SECTION 00 91 13
ADDENDUM 02

To all prospective bidders and others concerned, YOU ARE HEREBY ADVISED THAT the Contract Documents for the above referenced Project are revised in the following particulars:

Questions & Answers

Questions Received from Northwest Pipe Company:

Q1: **Plans:** Clarify – There is a discrepancy between specification section 01 22 01 Measurement and Payment vs the Bid Items – Measurement and Payment shows the pipe for bid additive alternate item 14 starting at 2+48 and going to 40+80. The bid form shows additive alternate item #14 starting at Sta. 4+45 and going to 40+80. A difference of 180 LF. Which is the starting point**?**

A1: Pipe lining of the existing 72" forcemain for Bid Item 14 Additive Alternate Phase 2D limits are from 4+45 to 40+80. The bid item and measurement and payment for this item has been updated in Addendum 2.
The bid item and measurement and payment for the Bid Item 7 Phase 2.B has been revised to include lining the PCCP from Sta 2+48 to 4+45. The bid item and measurement and payment for this item has been updated In Addendum 2.
Plan Sheet C-411 has been revised to show the limits of the lining the 72" PCCP from the Phase 1B Valve Vault (Sta 2+48 to Sta 4+50. This item is reflected in Addendum 2.

Q2: **33 31 11.23 - Fiberglass Reinforced Plastic Pipe**
3.06 Field Hydrostatic Testing
Delete: ~~C. Pipe Test Standards Page 8~~
~~#3 Leakage will not be allowed for welded Steel Pipe.~~
NOTE: Do you mean FRP will not be allowed to leak? This is in their specification, not the steel pipe specification. If you relocate it to 33 05 32 then please sited M11 or C604.

A2: Specification revised to read Leakage will not be allowed for FRP pipe.

Q3. Clarify the Steel Pipe Diameter Section 00 11 13 - Listed as 63" OD Steel Pipe; Section 33 05 32 - Listed Steel Pipe as 65" OD.

A3: **T**he steel pipe is 65" OD.

Q4.a: **Section 33 05 32** - Modify - Listed as 0.200 ~~0.250~~ Min.
NOTE: Steel Pipe would be .375x2 = .750 inches for the wall thickness plus 63 ID (required by competitors) The required OD would be 63.750 inches.

A4.a: Proposed change not accepted.

Q4.b: **Section 33 05 32 - Steel Liner Pipe**
1.01 Scope of Work
1.01E: Delete "…and 1-Inch mortar coating when installed in a trench."
NOTE: Mortar coating is not common in this market. NWP only supplies AWWA C222 Polyurethane and C214 Tape coatings. We do manufacture Mortar Coatings in the desert southwest where sulfates are a concern, but in the Norh and Northeast it is typically sulfides that are the issue. That is why we use a bonded coating.

A4.b. Proposed change partially accepted. Polyurethane with Polyethylene heat shrink sleeves at joints is also acceptable. See revised Section accompanying this Addendum.

Q4.c: **Section 33 05 32 - Steel Liner Pipe**
1.03 Quality Assurance
1.03.A.1 Modify: A registered PE licensed and employed by the manufacturer ~~in Michigan~~ shall design pipe fittings, and specials…

A4.c: See Revised specification, specifically Section 1.04.G.2.a and b in this Addendum. Michigan PE is still required.

Q4.d: **Section 33 05 32 - Steel Liner Pipe**
1.03.B.6 Delete: "~~…The yield strength used in the calculation….for cement mortar coated pipe shall not exceed 36,000 psi…~~"

A4.d: Proposed change not accepted. The language of the Section was amended.

Q4.e: **Section 33 05 32 - Steel Liner Pipe**
103.7 Modify: …AWWA M11, except that all pipes shall have a will thinness of at least 0.200-inch ~~1/4 inch and~~ a diameter to wall thickness ratio of D/240 in accordance with AWWA C200 Specifications ~~unless otherwise indicated in the Steel Pipe Schedule.~~

A4.e: Proposed change not accepted.

Q4.f: **Section 33 05 32 - Steel Liner Pipe**
103.8 Delete: Replace with Pipe wall thickness shall be constant with AWWA C200 and M11.

A4.f: Proposed change not accepted.

Q4.g: **Section 33 05 32 - Steel Liner Pipe**
1.05.B.2 Delete: Pipe ends remain Sealed until installation.
NOTE: The manufacturer places end caps on AWWA C205 Cement Linings to minimize shrinkage/hairline cracks. It is so that the cementitious material will remain hydrated.

A4.g: Proposed change accepted. Specification revised in this Addendum.

Q4.h: **Section 33 05 32 - Steel Liner Pipe**
2.01.C.2 Delete: "~~For pipes more than 24 inches and less than or equal to 66 inches in nominal diameter not ls than 0.3125 inch.~~"
NOTE: Possibly change to: As called out in AWWA C200 specifications, but no less than 0.200 wall thickness.

A4.h: Proposed change not accepted.

Q4.i: **Section 33 05 32 - Steel Liner Pipe**
E: Modify: Sliplined pipe inside the PCCP shall have lengths in accordance with AWWA C200 ~~Section 33 05 23.2,~~ but no longer than 20 feet or where grout rings are required by the engineer.

A4.i: Proposed change not accepted.

Q4.j: **Section 33 05 32 - Steel Liner Pipe**
2.02 Materials
2.02.A Clarify: If steel pipe is required to use 42,000 ~~45,000~~ Yield Strength material.
NOTE: Why can't 42,000 Yield Strength be used in design.

A4.j: Proposed change not accepted.

Q4.k. **Section 33 05 32 - Steel Liner Pipe**
2.04.A.2 Delete: ~~Double welded lap joints and butt …..~~
NOTE: Replace with: In conformance with AWWA C206.

A4.k: Proposed change not accepted. Note there are no double welded lap joints proposed on the project. So, this is only required on buttstraps.

Q4.l: **Section 33 05 32 - Steel Liner Pipe**
2.06.A Delete: ~~Section 09 91 00~~

A4.l: Proposed change not accepted.

Q4.m: **Section 33 05 32 - Steel Liner Pipe**
2.06.1 Modify: When shop-applied interior linings, or exterior coatings shall be held back…. If welded joints are used.

A.4.m: Proposed change not accepted.

Q5.a: **Section 33 05 23.2 - Steel Liner Installation Inside Existing Pipe**
2.06.A.3 Add: Gasketed joints are accepted in the tunnel and lining will not have a hold back required. Lining will go from end to end without field painting required.

A5.a: Proposed change not accepted. Contractor can suggest this as a Value Engineering Suggestion during construction. Steel pipe at this diameter does not typically allow the use of rubber gasketed joints.

Q5.b: **Section 33 05 23.2 - Steel Liner Installation Inside Existing Pipe**
Part3 Execution 3.01.A Modify/Clarify: The manufacturer will match the joints to the existing PCCP at the grout rings and anchor ring locations in accordance with AWWA C200 specifications. Steel pipe joints are not to be longer than 20 feet. ~~Match the joints in the steel liner to the joints in the existing PCCP at grout ring and anchor ring locations. The steel liner sections shall be no longer then the PCCP sections, unless approved in writing by the Engineer.~~ Approval of alternate plans will be at the Engineer's discretion….
NOTE: See attachment Link:
If this is not accepted – How long are the PCCP joints? It does not make sense to match the joints to this manufacturer.

A5.b: Proposed change not accepted. Note the reason the pipe must match the length of the PCCP is so the pipe can be deflected where the PCCP is deflected. If the joints do not match the PCCP joints it is likely the Contractor will have difficulties accommodating deflections in the PCCP.

Q5.c: **Section 33 05 23.2 - Steel Liner Installation Inside Existing Pipe**
3.01.C Delete: The used of …may be permitted in accordance with AWWA C200 specifications. ~~provided that the attachment is removed, and the base metal is returned to satisfactory condition…~~

A5.c: Proposed change not accepted.

Q5.d: **Section 33 05 23.2 - Steel Liner Installation Inside Existing Pipe**
3.07.A.1 Modify: Remove tack welds or joint stop used to position the pipe during laying **if located on the Interior of the pipe**….

A5.d: Proposed change not accepted.

Q5.e: **Section 33 05 23.2 - Steel Liner Installation Inside Existing Pipe**
3.07.A.2 Delete: …~~Weld the bell end longitudinal seam as applicable before placing the next liner section.~~

A5.e: Proposed change accepted. Specification revised in this Addendum.

Q5.f: Section 33 05 23.2 - Steel Liner Installation Inside Existing Pipe
3.07.D.2 Delete: ~~Weld inside and outside of all lap welds for pipe 24 inches in diameter and larger.~~

A5.f: Proposed change accepted. Specification revised in this Addendum.

Q6: Section 09 91 00 Delete: Entire Specification.
NOTE: Mortar coating is not common in this market. NWP only supplies AWWA C222 Polyurethane and C214 Tape coatings. We do manufacture Mortar Coatings in the desert southwest where sulfates are a concern, but in the Norh and Northeast it is typically sulfides that are the issue. That is why we use a bonded coating.

A6: Proposed change not accepted.

Questions Received from American Ductile Iron Pipe:

Q1: Section 33 05 32, Part 1.01.A

Section reads as follows:
"This Section specifies requirements for fabricated steel pipe, joints, fittings, and specials that are installed inside the existing PCCP or riveted steel pipe, buried, submerged, encased, or otherwise specified on the drawings and specifications.
1. Provide polyethylene lining for the steel pipe, joints, fittings, and specials in accordance with Section 09 96 00.01 - Polyurethane Lining for Steel Pipe.
2. See Section 40 05 24 - Steel Process Pipe for process steel pipe located in TAPS or the WPCF for pipe with diameters less than 14-inch diameter."

Revision reads as follows:
"This Section specifies requirements for fabricated steel pipe, joints, fittings, and specials that are installed inside the existing PCCP or riveted steel pipe, buried, submerged, encased, or otherwise specified on the drawings and specifications.
1. Provide cement mortar lining for the steel pipe, joints, fittings, and specials in accordance with Section 09 96 00.01 per AWWA C205 - Cement Lining for Steel Pipe.
2. See Section 40 05 24 - Steel Process Pipe for process steel pipe located in TAPS or the WPCF for pipe with diameters less than 14-inch diameter. "

Justification:
Cement motor is a time-tested lining that has been used in various applications. Cement lining is a more cost effective lining and will reduce manufacturing time.

A1: Suggested revised wording is not accepted.

Q2: Section 09 96 00, Part 2.02
Section reads as follows:
1. Lining: LifeLast Inc. DuraShield 210-61 NSF, 310-61 NSF or equal

Questions are as follows:
Will the owner approve Lifelast 110 as an approved equal? LifeLast 110 is commonly used as a polyurethane lining in force main applications and is more readily available.

A2: The alternative product will be evaluated during construction to determine if meets the "or equal" requirements. The product is not currently approved.

