



ISO 9001:2015 CERTIFIED

ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

106 Clair Drive • Piedmont, SC 29673 • Phone 864-269-0890

ADDENDUM NO. 1

FLAT ROCK PUMP STATION REPLACEMENT

OCONEE JOINT REGIONAL SEWER AUTHORITY

KCI Project No. 962205803

Date: June 30, 2023

TO: ALL HOLDERS OF RECORD OF CONTRACT DOCUMENTS

Acknowledge receipt of this addendum by inserting its number and date in the Bid Form. Failure to do so may subject bidder to disqualification.

The following revisions and/or additions to the Drawings and Contract Documents are hereby made a part of same and shall be incorporated in the Work of the Contract the same as if originally included in the Construction Documents. This addendum modifies them as follows:

Pre-Bid Meeting History:

1. The Pre-Bid Meeting History and Sign-In Sheet are attached with this addendum.

Questions and Clarifications:

1. If an alternative structural design for the wetwell structure is proposed, is the contractor responsible for receiving stamped approval for the design?

Answer: Yes, the contractor will be responsible for having a licensed South Carolina structural engineer sign-off on any proposed alternative structural designs.

Note that any alternative designs may be discussed after the project has been bid. All bidders shall price project based on the existing structural design.

Contract Documents and Specifications:

1. Section 02530 (Sanitary Sewerage Collection)

- A. Revise paragraph 2.1.E by adding Flomatic as an approved equal.

2. Section 02730 (Manhole & Wetwell Rehabilitation)

- A. Remove this specification and replace with the attached Section 02532 - Wetwell Protective Coating.

3. Section 09900 (Painting)

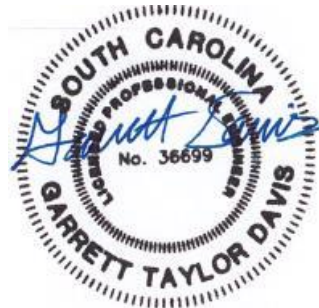
- A. This section has been added to the project specifications.

Plans:

1. Sheet G-1 (Pump Station Sections)

- A. Site Specific Construction Notes, Note 1 - Remove "including noise attenuation".

End of Addendum No. 1





ISO 9001:2015 CERTIFIED

ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

106 Clair Drive • Piedmont, SC 29673 • Phone 864-269-0890

PRE-BID MEETING HISTORY - FLAT ROCK PS REPLACEMENT

Oconee Joint Regional Sewer Authority

June 27, 2023
2:00 P.M.

OWNER: Oconee Joint Regional Sewer Authority (OJRSA)
623 Return Church Road
Seneca, SC 29678
(864) 972-3900
Primary Contact: Kyle Lindsay
Email: kyle.lindsay@ojrsa.org

ENGINEER: KCI Technologies, Inc.
106 Clair Drive
Piedmont, SC 29673
(864) 269-0890
Primary Contact: Garrett Davis, P.E.
Email: garrett.davis@kci.com

I. Welcome & Introduction

- a. KCI Representative - Garrett Davis - Project Engineer
- b. OJRSA Representatives: Chris Eleazer - Executive Director
Kyle Lindsay - Operations Director
Mark Dain - Maintenance Supervisor
- c. ACOG Representative: Arlene Young - Grants Services Consultant

II. Brief Project Overview

- a. Demolition & Bypass Pumping
 - Demolition of existing wetwell, portions of pump structure, radio antenna, fuel storage tanks, and other items as shown on project plans.
 - Bypass pumping as required to complete project.
 - Will require new bypass connection to be installed on existing forcemain, and bypass flow from upstream manholes.
- b. Wetwell Conversion & Valve Vault
 - Existing pump structure to be converted to new wetwell by removing interior floors and installing structure reinforcements as shown on project plans.
 - New valve vault to be installed adjacent to existing pump structure.

- c. Pumps, Generator, & Electrical
 - New 350 GPM submersible wastewater pumps.
 - New 125 kW standby power generator.
 - All associated control panels, transfer switch, wiring, and electrical work.
- d. Grading, Retaining Wall, & Site Work
 - Site grading as required to create a secondary access to the lower portion of the new wetwell structure.
 - Retaining wall, fencing, and other site work items as shown on the project plans.
- e. Misc. Piping & Paving
 - Miscellaneous piping as required to make forcemain and gravity sewer connections.
 - New suction pipe installed in converted wetwell with associated bypass connections.
 - Site paving as shown on project plans.

III. Discussion Items

- a. Bid Date: July 18, 2023, at 2 p.m. at OJRSA Operations Center.
- b. Bidders must be on the Official Plan Holder list for bid to be received. Register on Quest web site.
- c. SCIP Funded Project
 - Federal funding provisions.
 - No AIS or Davis-Bacon requirements.
 - Contractor must be registered in the federal System for Awards Management (SAM).
 - Bidders must make positive efforts to use small and minority-owned businesses.
 - Refer to Article 2 of Instructions to Bidders for all SCIP requirements.
- d. Preparation of Bid
 - See Article 13 of Instructions to Bidders.
 - Include items listed in attachments to bid.
 - Must use Bid Form included in Contract Documents.
 - Reference Section 01025 (Measurement and Payment) to understand what work each bid item encompasses.
- e. Award of Bid
 - See Article 19 of Instructions to Bidders.
 - Will be awarded on Base Bid plus alternates within budget
 - Award or selection of alternate bid items will be determined by the project budget and if any additional funding is available.

