Changes per Addendum No. 1

CITY OF ALBANY, OREGON

VINE STREET WATER TREATMENT PLANT
ACCELATOR IMPROVEMENTS
WTP-18-01

SEAL PAGE

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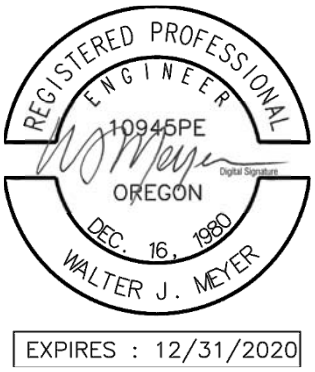

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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. General description of the Project and the Work to be performed by the Contractor.

1.02 WORK COVERED BY CONTRACT

A. The Work to be performed by the Contractor generally includes:

1. Furnishing all labor, superintendence, materials, power, water, tools, equipment, and services required by the Contract Documents or required to complete the Work.

2. Coordinate work of all trades.

3. Furnishing and installing miscellaneous items incidental to or necessary for completion of the Work, whether these items are specifically indicated in the Contract Documents, or not.

B. The Work consists of construction of the following items:

1. Concrete preparation and coating at the Vine Street Water Treatment Plant as shown on the drawings and specified herein.

2. Sealing of cracks in the solids contact clarifier.

3. Preparation and coating of tank, launders, stairs and walkways and other metal surfaces.

4. Replacement of tube settlers.

5. Replacement of the stairs and walkways on Accelator No.1.

6. Replacement of valve on Accelator No. 2

1.03 SPECIFICATION LANGUAGE

A. Specifications may be written in the imperative mood and streamlined form in accordance with practices and principals of the Construction Specifications Institute.

B. Imperative language is directed to the Contractor unless specifically noted otherwise.

C. The words “shall be” are included by inference where a colon (:) is used within sentences or phrases.

1.04 REGULATORY REQUIREMENTS

A. Comply with all Federal, State, and local laws, regulations, codes, and ordinance applicable to the work.

B. Other standards and codes that apply to the work are designated in the Specifications.

END OF SECTION

SECTION 01014

WORK SEQUENCE

PART 1 - GENERAL

1.01 CONTINUITY OF PLANT OPERATIONS

A. General

1. The Vine Street Water Treatment Plant (WTP) continuously produces potable water for the City of Albany, and this function shall not be interrupted except as specified herein. Coordinate the work to avoid any interference with normal operation of plant equipment and processes.

B. Access

1. Normal working hours at the Vine Street WTP and reservoir are from 7:00 a.m. to 5:00 p.m. five days per week. The Contractor shall have access to the facilities during these hours. The Contractor shall leave the site no later than 5:30 p.m. and lock the gate upon leaving.
2. One Accelator will remain operational throughout the work period.
3. City plant staff will shut down the basins and dewater these to the degree possible with existing drains.
4. Unless otherwise specified, provide 48-hour notice prior to any requested shutdown.

1.02 SUBMITTALS

A. Submit a schedule of work as required in Section 01310. In addition, a complete work sequence shall be submitted that clearly shows the work sequence to be used and the schedule for the work. The following sequence is provided as a guide; the Contractor shall adhere to the requirements outlined below.

1.03 WORK SEQUENCE

A. The following work sequence is anticipated

1. Submit schedule and work sequence.
2. Provide notice of shut down.
3. The City will remove one Accelator from service and dewater the unit so the water level is as low as possible with available drains.
4. Provide protective enclosures for surface preparation
5. Complete all work on Accelator that is out of service
6. Upon completion of work, the City will place Accelator into operation

7. The City will remove the second Accelator from service and dewater the unit so the water level is as low as possible with available drains.
8. Provide protective enclosures for surface preparation
9. Complete all work on Accelator
10. Upon completion of work, the City will place Accelator into operation
11. Replacement of the valve must be completed while Accelator No. 2 is out of service

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

A. Submittals covered by these requirements include manufacturers' information, shop drawings, test procedures, test results, samples, requests for substitutions, and miscellaneous work-related submittals. Submittals shall also include, but not be limited to, mechanical equipment and systems, materials, reinforcing steel, fabricated items, piping, and valves.

B. Furnish drawings, specifications, descriptive data, certificates, samples, tests, methods, schedules, manufacturer's installation instructions, and other information to fully demonstrate that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the Contract Documents.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the materials and equipment incorporated into the Work, or the methods of performing the Work shall be as described in the accepted submittals.

B. Verify that all features of all products conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment that are being submitted for review. Extraneous materials shall be crossed out or otherwise obliterated.

C. Ensure that there is no conflict with other submittals and notify the Engineer in each case where his submittal may affect the work of another contractor or the Owner. Coordinate submittals among subcontractors and suppliers including those submittals complying with unit responsibility requirements specified in applicable technical sections.

D. Coordinate submittals so that work will not be delayed. Coordinate and schedule different categories of submittals, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals. The Contractor shall not proceed with work related to a submittal until the submittal process is complete. This requires that submittals for review and comment shall be returned to the Contractor stamped "No Exceptions Taken" or "Make Corrections Noted."

E. Contractor shall certify on each submittal document that it has reviewed the submittal, verified field conditions, and complied with the contract documents.

1.03 CATEGORIES OF SUBMITTALS

A. General

1. Submittals fall into two general categories;

a. Submittals for review and comment. These submittals require action by the Engineer.

b. Submittals that are primarily for information only. These submittals do not require Engineer's approval.

B. Submittals for Review and Comment

1. Submittals shall be transmitted by the Contractor directly to the Engineer. The Engineer will review the submittal for compliance with the Contract requirements and will provide written comments regarding acceptability.

C. Submittals for Information Only

1. Where specified, the Contractor shall furnish submittals to the Engineer for information only. The Engineer, may at his/her option, review and comment on any product data. Incomplete or inadequate product data will be returned to the Contractor for resubmittal.

1.04 TRANSMITTAL PROCEDURE

A. General

1. Unless otherwise specified, submittals regarding material and equipment shall be accompanied by Shop Drawing/Transmittal Form. Submittals for operation and maintenance manuals, information and data also shall be accompanied by Operation and Maintenance Transmittal Form.

2. A separate form shall be used for each specific item, class of material, equipment, and items specified in separate, discrete sections, for which the submittal is required.

3. Submittal documents common to more than one piece of equipment shall be identified with all the appropriate equipment numbers.

B. Deviation from Contract

1. If the Contractor proposes to provide material, equipment, or method of work that deviates from the project manual, they shall so indicate under "Proposed Deviations" on the transmittal form accompanying the submittal copies.

C. Submittal Completeness

1. Submittals that do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

1.05 SUBMITTAL CONTENT

A. Prepare submittals with information required by individual Specification Sections.

B. Shop Drawings:

1. Develop project-specific, scaled drawings to fully establish materials and products that will be provided and their relationship to other products that will be furnished and installed. Do not utilize reproductions of the Contract Documents as the basis for the submittal.

2. Identify products, assemblies, equipment and systems.

3. Provide equipment identification numbers or tag numbers, wiring diagrams, and setting diagrams.

4. Identify critical dimensions.

C. Product Data:

1. Provide information necessary to demonstrate conformance with the specified requirements. Include performance curves, specifications, and wiring diagrams.

2. Product data may consist of manufacturer's standard catalog information and data sheets, marked to indicate the specific products that will be provided.

3. Provide supplemental information as necessary to fully demonstrate how products will be modified from the manufacture's standard products to meet the specification requirements.

D. Manufacturer's Instructions: Written or published information that establishes the manufacturer's recommendations, guidelines and procedures for handling and installation of products, equipment, and assemblies.

E. Samples: Mount, display or package samples in a manner that will facilitate review and establish workmanship and quality of materials.

1.06 REVIEW PROCEDURE

A. General

1. Submittals are specified for those features and characteristics of materials, equipment, and methods of operation that can be selected based on the Contractor's judgment of their conformance to the specified requirements. Other features and characteristics are specified in a manner that enables the Contractor to determine acceptable options without submittals. The review procedure is based on the Contractor's guarantee that all features and characteristics not requiring submittals conform as specified.

2. Review shall not extend to means, methods, techniques, sequences or procedures of construction, or to verifying quantities, dimensions, weights or gages, or fabrication processes (except where specifically indicated or required by the Project Manual) or to safety precautions or programs incident thereto.

3. Review of a separate item, as such, will not indicate approval of the assembly in which the item functions.

4. When the Contract Documents require a submittal, the Contractor shall submit the specified information as follows:

   a. Prepare submittals and Shop Drawings in electronic .pdf format including half-sized and full-sized drawings, catalog information and other required submittal information. Transmit electronic submittals by email to the Engineer. Break down submittals that are larger than 4 megabytes into smaller sections, using logical division points to create sections.

B. Submittals for Review and Comment

1. Unless otherwise specified, within thirty (30) calendar days after receipt of a submittal for review and comment, the Engineer will review the submittal and return two (2) copies of a marked-up reproducible original. The reproducible original will be retained by the Engineer. The returned submittal shall indicate one of the following actions:

   a. If the review indicates that the material, equipment or work method complies with the project manual, submittal copies will be marked "NO EXCEPTIONS TAKEN." In this event, the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.

   b. If the review indicates limited corrections are required, copies will be marked "MAKE CORRECTIONS NOTED." The Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in O&M data, a corrected copy shall be provided.

   c. If the review reveals that the submittal is insufficient or contains incorrect data, copies will be marked "AMEND AND RESUBMIT." Except at its own risk, the Contractor shall not undertake work covered by this submittal until it has been revised, resubmitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

   d. If the review indicates that the material, equipment, or work method does not comply with the project manual, copies of the submittal will be marked "REJECTED - SEE REMARKS." Submittals with deviations that have not been identified clearly may be rejected. Except at its own risk, the Contractor shall not undertake the work covered by such submittals until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

   e. If the submittal information does not require a review by the Engineer, copies of the submittal will be marked “Engineer’s Review not Required” and will be returned without review.

C. Submittals for Information Only

1. Such information is not subject to submittal review procedures and shall be provided as part of the work under this contract and its acceptability determined under normal inspection procedures.

1.07 PROCESSING TIME

A. Contractor shall prepare submittals and transmit to Engineer for review in sufficient time to allow Engineer's review; manufacture, fabrication or assembly of materials and systems; and shipping of material to the site in time for installation in accordance with the Contractor's schedule.

B. Engineer's time for review will begin upon receipt of a complete and comprehensive submittal containing all required information.

