

Willamette Water Supply

Our Reliable Water

September 24, 2020

Environmental Protection Agency
Water Infrastructure Division
Office of Wastewater Management
Attention: Alejandro Escobar
Portfolio Manager/WIFIA Program
via email

NOTE: Items and pages may have been intentionally redacted or excluded by the EPA. Contact CWSRFWaiver@epa.gov for more information if necessary.

RE: Willamette Water Supply System, Tualatin Valley Water District (Loan #N18167OR) and City of Hillsboro, Oregon (Loan #N18105OR); American Iron and Steel Waiver Request for restrained joint ductile iron fittings (TR Flex or Flex-Ring)

Dear Mr. Escobar:

On behalf of the Tualatin Valley Water District and the City of Hillsboro, (Borrowers), this letter is submitted to request a project waiver pursuant to the "American Iron and Steel" requirements for the purchase and installation of approximately 396 specified restrained ductile iron fittings (TR Flex or Flex-Ring) in sizes from 6-inch to 24-inch for use on the WWSP WIFIA Project. The project is located in Washington and Clackamas counties, Oregon, and will establish a new, seismically resilient water supply for the Borrowers and other communities.

As the WWSP WIFIA Project is funded by the Water Infrastructure Finance and Innovation Act (WIFIA) loans, the American Iron and Steel (AIS) requirements apply. According to the AIS requirements, recipients may request and receive a waiver to the AIS requirement in certain circumstances. For this project, we hereby request an availability waiver on the basis that "Iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality," which is condition number two as listed in the EPA's AIS guidance documents.

JUSTIFICATION OF USE: The engineer of record for one pipeline segment of the WWSP WIFIA Project (PLW_1.3) is Kennedy/Jenks Consultants and the associated prime contractor is Tapani, Inc. At the time of procurement for this pipeline segment, Tapani Inc. asserted and Kennedy/Jenks Consultants evaluated and confirmed the non-availability of the domestic construction materials for which the waiver is sought. The following is a list of manufacturers that were contacted. Representatives of these manufacturers all indicated that their company does not manufacture an AIS-compliant TR Flex or Flex-Ring in this size range and that they were unaware of any other manufacturers that can meet AIS requirements for these particular fittings. In addition, we requested and received confirmation from the EPA that they also could not locate 24-inch and smaller fittings meeting our design criteria.

Manufacturers Contacted/Proposed Suppliers:

- [REDACTED]
- [REDACTED]
- [REDACTED]

INSTANCES WHERE SUBSTITUTION OF AIS COMPLIANT PRODUCT IS POSSIBLE: Regarding PLW_1.3, with our engineer of record we reviewed the fittings of 24-inch and smaller on ductile iron piping to determine if any of these could be replaced with AIS compliant products and still meet design criteria. A specific connection point on two standard details were identified where another fitting could be used without compromising the intended design. A similar exercise will be undertaken for upcoming pipeline segments as design progresses.

INSTANCES WHERE NO SUBSTITUTION IS POSSIBLE – product waiver requested: The WWSP WIFIA Project still requires an estimated* 396 restrained joint ductile iron fittings (TR Flex or Flex-Ring) planned to be installed. See quantity and size schedule provided below:

TABLE 1: RESTRAINED DUCTILE IRON FITTINGS

ITEM/ LOCATION	SIZE	TYPE	ESTIMATED QUANTITY	ESTIMATED UNIT PRICE	ESTIMATED TOTAL COST
turnout	18	45	14		
turnout	18	90	14		
turnout	18	Tee	7		
turnout	12	6 tee	7		
turnout	12	45	7		
turnout	12	WYE	7		
turnout	18	reducer	28		
turnout	4	90	56		
air valve 1	8	90	64		
air valve 1	8	blind	32		
air valve 2	8	90	96		
air valve 2	8	blind	32		
Blow off 1	12	Tee	8		
Blow off 1	12	blind	8		
Blow off 2	12	Tee	16		
Blow off 2	12	blind	0		\$ -
Blow off 2	6	90	0		\$ -
Blow off 2	6	blind	0		\$ -
fitting	24	45	0		\$ -
WTP					
RWF					
			TOTAL		

* Quantities of needed product and associated pricing for PLW_1.3 were established by the engineer of record for PLW_1.3. Additional quantities were estimated based on review of the entire WWSP WIFIA Project specifications and drawings by Stantec (program and construction manager for WWSP WIFIA Project) and a Senior Cost Estimator. As various portions of the WWSP WIFIA project are in preliminary design, all quantities and associated costs are best estimates at the time of this writing and may change as design advances.