f. Completion Time of 210 calendar days

- Liquidated Damages \$500 per day
- The Notice to Proceed date for the project will be delayed as necessary to ensure that the Contractor has enough time to order the materials needed for the project.
- Time extensions available depending on availability of control panel and generator / transfer switch.

g. Access to Flat Rock Pump Station

- Pump station is located at 190 Duck Pond Road in Walhalla, SC.
- Access to site is gated at roadway (Duck Pond Road) and at pump station fence.
- Coordinate with OJRSA for access to site.

h. SC DHEC Construction Permit

- The SC DHEC construction permit has been obtained.
- Less than 1 acre SCDHEC stormwater permit has been obtained.
- DHEC approval prior to placing any new equipment into service.

IV. Addendum No. 1

- Addendum 1 with Pre-Bid Meeting minutes and other questions will be issued by 6-30-23.
- No questions will be accepted after 7-11-23.
- This addendum will also include any equipment suppliers that are approved equals.

V. Additional Topics/Comments:

The following questions were received at the meeting:

Question #1: Is there a downstream valve on the forcemain that can be used to shutoff flow to make the required bypass connection?

Answer: There are no additional valves on the forcemain after the valves in the pump station structure. The forcemain will need to be drained in order to make the bypass connection.

Question #2: Are there any recent geotechnical bores that have been completed at the pump station site?

Answer: Yes, three (3) bores were in completed in 2022, a full geotechnical report with boring logs is included in Appendix A of the bidding documents.

Question #3: Would the interior wetwell coating need to be applied before or after the installation of the structural reinforcement in the wetwell?

Answer: The coating would be applied after the installation of the structural reinforcement.

Question #4: Are there any requirements for noise attenuation on the bypass pumps?

Answer: No, there are no noise abatement requirements.

Question #5: Is a job-site trailer required for this project?

Answer: No, a job-site trailer is not required.

VI. A site visit was conducted following the pre-bid meeting at 190 Duck Pond Road, Walhalla, SC 29691.

VII. Adjourn



Oconee Joint Regional Sewer Authority

623 Return Church Road
Seneca, South Carolina 29678
Phone (864) 972-3900
www.ojrса.org

Meeting: Flat Rock PS Replacement - Pre-Bid Meeting & Site Visit **Meeting Host(s):** OJRSA & KCI

Date: June 27, 2023 **Time:** 14:00 **Location:** OJRSA

SIGNATURE	NAME (Print)	ORGANIZATION/COMPANY	PHONE	EMAIL
	Garrett Davis	KCI Technologies	864-714-1297	garrett.davis@kci.com
	Kyle Lindsay	OJRSA	864-972-3900	kyle.lindsay@ojrsa.org
	Mark Dain	OJRSA	864-873-7626	mark.dain@ojrsa.org
	Nathan Todd	Greenstone	843-504-6252	nathan@greenstoneconstructionllc.com
	GARRETT BRISTER	CUR Fluid Solutions	470-829-2756	gbrister@cur.com
	Drew Golden	Greenstone	864-903-4964	drew@greenstoneconstructionllc.com
	ROBERT LANDWEHR	XYLEM INC	910-263-9866	ROBERT.M.LANDWEHR@XYLEM.COM
	JEFF CATRUM	Cove Utility	864-505-5017	Jeff@coveutility.com
	Nick Onstott	Harper GC	864-380-4950	nonstott@harpergc.com
	Luke Morgan	Harper GC	864-525-6281	lmorgan@harpergc.com
	PAUL LAUGHLIN	COVE UTILITY	864-640-6892	PAUL@COVEUTILITY.COM
	Houston Brooks	Harper GC	803-586-3658	HBrooks@harpergc.com
	Dawn Reed	Sev	843-214-3266	Dawn.reed@phackshen.com
	Justin Brookes	Moorhead	864-230-9870	Justin@moorheadconstruction.com
	Wyatt Westmark	Greenstone	864-483-2353	Wyatt@greenstoneconstructionllc.com

PART 1 – SCOPE

- A. This specification covers work, materials and equipment required for protecting and/or rehabilitating concrete wetwells by the application of appropriate materials to eliminate infiltration, provide corrosion protection, repair voids and deteriorated surfaces and to enhance structural integrity. Procedures for surface preparation, cleaning, application and testing are described herein.
- B. Work described herein applies to the interior of the following structures:
 - 1) Flat Rock Pump Station Wetwell

PART 2 - DESIGN CRITERIA

Reference Standards of the American Society of Testing of Materials (ASTM)

- ASTM D638 - Tensile Properties of Plastics.
- ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics.
- ASTM D695 - Compressive Properties of Rigid Plastics.
- ASTM D4541 - Pull-off Strength of Coatings Using a Portable Adhesion Tester.
- ASTM D2584 - Volatile Matter Content.
- ASTM D2240 - Durometer Hardness, Type D.
- ASTM D543 - Resistance of Plastics to Chemical Reagents.
- ASTM C109 - Compressive Strength Hydraulic Cement Mortars.
- ASTM C348 - Flexural Strength Hydraulic Cement Mortars.
- ASTM C396 - Compressive Strength of Cement Mortars.
- ACI 506.2-77 - Specifications for Materials, Proportioning, Application of Shotcrete.
- ASTM C579 - Compressive Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars.

