SikaQuick FNP, Sikacrete 100 CI, Sikacrete 211 SCC Plus
d. Euclid Chemical Company; Tamms Form and Pour Concrete
e. ChemMasters: Chempatch Form & Pour

5. Polymer Modified Patching Mortar: See Cementitious Patching Mortar – Form and Pour

6. Cementitious Patching Mortar, Rapid Setting

a. MAPEI Corportation, Planitop 18, Planitop 18ES, Planitop 18TG
b. Master Builders Solutions; MasterEmaco T 415 OR T 430
c. Sika Corporation; SikaQuick 1000 or SikaQuick 2500
d. Euclid Chemical Company; EUCO-SPEED
e. ChemMasters: Chemspeed 75 or Chemspeed 75ES

2.3 EQUIPMENT

A. Chipping Hammers (if used): 25-pound class.

PART 3 - **EXECUTION**

3.1 EXAMINATION

A. Examine and verify repair areas with the Engineer per Section 1.8 above.

B. Inspect all concrete surfaces within project limits, using a hammer, sounding rod, chaindrag or other similar method approved by the Owners representative for locating deteriorated concrete. Sounding shall be done in accordance with ASTM D-4580-03.

C. Provide equipment as necessary to inspect the surfaces within the scope of the Work completely.

D. Using the Contractor's own aerosol spray paint, outline areas of loose, unsound, or delaminated concrete for removal.

3.2 PREPARATION

A. Temporary Protection and Shoring:

1. Provide necessary scaffolding and falsework. Be responsible for strength, safety, and compliance regulations regarding scaffolding and falsework, and other supports.
2. Supply necessary supports and shoring. Support insecure portions of concrete construction adjacent to the work area. Brace and support concrete work until adequate strength is attained. Be responsible for the strength and stability of the structure.
3. Provide shields, barriers, and coverings necessary to protect the building occupants and to prevent interference with the safe use of the structure by the occupants.

B. Dust Control: Isolate dust and debris to area of construction. Provide shields and barriers necessary to keep vehicles, and occupied and public areas free of deleterious materials and dust.

C. Surface Preparation:

1. Prepare per the International Concrete Repair Institute (ICRI) guidelines.
2. Remove loose, unsound, or delaminated concrete by hydro-demolition or mechanical means. Remove concrete in a manner that prevents damaging reinforcing steel and sound concrete.

    a. Operate chipping hammers at an angle of less than 45 degrees with respect to the surface.

3. Once initial removals are made, proceed with undercutting exposed corroded reinforcing bars, as indicated on the Drawings.

    a. Provide 3/4 inch minimum clearance between exposed reinforcing and surrounding concrete – or 1/4 inch larger than largest aggregate in repair mortar – whichever is greater.
    b. Extend concrete removals along the bars to locations along the bar that are free of bond-inhibiting corrosion, and where the bar is well bonded to surrounding concrete.
    c. If un-oxidized reinforcing steel is exposed during the undercutting process, take care not to damage the bar's bond to surrounding concrete. If bond between bar and concrete is broken, undercutting of the bar will be required.

4. Secure loose reinforcement in place by tying to other secured bars or by other approved methods.

5. If reinforcing has lost more than 25-percent cross section (20-percent if two or more consecutive parallel bars are affected), repair the reinforcing by complete bar replacement or addition of supplemental bar of proper bar size and length. Include required bar replacement in the Contractor's Base Bid and Unit Price costs. See typical repair and cleaning of reinforcing steel details on S-301 for more info
6. Make removal edges using 1/2 inch maximum depth sawcut or right angle break. The presence of feathered edges will be grounds for rejection of the installation. Keep patch configuration rectangular and as simple as possible.
7. After removals are complete, roughen sawcut surfaces and remove bond-inhibiting materials (dirt, concrete slurry, loosely bonded aggregates and heavy corrosion on reinforcing steel) by abrasive-blasting. Check surface after cleaning to be sure it is free of additional loose aggregate, or that additional delaminations are not present.
8. Prevent contamination of the repair surface. If hydro-demolition is used, remove cement and particulate slurry from the prepared surface before slurry hardens.
9. Use care to avoid damaging sound concrete. The Contractor shall bear the cost of additional repairs caused by the actions of the Contractor.

3.3 REPAIR MATERIAL MIXING

A. Add admixtures to the entire fresh pre-mixed batch or truckload of concrete at the Site prior to placement, as recommended by the Admixture Manufacturer.

B. Mix manufactured repair products per the respective Repair Materials Manufacturer's printed instructions.

3.4 PLACEMENT

A. Apply bonding agent to surface of concrete per the respective Repair Materials Manufacturer's printed instructions. Apply only enough bonding agent as can be covered by the repair material before it dries.

B. Immediately following application of bonding agent, place patching concrete. Consolidate patch materials, then screed and allow to set. Apply ample pressure to repair material when troweling to ensure intimate contact with the substrate and to eliminate voids behind reinforcing steel.

C. Patch areas shall receive a finish to match adjacent areas.

D. Do not exceed the maximum lift thickness as noted by the respective Repair Materials Manufacturer. Apply additional lifts as required to achieve full depth thickness of patch. Follow the respective Repair Materials Manufacturer's recommendations for preparing the surface of preceding layers of repair materials.

3.5 REPAIR OF SURFACE DEFECTS

A. Allow the Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Modify or replace concrete not conforming to required lines, detail, and elevations.

C. Repair or replace concrete not properly placed resulting in honeycombing and other defects.

END OF SECTION

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. This section includes all concrete topping slabs.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures:

1. 4000 PSI, Air Entrained Mix for new structural concrete walls, slabs, beams slab-on-grade and sidewalk.
2. 5000 PSI, Air Entrained Mix w/ Synthetic Fibers to be used for Form and Pour Structural Concrete Repairs.
3. 5000 psi at 28 days for concrete topping slab replacement with a maximum aggregate size of 3/8”

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Material certificates.

C. Material test reports.

D. Floor surface flatness and levelness measurements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel.

D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

E. Concrete Testing Service: Engage a qualified independent owner selected testing agency to perform material evaluation tests and to design concrete mixtures.

F. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

1. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M, epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I or Type III, gray. Supplement with the following:

a. Fly Ash: ASTM C 618, Class F or C.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
c. Type 1L Blended cement (ASTM C595) may be used in lieu of Type I Portland cement

B. Normal-Weight Aggregates: ASTM C 33, graded.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.4 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
3. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

2.5 FIBER REINFORCEMENT

A. Synthetic Micro-Fiber: Fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 3/4 inches to 1-1/2 inches long.

2.6 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

B. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick.

2.7 CURING MATERIALS

A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

B. Water: Potable.

C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.9 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.

C. For new concrete structural elements such as slabs, walls, floor slabs, slabs-on-gradeconcrete repair in parking areas and “form and pour” repairs, proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 5 to 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

D. For concrete repair in parking areas and “form and pour” repairs, proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 5000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.38.
3. Slump Limit: 5 to 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
5. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 1.5 to 3.0 lb/cu. yd.

E. For concrete topping slab replacement, the minimum criterial is as follows:

1. Minimum Compressive Strength: 5000 psi at 28 days
2. Modulus of Rupture:.400 psi @ 24 hours
3. Maximum Water-Cementitious Materials Ratio: 0.43.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

2.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

C. Cold-Weather Placement: Comply with ACI 306.1.

D. Hot-Weather Placement: Comply with ACI 301.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Protect and cure type MS concrete as directed in the Ohio Department of Transportation Construction and Materials Specification Manual.

C. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Contractor will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

1. Perform concrete compressive strength testing: Obtain 5 cylinders per ASTM C31. Test (1) cylinder at 3 days, 7 days, 14 days, and 28 days per ASTM C39 to determine concrete compressive strength. Hold one cylinder in reserve for 56 day break, if required.

END OF SECTION

SECTION 050300
CONSERVATION TREATMENT FOR PERIOD METALS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

A. Section 013591 - Period Treatment Procedures: For general historic preservation project requirements.

1.02 REFERENCE STANDARDS

A. ASTM A29/A29M - Standard Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought 2020.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.

C. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing 2021.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Restoration Schedule: Detailed description of areas to be restored including assessment of problem areas proposed procedures. Include the following:

C. Product data.

D. Shop Drawings: Indicate details of connections and anchors for metal elements. Detail shoring, bracing, and temporary or permanent support.

E. Manufacturer's Instructions: For cleaning materials, indicate special procedures and conditions requiring special attention.

F. Conservation treatment quality control plan.

G. Restorer's qualification statement.

1.04 QUALITY ASSURANCE

A. Conservation Treatment Quality Control Plan: Prior to commencing work of this section, submit and receive written approval of plan of proposed metal restoration and cleaning work. Including where restoration will take place, restoration process, material storage, coating application process and location.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver cleaning, restoration, and new materials and products neatly stacked and tied on pallets or in other appropriate packaging for transportation. Store clear of ground with adequate waterproof covering where directed by the Owner prior to installation.

1.06 FIELD CONDITIONS

A. Maintain materials and surrounding air temperature above 40 degrees F prior to, during, and 48 hours after completion of metal work.

