BECS
Building Envelope Consultants and Scientists, LLC.

PROJECT MANUAL

For

VOMITORIUM GUARDRAIL AND CONCRETE REPAIRS

At

Oriole Park at Camden Yards
333 W. Camden Street
Baltimore, MD 21201

Prepared For:

Maryland Stadium Authority
333 W. Camden Street, Suite 500
Baltimore, MD 21201

Prepared By:

Building Envelope Consultants and Scientists, LLC

May 15, 2019 – Bid Set

Oriole Park at Camden Yards
333 W. Camden Street
Baltimore, MD 21201
VOMITORIUM GUARDRAIL AND CONCRETE REPAIRS

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*Although available original architectural drawings are used for reference, BECS was not involved in their preparation and is not affiliated with the original design engineer/architect of record. The contractor shall field verify all dimensions and conditions.

SECTION 01000 – SUMMARY OF WORK

1.0 GENERAL INFORMATION

A. The work of this contract generally involves cast-in-place concrete repair, installation of new steel surface-mounted guardrail bases, crack repair, replacement of deteriorated precast panel anchorage, and steel painting at Oriole Park at Camden Yards, 333 W. Camden Street, Baltimore, MD 21201.

B. Include all Work listed in these Specifications and incidentals thereto. All phases of the Work shall be executed by skilled craftsmen experienced in their respective trades.

C. The Base Bid and Add Alternate work items are required.

D. The Contractor shall field verify dimensions and conditions needed to complete the work of this specification. Contractor shall provide means of access as needed to reach and work on all surfaces associated with this project from ground level up to and including roofs.

E. Conduct a pre-construction damage survey prior to beginning work. Create and supply a CD photo log of existing conditions to the Owner's representative and the Engineer.

F. Contractor shall provide complete overhead protection as needed below elevated work areas. Divert pedestrian traffic away from work areas and to building entrances using signage and physical barriers.

G. Provide an accurate schedule that reflects the various stages of work. Update the schedule bi-weekly and submit to the Owner via e-mail with active dialogue describing work completed during each week. Notify owner immediately via email or other written correspondence of any delays to the schedule.

H. Contractor may subcontract portions of the Work with prior approval from the Owner. Contractor shall oversee all subcontractor operations as related to completion of the work of this specification.

I. Provide manpower, labor, equipment, power hook-ups, and materials to access and complete the operations of this work. Review work areas for access requirements. Contractor shall remove, store on site or relocate items such as cellular phone antennas, electrical lines, security cameras, lighting, and power sources near the Work as needed to comply with OSHA requirements and maintain their work schedule. Contractor shall reset these items to their original configuration and operating order upon completion of the work.

J. Provide an allowance of $40,000 for miscellaneous hidden and/or unforeseen conditions, additional work requested by the Owner, and quantity overages that may be encountered during the project. Allowance funds will also be used for time and materials work.

K. Contractor shall prepare as-built drawings for each phase of work completed. Drawings will identify repair location, type, general configuration and dimensions, and overall square footages for each type of repair. Contractor shall provide the Engineer a complete set of as-built drawings upon completion of the project. The Engineer will sign, date, and take possession of the as-built drawings upon formal approval and will use the drawings to approve applications for payment submitted by the Contractor for work complete and in place. Digital copies of the as-built drawings will be made available by the Engineer once all work is completed. Original field copies will be returned to the contractor once the project is completed.

L. Clean areas affected by the Work daily of all work-related dust and debris. Remove and dispose of all formwork, by-products, and debris associated with the Work. Remove all equipment from the site. Store extra material purchased by the Owner in a location at the site designated by the Owner. Otherwise, dispose of all excess material.

1.1 SCOPE OF WORK

BASE BID REPAIRS

1. Salvage the existing galvanized steel guardrail systems on top of all level 100 and level 300 vomitorium walls except for the embedded portion. Saw cut the existing posts just above the weep holes, or slightly higher if necessary due to corrosion. Prepare and prime the exposed saw cut section of post and securely store until ready to be reinstalled with new base plates. Carefully document the location of each guardrail to ensure they are put back at the same vomitorium wall they came from.

2. Remove the top 6” of concrete (full width) continuously from the top of all level 100 and level 300 vomitorium walls, including the embedded portion of existing guardrails. Clean, prepare, and prime exposed reinforcing steel, prepare formwork to match existing dimensions and chamfers, and pour new approved self-consolidating concrete. Carefully document existing finish heights, slopes, chamfers, etc. prior to demo to ensure new concrete matches existing profiles.

3. Prime (1 coat) and paint (2 coats) base plates, and touch up prime and paint existing guardrails where paint has chipped or failed prior to installation.

4. Install guardrails with new galvanized steel base plates. Base plates and existing posts are to lap 3” minimum, and be fillet welded together at the top of the base plate. Typical base plate details are included in the Repair Drawings, but onsite measurements and shop drawing are still required to be created by the manufacturer. Ensure base plates sit properly on slopes. Guardrail heights are to match existing heights once reinstalled.

5. Perform miscellaneous vertical concrete repair at spalls and failing previous repairs on vomitorium walls. Minimum patch depth of 2 inches. Clean, prepare, and prime exposed reinforcing steel during repairs.

6. Perform select concrete crack rout and seal at vomitorium walls.

7. Replace aging joint sealants at level 300 vomitorium walls.

8. Install new epoxy anchors at façade precast panel locations where existing bolts are broken. To be identified jointly with the Engineer.

9. Replace loose and corroded nuts and washers with new stainless-steel hardware at precast panel attachments.

10. Clean, prime, and paint precast panel attachment hardware where experiencing corrosion.

11. Clean, prime, and paint select corroded areas of steel framing.

12. Install new clip angles at precast panel locations in stairwells where the existing are missing with new stainless-steel clip angles (matching existing) and epoxy anchors. Four anchors per clip angle. To be identified jointly with the Engineer.

13. Clean up all work areas.

Add Alternate Items

Alternate 1 – ADD Cost to install a breathable mineral-based coating (2 coats) on vomitorium walls following curing of concrete repairs. Coating is to extend from top to bottom of walls both sides, and will end at the interior walls at the start of the vomitorium ceiling. Use M3P by Conproco or approved equivalent.

Alternate 2 – ADD Cost to fabricate and weld new galvanized steel rail section to select existing guardrails at 23 level 300 vomitoriums to meet 42" height.

1.2 SCHEDULE

The project is anticipated to start upon receipt of written Notice to Proceed in mid June 2019. July, August, and September will be used for preparations such as measurements, shop drawings, submittal review, and material procurement. Site work may begin in October (after conclusion of the Orioles baseball season), beginning with temperature-sensitive concrete repairs.

2.0 PRODUCTS

See material specification sections.

3.0 EXECUTION

See material specification sections.

[END OF SECTION]

SECTION 01100 – ADMINISTRATIVE PROVISIONS

A. Various standards and specifications are incorporated in the technical sections of these specifications by reference. In all such instances, the reference shall mean the latest edition, including amendment or revision in effect as of the date of this specification, unless a specific issue is identified otherwise. In the event that referenced specifications or standards contain general requirements in conflict with the Contract Documents, the more stringent requirements shall govern.

B. Contractor shall be licensed to perform work in the State of Maryland.

C. Examine the site and verify dimensions and conditions necessary for completion of the Work. Notify Owner and Engineer should the conditions vary from those described in this document.

D. Existing conditions are reflected correctly to the best of Owner's knowledge. Should conditions be encountered which are not as indicated, modification to accommodate new Work shall be made as required at no additional expense to Owner.

E. Contractor shall obtain and pay for permits and permissions required to complete the specified work.

F. Acknowledge, by execution of the Contract, awareness and familiarity with the contents and requirements of the regulations, codes, standards, and guidance documents. Assume responsibility for the performance of the Work in strict compliance with these documents and for every instance of failure to comply with these documents. Where conflict exists between these documents and the Contract Documents, the more stringent requirements shall apply.

G. Dust protection shall be constructed in accordance with the Contractor’s approved (by Owner) Dust and Debris Control Plan. Contractor shall be responsible for damage to cars or other personal property as a result of the Work or by Contractor’s personnel.

