WHERE INNOVATION MEETS ELEVATION

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ADDENDUM NO. 1
TO THE CONTRACT DOCUMENTS FOR
ALDER CREEK WATER TREATMENT PLANT UPGRADES PROJECT

CITY OF SANDY

This addendum, issued on the **11th day of December 2025,** affects the request for proposal documents for the **Alder Creek Water Treatment Plant Upgrades Project** and shall be deemed an integral part of the above referenced documents.

All bidders shall acknowledge receipt of this addendum under Article 5 of Section C-410, Bid Form.

All changes, corrections, deletions and/or additions to the initial bidding documents enumerated herein shall be included in the Bidder's Proposal. In case of any conflict between the drawings, specifications, and this Addendum, this Addendum shall govern.

ITEM A – BIDDER QUESTIONS AND CLARIFICATIONS

Refer to attached Clarification Log (Attachment #1)

ITEM B – REVISED SECTIONS

Refer to attached Section 09 97 13 – Steel Water Storage Tank Painting (Attachment #2)

Refer to attached Section 40 05 31 - PVC Process and Yard Piping (Attachment #3)

		Question/Comment from Bidder (if applicable)	Response or Clarification Issued
ID	Reference [Section] | [Part] or [Drawing #]	Question/Comment	Response/Clarification/Modification
A1.1	C-410 | 2.01 & C-451	Is the attached Section C-451 - Qualifications Statement due with Bid?	Section C-451 is an optional attachment to the bid and will not affect the outcome of the selection.
A1.2	46 33 44 | 2.8	If we submit per bid documents, can Watson Marlow be named here?	Product substitution for the peristaltic metering pumps may be evaluated after issuance of the notice to proceed. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.
A1.3	-	Can we get a copy of the CAD Files for the above-mentioned project?	Bidders may request civil CAD files from the Engineer via email at jking@Kellerassociates.com. Interested bidders will be required to sign a release form prior to distribution of any CAD files.
A1.4	43 23 31	[Paraprashed for clarity purposes] Would American Marsh (2731841) be an approved equal for the vertical centrifugal pumps? Furthermore, would a different material, bronze C932 be accepted material for case wearing? I assume 20 ft. of overall length since I could not find the dimensions in the drawing.	Product substitution for the vertical centrifugal pumps may be evaluated after issuance of the notice to proceed. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.
A1.5	46 33 44 | 2.8	[Paraprashed for clarity purposes] Would Albin (CM120325) be an approved equal for the Peristaltic Metering Pumps?	Product substitution for the peristaltic metering pumps may be evaluated after issuance of the notice to proceed. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

		Question/Comment from Bidder (if applicable)	Response or Clarification Issued
ID	Reference [Section] | [Part] or [Drawing #]	Question/Comment	Response/Clarification/Modification
A1.6	09 97 13	In reviewing the specs and products listed for Sherwin Williams for System #1 exterior of the water tank OCS #5. Primer Kem Bond HS and Urethane Alkyd Enamel are both single component options which would be considered entry level options. AWWA OCS #5 specifies a SSPC SP6 commercial blast. With going to this level of surface prep an epoxy primer provides much better long term protection. Macropoxy 646 would be a great option. Urethane Alkyd Enamel is a single component coating, a 2 component Polyurethane would provide much better long-term solution. For System #2 (ICS #2) unfortunately Macropoxy 646 PW does not meet the new NSF 61-600 standard. In 2023 Sherwin Williams introduced Sher-Plate 600 SherPlate 600_TRM.120.indd to meet the new standard.	Replace the entire specification in its entirety with the **Attached** revision.
A1.7	E-601-A, E-601-B, E-602-B, E-601-D, E-601-T	Do you have a line showing the vfd's ?	Please refer to E-601-A, E-601-B, E-602-B, E-601-D, E-601-T for one-line diagrams related to the project. Please refer to Section 26 35 26 Active Harmonic Filters Part 2.1 for approved manufacturers.
A1.8	40 05 31 | 2.2.E.	Please direct me where to find or supply a spec for system 14 the polyethylene piping?	Replace Section 2.2.E with the following: E. Polyethylene Pipe Materials for 3-inch and Smaller Pipe 1.Polyethylene pipe shall be made from a HDPE material having a minimum material designation code of PE 4710 or higher. The material shall meet the requirements of ASTM D3350 and shall have a minimum cell classification of 445574 CC3. 2.Pipe and fittings shall meet the requirements of ANSI/AWWA C901. 3.HDPE pipe shall be iron pipe size, SDR 21 (200 psi). 4.Fittings shall be pack joint-type for polyethylene pipe or tubing with iron pipe threads. 5.Fittings shall be all brass or copper with Type 304 stainless steel inserts for water pipe. Provide Ford fittings or equal.