B. Maintain materials and surrounding air temperature below 90 degrees F prior to, during, and 48 hours after completion of metal work.

PART 2 PRODUCTS

2.01 METAL MATERIALS FOR REPLICATION OR REPRODUCTIONS

A. Steel Components:
   1. Sections, Shapes, Plate, and Bar: ASTM A36/A36M.

B. Stainless Steel Components:
   1. Stainless Steel Tubing: ASTM A554, Type 304, 3/16" minimum metal thickness, 3" diameter for cast-in hand rail post sleeve.

2.02 SEALANTS

A. Handrail post sealant at walking surface: Non-Staining Silicone Sealant; ASTM C920, Grade NS, Uses M and A; single or multi-component; use T.
   1. Dow 756 SMS Non-Staining; color to be selected by Architect.

2.03 PAINT REMOVERS

A. Manufacturers:
   1. Dumond Chemicals, Inc; Smart Strip Pro: www.dumondchemicals.com/#sle.
   2. PROSOCO, Inc; Enviro-Klean SafStrip: www.prosoco.com/#sle.
   3. Substitutions: See Section 016000 - Product Requirements.

B. Methylene Chloride Based: To remove multiple coats of oil-based, water-based, acrylic-based, epoxy-based, urethane-based, elastomeric, and lead-based paints.
   1. Viscosity: Thixotropic paste or gel.
   2. Temperature at Application: Coating and substrate temperature must be between 65 degrees F and 85 degrees F at time of application.

2.04 RUST REMOVERS

A. Removal Agent: Proprietary formulation, nonacidic gel.

2.05 ACCESSORY MATERIALS

A. Fasteners, General: Same basic metal and alloy as metal items being joined, unless indicated otherwise. Do not use incompatible metals that promote galvanic action.
   1. Nonferrous Metals Fastened to Carbon Steel or Iron Supports: Use pacified type 304 stainless steel fasteners.

PART 3 EXECUTION

3.01 PERIOD TREATMENT, GENERAL

A. See Section 013591 for special procedure requirements related to elements and features of historical significance and value.

3.02 EXAMINATION

A. Verify that surfaces to be cleaned and restored are ready for work of this section.

3.03 PREPARATION

A. Protect surrounding elements from damage from restoration procedures.

B. Remove and store removable items located in areas to be restored including, but not limited to, fixtures, fittings, finish hardware, and accessories; reinstall upon completion of restoration work.

C. Separate areas to be protected from restoration areas to prevent damage.

D. When using liquid cleaning methods, install drainage devices to prevent runoff over adjacent surfaces, unless those surfaces are impervious to damage from runoff.

E. Do not allow cleaning runoff to drain into sanitary or storm sewers.

3.04 REPAIR

A. General: Perform repairs in properly equipped fabrication facility or in situ, in accordance with Conservation Treatment Quality Control Plan.
   1. Match repair method to condition of the element and applicability to the element's metal composition.

B. Welding: Use for reattachment of ferrous elements.
   1. Identify the alloy. Do not weld white cast iron.
   2. Remove surface materials to completely clean the casting in the area of the weld.
   3. Preparation for Refinishing: Use techniques appropriate to the repair, such as deburring, surface grinding, planishing, fine sanding, and polishing.

3.05 GENERAL REQUIREMENTS FOR RESTORATION CLEANING

A. Perform in situ cleaning and rinsing of exterior elements only during daylight hours.

B. Perform in situ cleaning and rinsing of interior elements with adequate artificial lighting.

3.06 REMOVAL OF EXISTING COATINGS

A. Remove existing coatings. Observe remover manufacturer's instructions. Leave metal in a clean, chemical-free, pH neutral condition free of residue.

B. Removal of Coatings: Use techniques least likely to damage metal elements. Test effectiveness of proposed techniques on a small area prior to determining appropriateness of their use.

C. Prepare surface to a SSPC-SP10 Near-White Metal Blast Cleaning and protect until it can be recoated.

3.07 IN SITU RESTORATION

A. Do not mix or apply materials or products when ambient temperature or humidity are outside of range recommended by their manufacturers.

B. Schedule conservation treatments to avoid weather-related failures.

3.08 REINSTALLATION OF REPAIRED ELEMENTS

A. Separate dissimilar metals to prevent corrosion by galvanic action by painting contact surfaces with primer or with sealant or tape recommended by manufacturer for the purpose.

B. Reinstall.

3.09 FINAL CLEANING

A. Remove stains resulting from the work of this section without delay.

B. Clean surrounding surfaces.

END OF SECTION 050300

SECTION 050515
SHOP-APPLIED METAL FINISHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop-applied coating finish on metal.

1.02 REFERENCED STANDARDS

A. ANSI/BHMA A156.18 – American National Standard for Materials and Finishes.

B. NAAMM AMP 500-06 - Metal Finishes Manual 2006.

C. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.

1.03 DEFINITIONS

A. DFT; Dry-Film Thickness.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data:

C. Paint finishes

D. Samples for Initial Selection: Actual samples showing full range of colors, finish texture and finishes that are available for each type of exposed finish.

E. Samples for Verification:

F. Samples of metal finish for each color, finish texture specified, on production line-prepared components.
   1. Where component color is intended to match, provide samples of each component in one submission.

G. Size: 12 inches (305mm) square, representing actual product in color and texture.

H. Test and Evaluation Reports:

I. Product Test Reports: For each organic coating demonstrating compliance of coating with AAMA 2605 for humidity resistance, salt spray resistance, color retention, chalk resistance and resistance to erosion.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For all finishes

B. Warranty Documentation:
   1. Coating Manufacturers' special warranties.

1.06 QUALITY ASSURANCE

A. Qualifications:
   1. Mechanical and Chemical Finish Fabricator’s and Installer's Qualifications: A firm experienced in producing finishes similar to that indicated for this Project and with a record of successful in-service performance as well as sufficient production capacity to produce required units.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect items from damage during handling and transportation.

B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
   1. Store in well-ventilated space out of direct sunlight.
   2. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
   3. Avoid contact with other materials that might cause corrosion, staining, denting, or other surface damage.

1.08 WARRANTY

A. Special Warranty: Manufacturer, fabricator and applicator agrees to repair or replace coatings and finishes that fail in materials or workmanship within specified warranty period.

B. Failures include, but are not limited to, the following:
   1. Deterioration of mechanical finishes, beyond normal weathering.
   2. Deterioration of organic coating finishes, beyond normal weathering.
   3. Failures include:
      a. Corrosion of metal.
      b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
      c. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
      d. Cracking, checking, peeling or failure of paint to adhere to bare metal.

C. Warranty Period: 10 year(s) from date of Substantial Completion.

PART 2 PRODUCTS

2.01 WATER BORNE LIGHT INDUSTRIAL COATING FINISHES

A. Finishes, General: Comply with Master Painters Institute (MPI) for full surface preperation and recoating depending on DSD of railings section.
   1. Protect mechanical finishes on exposed surfaces from damage.
   2. Regalvanize surface as required after removal of old coating.
   3. Finish systems is identified by MPI REX 5.3G-G6, DSD-2

B. Three-Coat paint system is identified by MPI system and as follows:
   1. Basis of design products:
      a. Primer: MPI # 134 Primer, Galvanized, Water Based.
         1) SherwinWilliamsPro Industrial Pro-Cryl Universal Primer or approved equal.
         2) Color: Light Grey

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which Work is to be installed.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. General: Shop apply metal finishes to fullest extent possibe. Coat full height of railing posts, omiting top coat on portion enbedded into cast-in post sleeve. Field application only acceptable for post-installation touch-up.

3.03 APPLICATION OF WATER BORNE LIGHT INDUSTRIAL COATINGS

A. Perform application specified by formulator and as follows:
   1. Prepare, pretreat and apply coating to exposed metal surfaces to comply with coating manufacturers' written instructions and MPI according to DSD.
   2. Coating films: Uniform and free from flow lines, streaks, blisters, sags or other surface imperfections in dry−film state.
   3. Increase specified film thickness if required to achieve selected color.

B. Application: Perform application in accordance with coating manufacturer’s written instructions.

3.04 FINISH TOUCH-UP

A. Touch-up finishes in accordance with coating formulator's recommendations, matching original finish for color and gloss.

B. Provide touch-up adhesion to original finish equal to adhesion of the original finish to prepared surface.

3.05 CLEANING

A. Clean surfaces as recommended by coating manufacturer and formulator’s written instructions, prior to application of protective films or coatings.

3.06 PROTECTION

A. Protect shop-applied coatings, conversion and mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering recommended by finish applicator, before transporting.

B. Protect finished surfaces against damage. Prevent chemical solutions from coming into contact with people, motor vehicles, landscaping, buildings and other surfaces that could be harmed by such contact.
   1. For field applications for touch-up, cover adjacent surfaces with materials that are proved to resist chemical solutions and abrasive methods being used unless products being used will not damage adjacent surfaces.
   2. Do not apply liquid masking agent to painted or porous surfaces.
   3. When no longer needed, promptly remove masking to prevent adhesive staining.
   4. Do not apply chemical solutions during winds of enough force to spread them to unprotected surfaces.