H. The Contractor (after award of Contract) shall meet with the Owner for the purpose of preparing a detailed progress schedule. This will include a list of the Work items required to complete the Contract, the duration, sequence, and dependency on the Work of other Contractors. The Owner will review and revise the Work Schedule as required, with Contractor's cooperation. Work Schedule shall also include hours of expected operation as well as daily activity. Obtain approval from Owner prior to initiating or altering Work schedule. There are no specific work hours that the work must be held to, and weekend work is allowed. The facility is available 24/7 unless a public event is taking place.

I. Provide a full-time, on-site superintendent experienced in the repair procedures required for the Project. Superintendent shall speak fluent English and any languages used by the on-site labor force.

J. Parking is available for Contractor vehicles at the rear of the building during approved work hours only. Contractor vehicles will need to be registered with the Owner's security team.

K. Building access to all areas except the immediate Work area must be maintained at all times. Work areas shall not block access to any portion of the building (excluding the immediate Work area). Provide temporary barriers to restrict unintentional access to the Work area, without preventing emergency egress. Maintain all exits to the buildings as fire exits. Provide complete overhead protection per OSHA standards and requirements of the local jurisdiction above all pedestrian walkways, building entrances, and other areas of traffic flow that may be affected by the work.

L. Contractors may not give access to the building to other persons. No work-related items should remain inside the building during nonworking hours unless notice/permission to and from the Owner is provided. The Owner will provide necessary keys and access cards to the site foreman or superintendent as necessary for the contractor to mobilize/demobilize the site and begin and end daily work operations. Use of loading dock and service elevators shall be coordinated through the property manager.

M. Job site safety, bracing, and shoring shall be the sole responsibility of the Contractor. Contractor procedures and practices shall comply with applicable federal, state and local safety requirements.

N. Provide all equipment, materials and manpower to complete the Work outlined in this document.

O. Coordinate Work with others (if present), such that no delay with this project or the Work of others occurs.

P. Contractor shall assume full responsibility for protection and safekeeping of products stored on site under this Contract.

Q. Protect walls, decks, and other existing finish Work that is to remain as is and is exposed during execution of the Work.

R. Contractor shall have readily available at all times on site the Material Technical submittals and Manufacturer's Material Safety Data Sheets (MSDS) for **any** material or solution which is stored or intended for use on site. Material or solutions will not be permitted on site without this information. Flammable or potentially flammable products must be stored off site or in OSHA approved fire boxes.

S. Locate utilities that might be affected by the Work. Contractor is solely responsible for maintaining all utilities in operable condition, for repairing any damaged utilities, and for the safety of the Workers and public.

T. Maintain a minimum of three (or amount required by Code if more), currently inspected, 30-pound dry chemical fire extinguishers on the Project at all times.

U. Contractor may connect to existing power service and water sources. Contractor shall provide their own source of power and/or water in the event it is not available from the main building. Owner will pay cost of energy and water used from the main building. Exercise measures to conserve energy and water.

V. Provide all power equipment with qualified operating personnel for the safe and efficient use of equipment. Provide equipment with all safety devices as required by OSHA, local codes and ordinances, state codes and the equipment manufacturers.

W. Restrooms will be available for use in the stadium at a central location.

X. When unanticipated conditions conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Engineer.

Y. Contractor's project manager and superintendent shall participate in a preconstruction meeting, regular progress meetings, punch list walk through, and final walk through with the Owner. Regular progress meetings will be held once every two weeks unless agreed to otherwise.

Z. Contractor shall send weekly e-mails to the Owner's Representative and Engineer providing updates regarding the project schedule and overall project status.

AA. Clean-up shall be performed daily as required to prevent accidents to personnel, protect all Work in place, and to effect completion of the project in an orderly manner. Construction clean-up shall consist of the removal of all mud, oil, grease, sand, gravel, soil, trash, scrap, debris, and excess materials, from any drive, or walking surface, that may cause the tripping or sliding of persons or equipment. Loose materials or debris being removed from the site by the Contractor's vehicles, which becomes deposited on the roadways or other outside access areas, shall be cleaned up and removed immediately.

BB. Provide on-site dumpsters, if any are needed, in locations allowed by the Owner. Otherwise, obtain necessary permits to place dumpsters on public property. The Contractor shall pay for permits, meters, and costs associated with dumpster placement. Otherwise, Contractor shall remove and dispose of work related debris from the site on a daily basis.

CC. Payment by the Owner for any materials, equipment, or labor incorporated into the Work shall not be deemed to be an acceptance by the Owner. The risk of loss of such materials, equipment, or cost of labor spent to install such, shall remain with the Contractor, and the Contractor shall be fully responsible for such materials, equipment, or labor to the same extent as if the Owner had not paid or accepted real property, until after final inspection and approval by Owner. Stolen, damaged, vandalized, missing, or weather damaged equipment or material shall be considered the property of the Contractor until final acceptance by Owner.

DD. Following award of substantial completion by the Engineer, the Contractor shall fill out the Section 01700 Completion and Acceptance certificate for signature by the Owner and Engineer. The Contractor's quality assurance agent shall fully inspect the Work of each section. The quality assurance agent shall notify the Engineer in writing of satisfactory completion of the Work and request an inspection. During the Engineer's inspection, a list of deficiencies and defects will be recorded (the punch list). A reasonable time of approximately two weeks will be allowed for the Contractor to complete recorded "punch list" items. Additional punch list items discovered during this period will be added to the recorded list and shall also be addressed within the two week time frame. It is the expectation of the Owner that the Contractor will identify punch list work as part of their in-house quality assurance program and that additional items identified by the Owner and/or Engineer will be minimal. Contractor shall correct all deficiencies before final payment and release of retainage is approved by the Engineer unless another written agreement between the Owner and Contractor to reduce retainage is signed. Final acceptance of installed items will be in accordance with the referenced specifications. Replacement or correction of out of specification Work will be at the Contractors' expense.

EE. Any request for an extension of time is to be made immediately upon occurrence of conditions which, in the opinion of the Contractor, warrant such an extension with reasons clearly stated and detailed proof given for all delays beyond the Contractor's control, these to be made in writing to the Engineer. No time extension will be allowed except by formal approval of the Owner.

FF. Upon completion of the project, or as directed by the Owner, the Contractor shall remove all temporary items, material, and equipment from the site, same to become his property, and leave the premises.

GG. Contractor shall warrant work including labor and materials for a period of two years. Manufacturer's warranties shall be for a minimum period of two years unless the standard warranty is greater, which shall then apply.

HH. Close-out documents shall include the contractor formal statement of completion, contractor warranty, manufacturer warranties, list of subcontractors and material

suppliers and their addresses, product literature and maintenance guidelines, as-builts, shop drawings, and releases of lien.

[END OF SECTION]

SECTION 01125 – MOCK-UPS

1.0 GENERAL INFORMATION

A. Mock-ups shall be completed prior to beginning full production Work. The prototypes shall be located as directed by the Engineer.

B. Work items on each prototype shall be completed fully, as a finished installation. The intention of a prototype is to execute the Work exactly as planned for in full production. Work on prototypes may be accomplished singly or in combinations such that Work may begin when approval on that type of Work is given, without having all prototypes approved.

C. After final cleaning of the prototype(s), the Contractor shall leave scaffolds secured in place and shall stop Work on that type of repair for a period of up to seven calendar days to allow for evaluation of results by the Engineer and the Owner.

D. If changes in repair procedures are desired by the Owner or the Engineer, said changes shall be negotiated with the Contractor prior to resuming Work.

E. Work shall not resume until written notice is given to the Contractor by the Engineer. Delays in restarting the project, beyond the Contractor's control, shall be negotiated as a change order.

F. Quality and completeness of subsequent Work shall be compared to prototypes.

2.0 SCOPE OF MOCK-UPS

A. Mock-ups shall be performed at a single building location and shall remain in place as the quality standard for the duration of the project.

B. A minimum of 1 sample of field installed concrete repair.

C. A minimum of 1 field installed guardrail with new base plates.

D. Up to 3 field installed samples of mineral-based coating if Alternate 1 is chosen.

3.0 MOCK-UP SCHEDULE

A. Mock-ups shall be installed and accepted prior to the start of work.

[END OF SECTION]

SECTION 01210 - ALLOWANCE

A. Include the allowance amount stated on the Bid Form in the Base Bid Amount.

B. Time and material work as well as work resulting from hidden and unforeseen conditions will be taken from the Allowance with prior approval from the Engineer.

C. Allowance work shall be jointly marked in the field by the Contractor and Engineer and agreed to by the Owner before being performed.