		Question/Comment from Bidder (if applicable)	Response or Clarification Issued
ID	Reference [Section] | [Part] or [Drawing #]	Question/Comment	Response/Clarification/Modification
A1.9	M-101-B, M-501-B, M-502-B	I found the feed rates and pressures (specs) for three of the six chemicals, but I could not find application information for the Sodium Hydroxide, Sodium Bisulfite, or Citric Acid pumps. Is this information located in another spec section? It also appears in some of the drawings that there should be diaphragm metering pumps, but there is only a section for the peristaltic metering pumps. Will there be diaphragm pumps and will this information be released in addendum?	The chemical skids listed for Sodium Hydroxide, Sodium Bisulfite, and Citric Acid have been pre-purchased by the Owner. Please refer to Sheet M-101-B, keynotes 01, 02, and 03 for reference, in addition to sheets M-501-B and M-502-B. These pre-purchased chemical skids are the diaphragm metering pumps.

SECTION 09 97 13 – STEEL WATER STORAGE TANK PAINTING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials and equipment as required to furnish and apply all paint and coatings as specified herein.

1.2 DEFINITIONS

A. The term paint, coatings, or finishes as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.

B. Dry Film Thickness (DFT): The minimum dry film thickness, without any negative tolerance.

C. Volatile Organic Compound (VOC): Content of air polluting hydrocarbons in uncured coating product measured in units of grams per liter or pounds per gallon, as determined by EPA Method 24.

D. Where SSPC surface preparation standards are specified or implied for ductile iron pipe or fittings, the equivalent NAPF surface preparation standard shall be substituted for the SSPC standard.

1.3 REFERENCE STANDARDS

A. Codes and Standards: In addition to the requirements of these Specifications, the work to be performed under this section is to comply with the following codes and regulations:

1. Steel Structure Painting Council Specifications (SSPC):

   a. SSPC-PA 2 Procedure for Determining Conformance ot Dry Coating Thickness Requirements

   b. SSPC-PA 11 Protecting Corners, Edges, Crevices, and Irregular Steel Geometries by Stripe Coating

Add. 1

   c. SSPC SP-1 Solvent Cleaning.

   d. SSPC SP-2 Hand Tool Cleaning.

   e. SSPC SP-3 Power Tool Cleaning.

   f. SSPC SP-5 White Metal Blast Cleaning.

   g. SSPC SP-6 Commercial Blast Cleaning.

   h. SSPC SP-7 Brush-Off Blast Cleaning.

i. SSPC SP-10 Near-White Blast Cleaning.

j. SSPC SP-11 Power Tool Cleaning to Bare Metal.

k. SSPC-SP-12 High- and Ultrahigh-pressure Water Jetting.

2. Underwriters' Laboratory (UL):

a. UL 3P83 Drinking Water System Components - Health Effects.

Add. 1

3. National Association of Corrosion Engineers Standards (NACE):

a. SP0188 Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates

4. Applicable Standards of American National Standards Institute, Inc. (ANSI)

5. National Association of Pipe Fabricators (NAPF):

a. NAPF 500-03 Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.

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6. NSF International (NSF):

a. NSF/ANSI/CAN Standard 61 Drinking Water System Components.

7. NSF/ANSI/CAN Standard 600 Health Effects Evaluation and Criteria for Chemicals in Drinking Water American Society for Testing and Materials (ASTM):

a. ASTM D 4262-83 Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces.

b. ASTM D 4263-83 Test Method for indicating Moisture in Concrete by the Plastic Sheet Method.

c. ASTM D4285-83 Test Method for indicating Oil or Water in Compressed Air.

d. ASTM D4541-93 Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.

8. AWWA D102 Coating Steel Water-Storage Tanks

1.4 QUALITY ASSURANCE

A. Painter's Qualifications: The Work specified under this section shall be performed by or under the supervision of a qualified painter. The Contractor shall be required to document the painter's experience, competence, and ability to comply with the requirements of these Specifications and to complete the Work in a timely manner. The Painter or Applicator shall have the following qualifications:

1. Minimum of 5 years of experience applying specified type or types of coatings under conditions similar to those of the Work. Provide qualifications of applicator and references listing five similar projects completed in the past two years.