C. Engineer will review submitted information and transmit a response to Contractor within two weeks after receipt.

1. In some instances, review times for specific submittals may be modified by the individual specification Section.

2. Resubmittals will be subject to the same review time.

3. No adjustment of Contract Time or Contract Price will be allowed due to delays in the progress of the Work that are caused by rejected submittals and subsequent resubmittals.

1.08 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

A. The purpose of submittals is to demonstrate how Contractor intends to conform to the Contract Documents and design concepts. Engineer is entitled to rely upon the accuracy and completeness of designs, calculations, or certifications made by licensed professionals whether or not a stamp or seal is required by the Contract Documents.

B. Review of contract drawings, methods of work, or information regarding materials or equipment the Contractor proposes to provide, shall not relieve the Contractor of its responsibility from fulfilling the requirements of the Contract, proper operation of the equipment, and correction of defective work and shall not be regarded as an assumption of risks or liability by the Engineer or the Owner.

C. A mark of "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED" shall mean that the Owner has no objection to the Contractor, upon its own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

D. The Engineer's review of shop drawings, samples, or test procedures will be only for conformance with design concepts and for compliance with information given in Contract Documents. The Engineer's review does not extend to:

1. Accuracy of dimensions, quantities, or performance of equipment and systems designed by Contractor.

2. Contractor's means, methods, techniques, sequences, or procedures except when specified, indicated on the Drawings, or required by Contract Documents.

3. Safety precautions or programs related to safety which shall remain the sole responsibility of the Contractor.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparing and revising the construction schedule used for planning and managing construction activities.

1.02 REFERENCED SECTIONS

A. The following Sections are referenced in this Section:

1. Section 01014 – Work Sequence
2. Section 01300 – Submittals

1.03 COORDINATION WITH GENERAL CONDITIONS

A. Prepare and submit a Preliminary Schedule at the pre-construction meeting.

B. The Contractors schedule shall be consistent with the work sequence provided in Section 01014, Work Sequence.

C. The Contractor's execution of the Work shall begin based on the Preliminary Schedule accepted by the Engineer. As Work progresses, the Schedule shall be updated and resubmitted in accordance with the requirements of this Section.

1.04 USE OF SCHEDULE

A. The schedule and subsequent updates provides a basis for determining the progress status of the project relative to the completion time, specific dates, and for determining the acceptability of the Contractor's progress payment estimates.

PART 2 - (NOT USED)

PART 3 - EXECUTION

3.01 DESCRIPTION

A. Prepare a time scale network schedule using a critical path method.

1. The schedule shall depict all significant construction activities and all items of work listed in the breakdown of contract prices submitted by the Contractor. Indicate dependencies between activities to establish the effect the progress of any one activity has on the schedule.

B. Completion time shall be shown on the schedule. Activities making up the critical path shall be identified.

C. No activity on the schedule shall have a duration longer than twenty-one (21) days except activities comprising only fabrication and delivery, which may extend for more than twenty-one (21) days.

1. Activities that exceed these limits shall be divided into more detailed components.

2. The scheduled duration of each activity shall be based on the work being performed during the normal 40-hour workweek with allowances made for legal holidays and normal weather conditions.

3.02 SUBMITTAL PROCEDURES

A. Submit Preliminary Schedule in accordance with Section 01300.

B. Submit the following items:

1. Two copies of the project schedule formatted to fit 11x17 inch sheets.

2. Electronic file of the schedule.

C. The Engineer will review the Preliminary Schedule to ascertain compliance with specified project constraints, compliance with milestone dates, reasonableness of durations and sequence, accurate inter-relationships and completeness.

D. Review comments will be transmitted to Contractor following completion of preliminary review.

E. Revise and resubmit schedule in accordance with written comments, or request joint meeting to resolve objections.

F. When schedule reflects the Engineer and Contractor's agreement of project approach and sequence, schedule will be accepted as the Base Schedule. Use the accepted Base Schedule for planning, organizing and directing the work and for reporting progress.

3.03 UPDATING THE SCHEDULE

A. Submit an updated schedule with each Application for Payment.

B. Progress payment requests may not be processed by Engineer if updated schedule has not been submitted or if update is found unacceptable.

C. Prepare update using most recent accepted version of schedule including:

1. Actual start date of activities that have been started.

2. Actual finish date of activities that have been completed.

3. Percentage of completion of activities that have been started but not finished.

4. Actual dates on which milestones were achieved.

D. Submit narrative report in conjunction with updated schedule describing:

1. Activities added to or deleted from schedule. Identify added activities in manner distinctly different from original activity designations.
2. Changes in sequence or estimated duration of activities.
3. Current or anticipated problems and delays affecting progress, impact of these problems and delays and measures taken to mitigate impact.
4. Assumptions made and activities affected by incorporating change order work into the schedule.

3.04 REVISIONS TO SCHEDULE

A. Submit revised schedule within five (5) days when:

1. Delay in completion of any activity or group of activities indicates an overrun of the contract time or milestone dates by twenty (20) working days or 5% of the remaining duration, whichever is less.
2. Delays in submittals, deliveries, or work stoppages are encountered making necessary the re-planning or rescheduling of activities.
3. The schedule does not represent the actual progress of activities.
4. Any change to the sequence of activities, the completion date for major portions of the work, or when changes occur that affect the critical path.
5. Contract modification necessitates schedule revision; submit schedule analysis of change order work with cost proposal.

B. Submit printed copies of the revised schedule and electronic file.

C. Make revisions on most recently accepted version of schedule.

3.05 THREE WEEK “LOOK AHEAD” SCHEDULE

A. In addition to the overall Construction Schedule, provide a “Look Ahead” schedule in bar chart format. Show work activities undertaken in the preceding week and the work activities that will be undertaken during the upcoming three weeks.

B. Prepare the Look Ahead schedule weekly and submit to the Engineer.

C. The Look Ahead schedule will not be required when no active work is in progress.

END OF SECTION

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SECTION 01500

CONTRACTOR'S UTILITIES

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall be responsible for all utilities required for the work except the City will provide 110 volt electrical power and city water. The City will provide water from the nearby hydrant shown on the drawings.

B. Telephone

1. The Contractor shall provide cellular telephone service at the construction site and on the excavation equipment.

2. Radio telephone service is not acceptable as a substitute for cellular telephone service.

C. Sanitary Facilities

1. The Contractor shall provide toilet and wash-up facilities for his work force at the site of work.

2. Facilities shall comply with applicable laws, ordinances, and regulations pertaining to the public health and sanitation of construction field offices, dwellings, and camps.

3. The Water Treatment Plant sanitary facilities are not available for the Contractor's use.

END OF SECTION

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SECTION 01550

WARRANTY

PART 1 - GENERAL

1.01 GUARANTEE OF WORK

A. The Contractor hereby agrees to make, at its own expense, all repairs or replacements necessitated by defects in materials or workmanship, or lack of equipment performance, supplied under terms of this Contract, and pay for any damage to other works resulting from such defects, which becomes evident within one year after the date of acceptance of the project or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents.

B. The Contractor shall, upon the receipt of notice in writing from the Owner, promptly make all repairs arising out of defective materials, workmanship, or equipment. The Owner is hereby authorized to make such repairs, and the Contractor shall be liable for the cost thereof, if within ten (10) days after giving notice to the Contractor, the Contractor has failed to make or undertake the repairs with due diligence. In case of emergency, where in the opinion of the Owner delay could cause serious loss or damage, repairs may be made without notice being sent to the Contractor, and the expense in connection therewith shall be charged to the Contractor.

C. For the purpose of this paragraph, acceptance of the work or a portion of the work by the Owner, shall not extinguish any covenant or agreement on the part of the Contractor to be performed or fulfilled under this Contract which has not, in fact, been performed or fulfilled at the time of such acceptance. All covenants and agreements shall continue to be binding on the contractor until they have been fulfilled.

D. If, after installation, the operation or use of the materials or equipment furnished under this Contract proves to be unsatisfactory to the Owner, the Owner shall have the right to operate and use such materials or equipment until it can, without damage to the Owner, be taken out of service for correction or replacement. Such period of use of the defective materials or equipment pending correction or replacement shall in no way decrease the guarantee period required for the acceptable corrected or replaced items of materials or equipment.

END OF SECTION

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SECTION 01560

ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.01 SITE MAINTENANCE

1. The Contractor shall keep the work site, staging areas, and Contractor's facilities clean and free from rubbish and debris.

2. Staging area will be provided as shown on the drawings for Contractor's use. Materials and equipment shall be removed from the site when they are no longer necessary and when no immediate work is scheduled.

3. Upon completion of the work and before final acceptance, the work site shall be cleared of equipment, unused materials, and rubbish to present a clean and neat appearance.

B. Clean-up

1. Waste material of any kind will not be permitted to remain on the site of the work or on adjacent streets. Immediately upon such materials becoming unfit for use in the work, they shall be collected, carried off the site, and properly disposed of by the Contractor.

2. The Contractor shall provide temporary restroom and cleanup facilities for Contractor' employees and keep these areas clear of all refuse, rubbish, and debris that may accumulate from any source and shall keep them in a neat condition to the satisfaction of the Owner.

3. In the event that waste material, refuse, debris, and/or rubbish are not so removed from the work by the Contractor, the Contractor reserves the right to have the waste material, refuse, debris and/or rubbish removed and the expense of the removal and disposal charged to the Contractor.

4. Paints, solvents, and other construction materials shall be handled with care to prevent entry of contaminants into storm drains, surface waters, or soils.

C. Street Cleaning

1. The Contractor shall be responsible for preventing dirt and dust from escaping from trucks departing the project site, by covering dusty loads, washing truck tires before leaving the site, or other reasonable methods.

2. If the above requirements are violated and no action is taken by the Contractor after notification of infraction by the Engineer, the Owner reserves the right to have the streets in question cleaned by others and the expense of the operation charged to the Contractor.

1.02 WATER POLLUTION CONTROL

A. The Contractor shall not discharge any contaminants into surface streams or storm drains.

1.03 AIR POLLUTION CONTROL

A. The Contractor shall not discharge smoke, dust, and other contaminants into the atmosphere that violate the air pollution regulations for the area.

B. Internal combustion engines shall not be allowed to idle for prolonged periods of time. The Contractor shall maintain construction vehicles and equipment in good repair. Exhaust emissions that are determined to be excessive by the Engineer shall be repaired or replaced.

C. Comply with DEQ regulations for asbestos removal and disposal.

1.04 NOISE CONTROL

A. Construction involving noisy operations, including starting and warming up of equipment, shall be restricted to the hours between 7:00 a.m. and 6:00 p.m. on weekdays. Noisy operations shall be scheduled to minimize their duration and to ensure their completion by 6:00 p.m.