NACE - The published standards of National Association of Corrosion Engineers (NACE International), Houston, TX.

SSPC - The published standards of the Steel Structures Painting Council, Pittsburgh, PA.

PART 3 - SUBMITTALS

Comply with Section 01340. The following items shall be submitted to the Engineer for approval:

- A. Technical data sheet on each product used, including ASTM test results indicating the product conforms to and is suitable for its intended use per these specifications.
- B. Material Safety Data Sheets (MSDS) for each product used.
- C. Project-specific guidelines and recommendations.
- D. Qualifications of Applicator:

- 1) Manufacturer certification that the Applicator has been trained and approved in the handling, mixing and application of the products to be used. As used in this document, the term "Applicator" shall be defined as the person actually performing or directing the work on the site, and who is responsible for the proper execution of all work defined in the specifications.
 - 2) Applicator must have not less than three years experience using the specified material;
 - 3) All persons actively involved in the rehabilitation or coating operation, regardless of their level of responsibility, shall have less than two year's experience in manhole or concrete vault rehabilitation and coating.
 - 4) Certification that the equipment to be used for applying the products has been manufactured or approved by the protective coating manufacturer and that the Applicator personnel have been trained and certified for proper use of the equipment.
 - 5) Contractor shall provide five (5) recent references of indicating successful application to sewer manholes, or other underground concrete structure, of a high-build solventless epoxy coating by plural component spray application;
 - 6) Proof of any necessary federal, state or local permits or licenses necessary for the project, including all OSHA regulations.
- E. Design details for systems and equipment to be used in site and surface preparation, application and testing.
- F. Design details for systems and equipment to be used in site and surface preparation, application and testing.
- G. By-pass Pumping
- 1) The Contractor shall indicate to the Engineer if bypass pumping is required as a part of the work.
 - 2) If required, the Engineer shall provide to the Contractor flow data for the average and peak (dry weather) flows normally observed in the lines.
- H. Manufacturer Qualifications
- 1) Not less than 5 years of successful experience in supplying principal materials for reconstruction of sanitary sewer manholes or other concrete wastewater structures;
 - 2) Documentation of such experience by reference lists.

I. WARRANTY

- 1) Applicator shall warrant all work against defects in materials and workmanship for a period of ten (10) years, unless otherwise noted, from the date of final acceptance of the project.
- 2) Applicator shall, within a reasonable time after receipt of written notice thereof, repair defects in materials or workmanship which may develop during said ten (10) year period, and any damage to other work caused by such defects or the repairing of same, at his own expense and without cost to the Owner.

PART 4 - PRODUCTS AND MATERIALS

A. EXISTING MATERIALS

- 1) Standard Portland cement or new concrete (not quick setting high strength cement) must be well cured prior to application of the protective coating. Generally, 28 days is adequate cure time for standard Portland. If earlier application is desired, compressive or tensile strength of the concrete can be tested to determine if acceptable cure has occurred. (Note: Bond strength of the coating to the concrete surface is generally limited to the tensile strength of the concrete itself. Engineer may require Elcometer pull tests to determine suitability of concrete for coating)
- 2) Cementitious patching and repair materials should not be used unless their manufacturer provides information as to its suitability for topcoating with an epoxy coating. Project specific submittals should be provided including application, cure time and surface preparation procedures which permit optimum bond strength with the epoxy coating.
- 3) Remove existing coatings prior to application of the new protective coating. Applicator is to maintain strict adherence to applicable NACE and SSPC recommendations with regard to proper surface preparation and compatibility with existing coatings.

B. REPAIR MATERIALS

- 1) Infiltration control shall be achieved using one of the following methods:
 - a. A premixed, fast-setting, volume-stable waterproof cement plug consisting of hydraulic cement, graded silica aggregates, special plasticizing and accelerating agents may be used. It shall not contain chlorides, gypsums, plasters, iron particles, aluminum powder, or gas forming agents or promote the corrosion of steel it may come into contact with. Set time (ASTM C-191) shall be approximately 1 minute. Ten minute compressive strength (ASTM C-109) shall be a minimum of 500 psi. Acceptable products shall be:

CEMTEC, manufactured by A.W. Cook, Hoschton, Ga.;

Quadex Quad-Plug, manufactured by Quadex, Inc., Maumelle, Arkansas,

Thoroc Plug manufactured by ChemRex, Shakopee, MN

Approved equal products;

- b. A siliconate-based liquid accelerator, field mixed with neat Portland cement. The set time shall be approximately 1 minute.
- c. The elastomeric polyurethane resin-soaked method, using dry twisted jute oakum, or resin-rod with polyurethane resin (water activated)
- d. Chemical injection grout sealants which shall be applied according to the manufacturer's recommendations. Acceptable products shall be;

AV-100 Acrylamide Gel, AV-118 Acrylic Gel, or AV-202 Multigrout Urethane Resin manufactured by Avanti International,

Prime-Flex 900 XLV, Prime-Flex Hydrogel SX, manufactured by Prime Resins, Conyers, GA

HYDRO ACTIVE Combi Grout, HYDRO ACTIVE cut, HYDRO ACTIVE Flex LV, HYDRO ACTIVE Multi-gel NF, or HYDRO ACTIVE Safefoam, manufactured by De Neef Construction Chemicals, Houston, TX

Regardless of the method (or combination of methods) which are used, the Contractor shall demonstrate that permanent elimination of all infiltration has been achieved prior to the application of additional repair, rehab or protective coatings.