SCHEDULE AND LEAD TIME: A schedule for the WWSP WIFIA Project is included as an attachment. No products included in this waiver request have been purchased or installed. The first pipeline segment (PLW_1.3) for which we will need to use the ductile iron fittings in sizes 24-inch and below has an

installation date of January 2021. There is approximately a two-month lead time on the order to achieve this installation date.

SIMILAR APPROVED WAIVER REQUESTS: EPA's AIS website (<https://www.epa.gov/cwsrf/state-revolving-fund-american-iron-and-steel-ais-requirement>) indicates that AIS waiver requests have been granted for TR Flex and Flex-Ring that are substantially the same as this request. These waivers were for projects in:

- City of Raleigh, North Carolina (April 20, 2020);
- City of Columbus, Ohio (December 23, 2019); and
- West County Wastewater District, California (June 13, 2016).

Based on the information discussed herein, we are requesting that the TR Flex or Flex-Ring ductile iron fittings specified and proposed for this project be allowed for this project.

Please contact Ellen Peterman (ellen.peterman@tvwd.org or 503.840.3831) with any questions or comments after reviewing this request. Thank you for your consideration in this matter.

Sincerely,



David Kraska, P.E.
WWSS Program Director

Attachment – WWSP WIFIA Project schedule

Attachment – Specification section 40 20 16 – Ductile Iron Pipe and Fittings

Attachment – EPA email regarding independent market research of ductile iron fittings

cc: Ellen Peterman, WWSP WIFIA Compliance Specialist
Corianne Burnett, WWSP PLW_1.3 Project Manager
Mark Nelson, Kennedy Jenks PLW_1.3 Project Manager

SECTION 40 20 16
DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section specifies 4-inch to 30-inch diameter ductile iron pipe and fittings. All pipes larger than 30-inch are welded steel. All materials in contact with water are required to be NSF 61 certified for use with potable water.
- B. The American Iron and Steel Provisions apply to this project. Refer to Specification Section 01 11 00 Summary of Work, Article 1.6.

1.02 REFERENCE

- A. This Section incorporates by reference the latest revision of the following documents. These references are a part of this Section as specified and modified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this Section shall prevail.
 - 1. American Society of Mechanical Engineers (ASME):
 - a. B1.1, Unified Inch Screw Threads (UN and UNR Thread Form).
 - b. B16.1, Gray Iron Pipe Flanges and Flanged Fittings (Classes 25, 125, and 250).
 - c. B16.21, Nonmetallic Flat Gaskets for Pipe Flanges.
 - 2. ASTM International (ASTM):
 - a. A193, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
 - b. A194, Standard Specification for Carbon and Alloy-Steel Nuts for Bolts for High-Temperature Service.
 - c. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - d. A536, Standard Specification for Ductile Iron Castings Tensile Requirements
 - e. C150, Specification for Portland Cement.
 - f. D1330, Rubber Sheet Gaskets.
 - 3. American Water Works Association/American National Standards Institute (AWWA/ANSI):
 - a. C116, Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron.
 - b. C110/A21.10, Standard for Ductile-Iron and Gray-Iron Fittings.
 - c. C111/A21.11, Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - d. C115/A21.15, Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.

- e. C150/A21.50, Standard for Thickness Design of Ductile-Iron Pipe.
 - f. C151/A21.51, Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
 - g. C153/A21.53, Standard for Ductile-Iron Compact Fittings for Water Service.
 - h. C600, Installation of Ductile Iron Water Main and Their Appurtenances.
 - i. C606, Grooved and Shouldered Joints.
- 4. Society of Automotive Engineers (SAE):
 - a. AMS-QQ-P-416, Cadmium Plating - Electro-deposited.
 - 5. International Organization for Standardization (ISO):
 - a. ISO 8179 – Ductile Iron Pipes – External Zinc Based Coating
 - 6. National Sanitation Foundation (NSF):
 - a. 61: Drinking Water System Components