B. The Contractor shall comply with all local controls and noise level rules, regulations, and ordinances which apply to any work performed pursuant to the Contract. If the requirements of this Section are more restrictive than those of the local regulations, the requirements of this Section shall govern.

C. Each internal combustion engine, used for any purpose related to this Contract, shall be enclosed and be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler and enclosure.

END OF SECTION

SECTION 01750

RESTORATION OF IMPROVEMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Restoration of work areas after installation and construction of improvements.

1.02 STRUCTURES

A. Take precautions to protect the integrity and usefulness of existing facilities.

B. If necessary, remove existing improvements as necessary for the performance of the work.

1. Repair existing structures that are damaged as a result of the Work under this contract.

2. Replace plastic settling tubes, baffles and other facilities removed for installation of the coating.

3. Clean basins and filters.

1.03 ROADS AND STREETS

A. Asphalt pavement that has been removed, broken, or damaged, or in which the ground has caved or settled during the work under this contract, shall be brought to original grade, section and resurfaced.

B. Before resurfacing material is placed, sawcut edges of pavement to provide clean solid vertical faces.

1.04 CULTIVATED AREAS AND OTHER SURFACE IMPROVEMENTS

A. Restore cultivated or planted areas and other surface improvements which are damaged by construction as nearly as possible to their original condition or as shown on the drawings.

B. Repair existing guard posts, barricades, and fences that are damaged.

1.05 PROTECTION OF EXISTING INSTALLATIONS

A. Immediately repair or replace existing equipment, controls, structures, or facilities which are damaged as part of the Work.

B. Take measures that are necessary to ensure that construction debris and materials are kept out of the river, storm drainage system, and wastewater system.

END OF SECTION

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SECTION 03315

CONCRETE REPAIR

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Repair of concrete surfaces, cracks and joints, including, but not limited to, the following:

1. Concrete portion of the weir channel
2. Sealing of cracks within the concrete cone of Accelator #2
3. Wall of the Accelator #2

1.02 QUALITY ASSURANCE

A. Manufacturer's Field Services

1. The material manufacturer shall provide engineering field services to review the project and the material application prior to any preparation; to approve the applicator, the material used, and the procedure to be used; to observe surface preparation; to approve surface preparation; and to observe application.
2. The field representative shall be an employee of the material manufacturer.

B. Applicator

1. The applicator shall hold a valid State of Oregon Contractor's license for performing concrete repair work. The Contractor and the personnel doing the applications shall have a minimum of five (5) years practical experience and successful history in epoxy injection process for concrete crack repair. The Contractor shall substantiate this requirement by furnishing a written list of references and resumes with the bid package that includes a list of projects with previous crack repair projects.

1.03 SUBMITTALS

A. Provide the following information for both the pressure grouting of cracks and for the repair of the expansion joints:

1. The applicator shall submit through Contractor a satisfactory experience record including references from previous application of the specified materials to structures of similar design and complexity.
2. Resume of the personnel responsible for the work in the field.
3. Manufacturer's technical data on product and recommended use. Include the brand name and series number of all materials to be used.

4. The field representative of the material manufacturer shall submit, in writing through Contractor, approvals of proposed material, application procedures, applicator, and surface preparation.

5. Equipment information for pressure injection of epoxy.

PART 2 - PRODUCTS

2.01 PERFORMANCE AND DESIGN REQUIREMENTS

A. Unless otherwise specified or authorized, repairs shall conform to the requirements specified herein.

A. Types of repairs not specified herein shall be as specified in other sections, as indicated on the Drawings, or, in the absence of any definite requirement, as recommended by the manufacturer's representative and subject to acceptance by the Construction Manager.

B. The following types of repairs shall be performed as required.

1. Pressure-Injected Epoxy Resin used to seal cracks in the walls of the concrete.

2. Expansion joint replacement.

3. Restoration of concrete surfaces.

2.02 ACCEPTABLE PRODUCTS

A. Repair products/materials shall be manufactured by the companies specified herein.

B. Equivalent products of other manufacturers regularly producing high quality concrete repair products/materials and providing engineering field services may be furnished subject to review and acceptance by the Owner.

2.03 MATERIALS

A. All materials in contact with potable water shall be approved by ANSI/NSF Standard 61 for potable water applications.

B. Materials shall be as specified or as recommended by the manufacturer or temperature and moisture conditions encountered.

C. Weir Channel

1. Sika "Siaktop 122"

D. Pressure-Injected Epoxy Resin

1. ASTM C881, Type IV, moisture sensitive , maximum viscosity 350 cps at 77°F. KonTek 111 LV IR, Sika "Sikadur 52", Master Builders "MasterInject 1380".

E. Crack Sealant

1. Sika "Sikadur 31- Hi-Mod Gel", Master Builders "MasterEmaco ADH 327".

F. Epoxy Bonding Agent

1. Master Builders "MasterEmaco ADH 326", Sika "Sikadur Hi-Mod Adhesive".

G. Pressure Grouting Equipment

1. Shall include a mixer and holdover agitator tanks and be designed to place grout at pressure.

2. Gages shall be provided to indicate pressure used.

PART 3 - EXECUTION

3.01 INSPECTION

A. Prior to the placement of the repair materials, the crack to be repaired shall be inspected by the material manufacturer to assure that preparation and conditions are correct for the type of repair and the product/material being used as specified herein.

3.02 PREPARATION

A. All cracks and surfaces around the cracks shall be free of objectionable substances and shall conform to the requirements of the material manufacturer.

B. Concrete cracks to be repaired shall be cleaned by methods acceptable to the material manufacturer so that the cracks are free of dirt, oil, grease, laitance, and other foreign matter.

C. Surfaces for concrete restoration shall be power washed clean of moss and prepared to a CSP-3 finish.

D. All loose and deteriorated existing concrete and shotcrete surfaces shall be removed down to sound materials

E. All concrete and shotcrete shall be checked for delamination to ensure that all surfaces are sound. All edges shall be square cut to avoid feather edges.

F. Some steel and/or fiberglass weir plates may need to be removed prior to repairing the concrete surface next to them. The weirs to be reinstalled once completed.

G. Any other preparation recommended by the material manufacturer shall be brought to the Owner's attention and may be incorporated into the Work if acceptable to the Owner, but at no additional cost to the Owner.

H. Concrete surfaces in the area of a crack to be repaired shall be cleaned by wire brushing, blasting, or other acceptable methods. The Owner will loosen conduits and instruments from the wall when these interfere with the crack repair. Contractor shall protect all instruments and electrical devices by wrapping in plastic.

I. Wall surfaces shall be cleaned to expose crack networks.

J. If there is active water seepage in the repair area, the seepage shall be stopped as recommended by the injection material manufacturer and as acceptable to Owner.

K. Injection ports shall be installed as recommended by the injection material manufacturer but no further than 8 inches.

L. Injected Epoxy Resin

1. Preparation for injected epoxy resin shall include sealing the surface at the crack with crack sealant as recommended by the material manufacturer and as acceptable to the Owner for the pressure injection work.

2. Injection ports for epoxy resin shall penetrate through the crack sealant into the cracks at spacing recommended by the material manufacturer.

3.03 APPLICATION

A. Concrete crack repair work shall be performed in accordance with the following requirements.

1. Crack Surface Sealant

a. Trowel-applied to confine the injection adhesive in the fissure during application and cure.

b. The concrete surface where the sealant is applied shall be smooth, uniform, and free from irregularities.

c. Remove crack sealant after the injection of resin is completed whenever the sealant will be visible after completion of the work.

2. Pressure-Injected Resin

a. The injected areas shall be prepared as specified and as recommended by the manufacturer.

b. Pressure-injected resin shall be suitable for penetration of joints, cracks, and crack networks 2 mils (0.002″) wide and larger.

c. After the joints and cracks are prepared and before the injection of the resin, the joints shall be flushed with water.

a. Terminate the water flush when the turbidity of the expelled water is equal to that of the flush water.

b. The pumping equipment used for the pressure injection of resin shall have pressure metering.

1) Written procedures for use and quality control of the injection equipment shall be furnished to the Construction Manager for review and acceptance.

2) The pump shall be electric.

3) The material and process used for the pressure injection of the resin shall have been in use a minimum of five (5) years.

c. The joints and crack networks shall have a minimum of 90% penetration of resin into the joint or crack network.

d. Epoxy penetration shall be indicated by appearance at the adjacent entry port.

e. Core samples may be taken at the Construction Manager's discretion.

1) Epoxy Resin

a) Epoxy resin shall be injected into the structure in accordance with the material manufacturer's recommendations and as acceptable to Construction Manager.

b) Epoxy resin shall be injected until the resin appears at the next port.

3. Cold Weather

a. Do not work when ambient temperatures are expected below 40°F

b. Sudden cooling of the repair materials shall not be permitted.

3.04 PROTECTION

A. Post-placement curing and protection shall be as specified herein and in accordance with the manufacturer's recommendations.

B. Concrete surface repaired with a sealant shall be protected from rain for two days.

3.05 CLEANING AND FINISH

A. Clean work areas each day in accordance with the project requirements section.

B. Upon completion of crack repairs, sack exterior exposed walls in the immediate area of the repairs.

1. Repair defective work, remove fins, correct offsets, and grind projections smooth.

2. Fill depressions 1/16 ″ or larger in depth or width and tie holes with mortar.

3. "Brush-Off" sandblast surfaces prior to filling holes to expose all holes near surface of the concrete.

4. Thoroughly wet surfaces and commence filling of pits, holes, and depressions while surfaces are still damp.

5. Perform filling by rubbing mortar over entire area with clean burlap, sponge rubber floats, or trowels.

6. Do not let any material remain on surfaces, except that within pits and depressions.

7. Wipe surfaces clean and moist cure.

C. Upon completion of the final cleanup, restore areas affected by the grouting procedures to their original condition, leaving no trace of material piles or other wasted materials.

END OF SECTION

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SECTION 05120

STRUCTURAL STEEL AND MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Structural steel including structural steel shapes and plates, handrail, grating, mechanical fasteners, welding, and associated accessories.

1.02 REFERENCED SECTIONS

A. The following Sections are referenced in this Section

1. Section 01300 – Submittals
2. Section 09972 – Hot Dip Zinc Coating

1.03 SUBMITTALS

A. Comply with Section 01300.

B. Shop drawings of members to be fabricated before starting their fabrication. Include dimensions, weights for each section, materials for construction, fabrication details and fasteners.