Q3: Section 33 05 32, Part 2.07

Section reads as follows:

A. Legibly mark installation sequence number on pipe, fittings, and specials in accordance with lay drawings accepted for construction.
    1. Special pipe sections and fittings shall be marked at each end with notation “TOP FIELD CENTERLINE.”
    2. Mark/paint the word “TOP” on outside top spigot of each pipe section.
    3. Mark “TOP MATCH POINT” for compound bends per AWWA C208 so end rotations can be easily oriented in field.
B. Mark the joint stab depth on the exterior of pipe spigots to indicate the limits of the joint stab for installation.

Revision reads as follows:
A. Legibly mark installation sequence number on pipe, fittings, and specials in accordance with lay drawings accepted for construction.
    1. Special pipe sections and fittings shall be marked at each end with notation “TOP FIELD CENTERLINE.”

Justification:
Straight pipe can be installed at any orientation. Identifying a “Top” notation will slow the manufacturing process and increase installation time for a contractor, thus increasing cost. A field “Top” notation should be required for specials and fittings.

Section B. can be removed because it is unnecessary for installation and can increase installation time for contractors. Contractors can measure the stab depth in the field.

A3: Proposal is accepted. Specification revised in this Addendum.

Q4: Section 33 05 32, Part 2.08.B

Section reads as follows:
A. Shop Nondestructive Testing:
    1. Welds: 100 percent visually examined by CWI to criteria in ASME BPVC SEC VIII, Division 1.
    2. Fillet Welds: 100 percent examine using penetrant test method inspection.
    3. Welds in field joints not suitable for soap and compressed air testing shall be examined and evaluated by the liquid penetrant inspection procedure in accordance with this Section. Defects shall be chipped out; the section shall be rewelded and reexamined to ensure the defect has been removed.
    4. Air test collars and wrappers in accordance with AWWA C606.
    5. All shop weld tests shall be reviewed and signed by the CWI. C. Source Quality Control - Liquid-Penetrant Testing:”

Revision reads as follows:
B. **“**Shop Nondestructive Testing:
    1. Welds: 100 percent visually examined by CWI to criteria in ASME BPVC SEC VIII, Division 1.
    2. Fillet Welds: 100 percent examine using magnetic particle test method inspection or magnetic particle test method inspection.
    3. Air test collars and wrappers in accordance with AWWA C606.
    4. All shop weld tests shall be reviewed and signed by the CWI. C. Source Quality Control - Liquid-Penetrant Testing:”

Justification:
PT testing for fillet welds will not be able to accurately test for fillet welds as the scan of the weld will register the back side of the weld as a flaw in the weld. MT testing is a common test done for fillet welds and is an accurate way to test for fillet welds. MT testing is the industry standard and is conducted per AWWA M11 and C200.

Dye testing is impractical for field testing. Welding will become part of the critical path because both sides of the weld need to be visible for the test. Sub-section 3. Should be removed. Welds should be field tested in accordance with AWWA M11.

A4: Proposal is accepted. Specification revised in this Addendum.

Q5: Request for Section 33 05 32, Part 2.05.B

Section reads as follows:

B. Pipe Outlets:
   1. 12-inch and smaller pipe:
      a. ASME B16.1, cast iron or ductile iron, 125 pounds; or ASME B16.5, steel, 150 pounds, galvanized in accordance with ASTM A153/A153M were used with galvanized pipe.
   2. Larger than 12-inch pipe:
      a. ASME B16.5, steel, 150 pounds; galvanized in accordance with ASTM A153/A153M were used with galvanized pipe; or AWWA C207 and AWWA C208, fabricated from flanges and steel pipe, respectively.

Revision reads as follows:

B. Pipe Outlets:
   1. 12-inch and smaller pipe:
      a. ASME B16.1, cast iron or ductile iron, 125 pounds; or ASME B16.5, steel, 150 pounds, galvanized in accordance with ASTM A153/A153M were used with galvanized pipe; or AWWA C207 and AWWA C208, fabricated from flanges and steel pipe, respectively.
   2. Larger than 12-inch pipe:
      a. ASME B16.5, steel, 150 pounds; galvanized in accordance with ASTM A153/A153M were used with galvanized pipe; or AWWA C207 and AWWA C208, fabricated from flanges and steel pipe, respectively.

Justification:
AWWA C207 is an equivalent standard to ASME B16.1 and is the industry standard.

A5: Proposal is accepted. Specification revised in this Addendum.

Q6: Section 33 05 32, Part 3.01.D

Section reads as follows:

D. Protect pipe form UV degradation using methods approved by Owners' Representative. UV exposure of pipe shall not exceed 180 days. After this period, pipe may be subject to rejection.

Justification:
This section needs to be removed because the performance of the polyurethane coating will not be affected by UV degradation.

A6: Proposal is rejected.

Questions from Thompson Pipe: Several questions were received from Thompson Pipe and are related to Section 33 31 11.23 Fiberglass Reinforced Plastic Pipe.

Q1: Modify PRODUCTS 2.01 ACCEPTABLE PRODUCTS

A1: Specification revised to read: "Acceptable products for the specified FRP include ~~**Flowtite**~~ FRP by Thompson Pipe Group or approved equal." Specification revised in this Addendum.

Q2: Part 3.08 - FRP Pipe Design Schedule:
TPG Standard FRP PIPE DN63 PN100 SN18 ID:62.87“ OD:64.45”

A2: Response: Suggestion of change to specification to 62.87 inch ID FRP Pipe is not accepted. The 62.87 ID FRP pipe is a 63-inch nominal FRP size. All 63” nominal FRP sizes are acceptable. It is understood that 63-inch nominal FRP is not exactly 63-inch ID.

Suggestion of change to specification to 62.87 inch ID FRP Pipe is not accepted. The 62.87 ID FRP pipe is a 63-inch nominal FRP size. All 63” nominal FRP sizes are acceptable. It is understood that 63-inch nominal FRP is not exactly 63-inch ID.

Q3: Drawing C-105 - Will you please confirm restrain joints will be needed in areas out what has been identified on drawing No, C-105 with no thrust restraint?

A3: The locations of where thrust restraint is required are shown on the table on Sheet C-105. The table was not legible in the original bid documents. See addendum #1 sheet C-105 for locations requiring thrust restraint.

Q4: Drawing C-425

A4: The pipe diameter was shown incorrectly as 64” nominal on the drawings between Sta 165+00 to 167+37.52. The drawing is to be corrected to read the diameter is 63” nominal between Sta 165+00 to 167+37.5 Drawing revised in this Addendum.

Q5: Part 3.06 - Field Hydrostatic Testing

A5: Specification revised to read:
~~#3 Leakage will not be allowed for welded Steel Pipe.~~ “Leakage will not be allowed for FRP pipe.”
Specification revised in this Addendum.

Section	Description of Change
00 01 10	Add Section 02 04 00 - Changed Site Conditions for Trestle T-2
00 42 43	Under the Unit Price Breakdown for Item 5 (i.e., Trestle Locations 1 and 2 Rehabilitations/Repairs) in Section 00 42 43 - Proposal, the following will be revised. Revised Item 5.10 - Grout Bag Closure Wall - Quantity: 225 - Unit: CFT • Add Item 5.12 - Slide Rail System - Quantity: 1 - Unit: EACH • Renumber Item 5.11 - Site Restoration to Item 5.13
00 42 43	Modify Bid Item 7 Description to be Phase 2B 72-inch Forcemain Rehabilitation from Sta 118 + 00 to 167 + 50 and Sta 2+48 to Sta 4+45.
00 42 43	Modify Bid Item 10 Description to be TAPS Utility Relocations for Work by Utility Companies.
00 42 43	Increase Amount of Bid Item 10 Allowance for TAPS Utility Relocations by Utility Companies to be $175,000.
00 42 43	Modify Bid Item 14 Description to be Phase 2B 72-inch Forcemain Rehabilitation from Sta 4+45
01 11 00	Revise first sentence of 1.01. C.2 Phase 2B-Base Bid item a. to read “Install the new liner from Sta 118+00 to 167+00 (Third Avenue Pump Station) and from Sta 2+48 (Vault No. 2) to Sta 4+45.

01 11 00	Add item 1.08 Audio Video Survey- Contractor shall furnish the Engineer with an "Audio/Video Route Survey record of the existing conditions for all work areas prior to the start of construction at work locations in accordance with Section 01 33 00 Submittal Procedures Item 1.13.
01 11 00	Add Item 1.09 Temporary Earth Retention Systems-Contractor to provide submittals for Engineer Approval prior to construction for all Temporary Earth Retention Systems necessary for open excavations for work at the TAPS, WPCF and Insertion Pit locations. Submittals to be prepared by professional engineer to assume responsibility for the temporary earth support and protection of existing parallel forcemains including preparation of shop drawings and a comprehensive engineering analysis of the support systems by a qualified Engineer registered in the State of Michigan. licensed in Michigan.
01 22 01	Modify.
02 04 40	Section 02 04 00 - Changed Site Conditions for Trestle T-2 will be added to the Contract Documents, a copy of which accompanies this Addendum.
01 22 01	Modify Item 7 to read: Item 7-Phase 2B 72-inch Forcemain Rehabilitation from Sta 118 +00 to Sta 167 + 50 and Sta 2+48 to Sta 4 +45.
09 96 34	Section 09 96 34 - Heat Shrinkable Polyolefin Coating will be added to the Contract Documents in its entirety and a copy accompanies this Addendum.
33 05 32	Section 33 05 32 - Steel Liner Pipe shall be replaced in its entirety and a copy accompanies this Addendum.
33 05 23.2	Section 33 05 23.2 Part 3.07.A.2 - Delete: …~~Weld the bell end longitudinal seam as applicable before placing the next liner section.~~
33 05 23.2	Section 33 05 23.2 -**3**.07.D.2 Delete: ~~Weld inside and outside of all lap welds for pipe 24 inches in diameter and larger.~~
33 31 11.23	Section 33 31 11.23 Part 2.01 "Acceptable products for the specified FRP include ~~Flowtite~~ FRP by Thompson Pipe Group or approved equal."
33 31 11.23	Section 33 31 11.23 Part 3.06 Field Hydrostatic Testing - ~~#3 Leakage will not be allowed for welded Steel Pipe.~~ - "Leakage will not be allowed for FRP pipe"
Sheet	**Description of Change**
S-T-002	On Sheet S-T-002 of the plan set, the following will be revised, and Sheet S-T-002 will be reissued in its entirety, a copy of which accompanies this Addendum: • Add "Slide Rail System Item 5.12" EA, 1 to the Quantities Table • Remove "Grout Bag Closure Wall Item 9" CF, 450 from the Quantities Table • Edit T-2 Top Plan and elevation views to eliminate Item 9 callouts and add Item 11

S-T-013	On Sheet S-T-013 of the plan set, Note 2 will be revised to read as follows, and Sheet S-T-013 will be reissued in its entirety, a copy of which accompanies this Addendum: SUBMIT DESIGN MIX PER SPECIFICATION SECTION 02 04 00
C-425	The pipe diameter was shown incorrectly as 64” nominal on the drawings between Sta 165+00 to 167+37.52. The drawing is to be corrected to read the diameter is 63” nominal between Sta 165+00 to 167+37.52.
C-401	Add callout to identify lining of 72” forcemain from Sta 2+ 48 (Vault No. 2) to Sta 4+50 as part of Phase 2B Lining Base Bid Item 7.
C-701	Added Sheet C-701 Maintenance of Traffic Plan for work on River Oaks Drive road closure for Pit 6.