- 2) Repair materials shall be used to fill voids, structurally reinforce and/or rebuild surfaces, etc. as determined necessary by the Engineer and protective coating applicator. Repair materials must be compatible with the specified epoxy coating and shall be applied in accordance with the manufacturer's recommendations. The following products may be accepted and approved as compatible repair basecoat materials for epoxy topcoating for use within the specifications:
 - a. 100% solids epoxy grout specifically formulated for epoxy topcoating compatibility. The epoxy grout manufacturer shall provide instructions for trowel or spray application and for epoxy topcoating procedures.
 - b. Factory blended, rapid setting, high early strength, non-shrink repair mortar that can be trowelled or pneumatically spray applied may be approved if specifically formulated to be suitable for epoxy, urethane or polyurethane topcoating. Such repair mortars should not be used unless their manufacturer provides information as to its suitability for topcoating with an epoxy, urethane or polyurethane coating. Project specific submittals should be provided including application, cure time and surface preparation procedures which permit optimum bond strength with the epoxy, urethane or polyurethane coating.
 - c. A premixed nonshrink cement-based patching material consisting of hydraulic cement, graded silica aggregates, special plasticizing and accelerating agents, which has been formulated for vertical or overhead use. It shall not contain chlorides, gypsums, plasters, iron particales, aluminum powder, or gas-forming

agents or promote the corrosion of steel it may come into contact with. Set time (ASTM C-191) shall be less than 30 minutes. One hour compressive strength (ASTM C-109) shall be a minimum of 200 psi, and the ultimate compressive strengths (ASTM C-109) shall be a minimum of 5000psi. Bond strengths (ASTM C-882) Modified shall be a minimum of 1700 psi.

C. PROTECTIVE COATING MATERIALS

- 1) Definition: As used herein, the term “Protective Coating” shall refer to the final coat of material which is applied to the interior of the structure. This material shall be designed to protect concrete structures from attack by the components of domestic wastewater, particularly hydrogen sulfide gas and the resulting sulfuric acid which is generated in sewer collection and transmission systems. The protective coating shall be a 100% solids, high build, solvent free, two-part epoxy resin system installed by spray application.
- 2) Protective Coatings & Manufacturers. There are a variety of technologies which have been developed to protect concrete sewer structures; however, there can be no substitute for the skill and experience of the applicator. Subject to the training, certification, and experience of the applicator listed above, the following coatings and manufacturers are approved:
 - a. Raven 405, Raven Lining Systems, Inc.
 - b. Dura-Plate 6100, Sherwin Williams Company
 - c. Tnemec 436, Tnemec Perma-Shield
 - d. Or approved equal.

Other products will be evaluated upon submittal; however, the decision of the Engineer regarding equality shall be final.

D. STRUCTURAL RESTORATION

In certain instances, part of the rehabilitation requirements for a particular structure may be a partial restoration of the structural integrity of the manhole or vault. This is most often observed in the case of brick manholes which have deteriorating mortar, or pre-cast manholes with advanced corrosion. In these cases, preferential selection shall be given to those rehabilitation technologies which are shown to provide an improvement in structural integrity, in addition to the protection from corrosion which is common to all.

PART 5 - PROTECTIVE COATING APPLICATION EQUIPMENT

- A. The Protective Coating Application Equipment shall be specifically designed, or approved for use by the protective coating manufacturer, for use in the application of the specified protective coating.

- B. Repair Mortar Spray Application Equipment shall be specifically designed, or approved for use by the manufacturer of the material for continuous mixing and spraying of the material.

PART 6 - EXECUTION

A. ACCEPTABLE APPLICATORS

- 1) Chemical grout applicators should be trained in the proper application and use of chemical grouts and all related equipment;
- 2) Repair mortar applicators should be trained to properly apply the cementitious mortar according to manufacturer's recommendations.
- 3) Protective coating must be applied by a Certified Applicator of the protective coating manufacturer and according to manufacturer specifications.

B. EXAMINATION

- 1) All structures to be coated shall be readily accessible to Applicator.
- 2) Appropriate actions shall be taken to comply with local, state and federal regulatory and other applicable agencies with regard to environment, health and safety.
- 3) Prior to the application of any concrete rehabilitative or protective coating, all infiltration must be permanently stopped by whatever means are necessary as described above. This may include the use of hydraulic cement, chemical injection grouts or other method.
- 4) Any active wastewater flows shall be dammed, plugged or diverted as required to ensure that the liquid flow is maintained below the surfaces to be coated. If required, flows will be totally plugged and/or diverted when coating the invert. All flows into the manhole or vaults at or above the area coated shall be plugged and/or diverted for the amount of time specified by the manufacturer or until the epoxy has set hard to the touch, whichever is less. As an option, hot air may be added to the manhole to accelerate set time of the coating.
- 5) The Contractor shall assume that structures which may be included in this project are part of the active Owner's wastewater collection system. These structures must remain in operation continuously. However, flow may be stopped by the use of appropriately size inflatable or screw-operated plugs if this can be done intermittently or during periods of low flow. Also, the flow may be diverted through these structures by the installation of appropriate extension pipes or similar fixtures. It shall be the Contractor's responsibility to properly execute and schedule his work to permit the required rehabilitation and the proper application of the coating system to be achieved under the existing operating conditions of the Owner's system. Any bypass pumping or other measures which may be required will be the responsibility of the Contractor at no additional compensation.