END OF SECTION 050515

SECTION 07 16 00 - CEMENTITIOUS WATERPROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish all labor, materials, equipment, and supervision as necessary to install a composite waterproofing system consisting of a reactive penetrating primer, highly flexible membrane layer, and rigid cementitious bond coat on (new or existing) concrete pool/spa/fountain surfaces to receive (plaster, ceramic or glass tile or other), as shown on the project drawings and as outlined in this specification.

B. Following all applicable manufacturer's guidelines and application instructions shall be considered a requirement of this specification.

C. Related Sections:
1. Section 03 30 00 – Cast-in-Place Concrete
2. Section 03 37 13 – Shotcrete
3. Section 03 39 00 – Concrete Curing
5. Section 13 11 00 – Swimming Pools
6. Section 13 12 00 – Fountains
7. Section 13 13 00 – Aquariums

1.02 REFERENCES

A. ASTM C109: Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.

B. ASTM C348: Standard Test Method for Flexural Strength of Hydraulic Cement Mortars.

C. ASTM C321: Standard Test Method for Bond Strength of Chemical-Resistant Mortars.

D. ASTM E96: Standard Test Method for Water Vapor Transmission of Materials.

E. COE CRD-C48: Standard Test Method for Water Permeability of Concrete.

F. ICRI Technical Guideline No. 310.2 – 1997 (formerly 03732): Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

G. ICRI Technical Guideline No. 210.3 – 2004 (formerly 03739): Guide to Using In-Situ Tensile Pull-Off Tests to Evaluate Bond of Concrete Surface Materials.

1.03 SUBMITTALS

A. General: Submit each of the following items in accordance with the requirements of the Conditions of Contract and in Division 1 Specification Sections.

B. Product Data: Submit manufacturer's technical data sheets, available shop drawings, applicable installation guidelines or recommendations, and material safety data sheets for each product and/or composite system included in this specification.

C. Material and Mock-up Samples: For initial selection, submit manufacturer's standard color charts or cured material samples for review by the specification authority and owner's representative. For final selection, submit sample boards and/or perform mock-ups (specification writer shall specify sample size) to verify acceptable workmanship, texture, color and finish of the swimming pool composite waterproofing system.

D. Material certificates signed by the manufacturer certifying that the composite waterproofing system and all components of the system comply with all requirements specified herein.

E. Warranties: Submit a sample of the manufacturer's standard material warranty and the contractor's standard labor warranty.

F. Project Reference List: Contractor shall submit a minimum of 5 recently completed projects that entailed a similar scope of work and include total contract value.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: The manufacturer of the products specified in this section shall have a minimum of 5 years of experience in the production of these types of products.

B. Contractor Qualifications: The contractor installing the products specified in this section shall have a minimum of 3 years of experience and have successfully completed no less than 5 projects similar in scope and complexity and is acceptable to and has been trained by the manufacturer.

C. Substitutions: Requests for the approval of any product other than those specified in this section must be submitted to the specifying authority two weeks prior to the bid and shall include complete application specifications and physical characteristics. Any request after this date will not be accepted. Failure of performance requires immediate removal and replacement of unapproved substituted material with those originally specified at no cost to the owner, Architect, construction manager, or general contractor.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels containing brand name, batch or lot numbers, and directions for storage and mixing with other components.

B. Store materials to comply with manufacturer's directions to prevent from damage and/or deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1.06 PROJECT CONDITIONS

A. Environmental Conditions: Comply with all the manufacturer's directions for maintenance of ambient and substrate temperature, moisture, humidity, ventilation, and other conditions required to execute and protect completed work. In hot and cold weather conditions or when high evaporation rates or adverse conditions may be expected, the contractor will be responsible for the quality of the completed installation. Follow all recommendations and guidelines of the American Concrete Institute, as published in ACI Committee 305 for Hot-Weather Concreting and ACI Committee 306 for Cold-Weather Concreting.

B. Lighting: Permanent lighting will be in place and working before installing the proposed pool/spa/fountain waterproofing system.

C. Protection: Protect newly installed waterproofing system from rain or other potentially harmful climatic conditions for a minimum of 24 hours, from potential damage due foot or vehicular traffic and/or from the work of other trades.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Approved Manufacturer:

a. Miracote Division of Crossfield Products Corp., 3000 E. Harcourt Street, Rancho Dominguez, CA 90221, (310) 886-9100; also 140 Valley Road, Roselle Park, NJ 07204, (908) 245-2800, www.miracote.com.

b. Approved Equivalent.

B. Substitutions: Requests for the approval of any product other than those specified in this section must be submitted to the Architect/Engineer two weeks prior to the bid and shall include complete application

specifications and physical characteristics.

2.02 MATERIALS

A. The Cementitious pool liner system is a multi-layered, fracture-resistant, waterproofing membrane system consisting of a concrete substrate primer, highly flexible cementitious waterproofing layer, cementitious protective bond coat and other optional accessory materials.

B. System Components Required:

1. MiraPrime Aqua-Blok XL - Single-component, water-based colloidal silicate primer.
2. MiraFlex Membrane C – Two-component, polymer-modified, cementitious, waterproofing membrane.
3. Miracote BC Pro – Single-component, polymer-modified, rigid cementitious bond coat.
4. SGM Diamond Brite – Exposed aggregate pool finish system applied over cementitious waterproofing system.

C. Accessory Components Optional:

1. Miracote Poly Fabric - Polypropylene, alkaline-resistant, woven mesh reinforcement fabric.

2.03 PROPERTIES

A. MiraPrime Aqua-Blok XL Physical Properties:
Provide a single-component, reactive penetrating colloidal silicate integral waterproofing primer that meets the following physical properties or characteristics.

Vehicle Type:	Water-based solution
Reactive Agent:	Potassium Silicate
Color:	Clear
Flash Point:	None
Flammability:	None
Specific Gravity:	1.10
Odor:	None
pH:	11 - 12
Weight/Gal:	10.5 lbs./4.76kg
VOC (grams/liter):	0.0

B. MiraFlex Membrane C Physical Properties:
Provide a two-component, SBR polymer-modified, highly flexible, and crack-bridging cementitious waterproofing membrane that meets or exceeds the listed minimum physical property requirements.

Two Component Product	Liquid Polymer and Bagged Powder
Bagged Powder Color:	Gray and White
Liquid Polymer Type:	Styrene Butadiene Co-polymer
Working Time:	30 – 45 minutes
Elongation (ASTM D 638)	65%
Tensile Strength (ASTM D 638)	750 psi (7 days dry / 21 days wet)
Adhesion to Peel in Concrete:	8.3 lbs./in. width
Moisture Vapor Transmission (ASTM E 96)	2.5 grams (g/sq. meter/24 hrs.)
Water Vapor Permeability (ASTM E 96):	0.75 perms/inch
Impact Resistance: (MIL-3134) Para. 4.7.3	No cracking or detachment

C. Miracote BC Pro Physical Properties:
Provide single component, polymer-modified, rigid cementitious bond/protection coat.

Single Component Product	Bagged Powder
Mixing Liquid:	Potable water
Compressive Strength (ASTM C 579, Method A):	4,100 psi

Tensile Strength (ASTM C 307):	465 psi
Flexural Strength (ASTM C 580)	780 psi
Adhesion (ASTM C 932 Modified, No priming):	>250 psi (substrate failure)
Shrinkage (ASTM C 531):	0.015%
Water Vapor Permeability (ASTM E 96):	1.96 perms/inch
Impact Resistance: (MIL-3134) Para. 4.7.3 (2# steel ball dropped from 8' height onto coated steel plate)	No cracking or detachment

D. Miracote Poly Fabric Physical Properties:
Provide polypropylene, open weave reinforcing fabric for crack and transition zones.

Type:	Polypropylene
Compatibility:	Alkaline Resistant
Weave:	Open woven mesh

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine all construction substrates and conditions to which the proposed composite waterproofing system is to be installed. Notify the Specifying Authority of any unsatisfactory conditions that may be detrimental to the proper and timely completion of the work.

B. Do not proceed with the work until all such deficiencies have been corrected by the Contractor in an acceptable manner, and as approved by the Specifying Authority.

C. Existing Concrete: When installing the specified waterproofing system to existing aged concrete perform pH testing to verify the substrate has sufficient alkalinity for the application of the reactive primer. If the pH reading is below 10 immediately contact manufacturer for assistance and directions on how to proceed.

D. New Concrete: Surfaces shall not be burnished as this will negatively impact penetration of the reactive primer. Acceptable finishes include, but are not limited to, bull float, float and trowel, broom and textured finishes, and any other finish resulting in a textured open pore structure. The use of high fly ash content, latex additives, curing compounds, evaporation retardants, and crack reducing sprays are prohibited.

3.02 PREPARATION

A. Protect all surrounding areas, walls, window glass, landscaping and other adjacent surfaces from the execution of each item of work including, but not limited to, surface preparation and all application steps involved in the installation of the waterproofing system.