2. Manufacturer approved applicator when manufacturer has approved applicator program.

3. Contractor to provide and pay for services of a NACE inspector for the project.

B. Standard Products: All paints in a paint system are to be the products of a single manufacturer. The standard product of manufacturers other than those specified will be accepted when it is demonstrated they are equal to the product specified. All paint and coating products available in selectable colors shall be supplied in the color "Carlsbad Canyon," as required by the BLM paint palette.

1.5 SUBMITTALS

A. Before any paint materials are ordered, submit a complete list of all materials proposed to be furnished and applied under this Section. Any coating or paint materials ordered by Contractor prior to receiving submittal response from Engineer indicating that the submitted material is accepted shall be at the risk of the Contractor.

B. For each paint, furnish the paint manufacturer's specific application instructions and surface preparation requirements and the following information:

1. Paint manufacturer’s data sheet for each product proposed, including statements on the suitability of the materials for the intended use.

2. Type of primer, if required.

3. Maximum dry and wet mil thickness per coat.

4. Minimum and maximum curing time between coats, including atmospheric conditions for each.

5. Curing time before submergence in water.

6. Thinner to be used with each paint.

7. General ventilation requirements.

8. Atmospheric conditions during which the paint is <u>not</u> to be applied

9. Maximum, allowable moisture content.

10. Compatibility of shop and field applied coatings (where applicable).

C. Submit a quality control plan that outlines the sequence of activities, quality control instruments, third party quality control NACE inspections, monitoring program, and other measures to document compliance with applicable standards and specifications.

D. Reports: Submit the following reports to the Engineer:

1. Reports on visits to project site to observe and approve coating application procedures.

2. Reports on visits to coating plants to observe and approve surface preparation and coating application on items that are "shop coated."

1.6 DELIVERY AND STORAGE

A. Deliver, store, and handle products in accordance with manufacturer's requirements. All materials are to be delivered to the job site in their original, unopened containers bearing the manufacturer's name, brand, batch number, date of manufacture, and any special directions.

B. Only the approved material shall be stored at the job site and stored only in designated areas restricted to the storage of paint materials and related equipment. All paint is to be stored in enclosed structures and protected from weather and excessive heat or cold. Store coatings in well-ventilated facility that provides protection from the sun weather, and fire hazards. Maintain ambient storage temperature between 45- and 90-degrees Fahrenheit, unless otherwise recommended by the manufacturer.

PART 2 - PRODUCTS

2.1 PAINT AND COATING SYSTEM APPLICATIONS

A. Prepare surfaces and apply paint and coating systems in accordance with the following Schedule for all surfaces.

PAINT AND COATING APPPLICATION SCHEDULE

Surface to be Painted or Coated	Surface Preparation	Paint System
Reservoir Exterior (Entire Exterior and appurtenances)	SSPC – SP-6	System 1
Reservoir Interior (Entire Interior)	SSPC – SP-10 2.0 – 3.0 mil profile	System 2

2.2 PAINT AND COATING SYSTEMS

A. Furnish primers and finish coatings as shown on the coating table schedule below. All coatings shall be certified for contact with potable water and shall be NSF 61 certified by the manufacturer.

B. Interior painting system shall be a three coat, two component epoxy system in accordance with AWWA D102 Coating Steel Water-Storage Tanks System Designation ICS-2-. The interior finish coat color shall be white.

C. Exterior painting system shall be a three coat epoxy and polyurethane painting system in accordance with AWWA D102 Coating Steel Water-Storage Tanks System Designation OCS-5.

D. Where dry film thickness of the coating is not shown in the table below, the dry film thickness shall be as recommended by the manufacturer.