- 6) Installation of the protective coating shall not commence until the concrete substrate has properly cured in accordance with the specifications of the protective coating and the substrate coating manufacturers.
- 7) Temperature of the surface to be coated should be maintained between 40 deg F and 120 deg F during application. Prior to and during application, care should be taken to avoid exposure of direct sunlight or other intense heat source to the structure being coated. Where varying surface temperatures do exist, care should be taken to apply the coating when the temperature is falling versus rising (ie. late afternoon into evening vs. morning into afternoon).

C. SURFACE PREPARATION

- 1) Applicator shall inspect all surfaces specified to receive a protective coating prior to surface preparation. Applicator shall notify Owner of any noticeable disparity in the surfaces which may interfere with the proper preparation or application of the repair mortar and protective coating.
- 2) All concrete or mortar that is not sound or has been damaged by chemical exposure shall be removed to a sound concrete surface.
- 3) All contaminants including: oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed.
- 4) Surface preparation method(s) should be based upon the conditions of the substrate, service environment and the requirements of the protective coating to be applied.
- 5) All surfaces shall be repaired as required by the protective coating system in the intended service condition.
- 6) Surfaces to receive protective coating shall be cleaned and abraded to produce a sound surface with adequate profile and porosity to provide a strong bond between the protective coating and the substrate.
 - a. Generally, this can be achieved with a high pressure water cleaning using equipment capable of 5,000 psi at 4 gpm. Other methods such as high pressure water jetting (refer to NACE Standard No. 5/SSPCSP12), abrasive blasting, shotblasting, grinding, scarifying or acid etching may also be used.
 - b. Detergent water cleaning and hot water blasting may be necessary to remove oils, grease or other hydrocarbon residues from the concrete. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound clean neutralized surface that is not excessively damaged.
 - c. Debris resulting from surface preparation and cleaning shall be removed from the structure and not allowed to enter the wastewater flow.
 - d. Infiltration shall be stopped by using a material which is compatible with the specified repair mortar and is suitable for topcoating with the specified protective coating.

- e. It is the contractor's responsibility to test prepared surfaces after cleaning, but prior to application of the epoxy coating, to determine if a specific pH or moisture content of the concrete has been achieved if this is required according to manufacturer's recommendations.
- f. The area between the manhole and the manhole ring and any other area that might exhibit movement or cracking due to expansion and contraction, shall be grouted with a flexible or elastomeric grout or gel. Coating of iron castings is not specifically required under this specification. However, Owner reserves the right to add this requirement if necessary. Additional compensation will be negotiated to cover abrasive blasting, or other surface preparation as needed.

D. APPLICATION OF REPAIR MATERIALS

- 1) Areas where structural steel, ladders, brackets or piping has been exposed (particularly wet well riser piping) shall be prepared in accordance with the manufacturer's instructions for the preparation of steel surfaces to receive the protective coating which will be applied to the concrete structure surfaces. All metal surface preparation, primer application, etc. required shall be performed at no additional compensation.
- 2) Certain steel structures which are no longer used (ladders, brackets, etc.), may, at the option of the Contractor and with the approval of the Owner, be removed and discarded provided any resulting holes are filled flush with the concrete surface using the rehab methods described above. The Contractor shall be responsible for disposal of all materials so removed and for the repair of any subsequent damage which may occur during or as a result of such removal. Any such work will be performed at no additional compensation.
- 3) Repair materials shall meet the specifications herein. The materials shall be trowel or spray applied utilizing proper equipment on to specified surfaces.

The material thicknesses shall be as follows:

- a. Concrete build-back material shall be of sufficient thickness to restore the structure to the original thickness, grade and contour.
- b. Protective coating shall be applied to the thickness specified in the particular manufacturer's procedures.
- c. If using approved cementitious repair materials, such shall be trowelled to provide a smooth surface with an average profile equivalent to coarse sandpaper to optimally receive the protective coating. No bugholes or honeycomb surfaces should remain after the final trowel procedure of the repair mortar.
- d. The repair materials shall be permitted to cure according to manufacturer recommendations. Curing compounds should not be used unless approved for compatibility with the specified protective coating.

- e. After abrasive blast and leak repair is performed, all surfaces shall be inspected for remaining laitance prior to protective coating application. Any evidence of remaining contamination or laitance shall be removed by additional abrasive blast, shotblast or other approved method. If repair materials are used, refer to these specifications for surface preparation. Areas to be coated must also be prepared in accordance with these specifications after receiving a cementitious repair mortar and prior to application of the protective coating.