Attachment(s) to Addendum:

- Section 00 01 10
- Section 00 42 43
- Section 02 04 00
- Section 09 96 34
- Section 33 05 32
- Sheet S-T-002
- Sheet S-T-013
- Sheet SK-1
- Sheet C-701

This Addendum is hereby incorporated into the original Contract Documents for the bidding referred to above and is considered as binding as though originally appearing therein. Receipt of this Addendum must be noted in the place provided in Section 00 42 43 - Proposal, dated **June 24, 2024.**

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40 05 07 - Pipe Hangers and Supports for Process Piping

40 05 07.13 - Seismic Restraints for Piping

40 05 07.16 - Expansion Control for Piping

40 05 24 - Steel Process Piping

40 05 31.13 - Solvent Welded PVC and CPVC Pressure Pipe

40 05 45 - Piping System Identification

40 05 57.13 - Manual Actuators

40 05 57.23 - Electric Motor Actuators

40 05 60 - Valves

40 05 78.23 - Air Vacuum Valves

40 06 20.13 - Power Actuated Valve and Gate Schedule for Process Services

40 71 13 - Magnetic Flow Meters

40 72 00 - Level Measurements

40 90 00 - Process Instrumentation, Controls and Monitoring Equipment - General Requirements

40 91 00 - Instrumentation and Controls

DIVISION 43 - PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT

43 05 11 - General Requirements for Equipment

DIVISION 46 - WATER AND WASTEWATER EQUIPMENT

END OF SECTION 00 01 10

SECTION 00 42 43
PROPOSAL

Owner: City of Flint

Project: Third Avenue Pumping Station Forcemain Rehabilitation

Project Location: 2301 University Avenue, Flint MI 48504 MI

BIDDER INFORMATION

Bidder Name: _____

By (Printed Name): _____

Signature: _____

Address: _____

Phone No: _____

Email: _____

The Bidder proposes and agrees, if their Bid is accepted, to enter into an Agreement with the City of Flint in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in the Agreement, and in accordance with the Contract Documents.

In submitting their Bid, Bidder represents, as more fully set forth in the Agreement, that:

1. Bidder has examined copies of all Contract Documents (consisting of Plans dated Ready for Bidders date and Project Manual dated Ready for Bidders date) which Bidder understands and accepts as sufficient for the purpose, including any and all Addenda officially issued, the receipt of which has been acknowledged.
   A. Addendum _____ Acknowledged by: _____ Date: _____
   B. Addendum _____ Acknowledged by: _____Date: _____
   C. Addendum _____ Acknowledged by: _____ Date: _____
2. Bidder has examined the surface and subsurface conditions where the Work is to be performed, the legal requirements and local conditions affecting cost, progress, furnishing or performance of the Work, and has made such independent investigations as Bidder deems necessary.
3. Their Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any Agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for himself any advantage over any other Bidder or over the Owner.
4. The Bidder agrees to complete the Work, in accordance with the Contract Documents, for the following Contract Price:

See Next Page for Base Bid

Base Bid:

Item	Description	Quantity	Unit	Unit Price	Amount
1	Mobilization	1	LSUM	$_____	$_____
2	Third Avenue Pumping Station (TAPS) Modifications for New Header	1	LSUM	$_____	$_____
3	Forcemain Valve Vaults and Piping Modifications at Water Pollution Control Facility (WPCF)	1	LSUM	$_____	$_____
4	Temporary Bypassing Pumping System at WPCF during Outlet Modifications	1	LSUM	$_____	$_____
5	Trestle Locations 1 and 2 Rehabilitation/Repairs	1	LSUM	$_____	$_____
6	Phase 2A 72-inch Forcemain Cleaning and Internal Inspection-TAPS to WPCF	1	LSUM	$_____	$_____
7	**Phase 2B 72-inch Forcemain Rehabilitation from Sta 118 + 00 to 167 + 50 and Sta 2+48 to Sta 4 + 50**	1	LSUM	$_____	$_____
8	Testing of Existing 50-inch and Rehabilitated 72-inch Forcemain	1	LSUM	$_____	$_____
9	Owner Controlled Contingency Allowance	1	LSUM		$3,900,000
10	**TAPS Utility Relocations for Work by Utility Companies**	1	LSUM		**$175,000**
11	SCADA Allowance	1	LSUM		$20,000

Unit Price Breakdown for Item 5 - Trestle Locations 1 and 2 Rehabilitation/Repairs:

Item	Description	Quantity	Unit	Unit Price
5.1	Pressure Injection of Non-Weeping Crack Repair, Type 1	60	LFT	$_____
5.2	Concrete Surface Repair, Type 2A	40	SFT	$_____
5.3	Concrete Surface Repair, Type 2B	25	SFT	$_____
5.4	Sawcut Form and Pour Repair, Type 3	1.5	CYD	$_____
5.5	Brick Repointing Repair, Type 4	25	LFT	$_____
5.6	Protective Coating Repair, Type 5	6,800	SFT	$_____
5.7	Guardrail Post Repair, Type 6	7	EA	$_____
5.8	Replacement Steel Support Beams	1,450	LBS	$_____
5.9	Blast and Recoat Steel Supports	3,160	SFT	$_____
5.10	Grout Bag Closure Wall	**225**	CFT	$_____
5.11	Flowable Fill Beneath Footings	22	CYD	$_____
5.12	**Slide Rail System**	**1**	**EACH**	**$_____**
5.13	Site Restoration	1	LSUM	$_____

Note: The Unit Price Breakdown for Item 5 (table above) should equate to the Unit Price (Lump Sum) entered into Item 5 in the Base Bid.

Additive Alternates:

Item	Description	Quantity	Unit	Unit Price	Amount
12	Phase 2C 72-inch Liner Sta 78+50 to Sta 118+00	1	LSUM	$_____	$_____
13	Phase 2D 72-inch Liner Sta 40+80 to Sta 78+50	1	LSUM	$_____	$_____
14	Phase 2E 72-inch Liner Sta 4+45 to Sta 40+80	1	LSUM	$_____	$_____

Bid Summary:

Base Bid Total for Phase 1, 2A and 2B (Items 1 through 11)
$_____
Base Bid + Additive Alternate Phase 2C (Items 1 through 12)
$_____
Base Bid + Additive Alternates Phase 2C and 2D (Items 1 through 13)
$_____
Base Bid + Additive Alternates Phase 2C, 2D and 2E (Items 1 through 14)
$_____

B**idder's Chosen Pipe Liner Material and Supplier:**

_____

5. The Bidder by submitting a Bid, thereby certifies that Bidder or a qualified designated person in Bidder's employ has examined the Contract Documents provided by the Owner for bidding purposes. Further, they certify that Bidder or Bidder's qualified employee has reviewed the Bidder's proposed construction methods and finds them compatible with the conditions which Bidder anticipates from the information provided for Bidding.
6. The Bidder by submitting a Bid agrees to complete the Work under any job circumstances or field conditions present and/or ascertainable prior to bidding. In addition, Bidder agrees to complete the Work under whatever conditions Bidder may create by Bidder's own sequence of construction, construction methods, or other conditions he may create, at no additional cost to the Owner.
7. The Bidder by submitting a Bid, declares that Bidder has familiarized them self with the location of the proposed Work and the conditions under which it must be constructed. Also, Bidder has carefully examined the Plans, the Specifications, and the Contract Documents, which Bidder understands and accepts as sufficient for the purpose and agrees that Bidder will Contract with the Owner to furnish all labor, material, tools, and equipment necessary to do all Work specified and prescribed for the completion of the Project.
8. The Bidder will provide a bid bond, in the amount of at least **five (5)** percent of the amount Bid, drawn payable to City of Flint as security for the proper execution of the Agreement.

9. The Bidder by submitting a Bid agrees that if awarded Contract, to sign the Agreement and submit satisfactory bonds and certificates of insurance coverage and other evidence of insurance required by the Contract Documents within 15 days after the date of Owner's Notice of Award.
10. The Bidder by submitting a Bid agrees that time is of the essence and, if awarded Contract, that the Work will be Completed on or before the dates/days as specified in the Agreement.
11. Liquidated damages, as specified in the General Conditions, Supplementary Conditions and Agreement, shall also apply to the Substantial Completion date.
12. Engineering and inspection costs incurred after the final completion date shall be paid by the Contractor to the Owner as specified in the Conditions of the Contract and Agreement.
13. Proposals may not be withdrawn for a period of 90 days after bid opening.
14. The following documents are made a condition of this Proposal:
    A. Required Bid Security
    B. Legal Status of Bidder
    C. Non-Collusion Affidavit

SECTION 02 04 00
CHANGED SITE CONDITIONS - TRESTLE T-2

PART 1 GENERAL

1.01 GENERAL DESCRIPTION

A. As depicted in the Drawings, the Trestle T-2 footing was found partially undermined during inspections in November 2023.

B. In April 2024, the City DPW placed soil backfill and riprap around T-2 and the surrounding embankment where erosion and undermining were evident. Prior to placing the backfill and riprap, the DPW placed an unknown number of pre-packaged concrete mix bags beneath and around the T-2 footing foundation.

1. See Sheet S-T-001 for the Trestle T-2 location in plan view.
2. See Sheet S-T-002 for dimensions of the undermined area beneath the footing.
3. See Sketch SK-1 at the end of this Specification for additional information describing the changed site conditions.
4. See photos at the end of this Specification documenting the conditions in November 2023 and April 2024.

C. Per the bid documents, the bearing support of the T-2 foundation is to be re-instated by placing flowable fill in the voids beneath and around the T-2 footing. Prior to placing the flowable fill, the Contractor will be required to remove the rip rap and backfill in the work area surrounding Trestle T-2 to install a dig and push style shoring system, “Slide Rail System Item 11” or approved equal.

D. The means and methods for completing this Work shall be formalized in a document and submitted to the Owner for review as “Slide Rail System Item 11.”

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 33 00 - Submittal Procedures

1.03 SUBMITTALS

A. The “Slide Rail System Item 11” package shall be submitted to the Owner for review of design concept a minimum of four (4) weeks prior to the start of construction.

B. The “Slide Rail System Item 11” package shall be signed and sealed by a licensed Professional Engineer currently registered in the State of Michigan.

C. Contractor shall not perform any work until “Slide Rail System Item 11” package has been reviewed for design concept and accepted by Owner in its entirety.