B. Composite pool liner system must be applied to a clean, sound and properly prepared concrete substrate exhibiting a minimum CSP-2 surface profile, in accordance with the International Concrete Repair Institutes (ICRI) Technical Guideline No. 310.2 - 1997 (formerly 03732), Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays.

C. Contractor shall perform on site mock-up of the complete waterproofing system, and conduct tensile bond tests prior to proceeding, as directed by the Specification Authority, in accordance with International Concrete Repair Institutes (ICRI) Technical Guideline No. 210.3 - 2004 (formerly 03739), Guide to Using In-Situ Tensile Pull-Off Tests to Evaluate Bond of Concrete Surface Materials.

3.03 EXECUTION

A. General: Follow all manufacturers' directions, as published in their product technical data sheets and/or available installation guidelines regarding the application of the composite waterproofing system, as specified herein.

B. New Concrete: Upon evaporation of all bleed water and concrete has hardened enough to walk on

without damage, power wash at low pressure to remove laitance, form release agents, dust, debris and other pore blocking substances that may inhibit penetration of the reactive primer.

C. Existing Concrete: Refer to Section 3.02 Preparation – B and C.

D. Apply Reactive Primer: Thoroughly agitate or shake material well before use. Apply uniformly at a rate of 100 to 150 square feet per gallon, and avoid ponding of material in slab depressions and low lying areas. When applying to vertical surfaces use low pressure sprayers with a fan tip nozzle and begin applying from the bottom and work up the vertical face with north/south and east/west spray patterns. Saturate the host surface thoroughly until excess material forms a rundown pattern of 6 to 8 inches below the spray contact point. On horizontal substrates, apply a flood coat with enough material to maintain a wet condition for 3 to 5 minutes. If material ponds in shallow depressions use a broom or roller to evenly distribute material to surrounding areas. For maximum function and performance on both vertical and horizontal surfaces, a second wet-on-wet application within 20 to 40 minutes is required. Apply the second application at right angles from the first in a crisscross pattern. During hot weather conditions, pre-wet the substrate to saturated surface dry (SSD) state to cool the surface down prior to application. As a final step, apply two light mist-coats of potable water to the entire treated surface 30-40 minutes apart. This helps transport any uncured inorganic colloidal silicate minerals near the surface and drive them down into the concrete capillary network. This also leaves the near surface concrete pores open for the uninhibited application of subsequent coatings, stains and sealers.

E. Perform surface and crack repairs as necessary to re-profile, re-level or to restore the integrity of the concrete substrate or other surfaces in general. Concrete surface repair and levelling mortars shall be from the same manufacturer of the composite cementitious waterproofing system. Parge coats, brown coats, render coats, and/or mortar beds consisting a Portland cement and aggregate mixed on site are acceptable provided these materials are modified with the manufacturers acrylic latex admixture. Follow the manufacturers recommendations for proper ratio of latex admixture to potable water.

F. Joint Sealants: At the direction of the specifying authority and as shown on plans, install polyurethane or polyether sealant only at joints, transitions, and penetrations. Follow sealant manufacturers recommendations regarding the use of backer rod, bond breaking tape, priming, required cure time, proper detailing of concrete cracks and other installation requirements.

G. Detailing: Apply a coat of cementitious membrane material and embed 10” wide reinforcement fabric at all vertical and horizontal transitions, cracks, construction joints, pipe and drain penetrations, changes of plane and any other types of existing discontinuities that could undermine waterproofing integrity. Immediately apply an additional coat of cementitious membrane over the embedded poly fabric to lock it in, and smooth out any wrinkles and voids. Allow to dry before proceeding to the next installation step.

H. Apply Cementitious Membrane: Membrane material must be mixed mechanically to a uniform consistency in a clean mixing vessel using a low-speed drill (300-450 rpm) with a “Jiffy-type” or similar approved mixing paddle. Pre-mix membrane liquid component to re-disperse any polymer solids that may have settled on the bottom of the pail. When mixing membrane components pour the liquid component into the mixing pail first and gradually add the powder component while mixing. Thoroughly mix the complete unit for a minimum of three minutes or until a uniform consistency is achieved that is free of lumps and pockets of dry powder. Apply mixed membrane over the concrete substrate and previously detailed areas at a rate of 160 SF per kit by roller. Immediately when dry, apply a second coat of MiraFlex Membrane C at a rate of 160 SF per gallon. Consult manufacturer if a 3rd coat is recommended under certain conditions. Allow cementitious waterproofing membrane to cure for a minimum of 24 hours before application of the cementitious bond coat if applying plaster for final finish.

I. Apply Cementitious Bond Coat: Follow all instructions for mixing and applying the cementitious bond coat. Once mixed apply by loop roller or spray equipment such as hopper gun, rotor-stator pump or peristaltic pump. Bond coat application requires a single coat at the recommended coverage rate for the desired application method being employed. Allow bond coat to cure a minimum of 48 hours prior to proceeding with plaster, tile or other finishes. Consult manufacturer regarding weather conditions that may allow for application in less than 48 hours.

J. Apply (Diamond Brite) exposed aggregate pool finish system over cementitious bond coat per

manufacturers written recommendation. System shall be applied at a thickness of 1-80 lb bag per 22 SF of area.

K. Allow completed cementitious pool liner system to cure for 48 hours before subjecting to foot traffic and work of other trades.

3.04 CLEANING

A. Clean work area and remove/discard all debris resulting from the application of the raised access floor waterproofing system to the acceptance of the specifying authority or the owner.

3.05 PROTECTION

A. Protect all completed work of the application during the specified cure time of the material from vehicular or pedestrian traffic, or any exposure to solid or liquid spillage or any other form of contamination.

END OF SECTION

SECTION 071613
POLYMER MODIFIED CEMENT WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Waterproofing for positive hydrostatic pressure applications.
   1. Inside surfaces of DeRoy Reflecting Pool.

1.02 REFERENCE STANDARDS

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens) 2021.

B. ASTM C666/C666M - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing 2015.

C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016 (Reapproved 2021).

D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a, with Editorial Revision (2023).

1.03 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Details of joints and intersections.

B. Selection Samples: For colors other than gray or white, submit color chips representing manufacturer's full range of available colors and patterns.

C. Certification: Provide manufacturer's certification that waterproofing to be provided is suitable for the purpose specified and the locations where it is intended to be installed and that the requirements of Contract Documents do not preclude satisfactory installation and performance.

D. Certification: For potable water contact, submit evidence of current NSF certification.

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section with minimum three years of documented experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project site in manufacturer's original packaging, marked with manufacturer's product identification.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Keep stored products dry; store under cover and elevated above grade.

1.06 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Polymer-Modified Cement Waterproofing:
   1. Basis of Design Product: Crossfield, Miracote Aqua-Blok XL, Miraflex Membrane C.;
      a. https://miracote.com/aqua-blok/,
      b. https://miracote.com/membrane-c/,
      c. https://miracote.com/miratop-ucs/

2.02 MATERIALS

A. Polymer-Modified Cement Waterproofing for Potable Water Contact: Slurry coating of Portland or hydraulic cement, aggregates, polymer admixtures, and water; no solvents; NSF International certification for potable water contact; for application directly to cementitious substrate.
   1. Explicitly recommended by manufacturer as waterproofing, not simply as dampproofing.
   2. Requiring green concrete cure time of not more than 28 days.
   3. Elongation at Failure: 20 percent, minimum, when tested in accordance with ASTM D412.
   4. Water Vapor Transmission: Minimum permeance of finished coating of 1 perm, when tested in accordance with ASTM E96/E96M.
   5. Freeze-Thaw Durability: No change when tested in accordance with ASTM C666/C666M for 300 cycles.
   6. Compressive Strength: 5,000 psi, minimum, at 28 days, when tested in accordance with ASTM C109/C109M.
   7. Carbonation Resistance: Provide finished product that provides carbon dioxide diffusion resistance that is at least 10 times that of the equivalent thickness of ordinary concrete.
   8. Finished Coating Thickness: As recommended by manufacturer but not less than 1/16 inch.
   9. Color: Black.

B. Crack Repair Material, Joint Tape, and Reinforcing: Type and application as recommended by waterproofing manufacturer.

C. Water: Clean, clear, non-alkaline potable water, free of salts and other harmful elements. May include chlorine and bromine as water treatments.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces where waterproofing is to be applied for conditions detrimental to satisfactory performance.

B. Do not begin installation until substrates have been properly prepared.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Remove defective concrete and rebuild to original profiles.

B. Plug active leaks according to waterproofing manufacturer's instructions.

C. Patch holes and non-moving cracks and joints.

D. Clean and prepare surfaces thoroughly prior to installation; schedule cleaning and preparation so that residue will not fall on newly coated, uncured surfaces.

E. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. Use sandblasting, water blasting, or acid etching as recommended.

F. Application of waterproofing constitutes acceptance of substrates.

G. Protect other work from fallout, overspray, and spatter from waterproofing application; provide temporary enclosures and covers as necessary to do so.

3.03 INSTALLATION

A. Install waterproofing in accordance with manufacturer's instructions and recommendations unless more stringent requirements are indicated.