E. APPLICATION OF PROTECTIVE COATING

- 1) Application procedures shall conform to the recommendations of the protective coating manufacturer, including material handling, mixing, environmental controls during application, safety, and spray equipment.
- 2) The spray equipment shall be specifically designed to accurately ratio and apply the specified protective coating materials at the temperature specified by the manufacturer and shall be regularly maintained and in proper working order.
- 3) The protective coating material must be spray applied by a Certified Applicator of the protective coating manufacturer.
- 4) Airless spray application equipment approved by the coating manufacturer shall be used to apply each coat of the protective coating to avoid any potential contamination from compressed air oil which may encourage intercoat delamination. Air assisted spray application equipment may be acceptable, especially for thinner coats (<10 mils), only if the air source is filtered to completely remove all oil and water.
- 5) If necessary, subsequent topcoating or additional coats of the protective coating should occur as soon as the basecoat becomes tack free, ideally within 12 hours but no later than 24 hours after the prior coat has been applied at unless additional prior coat surface preparation is performed. The protective coating manufacturer must be consulted for any additional-coat surface preparation guidelines if necessary.
- 6) Depending on wastewater flow levels and how long flow can be stopped, inverts may be lined with an approved 100% solids, fast setting epoxy coating, grout or cementitious material. This treatment is only approved for those surfaces which, after resumption of normal flows, will be constantly covered by a layer of flowing water. Every effort should be made to coat the entire invert with a continuous application of the approved protective coating.

PART 7 - TESTING AND INSPECTION

- A. During application, a wet film thickness gage, such as those available through Paul N. Gardner Company, Inc. meeting ASTM D4414 - Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used by the Applicator to ensure a monolithic coating and uniform thickness during application. All results, will be verified by the Engineering Field Technician (EFT) in the field. Results shall be submitted to the EFT within 24 hours of testing.

- B. After the protective coating has set hard to the touch it shall be inspected with high voltage holiday detection equipment. An induced holiday shall be made on to the coated concrete surface and shall serve to determine the minimum/maximum voltage to be used to test the coating for holidays at that particular area. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of film thickness applied but may be adjusted as necessary to detect the induced holiday. All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional protective coating material can be hand applied to the repair area. All touch-up/repair procedures shall follow the protective coating manufacturer's recommendations.
- C. A final visual inspection shall be made by the Inspector and manufacturer's representative. Any deficiencies in the finished coating shall be marked and repaired according to the procedures set forth herein by Contractor.
- D. Final Vacuum Testing. After the structure has passed all testing listed above, the Engineer may require that the structure be vacuum tested.

END OF SECTION

PART I - GENERAL**1.1 WORK INCLUDED**

- A. The contractor shall furnish all materials, labor, equipment, and incidentals required to provide a protective coating system for the surfaces listed herein and not otherwise excluded.
- B. The work includes painting and finishing of interior and exterior exposed items and surfaces such as structural steel, miscellaneous metals, ceilings, walls, floors, doors, frames, transoms, roof fans, construction signs, guardrails, posts, fittings, valves, equipment, and all other work obviously required to be painted unless otherwise specified herein or on the drawings. The omission of minor items in the schedule of work shall not relieve the contractor of his obligation to include such items where they come within the general intent of the specification as stated herein.
- C. The following items will not be painted:
 - 1. Any code-requiring labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.
 - 2. Any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, linkages, sensing devices, motor and fan shafts, unless otherwise indicated.
 - 3. Aluminum handrails, walkways, windows, louvers and grating unless otherwise specified herein.
 - 4. Signs and nameplates.
 - 5. Finish hardware.
 - 6. Stainless steel angles, tubes, pipe, etc.
 - 7. Products with polished chrome, aluminum, nickel, or stainless steel finish.
 - 8. Plastic switch plates and receptacle plates.
 - 9. Flexible couplings, lubricated bearing surfaces, insulation and metal and plastic pipe interior.
 - 10. Sprinkler heads.

1.2 REFERENCES

- A. SSPC - Steel Structures Painting Council.
- B. Metal Ladder Manufacturer's Association - Specification for Ladders and Scaffolds.
- C. UL Requirement for Ladders and Scaffolds.

1.3 QUALITY ASSURANCE

- A. Workmanship shall be performed by skilled workmen thoroughly trained in necessary crafts and completely familiar with specific requirements and methods specified herein.
- B. All materials shall be produced by a single manufacturer. Total paint system shall be from one manufacturer and no cross coating allowed between primers and finish coats.

1.4 SUBMITTALS

- A. Submit manufacturer's printed literature and other data as required to certify compliance with requirements and systems specified herein.
- B. Colors to be selected by Engineer, and indicated on schedule.
- C. Samples:
 - 1. Samples of each finish and color shall be submitted to the Architect/Engineer for approval before any work is started.
 - 2. Such samples when approved in writing shall constitute a standard, as to color and finish only, for acceptance or rejection of the finish work.
 - 3. Rejected samples shall be resubmitted until approved.
- D. VOC Requirements: Submit manufacturer's certification that paints and coatings comply with Federal, State, and Local, whichever is more stringent, requirements for VOC (Volatile Organic Compound).