D. The “Slide Rail System Item 11” package shall include:

1. Survey/Structure Monitoring Points for monitoring movement at Trestles T-1 and T-2.
2. A Slide Rail System Work Plan and Calculation Package clearly illustrating the intended equipment, procedures, and shoring system components to complete the Work and engineering calculations confirming the appropriateness of the selections being submitted.
3. Submit in accordance with Section 01 33 00 - Submittal Procedures.

E. Information shall be submitted in an organized package for each submittal type. Incomplete submittals will be rejected without review.

F. Contractor shall not be relieved of responsibility for errors, omissions, or deviations from requirements of the Contract Documents by the Engineer's review and acceptance of the submittal packages described herein. Nor shall the Contractor be relieved of responsibility if construction operations and/or equipment deviate from what was submitted by the Contractor

and reviewed by the Engineer unless the Contractor has specifically informed the Engineer in writing of such intended deviation and the Engineer has given written acceptance of the specific deviation.

1.04 "SLIDE RAIL SYSTEM ITEM 11" SUBMITTAL REQUIREMENTS

A. Survey/Structure Monitoring Points

1. Retain the services of a third-party Professional Land Surveyor currently licensed in the State of Michigan to place survey monitors/monuments on Trestles T-1 and T-2, establishing exact elevations at fixed points to act as Structure Monitoring Points (SMPs). Clearly identify SMPs and record existing elevations before any construction operations commence near or around Trestles T-1 and T-2.
2. Provide a minimum of two (2) monitors/monuments per Trestle T-1 and T-2. Submit dimensioned plan and elevation views, illustrating locations of monitors/monuments.
3. During construction, survey SMPs daily, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if any changes in elevations occur or if cracks, sags, or other damage is evident in the adjacent structures.
4. Leave monitors in place until after Slide Rail System has been removed and before application of "Protective Coating Repair Type 5" unless instructed otherwise by Engineer.

B. Slide Rail System Work Plan and Calculation Package:

1. The Slide Rail System Work Plan and Calculation Package shall be signed and sealed by licensed Professional Engineer currently registered in the State of Michigan and shall include the following:
   a. Calculations for the determination of equipment and soil surcharges and appropriate earth slopes adjacent to the Slide Rail System for completion of the Work including:
      1) Cut sheets for governing equipment intended for use to complete the Work, showing dimensioned plan and elevation views, axle/wheel spacing, weights and weight distribution used in the calculations.
      2) Placement and travel path(s) of the proposed equipment used in the calculations.
   b. Details including dimensioned plan and section views of dig and push style shoring system around Trestle T-2, Slide Rail System or approved equal.
   c. Calculations for design of the Slide Rail System including:
      1) Evaluation of construction equipment and soil surcharge loads on shoring system.
      2) Determination of configuration and sizing including panels, spreader posts, corner posts, and roller beams as required.

1.05 LIMITATIONS AND ASSUMPTIONS

A. Slide Rail System Work Plan and Calculation Package limitations shall include the following:

1. Install Structure Monitoring Points and record existing elevations before any construction operations commence near or around Trestles T-1 and T-2.
2. Remove the rip rap and soil backfill from the north (upslope) and south (downslope) sides of the footing. Take care to sequence the removal such that equal depths of material are removed symmetrically from each side of the Trestle to maintain a balanced load condition.
3. Install Slide Rail System.
4. Excavate area the Slide Rail System down to footing. Remove grout bags, loose backfill soils, wood, and debris from void space beneath footing. Take care not to disturb in-situ soils that are supporting the footing around the void.
5. Place "Flowable Fill Beneath Footings Item 10" per detail on Sheet S-T-013.

6. Flowable Fill shall have a minimum unconfined compressive strength of at least 150 pounds per square inch (PSI). For remainder of flow fill mix design and submittal requirements, see Specification Section 33 30 00.
7. Allow grout to cure for a minimum of 7 days or until it has reached at least 85% of the minimum unconfined compressive strength as confirmed with cylinder tests before backfilling to proposed grade per Sheet C-601.
8. The trestles and their foundations shall be assumed to be structurally isolated from the piping (i.e. there is no lateral bracing or resistance provided by the piping against sliding or overturning of the trestle).

See Next Pages for SK-1 and Photos

SK-1 replaces this page

November 2023- Trestle T-2 looking Southwest

April 2023- Trestle T-2 looking Southwest

November 2023- Trestle T-2 before grout bags and debris removal

April 2023- Trestle T-2 after grout bags and debris removal

November 2023- Trestle T-2 looking West before backfill and rip rap

April 2023- Trestle T-2 looking West after backfill and rip rap placement

April 2023- Trestle T-2 before backfill looking North

November 2023- Trestle T-2 after backfill looking North

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 02 04 00

Addendum 02
Issued 06-24-2024

SECTION 09 96 34
HEAT SHRINKABLE POLYOLEFIN COATINGS FOR CONNECTIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section specifies heat shrinkable sleeves (polyolefin) for all buried bolted joints and couplings of steel pipe.

B. Section includes Post-welded or 'Weld after Backfill' (WAB) joints defined as welded pipe joints that have been coated and backfilled prior to completing interior welds.

1.02 REFERENCE STANDARDS

A. Referenced Standards: 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 Water Works Association (AWWA):

a. C216, Heat Shrinkable Cross-Linked Polyolefin Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.

1.03 QUALIFICATIONS

A. Heat shrinkable polyolefin coatings shall be applied by personnel trained by manufacturer and experienced in application of heat shrinkable polyolefin coating systems. Provide evidence of training.

B. Where WAB is specified, demonstrated welding techniques must be provided to limit damage to the exterior heat shrink sleeve. Procedures for WAB must be submitted for review by the Owner's representative. Owner reserves the right to require a testing program demonstrating the installation of WAB Sleeves.

1.04 SUBMITTALS

A. Procedures: Section 01 33 23 - Submittal Procedures.

B. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.

C. Check marks (✓) denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. Engineer is the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

D. Affidavits of Compliance: Contractor shall submit the manufacturer's certification that all work performed under this Specification complies with the requirements of this Specification and the appropriate ANSI/AWWA standards.

E. Manufacturer's certification that raw materials and sheet materials comply with required materials, mil thickness, and material properties.

F. Manufacturer/Installer quality control requirements.

G. Product technical data including:

1. Manufacturer’s surface preparation and application instructions.

    a. A training manual to facilitate applicator training and certification. The training information shall be applicable to pipe sizes used in the project. The information shall include:

        1) Tools required

        2) Surface preparation

        3) Methods and equipment for preheating and application

2. Procedures for sleeve application, roller and hand tool usage, sleeve closure, and finishing.

H. WAB Procedures and WAB Plan:

1. Sleeve technical data per 1.04 C through F.

2. Weld materials and procedures.

3. Special installation techniques and requirements for WAB Procedures including at a minimum:

    a. Low heat welding procedure, process, welding materials, number of passes, voltage, amperage, travel speed, and calculated heat input.

    b. Method of measuring pipe wall temperature.

    c. Method of assuring the clearance between the bell and spigot faying surfaces (joint gap) does not exceed 1/8-inch maximum.

4. Testing Program where required by Owner/Engineer. Quality control and craftsmanship requirements for all phases of the application and for the finished sleeve

5. A procedure from the heat-shrink sleeve manufacturer for repair of sleeves that become damaged in the field. The procedure shall specify materials, tools, and methods required to prepare and apply repair materials as required in this section.

6. Procedures for performing holiday and finish thickness inspection of each sleeve.

7. Certification of training provided by manufacturer for individuals installing these products.

8. Samples.

Addendum 02
Issued 06-24-2024

1.05 QUALITY ASSURANCE

A. Manufactures Field Services: Prior to the first application of the heat-shrink sleeves, the Contractor shall retain a technical representative from the material manufacturer during the first 4 days of sleeve application in the field to provide assistance and training in application of sleeves to ensure proper application.

1. The manufacturer's technical representative shall train and certify the applicators in accordance with the procedures submitted.

2. The technical representative shall provide training and certification for new applicators as required.

3. The technician shall be available to respond within 24 hours at the fabrication site or jobsite during the remainder of the project at the discretion of the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Heat shrinkable sleeves shall be compatible with the pipe shop and field-applied coating systems.

2.02 NON-WAB HEAT SHRINKABLE POLYOLEFIN COATINGS

A. Acceptable manufacturers/Products:

1. The following manufacturers are acceptable for heat shrinkable polyolefin coatings and butyl rubber based extruded filler material for Non-Weld After Backfill (WAB) pipe joints:

a. Canusa.

b. Berry Plastics.

B. Apply heat shrinkable coatings that consist of material fabricated from cross-linked polyolefin sheet with adhesive that conforms to pipe contours and shape when heat is applied.

C. The adhesive may be either mastic or hot-melt type compatible with polyolefin coating. Supply adhesive and backing as one prefabricated product from the same manufacturer.

D. Provide Type I Heat Shrinkable Polyolefin Coatings with the following minimum thicknesses:

1. Adhesive thickness: 45 mils

2. Backing thickness: 36 mils

3. Fully Recovered Sleeve Thickness: 105 mils

E. Provide heat shrinkable sleeve designed for use in this specific application and of sufficient size (sleeve length) to completely wrap pipe diameter with manufacturer's recommended overlap after heat shrinking. Provide minimum 6 inches of overlap.

F. Provide standard recovery sleeve for welded steel pipe fittings. \ High recovery sleeves shall be provided for mechanical, bell and spigot, ductile iron pipe, flange fittings, and coupling style fittings.

G. Butyl Rubber Based Extruded Filler:

1. Provide tacky non-hardening butyl rubber based extruded filler sized to fill transitions between bell and spigot joints or other surface profile changes when applying heat shrinkable polyolefin coatings.

H. Backfill:

1. Backfill materials in vicinity of heat-shrink sleeve shall contain aggregates 3/4-inch in size or smaller.

2.03 WAB HEAT SHRINKABLE POLYOLEFIN COATING

A. Heat shrink systems shall be specifically designed for the WAB procedure with a demonstrated history of successful installation. The following manufacturers are acceptable for heat shrinkable coatings for WAB pipe joints:

1. Canusa-CP Aqua-shield AQW-WAB,

2. Berry Plastics CPG – Covalence Water Wrap-WAB System

3. or equal

B. Joint coating and heat shrink systems shall be specifically designed for the WAB procedure.

C. Provide heat shrink wrap in a width such that when centered over the weld location the wrap extends a minimum of 6 inches over the adjacent pipe coating or as recommended by the heat shrink wrap manufacturer. Overlapping ends of the wrap should align evenly. Filler mastic materials shall be nonflammable, high temperature materials with 500-degree F flash point.

D. WAB welding shall be completed with a minimum of two weld passes. Three passes or more will be required for steel thickness greater than 0.375 inches, and as required to meet the specified welding procedures. These requirements are in addition to the maximum coating temperature limitations.