D. Allowance work shall be supported by timesheets, receipts, and any other back-up data required by the Engineer and shown on the Application for Payment.

E. Allowance funds not utilized shall be credited back to the Owner.

F. If during the course of performing allowance work, it appears allowance funds will be exhausted or exceeded, determined when the spent amount is at 75% of the allocated amount, the Contractor will immediately notify the Owner of the expected overage before it is incurred. Contractor will provide an estimate of costs to complete the needed work and shall seek and receive Owner approval before proceeding with additional work.

[END OF SECTION]

SECTION 01300 – SUBMITTALS

1.0 GENERAL INFORMATION

A. A complete copy of the submittals shall be sent to the Engineer electronically in pdf format. Partial submittals are unacceptable unless the flow of work dictates the need for partial submittals. The submittals may be e-mailed or sent on a thumb drive. Following approval by the Engineer of the submittals, the Contractor shall provide one complete hard copy to the Owner and one copy to the field superintendent. Both copies shall be maintained on site and be accessible to code officials at all times. Hard copies of submittals shall be presented in a submittal log. The log shall consist of an organized binder including a cover page with the job title and table of contents for all included submittals. Tab and label each individual submittal within the binder so that they may be turned to easily.

B. The Engineer will accept or reject submittals required by the contract. The Contractor may submit deviations and variations from Contract requirements for approval by the Engineer.

C. It is the Contractor's responsibility to obtain approval of all submittals required by the contract documents prior to starting the work or in some cases as the flow of work allows. Materials not approved shall not be used until formal authorization is given by the Owner.

2.0 SUBMITTALS

2.1 Contractor shall submit the following:

A. SCHEDULE: Proposed preliminary progress schedule for the Work. Revise and submit progress schedule on a weekly basis. Organize schedule utilizing critical path method of scheduling.

B. PHASING PLAN: Submit drawing that shows contractor's intended phasing plan for the project.

C. PERMITS: Provide copies of all permits, as required by the federal, state, or local entity for the construction or demolition work required during the progress of the Work. Contractor shall apply for building permit for this project.

D. CONTRACTOR'S WARRANTY: Submit sample contractor's two-year material and workmanship warranty. Provide copy of actual warranty to be provided at the completion of the Work and letter indicating intent to issue warranty. Provide actual warranty upon completion of the project.

E. MANUFACTURER'S WARRANTY: Submit sample manufacturer's warranties with a minimum of 2-years for all materials or as required per each submittal section of the Technical Specification sections of this Project Manual or as listed herein. Provide copy of actual warranty to be provided at the completion of the Work and letter from manufacturer indicating their intent to issue warranty. Provide actual warranties upon completion of the project.

- Sealants – 10 Years Minimum

F. SAFETY PLAN: Submit written plan for each phase of work, including protection of surrounding building elements, workers, and pedestrians and an emergency egress plan for unit owners when the front entrance stairs to buildings are not accessible. Safety plan shall also include a written description of measures to temporarily vent flue exhaust away from buildings and pedestrians during chimney reconstruction.

G. DAMAGE SURVEY: Submit pre-job damage survey covering work areas and areas needed to access work. Perform survey with the Owner's representative present.

H. SHOP DRAWINGS: Submit shop drawings where indicated in the Technical Specifications sections of the Project Manual. Shop drawings are to be based on these Specifications, the Drawings, and other applicable industry standards. Shop drawings shall clearly indicate sizes, materials, finish, dimensions, elevations, and methods of attachments to existing structure in accordance with the Project Manual, Drawings, and applicable code requirements. Submit shop drawing revisions if field conditions require changes to the original shop drawings.

I. PRODUCT AND MATERIAL SAFETY DATA: Submit product data and additional information for all materials as required per each submittal section of the Technical Specification sections of this Project Manual.

J. SCHEDULE OF VALUES with a 10 percent project closeout.

K. Proposed DEMOLITION METHOD including equipment to be used.

L. TEST RESULTS: Provide results for placement as required by this Project Manual.

M. AS-BUILT DRAWINGS: Provide as-built drawings where details differ from design details and shop drawings or letter indicating compliance with original and shop drawings.

N. CONTRACTOR CERTIFICATION: The Contractor shall certify in writing upon completion of the project that the work has been completed and was performed in strict accordance with these Specifications and Manufacturer's recommendations.

O. AFFIDAVIT OF RELEASE OF LIENS with each application for payment

P. APPLICATOR'S LICENSE AND CERTIFICATION (if applicable) for the system/materials to be installed, including license numbers, expiration dates and proof of experience.

Q. SHORING and BRACING DRAWINGS signed and sealed by a Professional Engineer registered in the state, district, or commonwealth where the work is being performed.

R. LETTERS OF COMPATIBILITY between materials specified by differing manufacturers or between newly installed and existing materials.

S. DUST CONTROL MEASURES for protection and containment of dust resulting from the work. Particular emphasis shall be placed on containment and cleaning inside individual units.

T. SUBCONTRACTOR AND MATERIAL SUPPLIER LIST with phone numbers and addresses and a listing of the materials used including colors, textures, grades, etc.

U. MAINTENANCE GUIDELINES for installed work with contact information for persons or companies who perform the recommended maintenance.

V. Any materials involving color selection shall have mock-ups field installed for the Owner's review and final selection (i.e. sealants, paint, mortar, brick). Initial colors for field samples shall be selected by the Owner from color chips or samples submitted by the Contractor to the Owner.

3.0 RECORD DOCUMENTS

See Section 1100

[END OF SECTION]

SECTION 01400 – QUALITY ASSURANCE

1.0 REFERENCES

All codes and standards applicable to the Work governed by this specification shall be the most recent edition federal, state and local codes and standards. All applicable codes and standards shall be strictly adhered to, including, but not limited to the following:

1. American Concrete Institute (ACI);
2. International Concrete Repair Institute (ICRI);
3. Brick Industry Association (BIA);
4. Sealant and Waterproofing Restoration Institute (SWRI);
5. National Roofing Contractors Association (NRCA);
6. American National Standards Institute (ANSI);
7. American Society for Testing and Materials (ASTM);
8. National Institute for Occupational Safety and Health (NIOSH);
9. Occupational Safety and Health Administration (OSHA) guidelines;
10. The International Building Code 2006 (IBC);
11. National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations;
12. The U.S. Environmental Protection Agency (EPA);
13. American Welding Society (AWS); and
14. Society for Protective Coatings (SSPC).
15. Post Tensioning Institute (PTI)

2.0 CONTRACTOR'S RESPONSIBILITIES

A. The contractor is responsible to provide primary quality assurance for all work required by this specification. Work not in compliance with this specification should be rejected by the contractor's in-house quality assurance officer and replaced prior to scheduling the Engineer to make construction observations.

B. Contractor shall allow access to Work areas as required for quality assurance activities.

C. Contractor shall provide water or electric power if needed for quality assurance testing.

D. Contractor shall allow Engineer to take material samples as needed for testing.

E. Contractor shall follow Engineer's direction in technical matters. Conflicts between Engineer's direction and Contractor's interpretation of specifications shall be resolved by the Engineer.

F. Work shall be performed only by personnel experienced in the repair and restoration of concrete and masonry structures, coatings, paints, sealants, and associated items as required by these Specifications.

G. Notify the Engineer of the first day of removal of any existing materials. Allow access to the Work area for review of these procedures prior to the placement of any repair/replacement materials.

H. The Contractor shall coordinate with the Engineer to review Work at reasonable intervals. Work that requires inspection shall not be covered or concealed in any manner prior to review and approval by the Engineer.

I. The Contractor shall recognize that any discrepancies discovered shall be immediately corrected prior to removal of any barricades, protection, or shoring, or demobilizing from job site.

J. Defective Repair Materials: Repair materials not conforming to required lines, details, dimensions, tolerances or specified requirements will be removed and replaced at the Contractor's expense. The Engineer will determine repair or replacement of defective materials.

K. The Engineer will determine repair or replacement of defective materials.

L. Do not patch, fill, touch-up, repair, or replace exposed defective materials except upon express direction of Engineer for each individual area.

M. Manufacturers' Representatives shall be on site during Contract operations for technical support as required by the Engineer. The representative is required to document all visits and to submit a copy of this documentation to the Engineer.

N. Manufacturers shall certify that all materials intended to be used are acceptable, compatible, and appropriate for their intended use in this building. Representatives for the material manufacturers shall visit the site at the beginning and at each quarter point (as a minimum) during installation to verify proper installation and that work is being performed in accordance with industry standard and manufacturer recommendations if so requested by the Engineer.