E. Paint and Coating Systems, or Equal:

System	Tnemec		Sherwin Williams
1	As specified: OCS 5 – 2 coats of Epoxoline Series 21 at 3.0 – 5.0 mils Finish: EnduraShield Series 73 at 3.0 – 5.0 mils Recommend alternate OCS -6 Primer: Hydro-Zinc Series 91H20 at 2.5 – 3.5 mils DFT Intermediate: Epoxoline Series 21 at 3.0-5.0 mils DFT Finish: EnduraShield Series 73 at 3.0 – 5.0 mils		Primer-Macropoxy 646 FC @ 2 mils DFT Intermediate Coat-Macropoxy 646 FC @ 2 mils DFT Acrolon 7700 @ 2 mils DFT
2	As specified ICS-2 Primer: Epoxoline Series 21 at 3.0-5.0 mils DFT Stripe Coat: PotaPox Plus N140 Intermediate: Epoxoline Series 21 at 4.0-6.0 mils DFT Finish: Epoxoline Series 21 at 4.0-6.0 mils DFT Recommend alternate ICS 5		Primer- SherPlate 600 @ 3 mils DFT Strip coat-Sherplate 600 (brush & rolled) 2 Coats- Sherplate 600 @ 4-5 mils DFT/coat. Total DFT 11-13 mils DFT

Add. 1

Primer: Hydro-Zinc Series 91H20 at 2.5 – 3.5 mils DFT

Stripe Coat: PotaPox Plus N140

Intermediate: Epoxoline Series 21 at 4.0-6.0 mils DFT

Finish: Epoxoline Series 21 at 4.0-6.0 mils DFT

Add. 1

F. Non Slip Coating – For exterior coating texture finish – add glass bead or shark grip to the finish coat and backroll.

Add. 1

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Comply with surface preparation requirements of the Steel Structures Painting Council (SSPC), the paint manufacture's instruction. If the paint or coating manufacturer recommends a surface preparation different than that shown, follow the more stringent surface preparation requirement.

1. ASTM D4259 – Wet Abrasive Blasting, Vacuum Assisted Dry Abrasive Blasting or Centrifugal Shot Abrasive Blasting

2. Shot Blasting –Blast with dustless steel shot and grit combination per equipment manufacturer recommendations to remove laitance, residue, and loose material, and to roughen the surface to achieve a 2.0-3.0 mil angular profile (equivalent to a texture of No. 40 to 60 grit sandpaper). After blasting fill defects and holes with filler recommended by the coating manufacturer.

3. Surface preparation requirements of the Steel Structures Painting Council (SSPC) are as follows:

a. SSPC – SP-1 Solvent Cleaning

b. SSPC – SP-2 Hand Tool Cleaning

c. SSPC – SP-3 Power Tool Cleaning

d. SSPC – SP-5 White Metal Blast Cleaning

e. SSPC – SP-6 Commercial Blast Cleaning

f. SSPC – SP-13 Mechanical or Chemical Cleaning

3.2 APPLICATION

A. Workmanship: All work shall be done in a workmanlike manner so that the finished surface will be free from runs, drips, ridges, waves, laps and unnecessary brush marks. All coats shall be applied in such a manner as to produce an even film of uniform thickness, completely coating all corners and crevices.

B. The Contractor's coating and painting equipment shall be designed for application of materials specified and shall be maintained in a first-class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air. Spray equipment shall be equipped with mechanical agitators, pressure gauges, and pressure regulators. Spray nozzles shall be of the proper sizes.

C. Each coat of paint shall be applied evenly and sharply cut to line. Care shall be exercised to avoid over spraying or spattering paint on surfaces not to be coated. Glass, hardware, floors, roofs and other adjacent areas and installation shall be protected by taping, drop cloths or other suitable measures.

D. Paint Properties, Mixing and Thinning: All paint, when applied, shall provide a satisfactory film and smooth, even surface. Glossy undercoats shall be lightly sanded to provide a surface suitable for the proper application, adhesion, and subsequent coats. Paints shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings consisting of two (2) or more components shall be mixed in accordance with manufacturer's instructions. Where necessary to suit conditions of the surface, temperature, weather, and method of application, and with the Engineer's approval, the paint may be thinned immediately prior to use by the addition of not more than one pint per gallon of the proper thinner; provided that in no case shall the paint be reduced more than necessary to obtain the proper application characteristics. Where specifically permitted by the Specifications, certain paints may be thinned more than the maximum indicated above. Paint thinner shall be as recommended by the paint manufacturer.