C. Structural calculations showing are capable of withstanding the following load:

1. Railings:
    a. Uniform load of 50 pounds per lineal foot applied in any direction.
    b. Concentrated load of 200 pounds applied in any direction.
    c. Uniform and concentrated load need not act concurrently.
2. Grating: 100 pounds per square foot live load.
    a. Maximum deflection under specified loading: L/240 of grating clear span.

D. Manufacturer's data for nuts, bolts, concrete anchors, chemical anchors and other fasteners.

1.04 QUALITY ASSURANCE

A. Comply with current governing edition of the Oregon Structural Specialty Code.

B. The completed work shall comply with the requirements of the standards for Oregon Occupational Safety and Health (Oregon OSHA).

C. Qualifications

1. Perform welding of structural metals with welders who have current American Welding Society (AWS) certificate for the type of welding to be performed.
2. Owner may use gamma ray, magnetic particle, dye penetrant, trepanning, or other aids to visually inspect or examine any weld.
3. Contractor shall bear costs of retests on defective welds.
4. Contractor shall also bear costs in connection with qualifying welders.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Package in a manner that will protect galvanized surfaces and surfaces coated with fusion bonded epoxy.

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, supports and other construction contiguous with structural steel and miscellaneous metals by field measurement before fabrication. Indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Unless otherwise specified or indicated on the Drawings, materials shall conform to the following:

Item	ASTM Standard Item	Class, Grade, Type or Alloy No.
Carbon Steel		
Structural plate, bars, rolled shapes, and miscellaneous items	A36	--
Standard bolts, nuts, and washers	A307	--
High strength bolts, nuts, and hardened flat washers	A325 A490	-- --
Eyebolts	A489	Type 1
Tubing, cold-formed	A500	Grade B
Tubing, hot-formed	A501	--
Steel pipe	A53	Grade B
Zinc (Hot-Dipped Galvanized) Coating	A123	--
Stainless Steel		
Plate, sheet and strip	A167	Type 304* or 316
Bars and shapes	A276	Type 304* or 316
Bolts, nuts, and washers	A276	Type 304* or 316
* Use Type 304L or Type 316L if material will be welded.		

B. Grating:

1. Manufactures:
   a. McNichols Company.
   b. Grating Pacific, Inc.
   c. Seidelhuber Metal Products, Inc.
2. Type: Swage locked, rectangular bar, end banded.

C. Stainless steels are designated by type or series defined by ASTM.

D. Where stainless steel is welded, use low-carbon stainless steel.

E. Where anchors, connections or other details of structural steel are not specifically indicated on the Drawings or specified, their material, size and form shall be equivalent in quality and workmanship to items specified.

2.02 BOLTS

A. Non-Structural Bolts, Nuts and Washers: Type 304 stainless steel.

B. High-Strength Bolts, Nuts, and Washers: ASTM A325, Type 1, heavy hex steel structural bolts with ASTM F436 hardened carbon-steel washers.

2.03 SHOP FABRICATION

A. Fabricate structural steel in conformance with AISC "Specification for the Structural Steel Buildings - Allowable Stress Design and Plastic Design".

B. Where anchors, connections or other details of structural steel are not specifically indicated on the Drawings or specified, their material, size and form shall be equivalent in quality and workmanship to items specified.

C. Structural Members Such as W Shapes, S Shapes, Channels, Angles, and Similar Members not Available in Quantity, Size, and Type of Stainless Steel Specified or indicated on the Drawings.

1. Fabricate by welding together pieces of low carbon stainless steel plate, such as 316L.

2. Make full penetration welds between pieces of plate to attain same or higher section modulus and moment of inertia as members indicated on the Drawings.

D. Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, weld spatter, or blemishes.

E. Assemble structural steel and miscellaneous metal in the shop to the greatest extent possible to minimize field splicing, welding and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

F. Form work true to line and level with accurate angles and surfaces.

G. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Where galvanizing is required, hot-dip galvanized structural steel after fabrication in accordance with Section 09972.

I. Before starting fabrication, take measurements necessary to properly fit work in the field.

PART 3 - EXECUTION

3.01 FABRICATION

A. Fabricate structural and foundry items to true dimensions without warp or twist.

B. Form welded closures neatly, and grind off smooth where weld material interferes with fit or is unsightly.

C. Round off sharp or hazardous projections and grind smooth.

3.02 ERECTION

A. Erect structural steel in conformance with AISC "Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design," unless otherwise specified or modified by applicable regulatory requirements.

B. Install structural items accurately and securely, true to level, plumb, in correct alignment and grade, with all parts bearing or fitting structure or equipment for which intended.

C. Do not force out of alignment, redrill, reshape, or force fit fabricated items.

D. Rigidly support and brace structural items needing special alignment to preserve straight, level, even, and smooth lines. Keep structural items braced until concrete, grout, or dry pack mortar has hardened for 48 hours minimum.

E. Protect dissimilar materials from galvanic corrosion by means of pressure tapes, coatings or isolators.

3.03 BOLTING

A. Install bolts, including anchor bolts and concrete anchors, of sufficient length to project 2 threads minimum, but 1/2 inch maximum beyond nut.

B. Tighten bolts to the "snug-tight" condition, defined as tightness attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench.

3.04 WELDING

A. General: Make welds full penetration type, unless otherwise indicated on the Drawings.

B. Welding Stainless Steel

1. Comply with AWS D1.1.

2. Perform with electrodes and techniques in accordance with AWS D10.4.

3. Remove all heat tinting with stainless steel wire brushes or by pickling.

C. Welding Carbon Steel

1. Comply with AWS D1.1.

2. Weld ASTM A36 structural steel, ASTM A500 and A501 structural tubing, and ASTM A53 pipe with electrodes conforming to AWS A5.1.

3. Field repair cut or otherwise damaged galvanized surfaces to equivalent original condition using one of the following or equal:

a. Galvinox.

b. Galvo-Weld.

D. Interface With Other Products

1. Where carbon steel comes in contact with aluminum or other dissimilar metals, bolt with stainless steel bolts and separate or isolate from dissimilar metals with neoprene gaskets, sleeves, and washers.

2. Prior to installing nuts, coat threads of stainless steel bolts with material to prevent galling of threads.

a. Manufacturers: One of the following or equal:

1) Never Seez Compound Corporation Never-Seez.
2) Oil Research, Inc., WLR No. 111.

3.05 PROTECTION

A. Protect finishes from damage during construction period with temporary protective coverings. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work.

3.06 TOLERANCE

A. Maximum variance from plumb: 1/4-inch every 10 feet.

B. Maximum offset from true alignment: 1/4-inch every 10 feet.

END OF SECTION

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SECTION 09900

STEEL / CONCRETE COATING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surface preparation, coating application, curing of coating, and inspection on interior and exterior concrete surfaces for the Accelators at the Vine Street Water Treatment Plant.

B. The Contractor shall furnish all labor, materials, tools and equipment required to perform surface preparation, coating work, and inspection as specified herein. The Contractor shall perform all subsidiary and incidental work necessary to complete the work in conformance with the project requirements, to accomplish the approved end result of a totally protected and usable structure, including all attachments, accessories and appurtenances.

1.02 QUALITY ASSURANCE

A. Applicator

1. The coating applicator shall hold a valid State of Oregon Contractor's license for performing cleaning and coating of steel and concrete. The Contractor's coating applicator shall have a minimum of five (5) years practical experience and successful history in the application of the Product for potable water treatment or storage projects. The Contractor shall substantiate this requirement by furnishing a written list of references with the bid package that includes a list of projects with verifiable coating inspection reports.

2. The Contractor's coating applicator shall provide a supervisor at the work site during cleaning and coating operations and provide skilled personnel qualified to perform the required work in a manner comparable with the best standards of practice and safety maintain continuity of personnel and coordinate transfer of personnel with the Owner’s Representative.

3. Field Testing: Inspection and daily test reports, including environmental conditions, cleanliness of compressed air supply, wet paint thickness, etc. recorded. Copies of the daily reports must be submitted to the Owner or Owner’s Representative, see Submittal Section

B. Manufacturer’s Field Services

1. The material manufacturer shall provide technical field services to review the project and the material application prior to any preparation; to approve the applicator, the material used, and the procedure to be used; to observe surface preparation; to approve surface preparation; and to observe application.

2. The technical representative shall be an employee of the material manufacturer and not an independent company selling the material.

1.03 SUBMITTALS

A. Submit to the Owner in accordance with Section 01300.

B. Submit the following list of items detailing the surface preparation and coating work as specified herein for each paint system, see Paint System Data Sheet (PSDS) attached:

1. Coating manufacturer's technical data on product and recommended use. Include the brand name and series number of all coatings to be used.

2. Coating manufacturer's surface preparation criteria, including recommended surface profile range after abrasive blasting.

3. Coating manufacturer's application instructions, equipment recommendation, temperature and humidity limitations, pot life and induction requirements, drying and curing times, and recoat cycle times. Recoat times and final cure shall be listed at 35° F., 45° F., 55° F., 65° F. and 75° F. substrate temperatures. Provide manufacturer's maximum and minimum material and substrate temperatures for proper application.

C. Also submit the following list of items:

1. Contractor's written program for over spray prevention and measures to contain sand blasting and pressure washing operations.

2. Coating manufacturer's Material Safety Data Sheets (MSDS) for all Product to be used on the project, including solvents, additives, cleaners and thinners.

3. Contractor's safety program to be employed on this project which complies with the current requirements of OSHA and this Specification.

4. Coating Manufacturer's Technical Representative name (not salesperson and/or independent company selling the product) and contact information

D. Dehumidifier Submittals (if required)

1. Type of dehumidifier to be used. Note: No liquid, granular, or loose lithium chloride drying system will be accepted.

2. Calculations for air change rate for maintaining a spread of 17 degrees F between inside surface temperature and inside space dew point temperature with a maximum relative humidity of 45 percent in the space.

3. Type and size of any auxiliary heat or cooling used to maintain surface temperature at acceptable level for coating manufacturer's parameters. Must include written approval by dehumidification supplier.

E. Contractor's Field-Testing Reports:

1. Environmental condition reports – submit daily

2. Compressed air cleanliness test – submit daily
3. Surface profile reports – submit prior to priming
4. Wet paint thickness reports – submit daily
5. Dry film thickness reports
6. Holiday test report

1.04 INSPECTION

A. All materials furnished, and all work accomplished under the contract shall be subject to inspection by the Owner. Unless otherwise noted herein, the Owner shall pay the cost of 3rd party inspection.

B. The Owner's Representative may perform inspection on all phases of the surface preparation, abrasive blast cleaning, and application of the coating and painting systems.