O. Representatives for material manufacturers shall document their site visits, findings, and recommendations in letters to the Owner following each visit. The letters will state the installation requirements have been met as required to receive the full manufacturer's warranty or will provide guidelines as needed so these requirements can be met.

3.0 OWNER'S RESPONSIBILITIES

A. Owner will remove belongings and non-stationary items to allow access for the Contractor to perform the work.

B. The Owner will keep residents aware of the schedule and of dust and noise producing activities based upon schedules provided by the repair contractor. The Owner will advise residents to keep windows and doors closed during these events.

C. Owner has employed BECS to perform quality assurance observations and consulting services as required.

D. BECS may visit the site periodically to inspect work for compliance with this specification and material manufacturer's requirements.

E. BECS may require installed materials to be removed in order to verify correct installation. Contractor shall remove such materials.

F. BECS may monitor installation of products for compliance with manufacturer's directions and this specification.

G. BECS may request and contractor shall supply purchase orders and material packaging to verify purchase dates, material quality, storage procedures, costs, etc.

H. BECS may request and contractor shall supply timesheets and work logs to verify time and material work completed.

I. BECS may communicate directly with the field foreman and/or superintendent as needed to correct work or verify installation procedures and scheduling.

[END OF SECTION]

SECTION 01700 - CONTRACTOR COMPLETION AND OWNER ACCEPTANCE

1.0 GENERAL

Prior to final payment, the Contractor and Owner shall complete and sign this Section 01700. Work shall be warranted against defects in material and workmanship. The Work shall be warranted according to the individual specification section for various materials used on the project, which in no case shall be less than two years. The Contractor shall provide a workmanship warranty compatible with materials warranties for duration, which in no case shall be less than two years. Repairs made on the project shall be documented by as-built drawings provided by the contractor so repairs under warranty can be located. The warranty shall assign the rights to materials and manufacturer's warranties to the Owner.

CONTRACTOR STATEMENT OF COMPLETION

We_____ (Contractor) have reviewed the work in entirety as it was being performed and at the end of the project following completion of all punch list items. In our opinion, the work is complete according to the contract documents including all addenda and change orders as listed below and is in compliance with industry standards for the type of work being performed.

The Contractor's and material warranties shall start on _____ and shall expire on _____ unless variable dates for various portions of the work are required, in which case separate start and finish dates are provided on attachments to this document.

Attached are copies of applicable manufacturers' and Contractor warranties. Rights to materials and manufacturer's warranties are hereby assigned to the Owner. Work is warranted against defective materials & workmanship and shall be replaced by Contractor during Period of Warranty, upon notification by Owner and at no cost to Owner.

Contractor Name: _____

Address: _____

_____

Contractor Signature: _____ Date:_____

OWNER ACCEPTANCE OF THE PROJECT AS COMPLETE

Project Name: _____

Address: _____

_____

Owner Signature: _____ Date:_____

END OF SECTION 01700

SECTION 02075 – CONCRETE DEMOLITION

1.0 GENERAL

A. Work included this section is concrete demolition and protection of adjacent areas.

B. Furnish all labor, materials, tools, equipment and services necessary for and reasonably incidental to complete concrete demolition work shown on Drawings or specified.

1.2 Schedule

A. Contractor shall submit a schedule, phasing plan, and pedestrian traffic control plan.

1.3 Equipment

A. 15# or less Pneumatic, hydraulic, electric concrete breakers or chipping hammers are acceptable.

1.4 Utilities

A. Work area shall be examined to determine the presence of electrical conduits or other embedded utilities that could be damaged during demolition. Remove and reset electrical features.

B. The Contractor shall be responsible for supplying, installing and maintaining temporary lighting which may be required by the work.

C. Other utility lines or building equipment in work areas shall be temporarily protected or relocated as needed by Contractor during the work.

1.5 Protection of Adjacent Areas

A. Contractor shall coordinate closing of walkways, stairs, and entrances with the Owner. Pedestrian traffic shall be relocated or diverted away from the work area. Contractor shall provide all signs, hard barricades, steel plates, as well as, other material required to properly delineate/protect work areas and redirect pedestrian traffic in a safe manner.

B. Contractor shall make provisions for pedestrian walkways when required by the work. Walkways shall be properly barricaded, have overhead protection if needed, and marked to provide safe access for the public. Special provisions shall be made for handicapped access if existing walkways are handicapped accessible.

C. Contractor is responsible for controlling water runoff and conditioning run-off per EPA guidelines prior to it entering the storm water system. Contractor shall take proper precautions to keep water from entering occupied areas or into areas with equipment which could be damaged by water. Contractor is responsible for repairing damage caused by water infiltration from Work.

1.6 Concrete Removal

A. Start demolition away from finished surfaces such as walls, steel framing, and embedded railings and posts near the center of the patch. Work toward the edge of each patch identifying placement of reinforcing steel and other embedded features. Remove debris frequently so the subgrade and any embedded features are not obscured.

B. Saw cut patch perimeters with 90 degree outside corners. Use 45 degree saw cuts for inside corners. Patch shoulder shall be a minimum of ½" deep unless existing reinforcing bar prohibits this depth. Do not cut existing reinforcing steel or embedded items.

C. Minimum depth of removal shall be 2 inches. If depth of repair area exceeds 2/3 of slab thickness, a full depth repair shall be made.

D. The removal of concrete from vertical members and soffits shall follow the same procedure for demolition of decks with the exception saw cuts are not required. Edges should be chipped square. Feathered edges are not acceptable.

E. Full depth patches are preferred to soffit patches.

F. Oxidized and corroded reinforcing bars shall be undercut a minimum of 3/4 inch or 1/4 inch larger than largest sized aggregate in patching concrete, whichever is greater. Exposed bars not oxidized or corroded do not have to be undercut if less than 50% of bar's circumference is exposed and bond between bar and concrete is intact. If bond is broken or more than 50% of bar's circumference is exposed, the bar shall be undercut as described above. Removal of concrete around reinforcing bars shall extend to point where bar is well bonded to

concrete and free of corrosion. Care shall be taken during undercutting not to damage bond between concrete and reinforcing bar in areas beyond patch.

G. In cases where apparently corroded or heavily oxidized reinforcing bars extend beyond marked repair areas into apparently sound concrete, Engineer shall direct Contractor how far to extend limits of repair area.

H. Final detailing to remove delaminated concrete and profile edges shall be done with 15 lb. chipping hammers, electric hammers, or with hand tools, taking care not to create damage in sound concrete at edges and sides of patch areas. Demolition debris and foreign materials shall be carefully removed from patch areas before surface preparation operations.

I. Protect exposed finishes using plywood or similar rigid material.

J. If removing bulk concrete by mechanical means, protect pathways along which the equipment will travel from ruts, abrasions, staining, etc.

[END OF SECTION 02075]

SECTION 03200 – CONCRETE REINFORCEMENT

1.0 GENERAL

This section includes:

A. Reinforcing steel bars, wire fabric or rod mats for cast-in-place concrete.

B. Support chairs, bolsters, bar supports, and spacers for supporting reinforcement.

1.1 References (latest edition)

A. ASTM A 497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.

B. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

C. ACI 301: Specifications for Structural Concrete for Buildings.

D. ACI 315: Details and Detailing of Concrete Reinforcement.

E. AWS D1.1: Structural Welding Code Steel.

F. AWS D1.4: Structural Welding Code Reinforcing Steel.

G. CRSI Document: Manual of Standard Practice.

1.2 Submittals

A. Shop drawings.

1. Indicate sizes, spacings, locations, and quantities of reinforcing steel, wire fabric, bending and cutting schedules, splicing, stirrup spacing, supporting, and spacing devices.

2. When required by Engineer, prepared shop drawings by a structural engineer who complies with licensing law for the commonwealth, state, or district where the work is being performed and is acceptable to Engineer.

1.3 Quality Assurance

A. Perform concrete reinforcement work in accordance with CRSI Manual of Standard Practice.

B. Comply with ACI 301 for concrete preparation and placement as it applies to precast concrete structures. Discrepancies will be brought to the immediate attention of and interpretation by the Engineer.