E. Atmospheric Conditions: Except as specified or required for certain water-thinned paints, paints shall be applied only to surfaces that are thoroughly dry and only under such combination of humidity and temperatures of the atmosphere and surfaces to be painted as will cause evaporation rather than condensation. In no case shall any paint be applied during rainy, misty weather, or to surfaces upon which there is frost or moisture condensation without suitable protection, as accepted by the Engineer. Where painting is permitted during damp weather or when the temperature is at or below 40 degrees F, the surfaces shall be heated to prevent moisture condensation thereof. Bar metal surfaces, except those which may be warped by heat, may be dehydrated by flame-heating devices immediately prior to paint application. While any painting is being done and for a period of at least eight (8) hours after the paint has been applied, the temperature of the surfaces to be painted, the painted surfaces and the atmosphere in contact therewith shall be maintained at or above 40 degrees F and 5 degrees above the dew point. All paint, when applied, shall be approximately the same temperature as that of the surface on which it is applied. The use of fans or heaters shall be required in enclosed areas where conditions causing condensation are severe.

F. Method of Paint Application: Where two (2) or more coats are required, alternate coats shall contain sufficient compatible color additive to act as indicator of coverage, or the alternate coats shall be of contrasting colors.

G. Unless otherwise specified, do not apply finish coats until all other work in the area is done and until the prime and intermediate coats have been inspected by the Engineer.

H. Film Thickness and Continuity: All paint and coating thickness stated in this specification are dry film thickness. The first coat on metal surfaces refers to the first full paint coat and not to conditioning or other pretreatment applications. All coatings shall be applied to the thickness in accordance with these Specifications. The minimum thickness at any point shall not deviate more than 25 percent from the required average. Except as specified, no less than two (2) coats shall be applied.

I. In testing for continuity about welds, projections such as bolts, nuts, and crevices, the Engineer will determine the minimum conductivity for smooth areas of like coating where the dry mil thickness has been found adequate. This conductivity shall then be taken as the minimum required for these rough irregular areas. All pinholes and holidays shall be repainted to the required coat coverage. All ferrous metal surfaces shall meet minimum continuity requirements.

J. It is intended that the dry film thickness and the continuity of painted ferrous metal surfaces be subject to continual field check by the Contractor's NACE quality control subcontractor. Dry-film thickness will be measured by an Elcometer or Mikrotest magnetic type dry-film thickness gauge. Continuity will be tested by a low voltage wet sponge transistorized device, as manufactured by Tinker-Rasor (Model M-1), or equal. The Contractor's quality control subcontractor shall use inspection devices that are in good working condition for detection of holidays and measurement of dry-film thickness. The Contractor's subcontractor shall also furnish U.S. Department of Commerce, National Bureau of Standards certified thickness calibration plates to test accuracy of dry-film thickness gauge and certified instrumentation to test accuracy of holiday detectors. Provide safe and suitable ladders or temporary scaffolding and adequate illumination to facilitate inspection.

3.3 CLEANUP

A. Upon completion of all painting, remove all surplus materials, protective coverings and accumulated rubbish and thoroughly clean all surfaces and repair any overspray or other paint-related damage.

END OF SECTION 09 97 13

SECTION 40 05 31 – PVC PROCESS AND YARD PIPING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall provide polyvinyl chloride (PVC) pipe (pressure and gravity) and chlorinated polyvinyl chloride (CPVC) pressure pipe, complete and in place, in accordance with the Contract Documents. PVC pipe shall be schedule 40, schedule 80, SDR 21, ASTM D3034, F679, or AWWA C900/C905 and CPVC shall be schedule 80 in accordance with the Piping Schedule shown on the drawings.

B. Refer to Section 40 05 00 – Piping, General for Process Interconnections for additional requirements.

1.2 REFERENCE STANDARDS

A.	ASTM D 1785	Poly Vinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120
B.	ANSI/ASME B 16.5	Pipe Ranges and Flanged Fittings, Class 150
C.	ASTM D 2467	Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D.	ASTM F 1498	Taper Pipe Threads 60 Degrees for Thermoplastic Pipe and Fittings
E.	ASTM D 2241	PVC Pressure Rated Pipe SDR 21 and SDR 35
F.	ASTM D 3034	PVC, SDR 21 and SDR 35 Fittings
G.	AWWA C900	PVC Pressure Pipe and Fabricated Fittings
H.	ASTM D 2241	PVC Pressure Rated Pipe
I.	ASTM D 3034	Type PSM PVC Sewer Pipe and Fittings
J.	NSF/ANSI 14	Plastics Piping System Components and Related Materials
K.	NSF/ANSI 61	Drinking Water System Components – Health Effects
L.	NSF/ANSI 372	Drinking Water System Components – Lead Content

1.3 SUBMITTALS

A. Submit shop drawings in accordance with Section 40 05 00 – Piping, General for Process Interconnections, and Section 01 33 00 – Submittal Procedures.