1. Welding speed, amperage, and voltage shall be controlled to assure the maximum heat input will not result in a sustained surface temperature at the coating/steel interface that exceeds 500 degrees F.

2. The weld temperature and duration shall not result in excessive carbonization of the heat shrink adhesive or adversely affect the integrity of the heat shrink sleeve. Carbonization is defined as the loss of volatile organic compounds that result in loss of tackiness, adhesion to the steel, and corrosion protection properties.

3. The finished heat shrink shall not have any creases or folds which are visible in the joint coating backing material or that extend through both the inner protective layer and outer joint sleeve. A slight surface deformation of the shrink sleeve may be deemed acceptable if the underlying layers are not compromised beyond the carbonization described above.

E. Backfill:

1. WAB joints shall be fully buried, with backfill material compacted per requirements of these specifications, prior to welding, with not less than 12 inches soil cover or flowable fill material on all sides. Gravel backfill shall not be permitted for WAB installation. CLSM, sand, or clay must be used to backfill around joints.

2.04 WAB TESTING PROGRAM

. Test Program must be performed on an initial section of pipe installed to verify the coating, heat shrink sleeve systems and WAB welding procedure.

A. The Test shall be performed in the field using actual construction installation conditions. Contractor must show that the operation will not damage the coating system or heat shrink wrap system to the Engineer's satisfaction.

B. Temperature Verification:

1. The interior steel temperature will be taken along the weld using an infrared thermometer to determine highest interior weld temperature, taken approximately 3 inches below the actual welding arc, concurrent to the welding and documented. This documented temperature will be the maximum limit allowed for the welders using this welding procedure.

    a. Engineer may designate up to three random weld temperature verifications concurrent to the welding to assure the welding is being performed as required.

    b. Owner may designate the two other tests at random at any time during the pipe installation.

2. Upon completion of each test section, Contractor shall excavate and expose the test pipe joints.

C. The third-party inspector will inspect the weld test joints and perform tests to confirm compliance with AWWA C216 Standard and AWS D1.1 Welding Code.

1. Third-party inspector will also perform a visual inspection and perform destructive and non-destructive tests in accordance with AWWA C216 and C222 to confirm there was no damage to the heat shrink sleeve or adjacent coatings.

    a. Sleeves shall have no visible burns

    b. Sleeves shall not have excessive wrinkles.

    c. Sleeves shall have no holidays.

    d. Sleeves shall have no areas of disbonded coating or disbonding of the heat-shrink sleeves except for the limited carbonized zone described above.

D. Where a WAB test joint has passed the visual inspection, it shall be tested using adhesion pull testing methods as defined in AWWA C216. Adhesion testing shall be performed at a point 2 inches from the center of the weld. Results of the testing shall be recorded and evaluated as follows:

1. Record all adhesion pull test data.

2. Determine the minimum field adhesion from two 'passing' (visual inspection) pipe joints.

3. Compare this minimum value to 50 percent of the recommended adhesion values in C216.

4. Use the higher number as the field acceptance adhesion criteria.

E. If it becomes apparent that the Contractor's welder or methods are not producing suitable results with the WAB process, then the right to use that method will be retracted and the Contractor will be required to use the Weld Before Backfill (WBB). The change to WBB will be performed by the Contractor at no additional cost to Owner.

PART 3 EXECUTION

3.01 PREPARATION

A. Store products in dry, ventilated area in original sealed container. Avoid exposure to direct sunlight, rain, snow, dust or other adverse environmental conditions. Avoid prolonged storage at temperatures below 0 degrees Fahrenheit or above 90 degrees Fahrenheit.

B. Clean exposed pipe and pipe coating around pipe joint with manufacturer approved cleaner to remove oil, grease and other contaminants. Remove rough or sharp areas from pipe.

3.02 APPLICATION

A. Firmly block the pipe in place by backfill or other means prior to application of the heat shrinkable sleeve. After the heat shrinkable sleeve is applied, allow no further pipe alignment adjustments.

B. Ensure the width of heat shrinkable sleeve width is sufficient to overlap the polyurethane coating by a minimum of 6 inches.

C. Preheat pipe and install sleeve according to manufacturer's recommendations.

D. Fill changes in pipe surface profile using butyl rubber based extruded filler.

E. Follow manufacturer's recommendations and apply heat shrinkable sleeve or wrap. Apply closure piece if using heat shrinkable wrap.

F. Shrink the wrap or sleeve until adhesive begins to ooze at the sleeve edges.

G. Monitor pipe temperature using a surface temperature gauge, infrared thermometer, or color changing crayons.

H. Finish shrinking the sleeve with long horizontal strokes of a hand roller over the entire surface to ensure a uniform bond. Use hand roller to gently roll the sleeve surface and push any trapped air up and out of the sleeve while the sleeve is still hot.

I. At locations where pipeline includes a Pass Through for Weld Leads, confirm the width of heat shrinkable (full pipe diameter) sleeve is sufficient to overlap the Pass Through hole and overlap the existing coating by a minimum of 6-inches beyond the hole in both directions.

J. Do not double sleeves and overlap two or more heat shrink sleeves to achieve the necessary width.

K. Allow the sleeve to cool before moving, handling, or backfilling. In hot climates, provide shading from direct sunlight.

L. Know that water quenching will be allowed only when permitted by the heat shrinkable sleeve manufacturer.

M. Remove and replace heat shrinkable sleeves which have become wrinkled or disbonded because of prolonged exposure to UV light or thermal cycling.

N. Do not apply heat shrinkable sleeves when there is water or slurry in bell holes.

3.03 QUALITY CONTROL

A. Visually inspect heat shrinkable polyolefin coating to ensure a smooth surface that is completely bonded, and holiday free. Contractor shall holiday test sleeves using electronic methods similar to method used to test pipe coating. Coating shall be free from bubbles, blisters, pinholes, cracks, wrinkles, delamination, voids, or contamination from foreign materials. The third-party inspector shall be present during visual inspection and holiday testing.

B. Repair small holidays and other imperfections according to the manufacturer's written instructions. Submit written instructions for approval before beginning coating operations.

3.04 COATING REPAIR

A. Repair visual damage or holidays according to manufacturer's written directions and meeting requirements of AWWA C216.

B. Overlap repair area a minimum of 2 inches on each side of damaged area.

C. Cold-applied tape coatings shall not be used to repair heat shrinkable polyolefin coating.

3.05 WAB INSTALLATION

A. Contractor will be required to excavate and expose up to five joints in the first 3,000 feet of pipeline for further examination and testing.

B. Joints to be excavated and exposed will be selected by the third-party inspector.

C. Testing will be comprised of visual inspection and non-destructive electrical holiday tests.

D. Destructive testing will be performed if visual or electrical holiday tests indicate a compromised coating.

E. If it is found that the Contractor's welding procedure damages the heat shrink sleeve coating system:

1. Contractor will be required to modify his welding procedure or replace its welding personnel, depending on the cause of the failure, to the satisfaction of the Owner.

2. Owner shall be entitled to require Contractor to excavate and expose up to 10 additional joints for additional examination and testing.

3. Additional joint exhumation, testing, and repairs shall be at no additional cost to the Owner.

4. Ongoing WAB Auditing:

    a. Owner is entitled to audit joint installation performance throughout the project by requiring Contractor to excavate and expose up to 2 joints per 5,000 feet of pipeline for inspection and testing.

5. Contractor shall modify and test a new welding procedure to the satisfaction of the Owner prior to completing any additional welded joints.

F. Contractor will make all repairs necessary to repair damaged coatings or sleeves caused during exhumation of joints for testing.

G. Joint heat shrink sleeves that are found to have installation defects or were subjected to destructive tests shall be completely removed and replaced.

END OF SECTION 09 96 34

ADDENDUM 01
ISSUED 06-24-2024

SECTION 33 05 32
STEEL LINER PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Section specifies requirements for fabricated steel pipe, joints, fittings, and specials that are installed inside the existing PCCP or riveted steel pipe, buried, submerged, encased, or otherwise specified on the drawings and specifications.

1. Provide polyethylene lining for the steel pipe, joints, fittings, and specials in accordance with Section 09 96 00.01 - Polyurethane Lining for Steel Pipe.

2. See Section 40 05 24 - Steel Process Pipe for process steel pipe located in TAPS or the WPCF for pipe with diameters less than 14-inch diameter.

B. NSF 61 certifications for potable water are not required for linings and coatings.

C. The American Iron and Steel (AIS) provisions apply to this project per Section 00 45 53 - American Iron and Steel Requirements.

D. The steel pipe liner shall be a class IV structural liner per AWWA M28, Appendix A. The liner shall meet the pressure and loading requirements specified in this section without reliance upon the host pipe.

E. ~~**The steel pipe shall have a polyurethane lining and no coating when installed inside a PCCP and shall have polyurethane lining and 1-inch mortar coating when installed in a trench.**~~

E. Steel pipe shall have a polyurethane lining and no coating when installed inside a PCCP pipe. When the pipe is installed in a trench, it shall have a polyurethane lining and either a polyurethane or mortar coating.

F. Exposed steel pipe and fittings within the access manholes shall be polyurethane coated.

1.02 REFERENCE STANDARDS

A. This section incorporates, by reference, the latest revision of the following standards and documents, they are a part of this Section as specified and modified. Where an item contains references to other standards, those documents are included as references under this section as if referenced directly, In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

1. American Association of State Highway and Transportation Officials (AASHTO):

   a. Standard H-20.

2. American Society of Mechanical Engineers (ASME):

   a. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

   b. ASME B16.3 - Malleable-Iron Threaded Fittings: Classes 150 and 300.

   c. ASME B16.5 - Pipe Flanges and Flanged Fittings.

   d. ASME B16.9 - Factory-Made Wrought Buttwelding Fittings.

   e. ASME B16.12 - Cast Iron Threaded Drainage Fittings.

   f. ASME - Boiler and Pressure Vessel Code.

3. ASTM International (ASTM):

a. ASTM A6/A6M - General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.

b. A20 - General Requirements for Steel Plates for Pressures Vessels.

c. ASTM A36/A36M - Carbon Structural Steel.

d. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Casting.

e. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

f. ASTM A105/A105M - Standard Specification for Carbon Steel Forgings for Piping Applications.

g. ASTM A106/A106M - Standard Specifications for Seamless Carbon Steel Pipe for High-Temperature Service.

h. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

i. ASTM A183 - Standard Specification for Carbon Steel Track Bolts and Nuts.

j. ASTM A283/A283M - Low and Intermediate Tensile Strength Carbon Steel Plates.

k. ASTM A370 - Test Methods and Definitions for Mechanical Testing of Steel Products.

l. ASTM A536, Standard Specification for Ductile Iron Casting.

m. ASTM A572/A572M - High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

n. ASTM A1011/A1011M - Sheet and Strip, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy Steel.

o. ASTM A1018 - Sheet and Strip, Heavy-Thickness Coils, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy Steel.

p. ASTM C150/C150M - Standard Specification for Portland Cement.

q. ASTM D297 - Standard Test Methods for Rubber Products-Chemical Analysis.

r. ASTM D395 - Standard Test Methods for Rubber Property-Compression Set.

s. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

t. ASTM D429 - Standard Test Methods for Rubber Property-Adhesion to Rigid Substrates.

u. ASTM D471 - Standard Test Methods for Rubber Property-Effect of Liquids.

v. ASTM D573 - Standard Test Methods for Rubber-Deterioration in an Air Oven.

w. ASTM D2000 - Standard Test Methods for Rubber Products in Automotive Applications.

x. ASTM D2240 - Standard Test Methods for Rubber Property-Durometer Hardness.

y. ASTM E165/E165M - Practice for Liquid Penetrant Examination

4. American Welding Society (AWS):

a. A42.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

b. A3.0 - Standard Welding Terms and Definitions.

c. AWS D1.1/D1.1M - Structural Welding Code – Steel.

d. QC 1 - Standard for AWS Certification of Welding Inspectors.