C. Welders: AWS D1.1 or AWS D1.4 as applicable.

2.0 PRODUCTS

2.1 Materials

A. Reinforcing Steel: Deformed bars grade ASTM A615 fy=60 ksi and type as indicated.

B. Welded Wire Reinforcing: In accordance with ASTM A185 welded wire reinforcing; in flat sheets.

2.2 Accessories

A. Tie Wire: Minimum 16 gage annealed type or a patented system accepted by Engineer.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete.

2.3 Fabrication

A. Detail reinforcement in accordance with ACI 315, providing for the concrete cover, laps, bar sizes, etc. specified in ACI 318.

B. Locate reinforcing splices not indicated on drawings at points of minimum stress. Indicate location of splices on shop drawings.

C. Weld reinforcing bars in accordance with AWS D1.4.

3.0 EXECUTION

3.1 Placing

A. All reinforcement to be free of loose mill scale, loose or thick rust, dirt, paint, oil or grease.

B. Place all reinforcement in the exact position indicated on approved shop drawings. Tie bars together at alternate intersections with approved tie wire.

C. Maintain the distance from vertical forms and between layers of reinforcement by means of prefabricated chairs, ties, hangers, or other approved devices. Placing and fastening of reinforcement in each section of the Work must be approved by Engineer before concrete is placed.

D. Overlap sheets of metal mesh one square plus 6" to maintain a uniform strength. Securely fasten at the ends, edges, and support to maintain clearances.

E. Support reinforcing steel of formed flat slabs with metal chairs, precast concrete blocks or other slab bolsters. Size chairs or bolsters to position the steel in the exact location indicated. Space chairs for supporting the top steel and bolsters for supporting the bottom steel not more than 4 feet on centers in each direction. Plastic or epoxy coat that portion of the metal support in contact with the forms to prevent rust. Tie down deck steel to beams or forms at regular intervals of not more than 4 feet on centers along the beams or forms to prevent movement of the steel during placement of the concrete.

3.2 Splicing

A. Furnish all reinforcement in the full lengths indicated unless otherwise permitted. Splicing of bars, except where indicated is not permitted without written approval from Engineer. Stagger splices where possible.

B. Unless indicated otherwise, overlap reinforcing bars per ACI 318. In lapped splices, place the bars and wire in such a manner as to maintain the minimum distance for clear spacing to the surface of the concrete.

C. Do not use lap splices on bars greater in diameter than No. 11 unless approved by Engineer.

D. Weld reinforcing steel only if indicated or if authorization is made by Engineer in writing. Weld in conformance to AWS D1.4.

E. Do not bend reinforcement after embedding in hardened concrete, unless permitted by Engineer.

F. Do not permit reinforcement or other embedded metal items bonded to the concrete, to extend continuously through any expansion joint, except dowels in floors bonded on only one side of joints.

3.3 Placing Embedded Items

A. Place all sleeves, inserts, anchors and embedded items prior to concrete placement. Fill voids in embedded items temporarily with readily removable material to prevent entry of concrete. Provide approved bond breakers at embedded slab penetrations. Inserts within 6” of slab edges shall be reinforced with a minimum of 2-#4, 18” length hair pins evenly spaced.

B. Give all trades whose work is related to the concrete section ample notice and opportunity to introduce and/or furnish embedded items before concrete placement.

[END OF SECTION 03200]

SECTION 03300 - CAST-IN-PLACE AND BAG MIX CONCRETE

1.0 GENERAL

A. Section Includes:

- Placement methods
- Finishing
- Curing

1.1 References

Concrete materials, placement, finishing and curing shall be in accordance with requirements of latest revision of ACI 301, Specifications for Structural Concrete, and ACI 302.1R, Guide for Concrete Floor and Slab Construction unless modified herein., ACI 305R, ACI 306R, and ACI 318 latest edition, and ICRI Guidelines.

1.2 Submittals

A. Manufacturer's data for pre-packaged materials, including mortars, aggregates, admixtures, cement, bonding agents, pre-blended concrete mixes and curing compounds.

B. Mix design for concrete mixes batch mixed at a concrete plant or on-site batch mixer.

1.3 Quality Assurance

A. Coordinate placement and finishing of concrete with the Engineer. Contractor is responsible for field quality assurance procedures as discussed in Section 01400.

1.4 Formwork

A. Form materials shall be standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

B. Form coating shall be an approved release agent that will not adversely affect concrete or interfere with application of coatings.

2.0 PRODUCTS

2.1 Reinforcement and Concrete

A. Balcony slab reinforcement shall be new billet steel conforming to ASTM A615, grade 60k.

B. Repair Concrete: Prepackaged repair concrete shall be Portland cement based with fine aggregate and admixtures included in the dry material.

C. Partial and full-depth concrete repairs: Deck Mix SCC by US Concrete Products, Sikacrete 211 SCC Plus by Sika Corporation, or an approved equivalent.

D. Vertical repairs: Deck Mix SCC by US Concrete Products, Sikacrete 211 SCC Plus by Sika Corporation, or an approved equivalent.

E. Minimum concrete design compressive strength of 4,500 p.s.i. for any exterior concrete exposed to de-icing salts.

F. Other types of repair materials: Shall not be used unless approved by the Engineer.

2.2 Concrete Accessories

A. Moisture-retaining cover shall be ASTM C 171; clear polyethylene or white burlap-polyethylene sheet.

B. Chemical curing is permitted using EZ Strip Cure by Chem Masters or an approved equivalent.

2.3 Joint Devices

A. Joint fillers shall be non extruded, resilient asphalt impregnated fiberboard or felt. 1/4" thick and 4" deep; tongue and groove profile.

3.0 EXECUTION

3.1 Mixing

A. Comply with ASTM C 94 for the material type being installed.

3.2 Examination

A. Verify lines, levels, and dimensions before proceeding with work of this section. Install new concrete within exiting tolerances with proper slope to drain. Ponding on slab surfaces is cause for rejection of the concrete work.

3.3 Preparation

A. Comply with requirements of ACI 301 in installing formwork. Design and fabricate forms and shoring to support all applied loads until concrete is cured, and for easy removal without damage to concrete. Verify that forms are clean and free of deleterious materials before applying release agent.

3.4 Installing Reinforcement

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection. Install new steel to match existing size and layout of the existing steel.

B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.5 Placement

A. After surface preparation is complete and all formwork is set, blow out forms with compressed air to remove all dust and debris.

B. Place concrete and force material against edge of forms working toward center. Use mechanical vibrators or other appropriate means to completely consolidate concrete in form work and fill voids. Strike off surfaces to desired level. After filling, consolidate, then screed. Allow concrete to set to desired stiffness. Provide a finish to match existing adjacent concrete surfaces.

C. After finishing cure by covering exposed surfaces with wet burlap or approved clear sealer. If ambient conditions such as high winds, high temperature, low humidity or direct sunlight cause excessively rapid drying, keep burlap wet with water misting. Evaporation can also be retarded by covering wet burlap with plastic sheets. Wet curing shall continue for a minimum of 72 hours. If ambient conditions cause premature drying of concrete, continue wet curing for an

additional 48 hours or use non-solvent, water based curing compound, which has been pre-approved by Architect and Manufacturer of repair materials.

3.6 Treatment of Concrete after Curing

A. After curing is complete, remove formwork, shoring and or temporary construction. Patch tie holes and remove materials not intended to remain. Submit sequence of formwork removal to Architect for review. Do not remove forms until concrete has attained sufficient strength to support its own weight and constructions live loads to be placed thereon, without damage to structure. Contractor shall be responsible for proper removal of forms and repair or replacement of Work damaged due to improper or early removal of forms.

B. Excessive honeycombing or large voids may be cause for rejection of Work. Voids accepted by Architect as not being detrimental to structure must be filled to produce an acceptable surface.

C. Grind off concrete fins or humps created by seams in formwork or at edges of repair areas. Grinding may be used to profile or level surfaces which are unacceptable after casting. The preferred method of creating grooves, drip edges and chamfers is by forming; however, grinding can be used to create these details where inadvertently omitted from formwork.

D. Rout and seal shrinkage cracks that develop following initial cure and for a period of 365 calendar days following concrete placement.

E. Thoroughly clean work area to remove all dust, dirt, overspray on columns, walls, and soffits.

[END OF SECTION 03300]

SECTION 05120 – STRUCTURAL STEEL

1.0 GENERAL

A. Provide materials, labor, and equipment necessary to complete repairs associated with providing precast panel attachment hardware.