C. At the start of each area to be coated (interior & exterior) the Coating Contractor shall surface prep a 4'x4' area for the Contractor, the Manufacturer's Technical Representative, and the Owner's Representative, to inspect and come to an agreement if it meets specified requirements. Re-perform, if need be, until an agreement can be made. At the same meeting everyone shall go over and agree on the methods and schedule for application. Needs to be performed for each Accelator. The passed surface preparation shall be the standard for that section being inspected.

D. Inspection equipment will be provided by the Contractor and may be operated by the Owner's Representative assigned to the project except where specifically stated otherwise in this specification. The Owner's inspector (s) may elect to use their own equipment.

E. Quality assurance procedures and practices shall be utilized to monitor all phases of surface preparation, application and inspection throughout the duration of the project. Procedures or practices not specifically defined herein may be utilized provided they meet recognized and acceptable professional standards and are approved by the Owner.

F. The Contractor shall be held strictly to the true intent of the Specifications regarding quality of materials, workmanship, and diligent execution of the contract. The use of a consultant to inspect the work in no way reduces or alters the quality control and quality assurance responsibilities of the Contractor or reduces or alters the Contractor's compliance with all requirements of the contract.

G. Work accomplished in the absence of prescribed Owner inspection may, upon written notice from the Owner, be removed and replaced to the extent required, under the proper inspection. The entire cost of removal and replacement, including the cost of all materials which may be furnished by the Owner and used in the work thus removed, shall be borne by the Contractor, regardless of whether the work removed is found to be defective or not.

H. The contractor shall provide, as a minimum, 200′ candles of illumination for all inspection. Comply with SSPC – Guide 12.

1.05 SAFETY AND HEALTH REQUIREMENTS

A. The Contractor shall comply with the applicable health and safety requirements of the State of Oregon and OSHA. The Contractor shall provide and require the use of proper personal protective and lifesaving equipment for all persons visiting or working in or about the project site.

B. Ventilation shall be used to control potential exposure and hazard to workers and employees of the plant. Ventilation equipment shall be explosion proof, of industrial design, and of adequate capacity to reduce the concentration of air contaminants to the degree that a hazard to workers or employees of the plant does not exist. The ventilation system shall be sufficient to maintain air changes within the confined space in accordance with OSHA regulations. Ventilation equipment shall operate by ducting air, vapors, and other potential hazardous substances from the confined space. Forced air ventilation during blast cleaning, abrasive removal, coating application, and curing is mandatory in confined spaces.

C. A ventilation system shall be furnished and installed by the Contractor in accordance with these specifications. The Contractor shall make modifications to the system as directed by the supplier of the equipment, to insure a safe working environment and provide complete removal of all solvent vapors.

D. Spark proof artificial lighting shall be provided for all work in confined spaces. Light bulbs shall be guarded with a protective cage to prevent breakage. Lighting fixtures and bulbs shall comply with the requirements of Section 70 of the National Fire Protection Association (NFPA), "National Electric Code", for the atmosphere in which they are used. All lighting and other electrical systems used on the project shall be of the ground fault type, as detailed in NFPA 70. Whenever required by the Owner, the Contractor shall provide additional illumination to fully illuminate all areas to be inspected. The level of illumination required for inspection purposes shall be solely determined by the Owner and as called out in this specification.

E. All ladders, scaffolding and rigging shall be designed for their intended use and shall conform to all requirements of OSHA regulations. They shall be erected where requested by the Owner to facilitate inspection and moved by the Contractor to the locations requested by the Owner. All scaffolding shall have proper "outriggers", cross bracing, handrails, ladders, and OSHA approved and tested planking.

F. The Contractor shall accord particular attention to the manufacturer's recommendations, precautions, and warnings regarding the handling and use of cleaning, coating materials specified herein. Coating materials may be irritating to the skin and eyes and may cause an allergic reaction in certain persons. When handling and mixing coatings and paints, workers shall wear proper protective clothing and equipment, including gloves, respirators and eye protection. Flammability, toxicity, allergenic properties, and any other characteristic requiring field precautions shall be identified, and specific safety practices shall be followed.

G. Before initiating work, the Contractor shall test paint to be removed for lead content and based on the findings, comply with OSHA safety regulations. The Owner has measured the lead content and measured lead below 0.5 percent. If testing by the Contractor determines concentrations above 0.5 percent lead, Environmental Protection Agency regulations shall be followed for conduct of the work and disposal of all such materials.

H. The Contractor and Coating Manufacturer's Technical Representative must test (using whatever test needed) the exterior coating to confirm the existing coating can be over-coated. The Coating Manufacturer's Technical Representative shall submit a letter saying the test has been performed and their coating can over-coat the existing coating system.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

A. Interior

1. Steel

a. Specified products of the following manufacturers have been approved:

1) Sika – Sikadur 62

2) Carboline – Carboguard 691

3) Tnemec – Pota-Pox N140F

b. All existing steel surfaces shall be prepared and primed as recommended by this specification or by the coating manufacturer, whichever is more stringent.

2. Concrete

a. Specified products of the following manufacturers have been approved:

1) Sika – Sikagard 62

2) Carboline – Carboguard 891 VOC

3) Tnemec Company Inc. –

a) Interior – Mortarclad Series 218 for patching and Pota-Pox N140F for final coat

b. All existing concrete surfaces shall be prepared as recommended by this specification or by the coating manufacturer, whichever is more stringent.

B. Exterior

1. Steel

a. Specified products of the following manufactures have been approved:

1) Sika – Sikadur 32

2) Carboline – Carbouguard 691 (main coat) and Carbothane 133 (top coat)

3) Tnemec – Pota-Pox N140F (main coat) and Series 1080 Endura-Shield (top coat)

2. Concrete

a. Specified products of the following manufacturers have been approved:

1) Sika – Sikagard 62

2) Carboline – Flexxide Elastomer

3) Tnemec Company Inc. – Elasto-Grip C 151 (primer) and Enviro-Crete Series 156 (final coat)

3. A coating will not be approved if the Coatings Manufacturer does not have Technical Representatives that can approve surface preparation and/or make decisions for the Manufacturer in the field.

2.02 COATING SYSTEMS

A. General:

1. All materials of a specified system including primer, touch-up, intermediate, and finish coats shall be provided by the same manufacturer. Thinners, cleaners and other additives shall be as recommended in writing by the coating manufacturer for the specified system.

2. Coating materials including additives to be used in interior potable water contact surfaces must appear in the current ANSI/NSF Standard 61 "Listing of Certified Drinking Water System Components Health Effects", as published by NSF International (NSF). They shall conform to regulations and applicable requirements of local, State and federal air quality and health regulatory agencies.

3. All coatings used on this project must be asbestos free, lead free, cadmium free, and chromate free.

4. Coating products shall conform to local air quality rules and regulations.

5. No request for product substitution will be considered which decreases the dry-film thickness designated, the number of coats to be applied, or which changes the generic type of coating specified.

6. Requests for substitution shall contain the full name of each product, descriptive literature, test data, data on past performance, manufacturer's instruction for use, generic type, and its nonvolatile content by volume. This information shall demonstrate equivalence of product and performance to the specified materials and complete systems.

7. The coatings manufacturer shall have their Technical Representation at the start of the project, end of the surface preparation, before starting to coat, and shall provide onsite technical support to resolve field problems

associated with the manufacturer's products furnished under this Contract or the application thereof throughout the duration of the Work.

8. No coating materials shall be procured or delivered to the project site prior to the review and acceptance of the proposed materials by the Owner in writing.

B. Performance Requirements for basin coating.

1. Steel

   a. Strip coat 3-4 mils dry film thickness (MDFT) (welds, edges, bolts, etc. – brush and/or roller)

   b. 3 coats, 5-8 MDFT per coat – minimum of 15 MDFT

   c. 1 coat, 2-3 MDFT – exterior only

2. Concrete

   a. Three coats of 10-15 MDFT per coat - minimum of 30 MDFT

   b. Tensile Strength – 5,400 psi

   c. Elongation Percent – 2.7%

2.03 TESTING GAUGES

A. The Coating Contractor shall have on hand for their and the ENGINEER's use during the coating process. At the start of the project the Coating Contractor shall show the ENGINEER the instruments and where he can find them, when needed.

1. Sling or battery operated psychrometer in conjunction with U.S. Weather Bureau's psychrometric tables, the relative humidity and dew point.

   a. Bacharach Instruments, Pittsburgh, PA

   b. Or equal

2. A surface temperature thermometer

   a. Pacific Transducer Corp., Los Angeles, CA

   b. Raytek, Billings, MT

   c. Or equal

3. Surface profile gauge (i.e. Testex press-o-film)

   a. Testex Inc., Newark, DE

   b. Or equal

4. Magnetic type dry film thickness gauge

   a. Nordson Corp., Mikrotest, Anaheim, CA

   b. Or equal

5. Electrical holiday detector, low voltage, wet sponge type

   a. Tinker and Rasor, Model M-1, San Gabriel, CA

   b. Or equal

2.04 EXECUTION

A. Delivery and Storage of Coating Materials

1. Deliver coating materials to the job in original sealed containers identified with labels indicating manufacturer; product name and number; color, batch or lot number; and date of manufacture. Note the date of manufacture and apply coatings prior to the expiration of the guaranteed storage life. Coating materials exceeding storage life will be rejected.

2. Store coating materials in enclosed structures to protect from weather and excessive heat or cold. Coatings stored at above or below manufacturers recommendations will be rejected. Conform to state and local requirements for flammable materials.

B. Protection of the Work

1. Protective coverings or drop cloths shall be used to protect floors, concrete, appurtenances, equipment, prepared surfaces and applied coatings or paints. Personnel entering containment structures or walking painted surfaces shall take precautions to prevent damage or contamination of coated or painted surfaces. Care shall be exercised to prevent coating from being spattered onto surfaces that are not to be coated or painted. Surfaces from which such material cannot be removed satisfactorily shall be repainted or recoated as required to produce a finish satisfactory to the Owner.

2. Where protection is required or provided for coated surfaces, such protection shall be maintained until the coating film has properly dried. Areas that have been coated shall not be handled, worked on or otherwise disturbed until the coating has cured to “dry to handle”.

3. All sand blasting operations shall be enclosed to prevent any drift of materials away from the immediate work area. Water treatment will be taking place next to the units and no spray, dust or drift will be allowed to occur near the treatment units.