1.5 DELIVERY, HANDLING AND STORAGE

- A. Deliver all material to site in original, new, unopened containers, labeled and bearing manufacturer's name and stock number, product and brand name, contents by volume for major constituents, instructions for mixing and reducing, and application instruction.
- B. Provide adequate storage facilities designed exclusively for the purpose of paint storage and mixing. Facility area shall be located away from open flames, be well ventilated, and be capable of maintaining ambient storage temperature of no less than 45 degrees F.
- C. Paint, coatings, reducing agents, and other solvents must be stored in original containers until opened; if not resealable, then must be transferred to UL approved safety containers. Provide proper ventilation, personal protection and fire protection for storage and use of same.
- D. Comply with requirements set forth by Occupational Safety and Health Act, OSHA, for storage and use of painting materials and equipment.

1.6 EXTRA STOCK

- A. Upon completion of work, provide owner with at least one gallon of each type and color of product used.
- B. Containers shall be tightly sealed and clearly labeled for identification.

PART 2 - PRODUCTS

2.1 ACCEPTABLE SYSTEMS AND MANUFACTURERS

- A. Materials specified are those that have been evaluated for the specific service. Products of the Tnemec Co. and Sherwin Williams Company are listed to establish a standard of quality. Equivalent "or equal" materials of other manufacturers may be substituted by the contractor on written approval of the Engineer.

Local Field Tnemec Technical Support: Tnemec Company, 209 Wood Duck Road, Columbia, SC 29223. Phone: (803) 736-1553 Email: techsvcs@tnemec.com

Local Field Sherwin Williams Technical Support: Sherwin Williams, 3080 SC Highway 14, Greer, SC 29650. Phone: (843) 214-3265 Email: darryl.t.rzepka@sherwin.com

- B. Requests for substitution shall include manufacturer's literature for each product giving the name, product number, generic type, descriptive information, solids by volume, recommended dry film thickness, certified test reports showing results to equal the performance criteria of the products specified herein, cost per gallon/unit and cost savings. No request for substitution shall be considered that will decrease film thickness or offer a change in the generic type of coatings specified. In addition, a list of five similar projects shall be submitted in which each product has been used and rendered satisfactory service for at least 5 years.

Requests for product substitution shall be made at least ten (10) days prior to bid date.

Any material savings shall be passed to the owner in the form of a contract dollar reduction.

Manufacturer's color charts shall be submitted to the Owner at least 30 days prior to paint application. General contractor and painting contractor shall coordinate work so as to allow sufficient time (five to ten days) for paint to be delivered to the jobsite.

2.2 MATERIALS

- A. Tnemec Company, Inc.
- B. Sherwin Williams Company
- C. Or Approved Equal.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Thoroughly examine surface scheduled to be painted prior to commencing work. Report in writing to the Engineer any condition that may affect proper application and overall performance of coating system. Do not proceed with work until such conditions have been corrected. Commencing with work indicates acceptance of existing conditions and for responsibility for performance of applied coating.

3.2 PROTECTION

- A. Extreme diligence shall be taken to ensure that vehicles, equipment, hardware, fixtures, materials, etc., are protected against paint spillage, overspray, etc. Such damages shall be corrected at no expense to Owner.
- B. Surfaces not to be coated shall be masked, removed, or otherwise covered to protect against cleaning and coating application procedures and weather. Drop cloths shall be used to protect floor, walls, machinery, equipment, and previously coated surfaces.
- C. Exercise care in erecting, bracing, handling, and dismantling staging and scaffolding, to avoid scratching or damaging walls, floors, equipment, etc.

3.3 SURFACE PREPARATION

- A. Perform preparation and cleaning procedures in strict accordance with manufacturer's instructions for each substrate condition.
- B. Ferrous metals (structural steel and miscellaneous metals) requiring shop or field priming shall be prepared as listed in PART 4 "Coating System Schedule" specified herein and listed for each individual coating system. All metal surfaces shall be cleaned prior to sandblasting to remove oil and grease present by following methods and procedures outlined in SSPC-SP1 Solvent Cleaning.
- C. Surface preparation for field touch-up of ferrous metals shop-primed shall be as follows:
 - 1. Immersion - Remove all oil, grease, dirt, dust and foreign matter from the surface. Weld slag, weld spatter, rough edges and sharp corners of weld seams shall be ground smooth. All rusted, abraded and unpainted areas shall be blast cleaned to a Near-White Finish as outlined in Steel Structures Painting Council's Specification SP-10.
 - 2. Non-Immersion - Remove all oil, grease, dirt, dust and foreign matter from the surface. Follow cleaning with Steel Structures Painting Council's Specification SP-3 Power Tool cleaning.
- D. Galvanized metals requiring paint (only as directed by Engineer) shall be cleaned by removing all oil, grease, dirt, dust and foreign matter by solvent cleaning in accordance with SSPC-SP1 prior to applying any finish.
- E. Concrete and concrete masonry surfaces shall be cleaned and free of oils, laitance, dust, dirt, loose mortar, and excess moisture. Structural cracks and defects shall be repaired. All surfaces must be completely dry prior to applying any coatings/paint.
- F. Gypsum board (or drywall) surfaces shall be dry, flat, and free of dust, dirt, grease, oil, powdery residue, wax, soap and other contaminants.

3.4 TOUCH-UP OF SHOP APPLIED COATINGS

- A. All shop applied coatings with manufacturer's standard paint and in non-immersion service, shall be touched-up with compatible barrier coating, Tnemec Series 135 Chembuild or Sherwin Williams Macropoxy 646 FC, able to receive specified topcoat(s). Notify the Engineer in writing of anticipated problems due to incompatible coating systems.
- B. All shop applied coatings with specified primer as listed in PART 4 "Coating System Schedule" shall be touched up with same primer before any topcoat(s) are applied.