1.1 Submittals

A. The Contractor shall submit for approval shop drawings for the fabrication and erection of all work. Include plans, elevations and details of sections and connections. Show type and location of all fasteners.

B. The Contractor shall submit the manufacturer's specifications, load tables, anchor details and standard installation details.

C. Samples of steel components and anchorage system shall be submitted for review.

D. Certificates:
- Structural steel.
- Steel for all connections.
- Welding materials.
- Shop coat primer paint.

E. Copy of welder's AWS certificate including subcontractors performing welding

F. Test reports for steel products

1.2 Quality Assurance

A. Product Delivery, Storage, and Handling

- The Contractor shall provide all materials required to complete the work of this Section.

- Deliver materials in manufacturer's original containers, dry, undamaged, seals and labels intact.

- Store materials in weather protected environment, clear of ground and moisture.

- All materials shall be handled, transported, and stored in accordance with manufacturer's requirements.

- The use of asbestos-containing materials or lead-based paint is prohibited on this project.

B. Field Quality Control

- Repairs shall be performed by a company specializing in exterior restoration, with minimum of five years of experience performing work similar in nature to that required by these Specifications. Contractor must comply with applicable provisions and recommendations of the following: NAAMM Metal Bar Grating Manual designated ANSI/NAAMM MBG 531 (Aluminum and Light Duty Steel and Stainless Steel Grating) and MBG 532 (Heavy Duty Steel Grating).

- Follow requirements of AISC 360: Specification for Structural Steel Buildings and AISC 303: Code of Standard Practice for Steel Buildings and Bridges.

- Acquire materials from the same source for all repairs required in this Section.

- Materials or repairs that do not conform to these Specifications shall be considered unacceptable. Such materials, whether in place or not, shall be removed from site.

- Take field measurements prior to preparation of final shop drawings and fabrication where required to ensure proper fitting of the work.

C. Warranty

- Provide a minimum two-year Contractor's Warranty for materials and workmanship.

2.0 PRODUCTS

A. Structural steel shall be ASTM A36 (36 ksi).

B. Fabrication and tolerances shall be in accordance with ANSI/NAAMM Metal Bar Grating Manual and AISC Manual of Steel Construction, latest edition.

C. All fasteners, washers, and nuts shall be high strength ASTM A325.

D. Epoxy Adhesive: Hilti HIT-RE 500 V3.

E. Miscellaneous rolled steel plates and shapes shall comply with ASTM A36, Fy=36 ksi.

F. Welding materials to comply with Structural Welding Code AWS D1.1. Welding rods shall be E70XX.

3.0 EXECUTION

A. Comply with manufacturer's instructions for delivery, storage, mixing, and application of products.

B. Do not proceed with installation of materials during inclement weather unless all specified requirements and manufacturer's instructions can be achieved.

C. Cover openings cut in walls or open tops of walls under construction that must be left open overnight. The covering must be weather tight and secured from blowing off in wind storms.

D. Protect fixtures attached to walls, cover or mask openings and windows adjacent to work areas.

E. Adhere to manufacturer’s specifications regarding environmental requirements, surface preparation, application methods, etc. where more stringent than required by these specifications.

F. Verify substrate surface condition is adequately prepared to receive the work of this Section.

G. Prior to the use of any materials of this Section, refer to the “Safety” section of the Materials Safety Data Sheets (MSDS) provided by the material manufacturer for applicable cautions and warnings.

3.1 Installation

A. Prior to installation Contractor shall inspect structure for deterioration, correct size, layout and alignment. Any inconsistencies discovered in the supporting structure deemed detrimental to installation shall be reported in writing to the Engineer prior to placement.

B. Prior to any welding on-site in contact with existing building steel structure coordinate with Owner in advance and ensure Owner's Fire Watch is in-place. Inform Owner daily when welding work is completed that day so that Owner may know when to terminate their Fire Watch for that day.

C. Welding in accordance with AWS D1.1. Welds shall be made only by welders and welding operators who have been previously qualified by tests as prescribed in AWS D1.1 to perform type of work required.

D. High Strength Bolts: High strength bolts tightened to a bolt tension not less than 70% of their minimum tensile strength. Tightening done with properly calibrated wrenches, by turn-of-nut method or by use of direct tension indicators (bolts or washers). Tighten bolts in connections identified as slip-critical using Direct Tension Indicators. Twist-off torque bolts are not an acceptable alternate fastener for slip critical connections.

E. Install work according to approved shop drawings and standard installation clearances as recommended by ANSI/NAAMM Metal Bar Grating Manual and AISC Manual of Steel Construction. Final detailing including opening size, pitch, welds, etc. shall be in compliance with the International Building Code and requirements of the local jurisdiction.

F. Perform all cutting & fitting required for installation. Utilize standard panel widths wherever possible.

G. Protect against contact between dissimilar materials (i.e. steel and aluminum and/or aluminum and concrete) by painting surfaces with bituminous paint and including neoprene gaskets between points of contact. Treat joints and seams between dissimilar metals with the approved silicone sealants.

H. Seal gaps on adjoining lengths of shelf angles with sheet metal closure pieces, sealed and set in-place with Silicone sealant prior to flashing installation.

3.2 Attachment

A. Use approved attachment system and fasteners to secure new components to existing supporting members.

B. Erection in accordance with AISC 303, Section 7B.

C. Temporary Supports: Temporary support of structural steel frames during erection in accordance with AISC 303, Section 7.

3.3 Cleaning

A. Clean all surfaces and areas affected by the work of this section. Consult manufacturer where cleaning of specialty finishes is required.

[END OF SECTION 05120]

SECTION 05520 – GUARDRAILS

PART 1 GENERAL

1.1 DESCRIPTION

A. This section includes new galvanized steel guardrail post bases at vomitorium walls.

1.2 REFERENCES

A. ASTM A 36 - Standard Specification for Carbon Structural Steel.

B. ASTM E 488 - Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements; 1996.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Guardrails shall be capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors and connections:
   1. Top Rail of Guards: Shall withstand the following loads:
      a. Concentrated load of 200 lbf (0.89kN) applied at any point and in any direction.
      b. Uniform load of 50 lbf-ft. (0.07kN-m) applied horizontally and concurrently with uniform load of 100 lbf-ft. (0.14kN-m) applied vertically downward.
      c. Concentrated and uniform loads above need not be assumed to act concurrently.
   2. Handrails Not Serving As Top Rails: Shall withstand the following loads:
      a. Concentrated load of 200 lbf (0.89kN) applied at any point and in any direction
      b. Uniform load of 50 lbf-ft. (0.07kN-m) applied in any direction
      c. Concentrated and uniform loads above need not be assumed to act concurrently.
   3. Guards Infill Area: Shall withstand the following loads:
      a. Concentrated horizontal load of 200 lbf (0.89 kN) applied to a 1sq. ft. at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area. Loads need not be assumed to act concurrently, with loads on top rails in determining stress on guard.

B. Thermal Movements: Design handrails and railings to allow for movements resulting from 120 degree F (49 C) changes in ambient and 180 degree F (82 C) surface temperatures. Base engineering calculation on surface temperatures of

materials due to both solar heat gain and nighttimes-sky heat loss.

C. Corrosion Resistance: Separate incompatible materials to prevent galvanic corrosion.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. 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.

C. Shop Drawings:
   1. Submit Manufacturer's approved shop drawings detailing the section and elevation views of each product to be installed.
   2. Coordinate with locations listed on Contract Drawings.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

F. Copy of welder’s AWS certificate including subcontractors performing welding.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (10) years experience.

B. Installer Qualifications: All products listed in this section should be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.

C. Mock-Up: Provide a mock-up for evaluation of installation techniques and application workmanship.
   1. Finish areas designated by Engineer.
   2. Do not proceed with remaining work until the installation is approved by Engineer.
   3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

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

installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT 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.

1.8 WARRANTY

A. At project closeout, provide to the Owner or Owners Representative, an executed copy of the manufacturer's standard document outlining the terms, conditions and limitations of their Lifetime Limited Warranty.
   1. Material Warranty: Twenty (20) Years.
   2. Finish Warranty, including the new base plates and the touch-up paint at existing guardrails: Five (5) Years.

PART 2 PRODUCTS

2.1 RAILING COMPONENTS

A. Galvanized steel railing posts and base plates to meet ASTM A36.

B. Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.