C. Condition of Equipment

1. The Contractor's coating equipment shall be designed for application of the material specified and shall be maintained in good working condition at all times. Compressors shall have suitable traps and filters to remove water, dust and oils from the air. The Contractor, in the presence of the Owner, will conduct blotter or white cloth tests at each start-up period, or as deemed necessary. Cleanliness of compressed air supply shall be verified daily, and as deemed necessary by the Owner, by directing a stream of air, without abrasive, from the blast nozzle onto a white blotter or cloth for twenty (20) seconds. If oil or water appears on the blotter or cloth, all traps and separators shall be blown down until two (2) subsequent twenty (20) second tests show no further oil or water. The compressed air system shall be capable of delivering a continuous nozzle pressure to achieve the required surface cleanliness and profile, typically 90 pounds per square inch (psi) minimum to each nozzle in operation.

2. Compressed breathing air supplied to respiratory protection devices shall meet the requirements of the specification for Grade D breathing air as described in Compressed Gas Association, Inc., specification G-7. Compressors for breathing air shall be constructed and located as to avoid entry of contaminated air into the air supply system. Oil lubricated compressors shall be equipped with a suitable in line air filtration system that includes a carbon monoxide sensor and alarm and air-purifying absorbent beds and filters that remove water, dust particles, odors, oil, and other hydrocarbons. Written certification is required that the breathing air supplied by the compressors has been tested and the air meets the specification for Grade D breathing air.

D. Limitations on the Application of Coatings

1. No coating shall be applied outside the limits recommended by the manufacturer without written approval by the Owner.

2. General: The following weather condition restrictions apply:

3. No coating shall be applied when the surrounding air temperature or the temperature of the surface to be painted is below 45° F or in excess of 120° F.

4. No coating shall be applied when the temperature of the material to be applied is less than 50° F or more than 100° F.

5. No coating shall be applied to wet, moist, or damp surfaces, or during snowy, rainy, foggy, or misty conditions, or when the relative humidity exceeds 85%, or when the ambient air temperature is less than five (5) degrees F above the dew point.

6. No coating shall be applied when it is expected that the relative humidity will exceed 85% or that the ambient air temperature will drop below 45° F within eight (8) hours after the application of the coating.

7. No coating shall be applied when the surface temperature is expected to drop to less than 5° F above the dew point within eight hours after application of coating.

8. No coating shall be applied when wind speed exceeds fifteen (15) miles per hour in the immediate coating area.

9. If a change in climatic conditions damages a coating application, repair the damaged coatings to their specified condition as directed by the Owner's representative at no cost to the Owner.

10. Depending on weather conditions and the OWNERS option the use of a dehumidifier may be required to maintain the environment within the accelerator tanks throughout the surface preparation, coating, and curing process.

E. Procedures for the Application of Coatings

1. All surfaces shall be prepared as recommended by this specification or coating manufacturer, whichever is more stringent. Surfaces shall be inspected and approved by the Owner and the coating manufacturer's technical representative prior to each application of coating materials. Materials applied prior to approval by the Owner or without Owner inspection shall be removed and reapplied to the satisfaction of the Owner at the sole expense of the Contractor.

    a. **Concrete Surfaces – All exterior surfaces shall be pressure washed** with a 5% solution of TSP with a minimum pressure of 3,000 psi pressure at a flow of 3.5 gpm or as recommended by the coating manufacturer, whichever is higher. After cleaning, apply an epoxy modified mortar, or primer over the entire surface as recommended by the coating manufacturer. The interior surfaces shall be prepared to SSPC-SP 13 with a profile of CSP 3.

    b. **Steel Surfaces –** All exterior surfaces shall be sand blasted to SSPC SP-10/CACE 2. For the interior surfaces – a white metal blast SSPC-SP 5/NACE-1 is required.

2. Any coating applied upon improperly prepared surfaces shall be removed and redone to the satisfaction of the Owner at the sole expense of the Contractor.

3. Follow the recommendations of the coating material manufacturer including the selection of application equipment, mixing, drying time, temperature and humidity of application, and safety precautions. Any conflicts between coating manufacturer's recommendations and requirements in this specification shall be brought up by the Contractor at the Pre-Construction Conference meeting and resolved at that time.

4. The surface to be coated with subsequent layers shall be properly cured and cleaned, and show no evidence of over spray from pervious coats, dirt or dust accumulation, or scuff marks from worker traffic.

5. All coating and painting application work shall conform to the applicable requirements of SSPC PA-1

6. Stir and strain as required, and keep coating materials at a uniform consistency during application.

7. Apply each coating evenly, free of sags, runs, and other evidence of poor workmanship. Finished surfaces shall be free from holidays, defects, or blemishes.

8. To insure complete coverage of all interior steel surfaces, all welds, sharp edges, nuts, bolts irregular surfaces difficult to coat or paint shall receive a brush coat of the specified material per SSPC-PA 1, 6.6 Striping, 7.4.6 Application Method (Brush). Coating shall be brushed in multiple directions to insure penetration and coverage. These areas include, but are

not limited to, welds, roof lap seams, nuts, bolts, ends and flanges of rafters, or other irregular shapes.

9. Do not use thinners unless recommended by the coating manufacturer. If thinning is allowed, do not exceed the maximum allowable amount of thinner per gallon of coating material. In no case, shall coating materials be reduced more than is absolutely necessary to obtain the proper application characteristics. Thinning required to achieve proper application characteristics shall not relieve the Contractor of his obligation to meet specified minimum dry film thickness. If the Contractor applies any coatings which have been modified or thinned to such a degree as to cause them to exceed established VOC levels, the Contractor shall be responsible for any fines, costs, required remedies, or legal action and costs which may result.

10. Care should be exercised during spray operations to hold the spray nozzle perpendicular and sufficiently close to surfaces being coated to avoid excessive evaporation of volatile constituent and loss of material into the air or the bridging of cracks and crevices. Use a spray technique that will result in a film free of fog, spatter or over spray. Reaching beyond limits of scaffold perimeter will not be permitted. All over spray shall be removed as directed by the Owner. The Owner's approval of Contractors over spray prevention procedures and Owner's presence on project site does not free Contractor from responsibility for over spray. Owner approval of procedures will be required prior to start of spray operations.

11. Drying time between coats and time between applications of coats shall be strictly observed as stated in the manufacturer's printed instructions to achieve maximum cross-linking of coatings. If the recommended minimum or maximum recoat time is violated, prepare the surface as directed by the coating manufacturer.

12. Apply coating systems within the specified minimum/maximum range dry-film thickness as measured from above the peaks of the surface profile. Measurement will be in accordance with SSPC-PA-2 and will be corrected for the magnetic effect of the surface profile.

13. Kits shall not be broken down. Do not mix partial kits.

14. Coating termination and transition details shall be in accordance with the manufacturer's recommendations.

2.05 WARRANTY

A. The Contractor and Coating Manufacturer shall jointly and severally warrant to the Owner and guarantee the work under this section. Provided a written warranty signed by both the Contractor and Coating Manufacturer against defects of the coating system for a period of two years beginning from the date of final acceptance of the work. Warranty shall cover both materials and labor in the event of any defect in the coating system.

2.06 EXCLUSIONS

A. Where surfaces, equipment, utilities or infrastructure are damaged, coated or otherwise not in conformance with the intent of these Specifications, the Contractor shall clean, repair or otherwise restore such surfaces to the satisfaction of the Owner at the Contractor's expense and at no additional cost to the Owner.

2.07 VENTILATION

A. Forced air ventilation must be used at all times to effectively remove solvents for proper drying of coats on the interior containment structures. It is essential that the solvent vapors released during application and from the deposited film be removed from the structure by explosion proof exhaust blowers or suction fans or as an integral part of the dehumidification equipment. The exhaust blowers or suction fans should be ducted to or from the bottom of the structure.

B. A minimum of seven (7) days continuous ventilation and/or dehumidification following application of the final coat on the interior surfaces shall be required before potable water structures can be disinfected and filled with water. All traces of solvent shall be removed completely from coating or structure. Forced air ventilation at a rate of at least one complete air changes every four hours shall be continuous operated during application of the interior coating for a minimum period of seven (7) days from the final interior coating application. Temperature and humidity conditions above or below 70° F and 50 percent relative humidity may extend or shorten the curing time required. If there is any doubt about the adequacy of the curing conditions, additional curing time with continued forced air ventilation and dehumidification (if required) shall be provided, as directed by the Owner. The Contractor shall maintain the exhaust blowers or suction fans in good working condition at all times during the final curing period.

2.08 FINAL CURE

A. Final curing shall be in accordance with the manufacturer’s recommendations. In no case shall the final cure period be less than a time element equivalent to seven (7) days (168 hours) at a temperature of 70° F at a relative humidity of 50% unless recommended in writing by the manufacturer and approved by the Owner.

B. After completion of curing cycle as noted above, the Contractor shall test the applied coating via a “solvent” or “hardness test” to verify, to the Owner, adequate curing has been attained. “Solvent” or “hardness test” requirements, including the solvent and number of double-rubs shall be as required by the coating manufactures written instructions.

C. The Contractor using a solvent wipe test shall verify completion of the final cure. The solvent wipe test shall consist of rubbing a cloth saturated with solvent as recommended by manufacturer on the area to be tested. If the area tested becomes tacky, the coating shall be considered not fully cured and the curing period shall be continued until the coating is fully cured to the satisfaction of the Owner. Testing shall conform to ASTM D5402.

D. If final cure has not been attained, based on tests described above, the curing time shall be continued until applied coating passes the "double rub solvent test" per manufacturer's instructions.

E. Once the test shows the coating is cured, the Contractor and Manufacturer's Technical representative shall provide a letter indicating the coating is cured and provide the date the structure can be put back into service.

2.09 INSPECTION AND TESTING

A. Inspection and testing shall be performed by the Contractor as specified herein and shall include such additional inspection, sampling and testing work as the Owner deems appropriate to ensure compliance with these Specifications.

B. Notify the Owner three (3) working days in advance of any field operations involving abrasive blast cleaning operation and coating and painting applications.

C. The Contractor shall coordinate his work with the inspection, sampling and testing requirements of the Owner and shall assist the Owner as may be required for the performance of the duties of the Owner. The Contractor shall provide all lighting and scaffolding to enable the Owner to perform inspection and testing as required. The level of illumination and scaffolding locations for inspection purposes shall be as directed by the Owner.

D. After surface preparation and filling of voids, Contractor shall test the surface strength of the concrete at two locations representative of the interior surface per ASTM C1583. Upon completion of the coating, Contractor shall conduct a pull-off adhesion test at four locations designated by the Owner per ASTM D7234.

E. The Owner may perform such tests as are required to help ensure compliance with all phases of the surface preparation, and application of the coating systems.