1.03 SUBMITTALS

- A. Procedures: Section 01 33 00 - Submittal Procedures.
- B. Shop Drawings:
 - 1. Manufacturer’s data sheets on ductile iron pipe, joints, gaskets, and fittings including dimensions, wall thickness, weight, coating, and lining.
 - 2. Certification of factory hydrostatic testing.
 - 3. If a mechanical coupling system is used, submit piping, fittings, and appurtenant items which will be utilized to meet system requirements.
 - 4. Restrained joint pipe: line layout and marking diagrams which indicate the specific number of each fitting and the location and direction of each fitting in the completed line. In addition, include the following in the line layouts: the pipe station and invert elevation at all changes in grade or horizontal alignment; all elements of curves and bends, both in the horizontal and vertical alignment; and the limits of each reach of restrained joints.
 - 5. Acknowledgement that Contractor has coordinated and accounted for fabrication of special order fittings.
- C. Test results.
- D. American Iron and Steel (AIS) step certification letter(s). Refer to Specification Section 01 11 00.

PART 2 - MATERIALS

2.01 ACCEPTABLE MANUFACTURERS

- A. Ductile Iron Pipe (Restrained Joint):
 - 1. Pipe:
 - a. American Ductile Iron Pipe: Flex-Ring
 - b. US Pipe: TR-Flex.
 - 2. Fittings:
 - a. American Ductile Iron Pipe: Flex-Ring
 - b. US Pipe: TR-Flex.
 - 3. AWWA C153 compact fittings shall be used for restrained joints only; if thrust blocks are used, C110 fittings are required.

2.02 DUCTILE IRON PIPE

- A. Mortar-lined and zinc-coated restrained Ductile Iron Pipe: ANSI/AWWA C104, C116, and C151, subject to the following requirements:
 - 1. Diameter and class indicated in the Drawings, except as noted in Paragraph 2.02.B, furnished complete with gaskets per Section 40 05 13, General Piping Requirements, and all specials and fittings provided as indicated.
 - 2. NBR gaskets: Color coded and marked in color so as to be easily identifiable as nitrile conforming to ANSI/AWWA C111.
 - 3. Cement Mortar Lining: ANSI/AWWA C104: Double thickness. Cement conforming to ASTM C150, Type II. Apply linings in shop. Ensure cement does not originate from kilns that burn metal-rich hazardous waste fuel, nor use a fly ash or pozzolan as a cement replacement.
 - 4. Zinc Coating: ISO 8179 Part 1: The exterior of the pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the Zinc applied shall be 200 g/m² of pipe surface area. A finishing layer of 2 mil minimum NSF61 certified asphalt topcoat shall be applied to the Zinc.
- B. Pipe Wall Thickness: ANSI/AWWA C150 as applicable and as modified in this Section. Minimum wall thickness for pipe having threaded flanges shall be minimum special thickness Class 53 per ANSI/AWWA C151.
- C. Pipe Marking: Plainly mark each length of pipe to identify the design pressure class or thickness class, the wall thickness, and date of manufacture.
- D. Maximum Pipe Laying Lengths: 20 feet with shorter lengths provided as required by the Drawings.
- E. Finish: Smooth dense interior surfaces free from fractures, excessive interior surface crazing, and roughness.
- F. Closures and Correction Pieces: Provide closures and correction pieces as allowed by Contract Documents that are required due to different headings in the pipe laying operation and to adjust pipe layout to conform to field conditions.
- G. All specials used for making transition from ductile pipe to steel pipe shall be manufactured by the same supplier as the pipe and fittings as the parent transition.

2.03 FLANGES

- A. Flanges shall conform to ANSI/AWWA C115/A21.15 or ANSI B16.42 Class 150 with a minimum rated working pressure of 250 psi.
- B. Flange Drilling Patterns: per Section 40 05 13 - General Piping Requirements.
- C. Flanged pipe shall be shop fabricated, not field fabricated. Flanges shall be individually fitted and machine tightened in the shop, then machined flat and perpendicular to the pipe barrel. Flanges shall be backfaced parallel to the face of flange.
- D. Blind flanges shall be ductile iron.