C. Provide formed or cast base flanges with predrilled hole for exposed bolt anchorage.

2.2 ACCESSORIES

A. Post-installed Anchors: Anchors of type indicated below, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four items the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
   1. Threaded Rod: A316 stainless-steel threaded rod. 1/2-inch diameter (or as required by railing manufacturer for use with the base flange connection), with embedment depth as shown on drawings. Include stainless-steel washer and acorn nut.
   2. Epoxy Adhesive: Hilti HIT-RE 100 or approved equivalent.

2.3 FABRICATION

A. Assemble handrails and railings in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

B. Mechanical Connections: Fabricate handrails and railings by connecting members with railing manufacturer's standard concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

C. Brackets, Flanges, Fittings and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings and anchors to connect handrail and railing members to other construction.

D. Close exposed ends of railing members with prefabricated end fittings.

E. Provide mounted handrails wall returns at wall ends unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch (6 mm) or less.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared. Allow new concrete to cure for at least 7 days prior to railing installation.

B. Verify field measurements are acceptable to suit railing assembly tolerances.

C. Verify supports and anchors are correctly positioned. Field locate and mark positions of all new railing base plates and fasteners and verify with Engineer.

D.

3.2 PREPARATION

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

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Fit exposed connections together to form tight, hairline joints. Fitting, and Placement: Set and railings accurately in approved location, alignment and elevation measured from established lines and levels and free from rack.

C. Cutting, Fitting, and Placement: Set and railings accurately in approved location, alignment and elevation measured from established lines and levels and free from rack.

1. Do not weld, cut or abrade coated or finished surfaces of railing components that are intended for field connection by mechanical or other means without further cutting or fitting.

2. Align rails so variations from level or parallel alignment do not exceed 1/4 inch in 12 feet (1.6 mm per m).

D. Adjust railings before anchoring to ensure alignment at abutting joint's space posts at interval indicated, but not less than required to achieve structural loads.

E. Use anchorage devices and fasteners where necessary for securing handrails and railings and for properly transferring loads to in-place construction.

F. Use mechanical joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

C. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

SECTION 07920 – SEALANTS

1.0 GENERAL

This section includes guidelines for removal of existing sealants and replacement with new sealants.

1.1 SUBMITTALS

A. Submit product data.

B. Color and sample charts from standard color charts.

C. Manufacturer's ***ten-year (minimum) warranty*** and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.2 QUALITY ASSURANCE

A. Standards

1. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005.

2. ASTM D 1667 - Standard Specification for Flexible Cellular Materials--Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).

B. Install mock-up of sealant joints for adhesion testing, detailing approval, and color selection prior to the start of work at each elevation.

1. Coordinate location of mock-ups with the Engineer and manufacturer's representative. Construct mock-up with specified sealant types and with other components noted as directed by the manufacturer's representative.

2. Allow sealant to cure before pulling or inspecting.

3. The test is successful if the sealant fails in cohesion when pulled. Sealant that fails in adhesion is not acceptable.

2.0 PRODUCTS

A. Urethane Hybrid Sealants

1. Masterseal NP 150, Tremco Dymonic FC, or an approved equivalent.

B. Silicone Sealants

1. Dow Corning 790, Tremco Spectrem 3, or an approved equivalent.

C. Accessories

1. Primer: as recommended by the manufacturer. All bids should include priming as part of joint preparation. Primer may only be removed as part of joint preparation if the manufacturer demonstrates better adhesion to existing substrates through field testing without the use of primer. All tests and results shall be documented in writing with the manufacturer's recommendations.

2. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; non-gassing, oversized 30 to 50 percent larger than joint width.

3. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

3.0 EXECUTION

A. Coordinate with the Owner for removal of hard features such as conduit, pipes, lighting, cameras, flags, awnings, signage, etc. that inhibit access to the work areas as part of allowance work. Reset existing features to their original configuration upon completion of the work.

B. Remove existing faulty or disturbed exterior sealant including sealant backer rod. Remove only the amount of sealant which can be replaced in a days Work unless temporary protection from dust, exterior air, water, etc. is provided.

C. Clean, dry and rake out all disturbed joints and spaces. For rout and seal, grind joints using an appropriately sized V-groove diamond plate blade.

D. Verify that substrate surfaces are ready to receive Work. Prime joints.

E. Install manufacturer approved backer rod or other joint backing. Verify that joint backing and release tapes are compatible with sealant. Where pre-existing joints were urethane verify complete removal of urethane remnants and grind away old material as needed. Acceptable removal shall be pre-determined through mock-ups and adhesion tests prior to the start of work. DO NOT proceed with removal of sealants until tests and mock-ups have been formally accepted in writing by the Owner.

F. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.

3.1 INSTALLATION

A. Install sealant in strict accordance with manufacturer's written directions to provide weather tight joints.

B. Install sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

C. Install sealant free of air pockets, foreign embedded matter, ridges, and sags. Use nozzles of size to suit joint being filled. Fill joints full and solid to form neat smooth beads on exposed surfaces.

D. Cleanly tool or strike the sealant with light pressure to spread the material against the back-up material and joint surfaces. Tool sealant so that precipitation and cleaning solutions will not pool.

E. Clean adjacent soiled surfaces.

F. Protect freshly installed sealants until they have fully cured.

G. Coordinate with the Engineer to perform periodic adhesion and plug tests of approximately 3 to 5 tests per drop depending upon results obtained.

[END OF SECTION]

SECTION 09900 – Concrete Non-Film Forming Mineral Silicate Paint

1.0 *GENERAL*

1.1 SUMMARY

Provide labor, materials, equipment and supervision necessary to complete the application of product to the existing prepared substrate.

1.2 SYSTEM DESCRIPTION

The products shall meet or exceed the following performance standards:

Base		Aqueous
pH		11.2
Percent solids by weight		51 percent
Viscosity	ASTM D562	95 - 105 KU – paint paddle
Density of liquid coatings	ASTM D1475	9.4 pounds per gallon
Drying time		1 hour at 65 degrees F – dry to touch
Fungus resistance	Fed. Spec. TT-P-19D	No growth
Accelerated weathering – QUV	ASTM G154	2000 hours – UV-B cycled with condensation- no effect
Hiding power of coating at 5 mils.	ASTM D2805	Excellent
Water penetration and leakage	ASTM E514	100 percent reduction
Water vapor transmission	ASTM D6490	96 percent water vapor transmission
Water vapor transmission – procedure B	ASTM E96	75 perms
Heat stability	ASTM C932	Pass – 2 weeks at 120 degrees F
Mud cracking at 10 mils.		None

1.3 SUBMITTALS

A. Manufacturer's current product data bulletin.

B. The trained applicator shall prepare a test panel of the repair installed on the actual building as a submittal for approval of proper application and adhesion.

C. The trained applicator shall submit to the specifier a list of five projects that he has completed within the last five years, exhibiting the applicator's skills. The list shall include project name, location and description of work and completion date.

1.4 QUALITY ASSURANCE

Products shall be installed by a trained applicator with a minimum of five years' experience and meet the requirements of the specifier.

1.5 DELIVERY, STORAGE & HANDLING

A. Deliver all products and all accessories in original labeled, sealed, and undamaged containers or bundles.

B. Store all products in accordance with manufacturer's printed instructions.

C. Handle products in accordance with manufacturer's printed instructions.

1.6 PROJECT/SITE CONDITIONS

All products shall be applied at substrate and ambient temperatures of 45 degrees F or above. A minimum temperature of 45 degrees F shall be maintained 24 hours after completion of work. Protect products from weather and other damage for a period of 24 hours after installation. Do not apply products to frozen surfaces.

1.7 SCHEDULING

The work requires close coordination with related sections and trades.

PART 2 PRODUCTS

2.1 MANUFACTURERS

The following manufacturers are approved for the project: Conproco or equivalent

2.2 MATERIALS

A. M3P: A completely inorganic mineral silicate paint that provides long-term protection and enhanced aesthetics to structures.

B. Color: TBD

PART 3 EXECUTION

3.1 EXAMINATION

A. Installation shall be performed strictly in accordance with manufacturer's current product data bulletin.

B. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.

C. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas and landscaping from contact due to mixing, handling, and application of materials.

D. Apply a test sample to determine suitability. A white surface film after 12 hours of curing indicates the substrate is too dense for proper penetration or a previous treatment impeding absorption has been applied.

3.2 SURFACE PREPARATION

A. Prior to application of products, inspect the substrate for proper cleaning and treatment of structural cracks, texture differences, damage, etc. Work shall not proceed until unsatisfactory conditions are corrected.