F. Under no circumstances shall inspection by the Owner relieve the Contractor of the responsibility of compliance with all the requirements of these specifications. In cases of dispute concerning surface profiles, film thickness, film continuity (holidays), etc., the Owner's measurements and tests shall be final, and the Contractor shall abide by the Owner's decisions and directives. Deficiencies in the continuity of the coating, or painting film or in the dry film thickness' shall be corrected by applying additional coats as required, at the sole expense of the Contractor.

G. All holiday detection of coatings shall be accomplished in the presence of the Owner.

H. The Contractor shall completely inspect each application of coating to determine thickness and integrity. Each coating application will be checked and deficiencies marked. After observing specified recoat time apply additional coating materials over areas not having the specified minimum dry film thickness and areas having any holidays or pinholes. After correction of deficiencies, the Contractor will re inspect those areas to determine the acceptability of the additional coating. Each coating application must be 100% to the satisfaction of the Owner prior to proceeding with successive coating applications.

I. The dry film thickness shall be measured with an approved magnetic type non-destructive dry film thickness gauge to ensure that the specified dry film thickness has been obtained. The specified dry film thicknesses are as measured from above the peaks of the surface profile. As many dry film thickness measurements as described in SSPC – PA2 shall be made to ensure compliance with these specifications using a Type II Constant Pressure Probe Dry Film Thickness Gauge.

J. The Contractor shall furnish and have on the job site, until final acceptance of the coating or painting system, calibrated inspection devices in good working condition for detection of holidays and measurement of dry film thickness. Inspection devices shall be calibrated and operated in accordance with the manufacturer's instructions. The Contractor shall also furnish U.S. Department of Commerce; National Bureau of Standards certified thickness calibrated plates to test the accuracy of dry film thickness gauges and certified instrumentation to test the accuracy of holiday detectors. Dry film thickness gauges and holiday detectors shall be available at all times until final acceptance of the application.

K. Owner is not precluded from furnishing their own inspection devices and rendering decisions based solely upon their test results.

L. The coating integrity of the interior surfaces shall be tested by the Contractor. All pinholes shall be marked, repaired in accordance with the manufacturer's printed recommendations, or as directed by the Owner, and retested. No holidays or other irregularities shall be permitted in the completed coating system. During the testing, the detecting blade shall be kept in continuous contact with the coated surface. Holiday detection shall not proceed until the completed coating system has been cured in accordance with the manufacturer's recommendations.

M. Dew point shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychrometric Tables, a digital sling psychrometer thermo hygrometer, or equivalent. Temperature and dew point requirements specified herein shall apply to all surface preparation and coating operations. These measurements shall be included with the Contractor’s daily inspection reports.

N. Anchor profile for prepared surfaces shall be measured by using a non-destructive instrument such as a Testex Press O Film System with the results included with the daily inspection reports.

O. The Contractor, using a solvent wipe test shall verify completion of the final cure of the interior lining. The solvent wipe test shall consist of rubbing a solvent saturated rag on the area to be tested per ASTM D5402, using solvent recommended by manufacture. If any coating material is removed or the surface being tested becomes tacky, the coating shall be considered as not fully cured and dehumidification, if required, shall be continued until the coating is fully cured.

P. The Project is subject to intermittent suspension of the work if, in the opinion of the Owner, the cleaning, coating operations of the Contractor are creating a localized condition detrimental to ongoing facility operation, personnel or adjacent

property. In the event of an intermittent or emergency suspension of the work by the Owner, the Contractor shall immediately correct deficiencies.

Q. The daily inspection reports by the Contractor shall be prepared and signed daily and submitted to the Owner on a weekly basis.

2.10 FINAL CLEANUP

A. Upon completion of the work as specified herein, all areas shall be left in a neat and presentable condition. Baffles and all other attachments shall be installed in their original locations. Tube settling bocks shall be reinstalled. Areas shall be free of rubbish, construction debris and waste, surplus construction materials, scaffolding, tools, equipment, and coating, and thinner containers, and excess coating, and thinners, and other objectionable materials. All such removed materials shall be disposed of by the Contractor away from the site of work and in conformance with all applicable codes, ordinances and regulations. Coating spots upon adjacent surfaces shall be removed and the entire job site cleaned. All damage to surfaces resulting from the work of this section shall be cleaned, repaired or refinished to the complete satisfaction of the Owner.

END OF SECTION

PAINT SYSTEM DATA SHEET
(one for each coating system)

Complete and attach manufacturer's Technical Data Sheet to this PSDS for <u>each</u> coating system.

Paint System Number (from Spec.):		
Paint System Title (from Spec.):		
Coating Supplier:		
Representative:		
Surface Preparation:		
Paint Material (Generic)	**Product Name/Number (Proprietary)**	**Min. Coats, Coverage**

Provide manufacturer's recommendations for the following parameters at temperature (F)/ relative humidity:

	Temperature (F)					
	35	**45**	**55**	**65**	**75**	**85**
Induction Time						
Pot Life						
Shelf Life						
Drying Time						
Curing Time						
Min. Recoat Time						
Max. Recoat Time						

Provide manufacturer's recommendations for the following:

Mixing Ratio: _____
Maximum Permissible Thinning: _____
Thinning Material for this coating: _____
Ambient Temperature Limitations: min.:_____ max.: _____
Surface Temperature Limitations: min.:_____ max.: _____
Surface Profile Requirements: min.:_____ max.: _____
Material Temperature Limitations: min.:_____ max.: _____
Humidity Limitations: min.:_____ max.: _____
Application Instructions: _____
_____
Equipment Recommendations: _____

Attach additional sheets detailing manufacturer's recommended storage requirements and holiday testing procedures.

SECTION 09972

HOT DIP ZINC COATING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Application of zinc coating to steel using the hot dip method.

1.02 REFERENCED SECTIONS

A. The following Section is referenced in this Section

1. Section 01300 – Submittals

1.03 SUBMITTALS

A. Comply with Section 01300.

B. Manufacturer's product data showing conformance to the specified product.

C. Narrative description of method for application of zinc coating.

D. Coating applicator's Certificate of Compliance that the hot-dip galvanized coating meets or exceeds the specified requirements of ASTM A123 or A153, as applicable.

E. Source quality control procedures.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Zinc Coating Material: In accordance with ASTM A153.

B. Zinc Dust-Zinc Oxide Coating: Conform to MILSPEC DOD-P-21035. Manufactured by Z.R.C. Chemical Products Co., Galvicon Co., or equal.

2.02 FABRICATION REQUIREMENTS

A. Fabrication practices for products to be galvanized: In accordance with applicable portions of ASTM A143, A384 and A385.

PART 3 - EXECUTION

3.01 APPLICATION

A. Galvanize steel members, fabrications and assemblies after fabrication and in accordance with ASTM A123.

B. Unless otherwise specified, steel items weighing 100 pounds or less shall be hot-dip zinc coated.

C. Galvanized Bolts and Nuts:

1. Bolts and nuts 5/8-inch in diameter and larger: Hot-dip zinc coated in accordance with ASTM A153.

2. Bolts and nuts smaller than 5/8-inch and all other bolts, screws, nuts, washers and other minor steel fasteners: Mechanically zinc coated.

3.02 COATING REQUIREMENTS

A. Coating Thickness: Coating Grade 35 in accordance with ASTM A123, Table 2.

3.03 REPAIR OF DEFECTIVE GALVANIZED COATING

A. Damaged Zinc Coating:

1. Clean substrate surface, then repaired with zinc dust-zinc oxide coating in accordance with ASTM A780. Apply in accordance with instructions published by the manufacturer of the zinc dust-zinc oxide coating.

2. Coating Thickness: Apply multiple coats to achieve a dry film thickness of 8 mils.

B. Items not physically damaged, but which have insufficient or deteriorating zinc coatings, and items damaged in shipment or prior to installation, shall be removed from the project site for repair by the hot-dip zinc coating method.

END OF SECTION

SECTION 11226

TUBE SETTLERS AND PROTECTIVE GRID

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Furnish and install 2-foot-deep tube settler modules in Accelator No.2.

1.02 REFERENCED SECTIONS

A. The following Section is referenced in this Section:

1. Section 01300 – Submittals

1.03 REFERENCE

A. National Sanitation Foundation International (NSF):

1. NSF 61 Drinking Water System Components – Health Effects

B. ASTM – American Society for Testing and Materials.

1. ASTM D635 – Test Method – Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
2. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.
3. ASTM D648 – Test Method – Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position
4. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
5. ASTM D792 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
6. ASTM D882 – Standard Test Methods for Tensile Properties of Thin Plastic Sheeting
7. ASTM D1784 – Rigid Polyvinyl (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
8. ASTM D5420 – Standard Test Methods for Impact Resistance of Flat Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact)

1.04 SYSTEM DESCRIPTION

A. Definitions:

1. Tube Settler Modules – Tube settlers are comprised of unidirectional, multiple-tubular channels sloped at an angle of 60° above horizontal, which

enhance settling characteristics and accumulation of solids within a settling basin. Tube settler modules shall be 2-foot width, 2-foot deep and 8-foot long.

B. System Tolerances:

1. Top of adjacent tube modules shall be installed level, plus or minus 1/2-inch in both the short and the long dimension of installation.

2. A maximum 1/4-inch space is allowed between installed modules.

C. Performance Requirements:

1. Each tube shall have a cross sectional perimeter of approximately 10 inches to give a low Reynolds number and of an approximate shape that allows rapid accumulation, concentration, and discharge of solids.

1.05 SUBMITTALS

A. Shop Drawings and Product Data: Furnish Shop Drawings and Product Data for review of the tube settlers modules to be installed in accordance with Section 01300. Include sufficient data to show that the product conforms to Specification requirements.

B. Samples: Submit a tube settler module with 4-foot-long tubes that is at least 48 inches long by 24 inches wide proposed for use on the project.

C. Manuals: Furnish manufacturer's installation, operation and maintenance manuals (including cleaning procedures) and bulletins.

D. Affidavits: Submit affidavits from the manufacturer stating that the tube settler modules have been properly installed and tested and are ready for full-time operation.

E. Certificates: Provide manufacturer’s certification that tube settler modules are tested and certified by NSF, Underwriters Laboratory (UL), or an equally qualified test agency, as complying with NSF Standard 61.

1.06 QUALITY CONTROL

A. Qualifications of Manufacturer: The tube settler module manufacturer shall have minimum 5 years’ experience in manufacturer and supply of tube settlers.

B. Installation Requirements:

1. Install tube settler system in accordance with manufacturer’s instructions.

2. Tube settler system manufacturer shall provide services of a qualified representative onsite to provide instructions on installation and cutting.