PART 2 - PRODUCTS

2.1 GENERAL

A. All pipe, fittings, solvents and primers used in potable water systems shall be compliant with NSF/ANSI 61, 14, and 372.

2.2 PIPE MATERIAL

A. PVC Schedule 40 and 80 pressure pipe, sizes ½ inch to 16-inch, ASTM D 1785.

1. Approved Use: As indicated in the Plans.

2. Pipe: Schedule 40 and Schedule 80 pipe shall be iron pipe size (IPS), made from all new rigid polyvinyl chloride compounds with a cell class of 12454 as per ASTM D 1784. Pipe shall be NSF 61 compliant if indicated in the pipe schedule on the drawings. Operating temperature will be less than 140 degrees F.

3. Joints:

a. Pipe joints shall be solvent-welded type with solvent cement and primer as recommended by the pipe manufacturer for the chemical to be used in the pipe. Solvent cements shall comply with ASTM D 2564. Primers shall comply with ASTM F656.

b. Schedule 80 screwed joints that are necessary to match up to threaded valves or fittings shall be made up with appropriate thread sealant, either paste or tape.

c. Flanged joints shall be made with Van-Stone type flanged connections.

4. Fittings:

a. Schedule 80 Fittings: Injection molded PVC Schedule 80 fittings shall conform to ASTM D 2467; threaded fittings shall conform to ASTM D 2464. Fittings shall conform to NSF International Standard 61 if indicated on the drawings.

b. Schedule 40 Fittings: Injection molded PVC Schedule 40 fittings shall comply with ASTM D 2466.

c. Flanged Fittings: Flanged fittings shall be Van-Stone type, Schedule 80 fabricated PVC fittings with 150 lb. flanges conforming to ANSI/ASME B 16.5. Gaskets shall be ANSI 150 lb. full face, 1/8-inch thick Plain Rubber SBR with NSF 61 Certification for water and Niltrile Buna-N for wastewater service. Gasket material shall be suitable for the chemical service shall be provided.

B. CPVC Pressure Pipe, sizes ½ inch to 8-inch, ASTM F 441.

1. Approved Use: As indicated in the Plans.

2. Schedule 40 and Schedule 80 pipe (iron pipe size) shall be made with a CPVC compound having a minimum cell classification of 24448, and shall be third party certified to NSF 14.

3. Fittings: CPVC Schedule 80 socket fittings shall conform to ASTM F439; Schedule 80 threaded fittings shall conform to ASTM F437. All fittings must be third party certified to NSF 14. CPVC Schedule 80 fabricated fittings shall be reinforced with fiberglass reinforced plastic (FRP). All CPVC fittings shall be molded or fabricated from a CPVC compound that is compatible with the pipe material.

C. PVC Pressure Pipe Sizes 4-inch through 60-inch for Water Distribution, ANSI/AWWA C900.

1. Approved Use: As indicated in the Plans.

2. Dimension Ratio: DR 18.

3. Joint: Bell and spigot end with ASTM F 477-02 elastomeric gaskets.

4. Fittings: Ductile Iron as per Section 40 05 19 – Ductile Iron Pipe and Fittings.

D. PVC SDR 35 Gravity Sewer Pipe, Sizes 4 inch to 15-inch, ASTM D 3034.

1. Approved Use: As indicated in the Plans.

2. Pipe: Pipe shall be manufactured from virgin rigid PVC compounds with a cell class of 12364 in accordance with ASTM D 1784. Pipe shall conform to ASTM D 3034 for gasket pipe with a minimum pipe stiffness of 46.

3. Joints: Elastomeric gasket joints with ASTM F477 elastomeric gaskets.

4. Buried pipe shall be installed in accordance with ASTM D 2321 and ASTM F 1668.

E. Polyethylene Pipe Materials for 3-inch and Smaller Pipe

1. Polyethylene pipe shall be made from a HDPE material having a minimum material designation code of PE 4710 or higher. The material shall meet the requirements of ASTM D3350 and shall have a minimum cell classification of 445574 CC3.

2. Pipe and fittings shall meet the requirements of ANSI/AWWA C901.

3. HDPE pipe shall be iron pipe size, SDR 21 (200 psi).

4. Fittings shall be pack joint-type for polyethylene pipe or tubing with iron pipe threads.

5. Fittings shall be all brass or copper with Type 304 stainless steel inserts for water pipe. Provide Ford fittings or equal.