2.04 FITTINGS AND FLANGED COUPLING ADAPTERS

- A. Fittings: ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10 for diameters 3-inch through 12 inch; minimum working pressure rating of 250 psi and test pressure of 1.25 times working pressure.
 - 1. Welded outlets and tangential welded outlets for ductile iron pipe may be used for branch connections, air valve and drain connections. The welded outlets and tangential welded outlets for ductile iron pipe shall have restrained joint connections with adaptors to flanged connections. Welded outlets must be installed by the original pipe manufacturer only, or by an iron fabricator authorized and contracted by the original pipe manufacturer. Pipe manufacturer's warranties will apply to fabricated outlets.
- B. Restrained Flanged Coupling Adapters: Ductile Iron, ASTM A536, Grade 65-45-12, flanges per ANSI Class 125 bolt circles. Stainless steel bolts and nuts required. Fusion bonded epoxy coating required. ROMAC RFCA 19.50, or approved equal.
- C. Mechanical Joint Restraint
- D. Ball and Socket:
 - 1. Double Ball with flanged ends. Flange outlets conform to the dimensional requirements of ANSI/AWWA C110/A21.10 (class 150) with the addition of an O-ring gasket. Provide minimum of 8 inches of expansion capacity.
 - 2. Rated for a minimum 150 psi and pressure tested prior to shipment.
 - 3. Expansion/Contraction travel preset at 50/50 setting.
 - 4. Ductile Iron per ASTM A536.
 - 5. Up to 15° deflection per ball.
 - 6. Interior coating 15 mils fusion bonded epoxy, NSF61 certified. Exterior 6 mils fusion bonded epoxy.
 - 7. Sealing gaskets of EPDM.
 - 8. Tested in accordance with either AWWA C600 or ASTM D2774.
- E. EBAA IRON FLEX-TEND, double ball flexible expansion joint, or approved equal.

- F. Flexible Expansion joint: Flexible expansion joints shall be installed in the locations indicated on the drawings.
1. Each flexible expansion joint shall be pressure tested prior to shipment against its own restraint to a minimum of 350 psi for 3-inch through 24-inch diameter (250 psi for flexible expansion joints 2-inch, and 30-inches diameter and larger.) A minimum 2:1 safety factor, determined from the published pressure rating, shall apply. Factory Mutual Approval for the 3-inch through 12-inch sizes is required.
 2. Each flexible expansion joint shall consist of an expansion joint designed and cast as an integral part of a ball and socket type flexible joint, having a minimum per ball deflection of: 20°, 2" - 12"; 15°, 14" - 36".
 3. All internal surfaces (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C216. Sealing gaskets shall be constructed of EPDM. The coating shall meet ANSI/NSF-61.
 4. Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16.
 5. Flexible expansion joints shall be FLEX-TEND as manufactured by EBAA Iron, Inc. Eastland, TX, or approved equal.

2.05 COATING FOR PIPE AND FITTINGS

- A. Ductile iron pipe shall be zinc coated in accordance with ISO 8179.
- B. Fittings shall be coated with Tnemec-Zinc 90- 98-Zinc rich paint- 2.5–3 mils DFT with 2 mil minimum asphalt topcoat, or equal.
- C. Coat blind flanges per Section 40 20 13, Steel Pipe (AWWA C200, Modified). Apply coating in shop.

2.06 BOLTS, NUTS AND GASKETS FOR FLANGES

- A. See Section 40 05 13, General Piping Requirements.

2.07 POLYETHYLENE ENCASEMENT

- A. Polyethylene encasement per Section 40 46 18, Polyethylene Sheet or Tube Encasement.

PART 3 - EXECUTION

3.01 DELIVERY, HANDLING AND STORAGE

- A. Do not roll or drop the pipe on the ground or allow the pipe to fall from the truck.
- B. Do not install pipe or fittings with damaged linings. Patch damaged areas in the field with material similar to the original and acceptable to the Owner's Representative. Where damage cannot be repaired in the field, replace the defective pipe or fittings.

- C. Lift pipes with mechanical equipment using wide belt slings. Do not use cable slings or chains. Do not move pipe by inserting any devices or piece of equipment into the pipe barrel.
- D. Stockpiled pipe shall be suitably supported and shall be secured to prevent accidental rolling and to avoid contact with mud, water, or other deleterious materials. Stockpiled pipe shall be supported on sand or earth berms free of rock exceeding 3 inches in diameter.
- E. The ends of all pipe shall be securely bulkheaded or otherwise sealed during transport to the jobsite.
- F. All pipe handling equipment and methods shall be approved by the Owner's Representative.