B. Perform installation only during ambient and substrate conditions recommended by manufacturer; provide temporary enclosures and/or temporary heating as necessary to do so.

C. Fill voids and holes prior to application of first coat.

D. Apply the number of coats and at the rates recommended by manufacturer for the specific application but not less than specified minimum thickness; apply at least two coats unless one coat is specifically indicated.

E. At surfaces exposed to view, apply a uniformly textured finish without major variations in appearance.
   1. Concrete repairs: Complete hiding of concrete repair joints is required.

F. Extend waterproofing to all surfaces in areas indicated to form continuous waterproofed surfaces.
   1. At horizontal surfaces, extend waterproofing down and into pits, sumps, trenches, and similar features and up and onto curbs, bases, stair risers, and similar features.

G. Cure waterproofing by recommended methods for recommended period prior to making waterproofed area available for use or occupancy; protect from too rapid drying, severe weather exposure, and water accumulation.
   1. Hot, Dry Weather: Use wet-cure methods regardless of manufacturer's instructions.
   2. Do not use covers that could stain waterproofing surfaces.
   3. Do not use chemical curing agents unless explicitly approved by waterproofing manufacturer.
   4. Do not expose waterproofing to sunlight for minimum of 72 hours after placement and as recommended by the waterproofing manufacturer.

3.04 FIELD QUALITY CONTROL

A. Flood test waterproofing application by filling to capacity and allowing to stand for not less than 24 hours.

B. If any leaks appear, notify the Owner and drain.
   1. Repair leaks at no additional cost to Owner.
   2. Repeat flood test until all leakage is eliminated.

END OF SECTION 071613

SECTION 071916 - CLEAR PENETRATING CONCRETE SEALER

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SCOPE OF WORK

This work shall consist of high pressure waterblasting or other approved methods of cleaning on horizontal concrete surfaces and application of a clear penetrating concrete sealer system as specified at locations shown on plans. No substitutions to proposed systems in bid proposals shall be allowed unless approved in writing by the Architect/Engineer.

1.03 QUALITY CONTROL

A. Field Testing Acceptance:

Meet or exceed the following requirements for this project based on testing performed on a minimum of three, 3 inch diameter (or larger) core samples removed from the treated area.

1. Repellency Rating (Waterproofing Performance) - 85% or better, based on comparison of untreated versus treated samples. Test procedure for waterproofing performance shall be according to ASTM D 6489-99, “Standard Test Method for Determining the Water Absorption of Hardened Concrete Treated with a Water Repellent Coating”.

2. Penetration (1 application) 1/4 inch minimum (6 mm), based on the average of a series of measurements on the split face of core samples.

B. Sealer Coordination:

Review other sections of these specifications in which curing compounds or paints, are to be provided on concrete surfaces to be sealed to ensure compatibility with the concrete sealer.

C. Warranty:

1. The system manufacturer shall furnish the Owner a written single-source performance warranty that the Concrete Penetrating Sealer System will be free of defects related to workmanship or material deficiency and meet or exceed the requirements above for a five (5) year period from the date of substantial completion of the work provided under this section of the specification.

2. Any required repairs under the warranty shall be made by the system manufacturer. The required written warranty shall be provided by the system manufacturer.

1.04 SUBMITTALS

A. Submit manufacturer's product, application and surface preparation specifications, testing data and warranty for approval prior to sealing concrete decks.

B. When payment for sealer application is based on square foot area of application, the area used in calculations shall be horizontal surfaces only.

C. As a condition for payment of the sealer application, the contractor must submit an invoice indicating the delivery and site receipt of the quantity of material calculated and designated for this project. In addition to the calculated quantity, the invoice shall also reflect the project address, or be designated for use on this project, if delivered to the contractor's address. No leftover material from previous projects will be permitted for use on this project.

1.05 JOB CONDITIONS

A. Environmental Requirements:

1. Do not proceed with application of materials if ambient temperature is below 40 degrees F or if ice or frost is covering the substrate.

2. Do not proceed with application if ambient temperature of surface temperature exceeds 100 degrees F.

3. Do not proceed with application of materials in rainy conditions or if rain is anticipated within 8 hours after application. Materials shall not be applied to damp substrates. The surface should be sufficiently dry to observe the spray pattern during application.

PART 2 - PRODUCTS

2.01 SEALER MATERIAL

A. Provide a clean liquid "silane" type, VOC compliant sealer which will penetrate the concrete to provide a surface which is resistant to salts, de-icer chemicals, moisture, gasoline, oil and acids. Sealer material shall not permanently alter the appearance or surface texture of concrete surfaces.

B. Sealer material shall be one of the products offered by the manufacturer's listed below. Substitute materials or manufacturers will not be allowed.

1. "Protectosil 100" as manufactured by Evonik Industries, (800) 828-0919

2. "MasterProtect H 1000" as manufactured by Master Builders Systems, (800) 433-9517

3. "Silane 100" as manufactured by Prosoco Inc., (800) 255-4255

C. All penetrating sealers applied shall contain fugitive dye to demonstrate complete and thorough application to surface.

PART 3 - EXECUTION

3.01 PREPARATION

A. Examine surfaces to receive sealer to assure that conditions are acceptable for application of materials. Concrete shall be cured a minimum of 28 days.

B. Remove dirt, dust and materials that will interfere with the proper and effective application of the water repellent coating through use of high pressure waterblast and cleaning detergents approved by penetrating sealer manufacturer.

C. Allow 72 hours minimum of drying time after cleaning surface with water prior to application.

C. All caulking, patching and joint sealants should be installed prior to application of this product.

3.02 INITIAL TEST APPLICATION AND TESTING

A. Test Procedure:

1. Prior to full scale surface preparation and application of selected material, a trial application shall be conducted. The location shall be of suitable size that a gallon of material can be applied at the manufacturer recommended rate. For example, a 14 foot by 14 foot area for products applied at 200 square feet per gallon (sf/gal). The location shall be determined by the Engineer. The preferred location will be on a sloping ramp.

2. The trial area shall be cleaned according to manufacturer's recommendations in the same manner as planned for the entire project. This may include sweeping and cleaning with compressed air, water cleaning under pressure or shotblasting. For the purposes of this test only, sandblasting is an acceptable substitute for shotblasting.

3. Upon completion of surface preparation, a core will be removed from the cleaned surface and tested for water absorption. This is the Untreated Water Absorption value. The test area will then be treated with one gallon of the selected material. From the treated area, three core samples shall be removed. The cores are to be tested for Treated Water Absorption and split with a chisel and dye tested for depth of sealer penetration. The repellency rating is calculated on the basis of untreated and treated water absorption values.

4. Once field test results are obtained, which meets or exceeds requirements of Section 1.03.A.1 and 1.03.A.2, the contractor will be authorized to perform full scale surface preparation and application of the selected material. Do not proceed with application unless directed in writing by the Engineer and Material Manufacturer.

5. Cost of trial area application and testing shall be included in the contractor's price for sealer installation. Testing shall be conducted in the presence of the Engineer or his designee. Additional quality control testing, if desired by the Owner in other areas or subsequent to the installation to determine warranty performance, shall be paid for by the Owner.

3.03 APPLICATION

A. Product shall be applied at a rate recommended by the manufacturer to meet or exceed the requirements of Section 1.03.A.1 and 1.03.A.2. Do not dilute or alter the material. The manufacturers published application rates are:

1. Protectosil 100; apply at application rate of 125 to 250 sf/gal

2. Hydrozo 100; apply at application rate of 250 to 400 sf/gal

3. Silane 100; apply at application rate of 250 to 400 sf/gal

B. Preferred method of application is with low pressure (15 psi) airless spray equipment or with a heavily-saturated brush or roller. Spray equipment should be equipped with solvent resistant gaskets and hoses.

C. When applying by brush or roller, care will be taken to ensure that sufficient material is being applied to thoroughly saturate the treatment surfaces maintaining the appropriate square foot coverage rate required.

1. Product shall be applied to horizontal and vertical surfaces in a single saturating application unless the manufacturer recommends an additional application.

2. Sufficient material shall be applied so that treated surfaces remain wet for a few minutes before penetration into the surface.

3. Surface residues, pools and puddles shall be broomed out thoroughly until they completely penetrate into the surface.

4. Treated surfaces shall be protected from rain and other surface water for a period of not less than eight (8) hours after application.

5. Treated surfaces shall be protected from excessive foot and vehicular traffic for a period of not less than eight (8) hours after application.

3.04 CLEAN-UP

A. When the work of this Section is complete, and at such other times as directed, remove surplus and waste materials, debris, rubbish, equipment, and implements from the site, and leave the work in a clean, neat and acceptable condition, as approved by the Engineer.

END OF SECTION

SECTION 07 92 02 - JOINT SEALANTS – CONCRETE APPLICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. The Work of this Section includes:
   1. Cleaning and preparation of joint surfaces.
   2. Application of backing materials and sealant as scheduled at the end of this Section.