5. American Water Works Association (AWWA):
    a. AWWA C200 - Steel Water Pipe 6 Inches and Larger.
    b. AWWA C203 - Coal-Tar Protective Coatings and Linings for Steel Water Pipelines-Enamel and Tape-Hot Applied.
    c. AWWA C205 - Standard for Cement-Mortar Protective Lining and Coating for Steel Water Pipe-4 Inches and Larger-Shop Applied.
    d. AWWA C206 - Field Welding of Steel Water Pipe.
    e. AWWA C207 - Standard for Steel Pipe Flanges for Waterworks Service-Sizes 4 inches Through 144 inches.
    f. AWWA C208 - Standard for Dimensions for Fabricated Steel Water Pipe Fittings.
    g. AWWA C209 - Standard for Cold-Applied Tape Coating for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.
    h. AWWA C214 - Standard for Tape-Coating Systems for the Exterior of Steel Water Pipelines.
    i. AWWA C222 - Polyurethane Coatings for Interior and Exterior of Steel Water Pipelines.
    j. AWWA C602 - Standard for Cement-Mortar Lining of Water Pipelines in Place-4 inches and Larger.
    k. AWWA C606 - Standard for Grooved and Shouldered Joints.
    l. AWWA C651 - Disinfecting Water Mains.
    m. AWWA M11 - Steel Pipe: A Guide for Design and Installation.
6. International Organization for Standardization (ISO):
    a. ISO 9001 - Quality Management Systems.
7. NACE International (NACE):
    a. RP0274-74 - Standard Recommended Practice.

1.03 QUALITY ASSURANCE

A. Design Calculations:
    1. A registered Professional Engineer licensed in Michigan shall design pipe fittings, and specials in accordance with the requirements specified, in service loading conditions (internal pressure, dead and live loads, seismic loads) and to withstand the Contractor's means and methods during installation, backfill and testing.
    2. Registered Professional Engineers shall have a minimum of 5 years of experience designing similar calculations and similar size pipe transmission systems.

B. Basis of Design:
    1. Steel pipe, fittings, and specials shall be fabricated type for pipe 24-inches and larger and may be either fabricated or mill type for pipe 24-inches and smaller. All items shall be the sizes, dimensions, and shapes indicated on the Drawings or specified herein.
    2. The specified size of fabricated pipe, fittings, and specials shall be the nominal inside diameter, in inches, where 12-inches and smaller, and the actual inside diameter of pipe lining where 14-inches and larger. Where stab joint pipe is permitted and two or more wall thicknesses are required for pipe of the same size, pipe size may be adjusted slightly to allow the different classes of pipe to be stabbed together.

3. The specified size of mill pipe, fittings, and specials shall be the nominal pipe size as set forth in ANSI/ASME B36.10.

4. Pipe design shall be performed by the pipe manufacturer. Minimum design criteria shall be as specified.

5. Pipe Wall Thickness. Pipe shall be designed for all conditions indicated in the Steel Pipe Schedule and on the drawings.

6. The wall thickness for internal pressure due to hoop stress shall be determined by the following formula.

   T = (PD)/(2s),

   where:

   t = the pipe wall thickness in inches

   S = the allowable fiber stress in psi, shall not exceed

   50 percent of the minimum yield strength of the steel plate at working pressure or 75 percent of the minimum yield strength at the larger of field test pressure or working pressure plus surge pressure. The yield strength used in the calculation for cement mortar coated pipe shall not exceed 36,000 psi. ~~**The yield strength used in the calculation for cement mortar coated pipe shall not exceed 42,000 psi.**~~

   P = the pipe working pressure or the larger of field test pressure or working pressure plus surge pressure in psi.

   D = the pipe outside diameter, in inches of straight pipe sections or the larger outside diameter of tapered sections.

7. Unless otherwise indicated, the working pressure and the working pressure plus surge pressure shall be as indicated in the Steel Pipe Schedule. The pipe wall thickness shall be in accordance with AWWA M11, except that all pipes shall have a wall thickness of at least 1/4 inch, and a diameter to wall thickness ratio not to exceed D/240 unless otherwise indicated in the Steel Pipe Schedule.

8. Pipe wall thickness shall be constant for the entire length of pipe for each pipe class, location, or service indicated in the Steel Pipe Schedule unless otherwise indicated on the drawings or specified. External loads on buried pipe shall be based on the prism load and the following design conditions:

Maximum Pipe Deflection, percent of nominal pipe diameter	3.0 percent
Minimum Design Cover Depth	See Steel Pipe Schedule
Maximum Design Cover Depth	See Steel Pipe Schedule
Total Design External Load On Pipe	See Steel Pipe Schedule
E', Modulus of Soil Reaction	800 psi to 10 feet of cover, 1200 psi over 10 feet of cover (all location except as indicated below) 700 psi from stations 290+00 and 300+00
K, Bedding Constant	0.090
Weight of Soil	120 lbs/cu. ft.
Deflection Lag Factor	1.25
Live Load	AASHTO HS-20 other
Impact Factor	1.5

Note: The maximum pipe deflection shall be reduced if required by the jointing system furnished

9. The pipe shall be designed to withstand full internal vacuum (-14 psia) under the buried conditions and for external loading under the flood conditions at ground surface or as otherwise indicated on the Drawings, when empty.

C. Pipe Manufacturer and Fabricator Qualifications:

1. Certification or Equal: ISO 9000.
2. Experienced in fabricating pipe of similar diameters, wall thicknesses, grade and lengths specified and shall have the production capability to meet the schedule requirements of this project.
    a. Experience shall include successful fabrication to AWWA C200 standards of at least 30,000 linear feet of 48-inch diameter of larger pipe, with wall thickness of ¼ inches or greater, in the United States (USA) in the past 5-years.
    b. Experience shall be applicable to fabrication plant facilities and personnel, not company or corporation that currently owns fabrication facility or employs personnel.
3. Experienced in fabricating fittings and specials of similar diameters, wall thickness, grade and configurations specified and shall have the production capability to meet the schedule requirements of this project.
    a. Experience shall include successful fabrication to AWWA C200/AWWA C208 standards of at least 25 fittings of 60-inch diameter or larger pipe, with all thickness 3/8 inch or greater, in the United States (USA) in the past 5-years.
    b. Experience shall be applicable to fabrication shop facilities and personnel, not company or corporation that currently owns fabrication facility or employes personnel.

D. Field Welding Subcontractor:

1. Perform all field welding (except tack welding) through either one of two welding subcontractors.
2. Welding subcontractor(s) shall show experience of successfully completing the single welded lap joints for over 2,000 feet of pipe (48-inch or larger) in the last 5 years. For each project referenced, submit client names, contact person, and phone number of each.
3. Welding subcontractor(s) shall show current license in state of Michigan.
4. Welding subcontractor(s) shall submit with each monthly invoice:
    a. Certified payrolls showing payment of employees FICA, workers compensation, and taxes.
    b. Demonstrate hourly payment of employees.
5. Unit work payment of welders (employees) is not allowed.

E. Welders and Welding Operators:

1. Shop Welders: In accordance with ASME BPVC SEC IX.
2. Field Welders: In accordance with AWS D1.1/D1.1M.
3. Welding qualifications shall be current within the last 6 months.

F. Welding Procedure Specification:

1. All welding procedures used to fabricate and install pipe shall be in accordance with the ASME Boiler and Pressure Vessel Code (BPVC) for shop welds and AWS D1.1/D1.1M for field welds. Welds qualified per the ASME BPVC shall include Supplementary Essential

Variables for notch tough welding. All provisions of AWS D1.1/D1.1M pertaining to notch tough welding shall apply.

a. Qualified by testing in accordance with ASME BPVC SEC IX for shop welds and AWS D1.1/D1.1M for field welds.

b. Procedure Qualification Records (PQRs) conducted on unlisted base metal (most coil products are unlisted base metals) to be production welded as required in the referenced welding Code shall be traceable to heat lots.

c. Written WPS required for welds, both shop and field.

d. Notch-tough welding that requires heat input control shall be required:

1) AWS D1.1/D1.1M prequalified welding procedures are not allowed.

2) WPS used to shop fabricate pipe shall be qualified per ASME BPVC SEC IX and shall include Supplementary Essential Variables.

3) WPS used to field install pipe shall be qualified for heat input control in accordance with AWS D1.1/D1.1M.

4) PQRs shall be qualified for notch tough welding with consideration for thickness of steel, test temperature, and Charpy V-notch CVN values. Refer to AWS D1.1/D1.1M, Table 4.6 PQR Supplementary Essential Variable Changes for CVN Testing Applications Requiring WPS Requalification for SMAW, SAW, GMAW, FCAW, and GTAW and Section 4, Part D Requirements for CVN Testing, Option A (three specimens). The CVN test temperature and acceptance shall be the same as pipe base metal specified herein.

G. Certified Welding Inspector (CWI):

1. Contractor shall provide third-party certified welding inspector (CWI) in accordance with AWS QC 1, with 5 years or more, professional experience of welding inspection similar to the Work.

a. Third-party inspector performing visual inspection of welds must be qualified and currently certified as Certified Welding Inspector (CWI) in accordance with AWS QC1, Standard for Qualification and Certification of Welding Inspectors.

b. Third-party inspector performing nondestructive tests shall be qualified and certified to the requirements of SNT TC 1A.

H. NDT Quality Control Personnel:

1. In accordance with requirements of Recommended Practice No. SNT-TC-1A, Level II.

2. After receiving NDT qualification, NDT personnel shall have at least 5 years of professional experience related to NDT inspection similar to the Work.

3. SHOP HYDROSTATIC PRESSURE TEST:

a. In accordance with AWWA C200 Section 5.2, except as follows:

1) Unless specified otherwise, testing of pipe, fittings, and specials shall be performed before lining and coating is applied.

2) Maintain test pressure for at least 1 minute and for sufficient time to observe all weld seams do not leak.

3) Fittings and Specials:

(a) If fabricated from untested straight pipe, test to minimum pressure equal to field test pressure indicated in the Pipe Schedule in the drawings.