3.5 APPLICATION

- A. No paint shall be applied when surrounding air temperature, as measured in the shade, is below 45 degrees F. No paint shall be applied when the temperature of the surface to be painted is below 40 degrees F. Paint shall not be applied to wet or damp surfaces, and shall not be applied in rain, snow, fog or mist, or when the relative humidity exceeds 85%. Paint shall not be applied when the substrate temperature is within 5 degrees of the dewpoint. Paint manufacturer's temperature guidelines must be followed.
- B. No paint shall be applied when it is expected that the relative humidity will exceed 85% or that the air temperature will drop below 45 degrees F within 4 hours after the application of the paint.

- C. Maintain proper ventilation in area of work to alleviate volatile solvents evaporating from coating materials.
- D. All ingredients in any container of the coating materials shall be thoroughly mixed and shall be agitated often enough during application to keep the pigment suspended.
- E. Should thinning be required use only the amounts specified by the coating manufacturer.
- F. Application of coating shall be by brush, roller, mitt, or spray and in accordance with manufacturer's recommendations. All material shall be evenly applied to form a smooth, continuous, unbroken coating. Drips, runs, sags, or pinholes shall not be acceptable.
- G. Provide proper application equipment, including ladders, scaffolding, masking materials, and tools to perform work. Ladders and scaffolding shall meet or exceed UL requirements and Metal Ladder Manufacturer's Association.
- H. Meet all requirements set forth by Occupational Safety and Health Act, OSHA, for confined space.

3.6 SYSTEM INSPECTION AND TESTING

- A. After application of each coating in the specified system and its surface has cured, measure its thickness with a properly calibrated Nordson Microtest Dry Film Thickness Gauge, or equivalent. Follow standard method for measurement of dry paint thickness with magnetic gauges as outlined in Steel Structures Painting Council's SSPC-PA2
- B. Make as many determinations as needed to ensure the specified thickness values in each typical area. To all surfaces having less dry film thickness than specified, apply additional coat(s) at no extra cost to Owner to bring thickness up to specifications.
- C. Structural metals in immersion service that receive a protective coating system shall be checked with a non-destructive holiday detector that shall not exceed 67 1/2 volts. All pinholes or defects shall be repaired in accordance with manufacturer's printed recommendations and then retested.
- D. Masonry, drywall, or other non-metallic surfaces shall be continuously checked with wet-film thickness gauges during application to ensure proper dry film thickness will be attained. Also, square feet coverage needs to be monitored to verify proper coverage rates.
- E. Painting contractor shall permit Engineer and/or paint & coating manufacturer (as requested by owner) to inspect his work for conformance to this specification. Owner reserves the right to reject all work that does not comply with this specification.

3.7 CLEAN-UP

- A. Upon completion, painting contractor shall clean up and remove from site all surplus materials, tools, appliances, empty cans, cartons, and rubbish resulting from painting work. Site shall be left in neat, orderly condition.
- B. Remove all protective drop cloths and masking from surfaces not being painted. Provide touch-up around same areas as directed by Engineer.
- D. Remove all misplaced paint splatters or drippings resulting from this work.

PART 4 - COATING SYSTEM SCHEDULE**4.1 STEEL - STRUCTURAL, TANKS, PIPES AND EQUIPMENT****A. Immersion - Non-Potable Water**

		<u>Dry Film-Mils</u>
<u>Surface Preparation:</u> SSPC-SP10 Near White Blast Cleaning		
<u>1st Coat:</u>	Tnemec Series 66 Hi-Build Epoxoline	4.0 - 5.0
<u>2nd Coat:</u>	Tnemec Series 66 Hi-Build Epoxoline	<u>5.0 - 6.0</u>
		11.5 - 14.5
<u>1st Coat:</u>	Sherwin Williams Macropoxy 646 FC	5.0 - 8.0
<u>2nd Coat:</u>	Sherwin Williams Macropoxy 646 FC	<u>5.0 - 8.0</u>
		10.0 - 16.0

4.2 GALVANIZED STEEL - PIPE, AND MISCELLANEOUS FABRICATIONS**A. Exterior/Interior Exposure (Non-Immersion)**

		<u>Dry Film-Mils</u>
<u>Surface Preparation:</u> SSPC-SP7 Brush-off blast. Exterior surfaces to be cleaned as required by manufacturer.		
<u>1st Coat:</u>	Tnemec Series 66 Hi-Build Epoxoline	4.0 - 5.0
<u>2nd Coat:</u>	Series 73 Endura-Shield	<u>3.0 - 4.0</u>
		7.0 - 9.0
<u>1st Coat:</u>	Sherwin Williams Macropoxy 646 FC	5.0 - 8.0
<u>2nd Coat:</u>	Sherwin Williams Acrolon 218 HS Gloss	<u>4.0 - 6.0</u>
		9.0 - 14.0

4.3 TNEMEC COLOR SYSTEM MATERIAL IDENTIFICATION

<u>Water</u>	<u>Generic Color</u>	<u>Tnemec Color</u>
Sewage	Gray	33GR Gray

END OF SECTION