B. All substrates must be sound and free from loose debris, oils, paints, sealers, form treatments or any substances that would interfere with proper penetration.

C. Prepare surface to sandpaper-like texture (Concrete Surface Profile 3) by mechanical abrasion or water blasting. Typical preparation method is high pressure water blasting. Refer to ICRI Surface Preparation Guide 03732 for information about Concrete Surface Profile.

D. Chemical cleaners may be used to remove stains and surface contaminants. If chemical cleaners are used, the surface must be neutralized prior to application of mineral silicate paint.

E. Allow surface to dry completely. New concrete must be cured 14 days before application. A dry surface is necessary to allow maximum penetration.

F. Adjacent surfaces should be protected from spatter or over spray (use masking tape and polyethylene film).

G. Do not apply mineral silicate paint to horizontal surfaces.

3.3 APPLICATION

A. Priming

1. Apply priming treatment with low-pressure spray, roller or brush. Coverage will vary with the absorption rate of the substrate.

2. For best results when spray applying, apply beginning at the bottom of the structure and work towards the top.

3. Allow 12 hours for priming treatment to react with the substrate before applying mineral silicate paint. A white film on the surface after 12 hours indicates the substrate is either too dense for proper penetration or a previous treatment such as a water repellent has been applied.

B. Mixing

1. No additives of any kind shall be added to any of the products.

2. Mix until homogeneous. Do not use high-speed mixers or over mix as this will entrain excess air.

3. Mix pails from different batches when an entire surface is visible.

C. Application

1. Apply mineral silicate paint with roller, brush or spray. The undiluted mineral silicate paint should be applied at a rate of 5 mils wet. Do not exceed 10 mils wet as a thicker application can result in mud cracking.

2. One application is usually sufficient when the substrate has been pre-treated with priming treatment. Allow 12 hours curing between applications.

3. Substrates with greater porosity and texture may require a second application.

4. A test application is strongly recommended to determine coverage and suitability of final appearance.

5. For roller applications, use a 3/8 to 1/2 inch synthetic nap roller depending on texture of substrate. For spray applications, use an airless sprayer with 0.017 – 0.021 tip.

6. Work to pre-determined break points in the structure.

7. Maintain a wet edge.

8. In most cases mineral silicate paint will be applied without dilution. However, the opacity of mineral silicate paint can be altered to meet the aesthetic requirements of the project by adding priming treatment up to 1 part mineral silicate paint to 6 parts priming treatment.

D. Curing

1. Protect all surfaces against wet or damp weather conditions for at least 24 hours after application.

3.4 CLEANING

A. Material left over at the job site by the approved applicator shall be removed.

B. Clean tools, equipment and adjacent areas with soap and water before material dries. mineral silicate paint and priming treatment are highly alkaline.

C. Clean all metal and glass surfaces immediately to prevent permanent discoloration.

D. Any foreign material resulting from the work of the approved applicator shall be removed.

[END OF SECTION]

SECTION 09910 – PAINT FOR WEATHERED STEEL COMPONENTS

PART 1 – GENERAL

1.1 SUMMARY

This section includes paint systems for steel and metal components exposed to weather.

1.2 SUBMITTALS

A. Submit product and material safety data.

B. Color and sample charts from standard color charts.

C. Install mock-up of surface preparation, priming, and painted steel surfaces.

D. Test data indicating whether or not existing paints on surfaces designated for repainting are lead-based. If lead-based paint exists, submit additional costs and abatement program protocol to abate the lead prior to repainting.

1.3 QUALITY ASSURANCE

A. Standards

1. ASTM D610-08 Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces.

2. Society for Protective Coatings Surface Preparation Guidelines SP-3 or better.

B. Qualifications

1. Manufacturer shall be a company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.

2. Applicator shall be a company specializing in painting exterior steel features, with minimum three years of experience.

C. Delivery, Storage, and Handling

1. Maintain storage area at minimum ambient temperature of 55° F.

2. Keep away from fire or open flame.

D. Environmental Requirements

1. Do not install materials when temperature is below 40°F or above 90°F.

2. Time work so this temperature range is maintained for 24 hours before and during the necessary cure time described by the manufacturer.

E. Inspections

1. The Engineer will periodically inspect completed work and installation procedures, which is subject to Engineer approval. Work not in compliance with specifications or manufacturer's instructions shall be corrected by the Contractor upon verbal or written notification by the Engineer at no expense to the Owner.

2. The Contractor's on-site foreman or superintendent shall provide documented quality control inspections to ensure the work is installed as specified and submitted. Inspections will include review of the scope of work and material requirements in conjunction with the engineer, review of equipment needs and procedures to ensure needed equipment is on site and in use, wet film mil readings to ensure materials are being installed in accordance with the manufacturer's recommendations, surface and air temperature readings, time data to ensure coatings are being installed within cure times for each coat, and follow up inspections for a uniform surface finish with no defects. Defects shall be recorded and repaired.

3. Upon completion of painting in each phase of the project and after the Contractor has inspected and approved the completed work in-house, the Contractor shall schedule and Engineer's inspection of the completed work.

F. Warranty

1. The contractor's and manufacturer's warranties shall include removal and replacement of defective materials and include necessary equipment, and labor. Provide two-year contractor and manufacturer warranty for the paint system against delamination, rust, and/or bleed through for a period of two years. The Engineer may periodically monitor paint surface

preparation and installation. The warranty excludes locations that are inaccessible for preparation or paint.

PART 2 – PRODUCTS

2.1 Materials

A. Urethane Fortified Alkyd Paint and Accessories

B. Primer (1 coat): red oxide metal primer as recommended by the manufacturer.

C. Top Coat (2 coats): Acceptable manufacturers include Benjamin Moore (C163 Series), Duron (Dura Clad Series), Tnemec (394, 1075u series), or approved equivalent.

PART 3 – EXECUTION

3.1 WORK SEQUENCE

A. Verify that substrate is ready to receive work, surface is clean, dry, and free of substances that could affect bond.

B. Remove loose rust, paint, and foreign matter by chipping, sanding, and grinding. Wipe areas with a clean towel and blow off remaining residue with compressed air.

C. Protect adjacent surfaces. Provide signage, barricades, and overhead protection as needed to redirect pedestrians away from “wet paint” areas.

D. Solvents, towels, and accessories used to prepare and clean surfaces of this section shall be kept in labeled fire safe boxes and/or disposed of promptly off the property at the end of each work day. Flammable materials shall be stored at ground level only in fire safe boxes.

3.2 INSTALLATION

A. Apply system materials in accordance with manufacturer's instructions. Deviations from the manufacturer's written installation instructions shall be approved by the manufacturer's technical representative in writing and submitted to the Engineer for approval in advance of performing the Work.

B. Mix materials thoroughly prior to starting work and intermittently during the work. Contractor may brush, roll, and/or spray primer and paint to surfaces scheduled for painting. In all cases, the Contractor shall provide protection required to prevent

overspray or any by-product of the painting process from migrating onto adjacent surfaces.

C. Apply each coat without runs, sags, skips, holidays or other defects. Alligatoring, blisters, stains, cloudy and mottled surfaces, spider webs, and/or other defects shall require removal of installed paint and installation of new paint until the final product is of uniform thickness, color, and texture.

D. Schedule the installation of primer and paint to avoid the appearance of rust between coats. Rust observed prior to primer or bleeding through primer shall require further preparation by the Contractor at no expense to the Owner.

E. Galvanized surfaces to be painted shall be thoroughly cleaned to remove loose and peeling paint. Bare galvanized metal shall be wiped down with a manufacturer approved solvent cleaner and surfaces prepared in strict accordance with manufacturer guidelines.

F. Ferrous metals shall be thoroughly cleaned and loose rust or mill scale removed by wire brush, scraper, and/or power tool, such as an electric drill with wire brush attachment. Rust spots or bare metal shall receive the appropriate prime coat. Hard, glossy surfaces shall be dulled. Blush rust through primed surfaces prior to painting is unacceptable and shall be removed and re-primed.

G. Apply primer coat to wet mil thickness as recommended by material manufacturer and allow to dry.

H. Apply first top coat to wet mil thickness as recommended by material manufacturer and allow to dry.

I. Apply second top coat to wet mil thickness as recommended by material manufacturer and allow to dry.

J. Clean affected surfaces of by-products created by the work of this section.

[END OF SECTION]