B. Related Requirements:
   1. Section 03 01 30 – Patching of Cast-In-Place Concrete
   2. Section 03 31 50 - Cast-In-Place Concrete

1.03 REFERENCE

A. Definitions:
   1. Exterior joints exposed to spaces that are not indicated to be heated and/or air-conditioned.

B. Reference Standards: The publications listed below form a part of this Section to the extent referenced. The publications are referred to within the text by the basic designation only.
   1. ASTM International:
      a. Standard Specification for Latex Sealants
      b. Standard Specification for Elastomeric Joint Sealants (ASTM C-920-02).
      c. Standard Guide for Use of Joint Sealants (ASTM C-1193-05).
      d. Standard Specification for Solvent Release Sealants (ASTM C-1311-95). Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber (ASTM D-1056-00).

1.04 SUBMITTALS

A. General: Prepare, review, approve, and submit the following per the GENERAL REQUIREMENTS.

B. Action Submittals:
   1. Product Data.
   2. Samples for Selection: The Sealant Manufacturer’s full range of available standard colors for each sealant
   3. Samples for Verification: The selected colors for each sealant.

C. Informational Submittals:
   1. Certificates: Provide certification required by QUALITY ASSURANCE below, before delivery of sealant materials to the Site.

2. Manufacturer's Instructions: Submit the Sealant Manufacturer's surface preparation and installation instructions.

1.05 QUALITY ASSURANCE

1. Certifications: Provide certification that the materials conform to the requirements of this Section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Site in original sealed containers marked with
   1. Supplier.
   2. Name of material.
   3. Specification number.
   4. Color.
   5. Expiration date.
   6. Curing time.
   7. Mixing instructions.

B. Store and protect sealant materials per the Sealant Manufacturer's written instructions. Do not use outdated materials.

C. Follow the Sealant Manufacturer's recommended special precautions where hazardous materials are involved.

1.07 PROJECT CONDITIONS

A. Apply sealant within temperatures recommended by the Sealant Manufacturer. Consult with the Sealant Manufacturer when sealants cannot be applied within the recommended ranges.

1.08 WARRANTY

A. Provide a Warranty, guaranteeing the Work of this Section to remain in a serviceable, watertight, elastic, adhesive condition, and to not stain or injure adjoining materials, for three years from date of final acceptance of the Project – and to repair any defects appearing within that period at no additional cost to the .

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Master Builders Systems, MBSS Americas, Shakopee MN (URL: wwwMBSS.com, Voice: 800.433.9517).

B. Sika Corporation (USA), Lyndhurst NJ (URL: www.sikausa.com, Voice: 800.933.7452).

C. LymTal International Inc., Lake Orion, MI (URL: www.lymtal.com, Voice: 800.373.8100).

2.02 MANUFACTURED UNITS

A. Sealant for horizontal Control Joints, Construction Joints, and Cracks: Polyurethane-based, multiple-component, moisture-curing, conforming to requirements of ASTM C-920, Type M,

Class 25, Use NT, M, A, & O, non-staining, non-bleeding, plus-or-minus 50-percent joint movement, in colors as selected by the from the Sealant Manufacturer's full range of standard colors.

1. MasterSeal SL2 by Master Builders.
2. Iso-Flex 880GB Sealant by LymTal.
3. Sikaflex-2C SL by Sika.

B. Sealant for Vertical Joints and Cove Joints: Polyurethane-based, multiple-component, moisture-curing, conforming to requirements of ASTM C-920, Type M, Class 25, Use NT, M, A, & O, non-staining, non-bleeding, plus-or-minus 50-percent joint movement, in colors as selected by the from the Sealant Manufacturer's full range of standard colors.

1. MasterSeal NP2 by Master Builders.
2. Iso-Flex 881 NS Sealant by LymTal.
3. Sikaflex-2C-NS by Sika.

2.03 ACCESSORIES

A. Primer (where required): Non-staining type recommended by the Sealant Manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by the Sealant Manufacturer, compatible with joint-forming materials.

C. Joint Filler: Provide sealant backings of material and type that are non-staining, compatible with joint substrates, sealants, primers, and other joint fillers, and as recommended by the Sealant Manufacturer.

D. Bond Breaker (as indicated on the Drawings and where required): Pressure-sensitive tape recommended by the Sealant Manufacturer to suit application.

2.04 EXAMINATION

A. Report defects in writing to the and do not proceed until defects have been corrected. Commencement of the Work of this Section will constitute acceptance of the conditions of the substrate surfaces to which sealant is to be applied.

B. Verify that joint dimensions, physical, and environmental conditions are acceptable to receive the Work of this Section.

C. Verify that joint shaping materials and release tapes are compatible with sealant.

D. Examine joint dimensions. Size materials to achieve required width/depth ratios

2.05 PREPARATION

A. Clean, prepare, and size joints per the Sealant Manufacturer's instructions. Thoroughly clean joints, completely removing foreign matter such as old sealant, dust, paint (unless a permanent protective coating), oil, grease, waterproofing or water-repellant treatments, water, surface dirt, and frost – and other contaminants that might impair adhesion of sealant.

B. Clean porous materials including concrete and masonry by brushing, grinding, blast cleaning, mechanical abrading, acid-washing, or a combination of these methods to provide a clean, sound substrate for optimum sealant adhesion.

1. Admixtures in precast concrete can affect bond of sealant with concrete. Conduct adhesion test on joints to determine if grinding can be waived.

C. If required, cut back surface of concrete to remove contaminants and expose a clean surface. Remove laitance from concrete by acid-washing, grinding, or mechanical abrading. Remove oils by blast cleaning. Prior to application of primer or sealant, blow out joints with oil-free compressed air or vacuuming.

D. Clean non-porous surfaces, such as metal glass, chemically or by other means acceptable to the Sealant Manufacturer and the manufacturer of the substrate.

E. Remove temporary protective coatings on metallic surfaces using a solvent that leaves no residue. Wipe clean. Do not remove permanent coatings intended to remain.

F. To allow sealants to perform properly, use joint filler to achieve required joint depth.

G. Use bond breaker as indicated on the Drawings and where required.

2.06 INSTALLATION

A. Perform the Work of this Section per ASTM C-1193 and the Sealant Manufacturer's instructions.

B. Prior to the general commencement of the Work of this Section, install a 5-foot length of each type of sealant to the substrates for which it is intended. Allow to cure. Examine to determine whether proper adhesion has been obtained.

C. Construct joint free of air pockets, embedded foreign matter, ridges and sags.

D. Tool joints slightly concave.

END OF SECTION

SECTION 07 95 00 - EXPANSION CONTROL

PART 1 GENERAL

1.01 SUMMARY

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

B. Related Requirements
1. Section 03 01 30 – Patching of Cast-In-Place Concrete
2. Section 07 92 02 – Joint Sealants – Concrete Applications

1.02 REFERENCE STANDARDS

A. ASTM E 1612; preformed elastomeric extrusions having an internal baffle system and designed to function under compression.

B. ASTM E 1783; preformed elastomeric membranes.

1.03 ACTION SUBMITTALS

A. Shop Drawings: For each expansion control system specified. Include plans, elevations, sections, details, splices, blockout requirement, attachments to other work, and line diagrams showing entire route of each expansion control system. Where expansion control systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

B. Samples: For each exposed expansion control system and for each color and texture specified, full width by 6 inches long in size.

C. Samples for Initial Selection: For each type of expansion control system indicated
1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

D. Samples for Verification: For each type of expansion control system indicated, full width by 6 inches long in size.

E. Product Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:
1. Manufacturer and model number for each expansion control system.
2. Expansion control system location cross-referenced to Drawings.
3. Nominal joint width.
4. Movement capability.
5. Classification as thermal or seismic.
6. Materials, colors, and finishes
7. Product options.

1.04 INFORMATION SUBMITTALS

A. Product Test Reports: For each fire barrier provided as part of an expansion control system, for tests performed by a qualified testing agency.

1.05 WARRANTY

A. form of submittal
   1. At Final Completion compile two copies of each required warranty and bond properly executed by the CONTACTOR, or by the subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence.

B. requirements
   1. A 5-year joint manufacturer/installer warranty against failure/leaking/debonding of any component is required.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

A. General: Provide expansion control systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.
   1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where expansion control systems change direction or abut other materials.
   2. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion control systems.

2.02 EXPANSION CONTROL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following.
   1. Watson Bowman Acme, (www.wbacorp.com).
   2. LymTal International, Inc.(www.lymtal.com).
   3. Emseal Joint Systems, Ltd. (www.emseal.com).

B. Source Limitations: Obtain expansion control systems from single source from single manufacturer.

C. Approved Products: Pre-compressed Expasion Joint Systems.
   1. “DSM System”, as manufactured by Emseal Joint Systems, Ltd. (800) 526-8365, size to be field verified.
   2. “Iso-Flex Precom H-SL”, as manufactured by LymTal International, Inc. (248) 373-8100, size to be field verified.
   3. “Wabo HSeal” as manufactured by Watson Bowman Acme (716) 691-7566, (www.wbacorp.com), size to be field verified.

D. Contractor shall review specific details on drawings for the project regarding locations. Due to various joint width openings and overall block-out dimensions, the Contractor and expansion joint supplier should verify field condition prior to bid submission and execution of the work.