(b) Except as otherwise specified herein, no additional shop hydrostatic test will be required on fittings and specials fabricated form successfully tested straight pipe.

(c) Hydrostatic test all fabricated fittings and specials with crotch plates. Testing will be required regardless of whether starting pipe sections used were previously tested.

1.04 SUBMITTALS

A. Procedures: Section 01 33 00 - Submittal Procedures.

B. A copy of this specification section with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.

C. Check marks (✓) shall denote full compliance with a paragraph as a whole. Deviations shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Include a detailed, written justification for each deviation. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

D. Action Submittals:

1. Submit Line Lay Drawings and Shop Drawings per paragraph 1.05 of this Section:
    a. Fabrication and Material information.
    b. Line lay out information including alignment, grade, design details and calculations.
    c. Welding information.
    d. Shop Certifications.
2. Written Welding Procedures Specifications (WPSs) in accordance with AWS D1.1/D1.1M, for all shop and field welds.

E. Informational Submittals:

1. Blind flanges and flange connections.
    a. Bolting Patterns and bolting torques and installation sequence from gasket supplier for proper seating of flange gaskets for each size and pressure rating.
2. Certificates:
    a. Mill certificates including certificates of compliance for steel pie, coatings & linings.
    b. Manufacturer’s Certificate of Compliance that products furnished meet requirements of this Specification.
3. Statements of Qualification:
    a. Pipe manufacturer and fittings/specials fabricator.
        1) Facility Quality Assurance/Control Plan.
        2) ISO 9000 Certification for the facility or Equal/
    b. Welding operator/subcontractor qualification and certified payrolls.
    c. Welders or Welding Operators:
        1) Name of welder and certification stamp number.
        2) Welding procedures/positions for which welder is qualified.
        3) Certification date and current certification status.

d. Certified Welding Inspector.

e. Non-destructive testing Quality Control Personnel.

4. Shop and Field Welding Information and Procedures:

a. At a minimum includes a complete welding code paper trail with linkage to Shop Drawings that includes the following:

1) Written welding procedures specifications (WPS) and procedure qualification records (PQRs)

(a) Monitoring pipeline temperatures during installation.

(b) Provide complete joint dimensions and details showing bevels, groove angles, root face, and root openings for all welds.

(c) Notch-tough welding shall be required. For shop welding, address supplementary essential variables in addition to essential variables as indicated in ASME Section IX, QW-251.2.

(d) For field welding, heat-input, control PQR essential variables as indicted in AWS D1.1/D1.1M shall be included. For shop and field welding, provide heat-input table on WPS's for welder guidance.

(e) PQRs for notch-tough welding shall document heat-input control by monitoring volts, amps, and travel speed or time-rate of change of weld metal volume as calculated by measuring change in electrode length over a period of time. Charpy V-notch tests shall be conducted on weld metal and heat affected zone. Test coupons shall be oriented transverse to final direction of rolling. Full size Charpy specimen test acceptance shall be same as base metal specified herein.

2) Written Non-destructive testing (NDT) procedures.

3) Written description of pipeline installation with sequencing by station and of fittings, specials, temperature control joints, closure pieces, dished heads (temporary and permanent).

b. Written consumable control procedure for welding materials demonstrating:

1) How consumables will be stored to comply with manufacturer's written instructions.

2) How consumables will be dried in ovens prior to use.

3) How consumables which become wet will be reconditioned.

c. Written weld repair procedures.

F. Constructions Submittals:

1. Record copies of issued permits.

2. Record copies of fabrication inspection and testing results.

a. Fabricators Hydrostatic testing

b. Destructive weld testing

c. Nondestructive weld testing

d. Steel impact testing using Charpy V-notch method.

e. Coating and lining factory site visit letter by qualified manufacturer's technical representative.

3. Field Quality Control Test Reports:

a. Weld tests, including re-examination of repaired welds, on each weld joint for the following tests, as applicable:

1) Visual Testing (VT)

2) Radiographic Testing (RT)

3) Ultrasonic Testing (UT)

4) Magnetic Particle Testing (MT)

5) Liquid Penetrant Testing (PT)

6) Leak Testing (LT)

4. Hydrostatic Field Testing Plan: Submit field hydrostatic test procedure.

5. AIS step certification letter(s) as applicable to the Work. Refer to Specification 01 11 00.

G. Line Lay Drawings and Shop Drawings:

1. Provide complete pipeline layout prepared by the pipe manufacturer/fabricator, in accordance with AWWA M11. Provide the following minimum information:

a. Fabrications and Materials Information:

1) Provide a unique number, location, and direction of each pipe, fitting, or special. Number each component in order of the installation sequence.

2) Pipe, fitting and special details for both temporary and permanent components including:

(a) Materials of construction with applicable ASTM standards, provided grade, cylinder thickness, manufacturing tolerances.

(b) Design details and calculations including those fittings, flanges, specials, and reinforcement not specifically detailed on the drawings.

(c) Developed plan dimensions, wall thickness, reinforcement at openings, etc.

(d) Lining and coatings provided, including type, thickness, supplier, and product name (e.g., DuraShield 201-61)

3) Chemical analysis and mechanical properties test reports that indicate the steel conforms to the requirements specified.

(a) Provide verification from two samples per heat lot in production.

b. Line Layout Information:

1) Stationing and elevation as shown on Drawings including:

(a) Changes in grade or horizontal alignment.

(b) Horizontal and vertical curves and bends, start, end, point of inflection, radius, joint deflection, end condition, and spool lengths.

(c) Location of each spool piece, fitting, specials, and closure pieces with length adjustment.

(d) Locations of mitered sections, beveled ends, and thermal stress control joints with deep bell lap joints.

(e) Location of welds, type, including lap welds, butt welds, butt straps, weld lead outlets for construction.

(f) Locations of valves, fittings, outlets, and access manways.

(g) Location of Dished heads both those shown and as required, for hydrostatic testing of pipeline. Include details for removal and repair of lining and coatings.

2) Stulling size, spacing and layout.

c. Welding Information (Shop and Field Welding):

1) Show on a weld map, location, type, size, and extent of welds with reference call out for WPS and non-destructive examination (NDE) numbers in tail of weld symbol.

2) Distinguish between shop and field welds.

(a) Indicate, by welding symbols or sketches, details of welded joints and preparation of base metal.

(b) Welding and NDE symbols shall be in accordance with AWS A2.4.

(c) Welding terms and definitions shall be in accordance with AWS A3.0.

(d) Submit welding data together with shop drawings as complete package.

3) Welded joint details, including:

(a) Butt joints

(b) Miter-cut ends for alignment conformance

(c) Lap joints including joint stab length and expected markings and deep laps for control of temperature stresses.

(d) Butt strap joints

4) Provide manufacturing tolerances and maximum angular deflection limitations of field joints.

5) Product data include details of materials, grooved joint piping fittings, gaskets, couplings, grooving of pipe and fittings.

d. Pipe handling equipment and methods for loading and unloading of pipe.

2. Design Calculations:

~~**a. Wall thickness for external loading, special loading (transportation, handling to load/unload, etc.), and internal pressure including fittings, specials, and reinforcement**~~.

a. **Calculations shall be provided showing the pipe, fittings and specials are designed for all loading conditions shown in the Pipe Design Schedule. These calculations shall be signed and stamped by a Professional Engineer registered in the state of Michigan.**

b. Calculations shall as a minimum consider the following:

1) **Design shall assume host pipe is fully deteriorated and liner system shall meet the requirements of AWWA Class IV Structural Capability as applicable and shall withstand any special loading over time associated with continued deterioration of the host steel pipe.**

2) **Design of steel pipe in trenches shall consider all applicable forces such as dead load, live load, groundwater, vacuum and construction loading. See steel pipe design schedule.**

3) **Steel pipe shall be designed per the most current edition of M-11 and C-208 and other applicable specifications and standards.**

4) **Contractor shall design the pipe for the internal working pressure and transient pressure (and its duration) required for the pipe design with the mandatory requirement that all vacuum/air release valves are assumed to be non-functioning. Pipe and fittings shall be designed for the intended installation or jacking pressure and operating pressures.**

5) **Design shall consider all the forces the pipe will experience during installation including but not limited to jacking forces, grouting pressures, transportation forces, blocking forces etc. Maximum allowable deflection shall be in accordance with manufacturer's recommendations.**

6) **The pipe shall be designed to resist the forces shown in Steel Pipe Schedule considering the factors in paragraph 1.03.B.8 above.**

7) **External loads on buried pipe shall be based on the prism load above the pipe and live load per the Steel Pipe Schedule.**

8) **Pipe shall be furnished in the maximum lengths as per the manufacturer with shorter lengths, bends, elbows, tees, fittings, closure or trim pieces as necessary for construction and installation.**

9) **Curves, angles, tees, fittings, closures and bends shall be designed to ensure the correct location of pipeline features and to accommodate installation, lining and field testing. Special bends, curves, and fittings shall be designed to allow for installation inside the existing host pipeline horizontal and vertical bends without requiring open cut excavation.**

10) **Pipe Performance Calculations for sliplined pipe and pipe installed in a trench shall be signed and stamped by a Professional Engineer in Michigan. The design forces shall include the forces below as well as those shown in the Steel Pipe schedule:**

(a) **Design Pressure Evaluation**

(b) **Deflection**

(c) **Surge Pressure**

(d) **Bending, pressure and combined strain**

(e) **Buckling**

(f) **Maximum pushing load**

(g) **Unconfined Buckling**

(h) **Vacuum Pressure**

3. Shop Certifications:

a. Furnish a certified affidavit of compliance for all pipe and other products, materials, or related work provided under this Section. Certifications as specified in AWWA C200, AWWA C205, AWWA C206, AWWA C222 and the following additional requirements:

1) Compliance with the additional requirements included in these Contract Documents.

2) Physical and chemical properties of all steel with applicable ASTM references.

3) Fabricator's hydrostatic test reports

4) Results of production weld tests.

(a) Sand, cement, mortar and coating tests. Coating tests shall include, at a minimum: holiday testing, adhesion testing, thickness test, and applicable chemical and property testing.

ADDENDUM 01
ISSUED 06-24-2024

1.05 DELIVERY, HANDLING, AND STORAGE

A. Pipe damaged, as determined by the Engineer, during delivery, handling, storage, or installation shall be repaired or replaced at no additional cost to the Owner.

B. Delivery:

1. Securely bulkhead or otherwise seal ends of pipe, specials, and fittings prior to loading at manufacturing site.

~~**2. Pipe ends shall remain sealed until installation.**~~

2. Do not roll or drop the pipe on the ground or allow the pipe to fall from the truck. Dragging or skidding of pipe on grade or in the trench will not be permitted.