Add. 1

F. Chemical Transfer Tubing – Braided PVC (Inner Tube)

1. Provide flexible, clear, polyester braid reinforcement PVC tubing suitable for pressurized chemical service as the inner carrier pipe in a double containment piping system. Tubing shall be routed inside 2-inch Schedule 40 PVC carrier pipe for chemical transport applications.

2. Double-Walled Tubing Size and Construction:

   a. Inside Diameter (ID): 3/4 inch

   b. Outside Diameter (OD): 1 inch

3. Performance Requirements:

   a. Minimum Working Pressure: 150 psi at 70°F

   b. Temperature Range: 25°F to 150°F

   c. Chemical Compatibility: Tubing material shall be chemically resistant to the conveyed fluid (e.g., Sodium Hypochlorite, ACH, Soda Ash, etc.)

   d. Bend Radius: ≤ 4 inches

4. Certifications and Material Compliance:

   a. Manufactured from FDA-compliant and NSF 61 listed PVC compounds

   b. Tubing shall be free of phthalates and BPA

5. Installation Requirements:

   a. Tubing shall be installed continuously, no splices or fittings, inside 2" PVC carrier pipe with no intermediate connections or splices unless specifically approved.

   b. Ends of tubing shall be fitted with barbed or compression fittings and stainless steel clamps rated for chemical service.

   c. Terminate inner and outer pipes at access boxes or sumps for visual leak detection and secondary containment.

   d. Label ends with chemical name and direction of flow per project requirements.

   e. Provide a durable, corrosion-resistant pull string or rope rated for long-term chemical service inside the carrier pipe alongside the tubing to facilitate future removal and replacement of the chemical transfer tubing.

      1) Pull string shall be installed continuously inside the carrier pipe, with both ends accessible at termination points.

G. COUPLINGS

1. Couplings shall be in accordance with Section 40 05 00 – Piping, General for Process Interconnections

H. THRUST BLOCKS

1. Thrust blocks shall be in accordance with Section 40 05 00 – Piping, General for Process Interconnections.

I. MECHANICAL RESTRAINT

1. Mechanical restraint shall be in accordance with Section 40 05 00 – Piping, General for Process Interconnections.

PART 3 - EXECUTION

3.1 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect pipe and components against dirt, damage and excessive sunlight during shipment and storage. Handle and store pipe to prevent damage or contamination.

B. Verify compatibility of pipe type and fittings prior to installation.

C. Keep jointing material sealed when not in use. Store gaskets in a cool, well-ventilated place and do not expose to the direct rays of the sun until immediately before joint assembly.

3.2 PIPE PREPARATION

A. Prior to installation, each pipe length shall be carefully inspected, flushed clean of any debris or dust, and be straightened, if not true. Ends of threaded pipes shall be reamed and filed smooth. Pipe fittings shall be equally cleaned before assembly.

3.3 INSTALLATION

A. PVC pipe shall be installed in a neat and workmanlike manner, properly aligned, and cut from measurements taken at the Site to avoid interferences with structural members, architectural features, openings, and equipment. Exposed pipe shall afford maximum headroom and access to equipment, and where necessary, piping shall be installed with sufficient slopes for venting or drainage of liquids and condensate to low points. It is recommended that the Contractor obtain the assistance of the pipe manufacturer's field representative to instruct the pipe fitters in the correct installation and support of PVC piping.

B. Install pipe as per manufacturer's specific instructions. Do not install buried pipe without continuous support under the barrel or where a dry joint connection cannot be made.

C. Install buried pipe with cover indicated in the plans. Ensure that the pipe has adequate cover from subgrade and is installed below frost depth.

D. Supports and Anchors: Piping shall be firmly supported with fabricated or commercial hangers or supports in accordance with Section 40 05 07 – Hangers and Supports for Process Piping. Where necessary to avoid stress on equipment or structural members, the pipe shall be anchored or harnessed. Expansion joints and guides shall compensate for pipe expansion due to temperature changes.

E. Valves and Unions: Unless otherwise indicated, connections to fixtures, groups of fixtures, and equipment shall be provided with a shutoff valve and union, unless the valve has flanged ends. Unions shall be provided at threaded valves, equipment, and other devices requiring occasional removal or disconnection. Valves and flanges attached to PVC pipe shall be provided with adequate supports.