2.03 ACCESSORIES

A. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

B. Adhesives shall be per the joint seal manufacturer’s recommendations

2.04 GENERAL FINISH REQUIREMENTS

A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces where expansion control systems will be installed for installation tolerances and other conditions affecting performance of work.
   1. Proceed with installation only after unsatisfactory conditions have been corrected

3.02 PREPARATION

A. Prepare substrates according to expansion control system manufacturer's written instructions. Remove all old adhesives, dust, dirt, oil, grease, frost, old elastomeric concrete, old sealants, etc.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion control systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion control systems.

3.03 INSTALLATION

A. Preparatory Work:
   1. The block-out shall be provided to the specified dimensions and acceptable to the manufacturer. The licensed installer shall additionally verify that the ‘as-built’ configuration of the block-out for the expansion joint will allow the expansion joint to be installed such that elevation differences in the vicinity of the joint and across the joint will not exceed industry and ADA-related recommendations. Any edge raveling at the joint opening or spalls shall be repaired with a suitable compound to provide a solid, square block-out, refer to approved products listed in Section 03 01 30 – Patching of Cast-In-Place Concrete.
   2. The block-out substrate shall be sandblasted clean of all contaminants and impurities immediately prior to the system installation to assure proper adhesion.
   3. The membrane gland element shall be unpackaged and laid in a relaxed position to relieve any temporary set from shipment packaging prior to placement. The pre-molded element shall be wiped clean with a solvent solution such as toluene.
   4. It is recommended that adjacent deck surfaces be taped off and protected to assure a clean, neat professional installation.

B. Installation.
   1. Joint installation shall be made in strict accordance with the manufacturer's written instruction.
   2. Follow standard manufacturer’s recommendation for installation of the material, taking into account block-out dimensions, joint width, and ambient temperature conditions.

3.04 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion control systems. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION

SECTION 099653 - SPECIALTY COATINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Substrate preparation for polyurea coating system.

B. Polyurea coating system.

1.02 RELATED SECTIONS

A. Section 013591 “Historic Treatment Procedures” for administrative and procedural requirements related to all Work of this Project.

1.03 CONTRACTOR EXPERIENCE

A. Minimum of five years of experience in performing work similar to that shown in the Drawings and Specifications and holding a current “Authorized Contractor Certificate” from the coating system manufacturer.

B. Submit a list of three projects in which similar work to that specified was successfully completed. This list to contain the following for each of the three projects.

1. Project name.

2. Owner's agent of project.

3. Owner's agent representative, address and telephone number.

4. Brief description of work.

5. Cost of portion of work similar to that specified in this section.

6. Total restoration cost of project.

7. Date of completion of work.

C. The Contractor must have been trained by the polyurea coating manufacturer in all phases of proper surface preparation and application of the specified polyurea system.

1.04 SUBMITTALS

A. Submit a current “Authorized Contractor Certificate” from the coating system manufacturer.

B. Submit four copies of technical literature for manufactured products, including latest published copies of manufacturer's specifications and installation instructions or applicator's manual.

C. Submit four samples of the coating system and four copies of the letter of certification required by Item 3.01.A.

1. Spray-apply the coating system to a ¾-inch x 4-foot x 8-foot piece of exterior marine grade plywood at the project site. If more than one person will spray-apply the coating at the project site, create one sample for each applicator; each sample to be signed by the applicator and a representative of the coating system manufacturer. The sample application/demonstration panel(s) will be used to establish an approved finish texture, thickness, and color and will also be used evaluate the acceptability of the coating application. Ensure that a representative of the coating system manufacturer is on site to observe and approve the sample application/demonstration panel(s).

D. Submit Material Safety Data Sheets on materials that are classified hazardous materials.

E. Upon completion of the work and prior to final payment, submit a fully executed copy of the warranty as specified. Include manufacturer maintenance requirements with the warranty.

1.05 QUALITY ASSURANCE

A. Contractor to review and accept existing substrates to which the coating system is to be applied to ensure compatibility with the coating system. Do not begin application of the coating system primer and base coat until manufacturer's technician, specified in Paragraph 1.05.G is on-site to approve surface preparation and application of primer coat(s).

B. Contractor must review the materials specified elsewhere in these Specifications for joint materials, sealants, and concrete repair material, to which the coating system is intended to be applied, to ensure compatibility with the coating system.

C. Contractor must submit in writing any existing or specified materials that would cause coating material adhesion to substrate less than that normally anticipated, or other compatibility or performance difficulties should the coating material be applied to them.

D. If Contractor fails to review and identify deleterious products/materials, and if failure of the coating system is a result of adhesion difficulties or chemical or physical incompatibilities with existing or specified products or materials, the Contractor will be held responsible for all costs related to correcting the deficient work, including Owner's costs and consulting fees relating to same and all direct or indirect costs to the Owner.

E. The Architect may direct the Contractor to make test cuts in the membrane for testing purposes. Test cuts will be 2-inches by 2-inches and will be in partially completed or fully completed coating. A maximum of 10 tests may be requested. Include the costs of taking test cuts as and where determined by Architect, and the costs of patching test cut areas in the Base Bid.

F. In addition to tests defined in paragraph 1.05 E, the Architect may request other tests to be performed to assure compliance with Project and coating system manufacturer's specifications. If any test, including those indicated in Item 1.05 E., reveals non-compliance of the coating system, correct deficiencies in a manner approved by the Architect, and at no cost to the Owner.

G. Independent Inspection: Contractor shall retain the services of an independent inspector, separate from the applicator. The inspector shall be a technically competent employee of the coating system manufacturer and must be approved by the Architect. The inspector shall be responsible for performing the following duties:

1. Review Contractor's mock-ups in conjunction with the Architect for compliance with the specifications and manufacturer's recommendations.

2. Inspect all substrate conditions prior to the application of the primer, base, and top coats. Advise Contractor of all locations and conditions where substrates do not meet specifications or manufacturer's requirements. Certify and submit approvals in writing directly to the Contractor and Architect at each stage.

3. Conduct on-site inspections at the initial start-up and application of the primer, base, and top coats to oversee techniques and procedures used by the Contractor. Provide direction to Contractor where corrections are required to conform with specifications and manufacturer's requirements.

4. Perform regular inspections as necessary to observe the application of the primer, base, and top coats and to review techniques and procedures used by the Contractor.

5. Advise Contractor as required where techniques and procedures do not comply with the specifications and manufacturer's recommendations.

6. Provide written reports directly to the Architect, including photographs, documenting all site inspections.

7. In addition to above, perform inspections of coating system prior to and immediately following water test. Advise Contractor and Architect during water test and in the event the water test fails.

8. Perform final inspection and certify to the Contractor and Architect that the coating system has been installed in accordance with all specifications and manufacturer's requirements.

H. It is the Contractor's responsibility to schedule the required site visits by the independent inspector.

1.06 PRODUCT DELIVERY AND STORAGE

A. Deliver materials to job site in sealed, undamaged containers. Identify each container with material's name, date of manufacture and lot number. Do not begin application of the coating system primer and base coat until manufacturer's technician, specified in Paragraph 1.05.G is on-site to approve surface preparation and application of primer coat(s).

B. Only those materials being used during any one work shift may be stored in the work area.

C. Keep coating materials sealed when not in use.

D. Store and handle materials in accordance with requirements of the applicable safety regulatory agencies and the material manufacturer's requirements.

E. Heat or cool storage areas as required to maintain the material temperatures within the application temperature range recommended by the coating system manufacturer.

F. Coordinate location of storage area(s) with the Owner.

1.07 JOB CONDITIONS

A. Install coating system 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. Do not begin application of the coating system primer and base coat until manufacturer's technician, specified in Paragraph 1.05.G is on-site to approve surface preparation and application of primer coat(s).

B. Control fumes and overspray to prevent harmful or undesirable effects in surrounding areas. Seal all potential avenues for penetration of fumes or overspray into surrounding occupied areas prior to the start of work.

C. Remove empty containers from the site at the end of each workday. Place all cloths soiled with coating that might constitute a fire hazard in suitable metal safety containers and remove the cloths and containers from the site at the end of each working day. Take special care in storage or disposal of flammable materials. Comply with federal and local health, safety, and fire regulations.

D. When toxic or flammable solvents are used, 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 to conform to the requirements of the applicable safety regulatory agencies.

1.08 WARRANTY

A. Warranty the completed installation jointly and severally on a single document by manufacturer and applicator to cover labor and materials for the repair of material and workmanship deficiencies for a period of twemty years, beginning with the date of substantial project completion.

B. Perform repairs under this warranty at no cost to the Owner, including repairs required on adjacent work to access or otherwise repair the required work of this section.

PART 2 - PRODUCTS

2.01 GENERAL

A. When the term "manufacturer's recommendations”, or variations thereon, are found in this Specification, it will mean latest (most recent) published "manufacturer's recommendations which are found in publications available to and commonly used by the general architectural/engineering and consulting professions."

2.02 COATING SYSTEM

A. Coating System Requirements:

1. Primer: two-component modified urethane, 100% solids primer compatible with polyurea coating and substrate conditions of this Project.