3.02 SANITATION OF PIPE INTERIOR

- A. Keep the interior of the pipe clean as the construction progresses. The purpose of maintaining a clean interior is to minimize flushing and aid in the passage of the bacteriologic quality testing after disinfection.
- B. When pipe laying is not in progress close the ends of the installed pipe with a plug to deter entry of animals, dirt, water, or foreign material.

3.03 INSTALLATION OF PIPE

- A. Begin installation of polyethylene encasement.
- B. Inspect each pipe and fitting before lowering into the trench. The Owner's Representative may inspect all pipe prior to installation for damage to pipe, coatings, and linings. Clean ends of pipe thoroughly.
- C. Install the pipe in accordance with ANSI/AWWA C600.
- D. Lay pipe directly on the bedding material. No blocking will be permitted and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe. Excavate as needed to facilitate removal of handling devices after the pipe is laid. Form bell holes at the ends of the pipe to prevent point loading at the bells, fittings, and couplings and allow completion of polyethylene encasement.
- E. Lay each section of pipe in the order and position indicated on the laying schedule. In laying pipe, lay to line and grade within 1 inch plus or minus.
- F. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the Owner's Representative may change the alignment and grades. Make such change by the deflection of joints, by the use of bevel adapters, or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 75 percent of the maximum deflection recommended by the pipe manufacturer. No joint shall be misfit any amount which will be detrimental to the strength and water tightness of the finished joint.
- G. Except for short runs that may be permitted by the Owner's Representative, lay pipes uphill on grades exceeding 10 percent. For pipe that is laid on a downhill grade, block and hold in place until sufficient support is furnished by the following pipe to prevent movement.

- H. Cold Weather Protection: Do not install pipe upon a foundation into which frost has penetrated or at any time that there is a danger of the formation of ice or penetration of frost at the bottom of the excavation. Do not lay pipe unless it can be established that the trench will be backfilled before the formation of ice and frost occurs.
 - I. Protection of Pipe: At locations where the Contractor proposes to cross the installed pipeline with heavy equipment, precautions as approved by the Owner's Representative shall be taken to protect the pipe from damage. Acceptable precautions include: backfilling the pipe trench as necessary to protect the pipe, concrete encasing the pipe, and placing steel plating over the pipe. Any damage to the pipe caused by the Contractor's operation or his equipment shall be repaired.
 - J. See Sections 31 21 33 - Trenching, Backfilling, and Compacting for Utilities and 31 23 00 - Earthwork for additional pipe installation requirements.
 - K. Marking Tape Installation: Install metallic marking tape along the pipe at the depth and shown on the Drawings and Standard Details. Depending on depth there may be as many as 3 rows of marking tape at one time.
- 3.04 INSTALLATION OF FLANGED JOINTS
- A. See Section 40 05 13 - General Piping Requirements for installation instructions.
- 3.05 INSTALLATION OF RESTRAINED JOINTS
- A. Install in accordance with AWWA/ANSI C151/A21.51.
 - B. Assemble joints in accordance with manufacturer's directions. Extend restrained joints after assembly to take up any slack.
 - C. Bevel and lubricate spigot end of pipe to facilitate assembly without damage to gasket. Taper of bevel shall be approximately 30 degrees with centerline of pipe and approximately 1/4 inch back. Use lubricant that is non-toxic, does not support the growth of bacteria, has no deteriorating effects on the gasket material, and imparts no taste or odor to water in pipe.
 - D. Assure the gasket groove is thoroughly clean.
 - E. For cold weather installation, warm gasket prior to placement in bell.
- 3.06 FIELD WELDING
- A. Follow manufacturer's recommended procedures instructions for field welding restrained joint rings or other ductile iron components. Field welding must be acceptable to the Owner's Representative.
- 3.07 PRESSURE TESTING
- A. See Section 33 13 05 - Cleaning, Inspection and Pressure Testing of Piping for pressure testing requirements.
- 3.08 DISINFECTION
- A. See Section 33 13 06 - Disinfection.

3.09 PIPE NOT IMMEDIATELY PLACED INTO SERVICE

- A. See Section 33 13 06 - Disinfection, for pipe not immediately placed into service requirements.

END OF SECTION