F. Control line and grade of the pipe installation by use of a pipeline laser. Limit variance of installed pipe from design line and grade to less than 0.02 feet, unless a smaller variance is necessary to prevent a level or negative slope.

G. Furnish and install plugs or caps on pipe ends and stub-outs. Insure watertight connection. Provide a bell end or joint suitable for making a gasketed connection when the pipeline is extended. Thrust block all pressure pipe stubs. Protect against displacement during backfilling operations and testing.

H. If excavation enters an area of petroleum or other contamination, stop Work and notify the Engineer for verification of piping and gasket material usage.

I. When pipe installation is suspended, assure that no dirt or other foreign material is allowed in pipe or fittings. Block or plug the open end of the pipe to prevent creep, uplift or floating, entrance of water, dirt, or other materials.

J. Joint Gap: Rubber gasket pipe shall be installed with maximum joint gaps not exceeding 75% of the manufacturer's recommended gap, at any point around the internal joint perimeter. Joint gaps shall be internally verified for each joint.

K. Place thrust blocks at each angled fitting, tee, cross, reducer, cap, plug, and valve. Provide bearing area against undisturbed earth. Place such that thrust block may be removed in the future without damage to pipe or fitting. Place 6 mil polyethylene plastic between thrust blocks and fittings.

1. Concrete thrust blocks shall be cured one (1) day before the pipeline may be filled with water, and three (3) days before the pipeline may be pressurized.

L. Deflection: Long radius curves may be constructed by pulling the pipe at the joints. The maximum deflection angle at a pulled joint shall not exceed one degree (1°) or as recommended by the manufacturer, as long as the maximum joint gap does not exceed 75% of the manufacturer's recommended gap.

M. Do not operate existing or active valves without the authorization of the Engineer.

N. Pipe bedding is required, bed pipe in accordance with Section 31 23 33 – Trenching and Backfilling.

O. Except as required for backfilling, prohibit walking or working on the pipe until backfilling of the trench has been completed. Provide temporary bridging over pipe as necessary to provide crossings for workers or equipment.

P. Assure that continuity is maintained in locating wire, in accordance with Section 31 23 33 – Trenching and Backfilling.

3.4 PIPE JOINTS

A. Threaded Joints: Pipe threads shall conform to ASTM F 1498 - Taper Pipe Threads 60 Degrees for Thermoplastic Pipe and Fittings, and shall be full and cleanly cut with sharp dies or molded. Joints shall be made with manufacturer recommended tape or thread sealant.

B. Solvent-Welded Joints: Solvent-welded joints shall be made with fresh primer and solvent cement on clean, dry pipe ends. The primer and cement cans shall be kept closed at all times and the joints shall be made up at the recommended ambient temperatures, to the pipe or cement manufacturer's written recommendations. Pipe ends shall be inserted to the full depth of the socket.

C. Flange Joints: Flanged joints shall be made with gaskets and Type 316 stainless steel bolts and nuts. Care shall be taken not to over-torque the bolts, in accordance with the manufacturer's written recommendations.

D. Mechanical Joints: As per Section 40 05 00 – Piping, General for Process Interconnections.

3.5 INSPECTION AND FIELD TESTING

A. Inspection: Finished installations shall be carefully inspected for proper joints and sufficient supports, anchoring, interferences, and damage to pipe, fittings, and coating. Damage shall be repaired to the satisfaction of the Engineer.

B. Field Testing: The Contractor shall allow adequate time for the solvent cement joints to cure. Curing time shall be per the solvent cement manufacturer's recommendation. Prior to enclosure or burying, piping systems shall be pressure tested as required in 40 05 00 – Piping, General for Process Interconnections, without exceeding the tolerances listed in the Piping Schedule. Caution - Do not use air or gas for testing PVC pipe. Where no pressures are indicated, the pipes shall be subject to 1.5 times the maximum working pressure. The Contractor shall furnish all test equipment, labor, materials, and devices.

C. Leakage shall be determined by loss of pressure. Fixtures, devices, or other accessories that would be damaged if subjected to the test pressure shall be disconnected and ends of the branch lines shall be plugged or capped as appropriate during the testing procedures.

D. Leaks shall be repaired to the satisfaction of the Engineer, and the system shall be re-tested until no leaks are found at Contractor’s expense.

E. Disinfect potable water lines in accordance with Section 33 01 12 – Inspection and Testing of Water Utilities.

END OF SECTION 40 05 31