2. Polyurea Coating: fast set, rapid-curing, 100% solids, flexible, two-component polyurea elastomer spray coating.

   a. Elongation: min. 400%
   b. Tensile Strength: min. 2000 psi.
   c. Color: black
   d. UV-resistant for color stability.
   e. Low-VOC.

3. Topcoat: fast set, rapid-curing, 100% solids, color stable, aliphatic polyurea coating.

B. Acceptable Manufacturers:

1. Basis of Design: VersaFlex, Incorporated (www.VersaFlex.com).

2. Subject to compliance with requirements of the Contract Documents, products by the following manufacturers may also be submitted:

   a. Henry Company, Inc.
   b. Elastomer Specialties, Inc.
   c. Specialty Products, Inc.

2.03 EQUIPMENT

A. Spray equipment: Equipment required or recommended by the coating system manufacturer

B. Respirators: Organic vapor or fresh air, OSHA- or MIOSHA-approved for the system materials to be used and the work operations to be performed.

2.04 MISCELLANEOUS

A. Plywood: C-C, EXT-APA, ¾-inch thickness.

PART 3 - EXECUTION

3.01 GENERAL

A. Prior to beginning the work, certify that components of the coating system and substrate surfaces in contact with any component of the coating system are compatible. Submit letter of certification stating same.

3.02 SAFETY

A. Provide all barricades and signage to prevent pedestrians from entering the work area, as approved by the Architect.

B. As a minimum, provide Contractor personnel with the following protective clothing/equipment:

1. Long-sleeve coveralls or disposable “Tyvek” coveralls.

2. Rubber gloves.

3. Splash shield or safety glasses with splash guards.

4. Rubber or leather boots.

5. Organic vapor or fresh air respirator.

C. Do not mix, use, or apply coating materials near high heat or open flame.

D. Review and comply with the additional requirements of the product MSDSs.

3.03 PREPARATION

A. Perform surface preparation and cleaning procedures in strict accordance with this specification unless more stringent requirements are recommended by the coating system manufacturer. All prepared concrete surfaces to receive the polyurea specialty coating system must meet the requirements of SSPC-SP-13 (NACE 6) with a minimum ICRI concrete surface profile (CSP) 5 surface. Apply coating only to clean, dry, prepared surfaces. All new concrete surfaces must be properly cured and prepared prior to application of the coating system.

B. Surfaces must be free from all traces of dirt, dust, salt, grease, oil, asphalt, laitance, bug holes, spalls, curing compounds, paint, coatings, and other foreign materials. The purpose of cleaning is to remove contaminants and leave the pores open to allow bonding of the coating system materials. The use of brooms/brushes may be required to help remove some contaminants.

C. Grind high spots and uneven repair elevations and fill low spots to an ICRI concrete surface profile (CSP) of 5.

D. Scrub detergents, approved by the coating system manufacturer and Architect, into oily contaminated surfaces prior to cleaning. Rinse surfaces thoroughly. Repeat if necessary to remove all traces of oil or foreign material.

E. The use of acids in surface preparation procedures and techniques is prohibited.

F. Rinse surfaces thoroughly with clean water and allow to dry completely**.** Low spots and water puddles must be identified by the Contractor and vacuumed dry to remove contaminants left by the rinsing operation. Determine if any repairs are required in low spots prior to coating system application. Failure of the Contractor to identify low spots before coating system application may result in removal and replacement of the coating products in these areas at no cost to the Owner.

G. After completion of surface preparation work and prior to application of coating materials, repair scaled, freeze/thaw damaged and loose, pop-out areas, cracked and damaged areas made apparent by the surface preparation methods, as specified in Sections 03 0130.41 and 03 0130.71. Areas requiring repair will be subject to further surface preparation, which is incidental to the work.

3.04 EXTENT OF COATING WORK

A. The following surfaces are to receive the coating system:

1. All horizontal surfaces of the concrete pond structure.

2. All vertical surfaces of the pond walls, including up and over the perimeter pond walls and island walls where the granite coping stones were removed.

1. Extend coating work up to all drain openings, feeds, skimmers, etc. and terminate the coating in a self-flashing application such that a water tight seal is achieved.

3.05 PRIMER

A. Do not begin primer application until inspection by independent inspector to ensure that concrete surfaces to receive the primer have been prepared as specified in Section 03 0130.71 and are clean and surface dry before applying primer.

B. Ensure that perimeter granite coping stones have been removed. Ensure that other surfaces not scheduled to receive primer are protected before applying primer. Install spray curtains and partitions as required to control overspray.

C. Mix and spray-apply the primer components in accordance with the requirements and recommendations of the coating manufacturer:

1. Apply the primer to an 8 to 10 wet mil thickness.

2. Avoid puddling/ponding on the pond surfaces.

3. Note that the primer has a working time of 45 minutes.

D. Ensure that the primer is properly cured before applying the polyurea base coat. The polyurea base coat must be applied within 12 hours of the primer application; otherwise, reapply the primer.

E. Clean spills and over-sprays as they occur. Use cleaning products and methods required by the coating system manufacturer.

3.06 POLYUREA

A. Do not begin polyurea application until inspection by independent inspector to ensure that the primer has properly cured and the polyurea base coat is applied within 12 hours of the primer application.

B. Spray-apply the polyurea using the equipment approved by the coating system manufacturer.

1. Spray a 30-mil base coat of polyurea over the primed surfaces.

2. Retouch the base coat by filling low spots and other areas of inadequate thickness.

3. Allow the base coat to cure, as required by the coating system manufacturer, before application of the subsequent coat.

4. Spray an additional 30-mil coat of polyurea in a perpendicular direction to the first coat and allow to cure.

C. Clean spills and over-sprays as they occur. Use cleaning products and methods required by the coating system manufacturer.

3.07 TOPCOAT

A. Do not begin topcoat application until inspection by independent inspector to ensure that the polyurea coatings have been properly applied and cured. Spray-apply the topcoat using the equipment required by the coating system manufacturer.

B. Apply the topcoat, in multiple coats, to a 20-mil thickness; maximum thickness per coat is 8 mils. Allow each coat to cure, as required by the coating system manufacturer, before application of subsequent coats.

C. Clean spills and over-sprays as they occur. Use cleaning products and methods required by the coating system manufacturer.

C. Keep at the site, and maintain in proper condition, an adequate number (at least two per application crew) of wet film thickness gauges. Continuously use the gauges, to ensure the specified thickness of each system coat is uniformly maintained. Periodic monitoring of application rates that may be performed by the Architect will not relieve the Contractor of the responsibility for verifying and providing the specified coating thickness.

3.08 WATERTEST

A. Subsequent to the completion of the topcoat application, perform a 48 hour water test. Fill the pond to the proposed pond elevation and confirm depth of water at several points along the perimeter and islands. After 48 hours, recheck the depth of water to verify no loss of water except for a small allowance for evaporation.

B. Provide any needed repairs to correct deficient conditions.

C. Perform final inspection and provide certification from independent inspector that all work has been performed in accordance with the specifications and Manufacturer’s recommendations.

3.09 CLEAN-UP

A. During the progress of the work, remove all discarded membrane/coating materials, rubbish, cans and rags from the project on a daily basis.

B. Leave the general premises clean and free of all construction dust, dirt and debris.

END OF SECTION

SECTION 099113
EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field touch-up application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to remain unfinished.

1.02 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2019.

B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.

C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.

D. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual Volume 2 2021.

E. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).

F. SSPC-SP 6 - Commercial Blast Cleaning 2007.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.

D. Samples: Submit two painted samples, illustrating selected colors and sheen for each color and system selected with specified coats cascaded.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

1.05 MOCK-UPS

A. See Section 014000 - Quality Requirements, for general requirements for mock-up.

B. Provide section of painted handrail 8' long, illustrating paint color, texture, sheen and finish.

C. Locate where directed by Owner.

D. Mock-up may remain as part of the work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Basis of Desin Manufacturer:
   2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

C. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   4. Supply each paint material in quantity required to complete entire project's work from a single production run.
   5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.

B. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

C. Colors: To be selected from manufacturer's full range of available colors.

1. Selection to be made by Architect after award of contract.
2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete and primed metal.
   1. Two top coats and one coat primer.
   2. Top Coat(s): Exterior Light Industrial Coating, Water Based; MPI #161, 163, or 164.
      a. Products:
         1) Sherwin-Williams Pro Industrial DTM Acrylic, Gloss. (MPI #164)

2.04 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
   1. Water Based Primer for Galvanized Metal; MPI #134.
      a. Products:
         1) Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer. (MPI #134)

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 Commercial Blast Cleaning. Protect from corrosion until coated.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance.

D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.06 SCHEDULE - PAINT SYSTEMS

A. Steel Fabrications: Finish surfaces exposed to view and concealed surfaces where required to conform to performance requirements and resist corrosion.
   1. Exterior: ME-OP-3A, gloss; apply finish to exposed and concealed surfaces before installation.

B. Shop-Primed Metal Items: Finish surfaces exposed to view.
   1. Finish the following items:
      a. Exposed surfaces of handrail assembly including embedded posts.

END OF SECTION 099113