C. Source Quality Control:

1. Individual modules shall bear the seal as being NSF or UL Certified.

1.07 DELIVERY, STORAGE & HANDLING

A. Delivery: Tube settler modules shall be securely packed to prevent damage during shipping. Modules shall be delivered on pallets. Do not stack tube settler pallets.

B. Storage:

1. All material and equipment shall be shipped, stored, handled, and installed in such a manner as to not degrade quality or serviceability.

2. The tube settling modules, when removed from the pallets, shall not be stacked more than eight feet high.

3. All modules shall be stacked such that the PVC sheet planes are in a vertical position.

4. A light-colored covering shall be provided for all modules required to be stored in the open for more than 60 days. Clear covers are prohibited. Black is not allowed.

5. Covers shall not be wrapped tightly around the settlers. There should be at least a 6-inch air gap between the cover and top of the tube settler modules. The ends of the cover shall be securely anchored on all sides with at least 12-inch air gap at the bottom. These covers shall provide shading while allowing air to pass through to prevent heat from building up.

6. Modules and covers, when applicable, shall be inspected at least once per week. Make any minor repairs to covers or restack any modules that could have fallen.

7. Each tube settler shall be inspected by the Engineer that is delivered to the project site as it is removed from the delivery truck. Damaged tube settler modules shall be removed from site and replaced at no additional cost to the Owner.

1.08 HANDLING:

1. Tube settler modules shall remain on shipping pallets until ready to install.

2. Any abusive handling of the modules shall not be permitted. Workmen shall be careful in placing the tube settler modules and avoid any damage to the corners and tube edges.

3. Personnel shall not stand or walk directly on top of the modules, except as described in Paragraph 2.02.A.5.

PART 2 - PRODUCTS

2.01 MANUFACTURES

A. Model IFR-6041 by Brentwood Industries, Inc., Reading, Pennsylvania; equivalent model by EnviroPax, Inc., Salt Lake City, Utah; or equal.

2.02 MATERIALS

A. Tube Settler Modules:

1. The material of construction shall be flame resistant, self-extinguishing, rigid PVC.

2. Material shall be inert and resistant to naturally occurring constituents in water and to the normal dose of water treatment chemicals required in the treatment process.

3. Tube settler modules shall be tested and certified by NSF or UL as complying with NSF Standard 61. Certification must be included with submittal package and indelibly marked on the tube settler modules.

4. The tube settler modules shall be rigid PVC conforming to commercial standard with the following properties.

Property	Test Method	Unit	Typical Value
Specific Gravity	D792	gm/cc	1.45 max.
Tensile Strength	D638/D882	psi	6,000 min.
Flexural Modulus	D790	psi	390,000 min.
Flexural Strength	D790	psi	11,000 min.
Impact Resistance	D5420	in.lbs./mil	0.8 min.
Heat Deflection	D648	°F (264 psi)	155 min.
Flammability	D635	--	Self-extinguishing less than 5 sec.

5. The modules shall be self-supporting and of structural integrity adequate to support foot traffic. Such foot traffic may occur only on the surface of a 4’ x 4’ x 3/8” thick plywood sheet placed on top of the modules to prevent damage to the tube edges.

6. Structural integrity of the modules shall be maintained under a loading of 15 pounds per square foot (psf) which includes the module dead weight plus a uniformly distributed residual solids load of 10 psf while bearing a movable live load of 250 pounds concentrated over a one square foot area.

7. The material thickness of the tube settler modules is classified as follows for each of the acceptable manufacturers previously listed (approved equals must provide materials equivalent to one of the listed manufacturer’s product):

Acceptable Manufacturer	“Standard” Wave/Flat Surface Thickness (mils)	“Standard” Corrugated Surface Thickness (mils)	“Heavy” Wave/Flat Surface Thickness (mils)	“Heavy” Corrugated Surface Thickness (mils)
Brentwood	22	30	30	35
EnviroPax	25	20	30	25

8. Tube modules shall be 2-foot width and nominal 8-foot length.

2.03 FABRICATION

A. Tube Modules:

1. All PVC sheets shall be thermoformed and have a continuous, dedicated glue guide to allow precise alignment of sheets during assembly and installation. Both thermoformed and non-thermoformed sheets, which do not provide dedicated guides for precise tube alignment, are not acceptable.

2. Fabricated modules shall be comprised of tube-like channels sloped at an angle of 60° above horizontal placed in same direction to prevent mixing points and unstable flow patterns. Modules that include tubes in alternating directions are not acceptable.

3. Join PVC sheets and channels by solvent bonding to provide a rigid structure, resistant to separation of sheets.

4. Solvent cements used to join PVC sheets shall meet NSF 61 criteria after applicable cure time.

2.04 SPARE PARTS

A. Spare tube settler modules – Furnish six spare 2-foot width, 8-foot length tube settler modules to the Owner.

PART 3 - EXECUTION

3.01 PREPARATION

A. Field measurements:

1. Field verify all dimensions affecting installation.

2. Lay out all work prior to installation.

B. Protection:

1. Protect adjacent surfaces, piping and other items.

2. Protect tube settler material as outlined in Paragraph 1.07.B.

3.02 INSTALLATION

A. Install the equipment only after shop drawings or other data as specified herein have been approved.

B. Install tube settler modules in accordance with manufacturer's recommendations.

C. Remove and replace any modules damaged prior to or during installation as directed by the Engineer at no additional cost to the Owner.

D. Workers shall not walk on tube settler modules without 3/4- to 1-inch plywood protection.

3.03 FIELD SERVICES

A. Tube settler manufacturer shall provide the services of a qualified field installation supervisor. Installation supervision shall be provided for at least four working days, (eight working hours per day). This time period shall be for two trips with two working days per trip.

3.04 WARRANTY

A. Provide a special guarantee for the tube settler system to be free from defects in material for a period of 3-years from date of Final Completion.

END OF SECTION

SECTION 15115

ECCENTRIC PLUG VALVES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Non-lubricated eccentric plug valves.

1.02 UNIT RESPONSIBILITY

A. Plug valve manufacturer has unit responsibility for valve and actuator compatibility.

B. Responsibility of the manufacturer extends to the proper selection, assembly, factory testing, and furnishing of the specified products.

1.03 SUBMITTALS

A. Comply with Section 01300.

B. Product Data: Submit Manufacturer's standard product data.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: One of the following or equal from an American company:

1. This specification covers DeZurik, Model PEF.

2. Clow Valve Company, Model F-5412 (flanged) or F-5413 (mechanical joint).

2.02 ECCENTRIC PLUG VALVES

A. Valve Design

1. Port Design

a. Rectangular shaped.

1) Port Area: At least 100 percent of the full pipe cross-sectional area.

2. Plug Design:

a. Geometry: Eccentrically shaped with a cylindrical seating surface that is offset from the center of the plug shaft.

b. Facing:

1) Encapsulate entire plug with resilient material.

2) Bond between Resilient Facing and Metal Plug: Capable of withstanding 75-pound pull in accordance with ASTM D429, Method B.

3. Valve Seats: Welded-in overlay of not less than 90 percent pure nickel to form a raised area at least 1/8-inch thick for contact with the plug facing. Machine seat after welding to provide a smooth surface.

4. Shaft Bearing and Bottom Bearing:

   a. Provide replaceable bearings in the upper and lower shaft trunnions.

   b. Design: Sleeve-type, permanently lubricated.

5. Shaft Seal: Chevron type packing seal, held in place with an adjustable gland follower. Valves using O-ring type shaft seals are not acceptable.

B. Valve Body Pressure Ratings

1. Valves 12 inches in nominal size and smaller: 175 psi.

   a. End Connections – Flanged conforming to ANSI B16.1, Class 125.

2.03 MATERIALS

A. Materials of Construction

1. Body: Cast iron, ASTM A126, Class B.

2. Plug: Cast iron, ASTM A126, Class B, or cast iron ASTM A436 (Ni-resist), or ductile iron, ASTM A536.

3. Plug Facing: Neoprene or Buna-N.

4. Body Seats:

   a. Valves less than 3 inches in nominal size: Cast iron, ASTM A126, Class B.

   b. Valves 3 inches in nominal size and larger: Stainless steel, ASTM A276, Type 304 or nickel.

5. Stem Packing: Buna-N or PTFE.

6. Plug Bearings: Type 316 stainless steel.

7. Bolts, Studs, Nuts and Washers: Zinc plated in exposed installations, Type 316 stainless steel in buried installations.

B. Shop Applied Interior and Exterior Coatings

1. Interior Surfaces: Apply two coats Ameron Amerlock 400, Kop Coat Carboline 890LT, or equal. Apply each coat to 4 to 5 mils thick.

2. Exterior Surfaces: Apply polyurethane coating system consisting of one coat primer, one intermediate coat of polyamide epoxy, and one final coat of polyurethane.

   a. Primer and Intermediate Coats: Ameron Amerlock 400, Kop Coat Carboline 890LT, or equal. Apply each coat to 4 to 5 mils thick.

b. Finish Coat: Ameron Amercoat 450HS, Kop Coat Carboline 134HS, Tnemec Series 74 Semi-Gloss Endura-Shield, or equal. Apply 1.5 to 2 mills thick.

2.04 VALVE ACTUATORS

A. Buried Service Valves: Provide valve with standard 2-inch AWWA wrench nut and valve box with lid to accommodate operating stem extension.

B. Provide adjustable stop on manual actuators.

C. Size valve actuator components for the valve design pressure in accordance with AWWA C504. Size manual operators such that the torque that must be applied to the actuator to open the valve does not exceed 80 ft-lbs.

D. Direction of Rotation: Counterclockwise for opening.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Clean interior of valve and valve end joints before installation.

B. Use slings or chains placed around the valve body to lift valve or to lower valve into position. Do not place slings or chains through the port opening or use the mounted actuator for lifting.

C. Valve Seat Positions

1. Clean Water Installations: Install valve with the seat on the downstream side of the plug so that in the closed position the higher upstream pressure in the pipeline applies a seating head on the valve plug against the seat. Install valve with the plug stem in the horizontal position with the plug rotating upwards upon opening.

2. Wastewater Installations and Installations with Entrained Suspended Solids:

a. Vertical Pipe Runs: Install valve with the seat on the top of the valve to prevent solids from packing into body cavity when shut.

b. Horizontal Pipe Runs: Install valve with the seat on the upstream side of the valve to prevent solids from packing in body cavity when shut. Install valve with the plug stem in the horizontal position with the plug rotating upwards upon opening.

END OF SECTION

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