C. Loading, transporting, unloading, and handling pipe and fittings:

1. Handle pipe in a manner and by methods that prevent damage to pipe, lining, and coatings. Take all necessary precautions to maintain the integrity of the coating.
2. Handle pipe with proper equipment and do not be push or drag along the ground.
3. Use padded slings and supports during handling as necessary to prevent damage.
4. Do not stack or otherwise loaded externally pipe such that the dimensional integrity of the joint configuration and/or roundness of the pipe may be compromised.

D. Storage and Handling:

1. Meet requirements in Section 01 60 00 - Product Requirements.
2. Support pipe securely to prevent accidental rolling and to avoid contact with mud, water, or other deleterious materials.
3. Support on sand or earth berms free of rock exceeding 1-inch in diameter.

E. Inspection:

1. Inspect pipe lining and coating immediately before installation for damage and holidays.
2. Repair damaged pipe lining and coatings or reject in accordance with specified criteria for identifying and making minor repairs.
3. Mark and remove rejected pipe form the project site.

1.06 EXISTING UTILITY AND POTHOLE INFORMATION

A. Call for utility locates to identify existing utilities including appurtenances proximate to, parallel to, or crossing the pipeline.

B. Pothole all utilities and appurtenances including utilities and appurtenances not marked but evident from field observations that are proximate to or may conflict with the pipeline. Notify Engineer and Utility Owner of any conflicts.

C. All existing pothole information, including surveyed existing utility elevations, shall be completed, and submitted prior to submittal of line layout information.

1.07 SEQUENCING AND SCHEDULING

A. Notify Engineer in writing of the following:

1. Pipe Manufacturing: Not less than 14 days prior to starting.
2. Not less than 5 days prior to start of each of the following:
    a. Welding
    b. Coating application
    c. Lining application

d. Shop hydrostatic testing

PART 2 PRODUCTS

2.01 GENERAL

A. Manufacturing of steel pipe, fittings, and specials shall be under direction of one pipe Supplier. Responsibility shall include, at minimum, coordinating work of other suppliers for fittings and specials.

B. Pipe shall be manufactured as fabricated pipe per AWWA C200 as modified herein. ASTM pipe manufacturing standard reference in ASSA C200 shall not be used.

1. Steel pipe, fittings, and specials shall be manufactured, tested, inspected, and marked to comply with AWWA C200 and additional requirements of these Contract Documents.

2. Coordinated provided steel cylinder thickness, inside and outside diameter for pipe, spool length, fittings, specials and appurtenances, linings, and coatings. Contractor is solely responsible for coordination of the pipeline system provided, complete and in place.

C. Pipe Cylinder Thickness:

1. Provide pipe, fitting and specials cylinder at the minimum thickness. Do not provide a steel cylinder thickness less than specified.

2. Where not specified, cylinder thickness of pipe, fittings and specials shall be provided to the following minimum requirements:

a. Material per Article 2.0, minimum yield strength 45 ksi.

b. For pipes 24-inches and less in nominal diameter, not less than 1/4-inch.

c. For pipes more than 24-inches and less than or equal to 66-inches in nominal diameter, not less than 0.3125 inch.

D. Pipe Cylinder Diameter:

1. Provide pipe, fitting and specials cylinder diameter as follows unless otherwise accepted:

a. For buried piping with butt welded joints, maintain constant outside diameter of steel cylinder of the same nominal diameter.

b. Force Main Diameter:

1) The outside diameter called shall be the outer surface of the steel plate without any coating.

c. Pipes 36-inch Diameter and Smaller:

1) Diameter called out shall be steel cylinder diameter per ASME B36.10.

d. Pipes within 5 diameters upstream of meters shall have the same inside diameter as the meter (within one percent).

E. Laying Lengths:

1. Maximum pipe laying lengths shall not be limited unless specifically specified.

2. Select lengths to accommodate installation requirements.

3. Sliplined pipe inside the PCCP shall have lengths in accordance with Section 33 05 23.02 - Steel Liner Installation Inside Existing Pipe or Section 33 31 23.02 - Fiberglass Reinforced Plastic Pipe Liner Installation in Existing Pipes, depending on the pipe material used.

2.02 MATERIALS

A. Per AWWA C200, steel pipe as follows:

1. Specified Minimum Yield Strength: ~~**45,000**~~ **42,000** psi
2. Specified Minimum Tensile Strength: 63,000 psi.
3. Pressure Vessel Quality as follows:
    a. Coils: Continuous cast process, fully-killed, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A1018/a101/M, SS, Grade 45 (modified) or greater as specified.
    b. Plate:
        1) Fully killed, conforming to ASTM A20, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A516/A516M, Grade 70 or greater as specified.
        2) Steel Chemistry: Conform to ASTM A516/A516M, Grade 70 or greater as specified. Steel plates that are over 1-inch thick shall be normalized.
    c. Toughness:
        1) Charpy V-notch Acceptance Criteria: Transverse specimen orientation, full size specimens, 25 foot-pounds energy at test temperature of 30 degrees F.
        2) Frequency: See paragraph 2.08 - Steel Toughness Testing.
4. Type, 24 inches and larger, with grooved type couplings and wall thickness less than 1/2-inch: Provided with stub ends, sized as follows, for grooves.
5. Thickness: As recommended by coupling manufacturer, but not less than 1/2-inch.
6. Length: Width of coupling plus 1 inch, but not less than 6 inches.

2.03 FITTING AND SPECIALS

A. Fabrication:
    1. Shop fabricated in accordance with the recommended procedures in AWWA M11 and AWWA C208 as complemented and notified in this Section.
        a. No field fabrication will be allowed.
        b. Fabricate to uniform lengths with proper end clearance for the specified types of joint or attachment without cutting or special work.
        c. Fabricate in units as long as practicable for safe hauling and installation. Minimize number of field welds.
        d. Ends of fittings shall be beveled for welding unless otherwise specified or accepted by the Engineer.

B. Reinforcement:
    1. Reinforce to withstand either internal pressures, both circumferential and longitudinal, or external loading conditions, whichever is greater.
    2. In lieu of collar reinforcement, pipe, fittings, or specials with outlets may be fabricated in their entirety of steel plate having thickness equal to sum of pipe wall plus required reinforcement.

C. Elbows, Tees and Reducers:
    1. Per AWWA C208 and as modified by the requirements of this Section.
    2. Elbows and other fittings made up of section of pipe welded together shall be made of pipe of at least the same wall thickness and grade as the pipe with which connected.
        a. Welding of these made-up fittings shall be in accordance with AWWA C206.

b. Minimum Radius: 2.5 times pipe diameter unless otherwise specified.

D. Outlets:

1. 12 Inches and Smaller: Fabricate from ASTM A53/A53M, Type E or S, Grade B, standard weight steel pipe.

2. Larger than 12 Inches: Fabricate outlet, collar and reinforcement from same material and grade of steel as mainline. Minimum outlet and collar thickness to match the mainline cylinder unless otherwise accepted. Design for test pressure per testing schedule and submit reinforcement calculations with lay drawings.

E. Dished Heads:

1. Per AWWA M11 and AWWA C208

a. One-Piece (seamless) spherically dished (tori-spherical) heads.

F. Crotch Plate:

1. Crotch plates are not allowed on fittings inside vaults or the Area 30 pump station. Increase cylinder thickness or use pipe collars or wrappers to satisfy fitting design requirements.

2. Fabricate from fully killed, fine grain, pressure vessel steel conforming to ASTM A516/A516M, Grade 70, and as follows:

a. Plates shall be normalized.

b. Carbon equivalent shall not exceed 0.45 percent.

c. Sulfur content shall not exceed 0.005 percent. Carbon shall not exceed 0.20 percent. Manganese shall not exceed 1.20 percent.

d. Submit Charpy test for all crotch plate materials.

1) Charpy V notch test in direction transverse to final rolling shall be performed per ASTM A370 on full size specimens of coupons taken from each plate. Acceptance shall be 25-foot pounds at 30 degrees F.

e. Through Thickness tension testing shall be performed with acceptance criteria per Article 5 of ASTM A770/A770M on each plate.

f. Straight Beam Ultrasonic Examination shall be conducted with acceptance criteria per Article 6 of ASTM A435/A435M on each plate.

g. Plates that do not qualify shall not be used.

2.04 WELDED JOINTS

A. Provide joints as specified:

1. Form bell ends by an expanding press or by being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape.

2. Double welded lap joints and butt strap joints shall be tapped and drilled for testing in accordance with AWWA C206.

B. Shop Welded Joints:

1. Fabricate in accordance with AWWA C200 as modified herein.

2. Complete joint penetration (CJP) butt joints shall be used for longitudinal, girth, and spiral welds, unless otherwise indicated.

C. Field Welded Joints:

1. Prepared for field welding in accordance with ANSI/AWWA C200 and AWWA C206.
2. The method used to form, shape, and size bell ends shall be such that the physical properties of the steel are not substantially altered.
3. Bell ends shall be formed by an expanding press or by the pipe being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape.
4. The ends shall not be rolled. Faying surfaces of the bell and spigot shall be parallel, but in no case shall the bell slope vary more than 2 degrees from the longitudinal axis of the pipe.

D. Fit test a minimum of 5 joints, selected by Engineer, of each pipe size used:
1. Join pipe ends with proposed adjacent pipe end.
2. Match mark pipe ends.
3. Record Actual Annular Space.
4. Maximum space at any point.
5. Minimum space at any point.
6. Space at 90-degree intervals; top, bottom, and spring line on both sides.

E. Miter-End Cuts:
1. Welded Lap Joints:
a. Moderate deflections and long radius curves may be made using miter end cuts.
b. Maximum Total Allowable Angle: 1.5 degrees (50% of 3 degrees) per pipe joint.
c. Provide miter-cut that is cold expanded square with face of miter-cut on bell ends only.
d. Mitering of spigot ends will not be permitted.

2.05 FLANGED JOINTS AND FITTINGS

A. Flanges: AWWA C207, Class D or E (as required to meet the test pressure listed in the Piping Schedule), steel ring, and as follows:
1. Match appurtenances flanges to the AWWA pipe flanges.
2. Machine flanges or provide tapered filler for changes in grade or to slope lines for drainage. Attach slip-on flanges to pipe by 2 fillet welds, in accordance with AWWA C207.
3. Weld flanges to pipe or fittings before applying lining.
4. Flanges shall be bolted in accordance with the accepted shop submittals and proper orientation with no air gaps between the flanges after the gaskets are in place.

B. Pipe Outlets:
1. 12-inch and smaller pipe:
a. ASME B16.1, cast iron or ductile iron, 125 pounds; or ASME B16.5, steel, 150 pounds, galvanized in accordance with ASTM A153/A153M where used with galvanized pipe **; or AWWA C207 and AWWA C208, fabricated from flanges and steel pipe, respectively.**
2. Larger than 12-inch pipe:
a. ASME B16.5, steel, 150 pounds; galvanized in accordance with ASTM A153/A153M were used with galvanized pipe; or AWWA C207 and AWWA C208, fabricated from flanges and steel pipe, respectively.

C. Companion Flanges

1. 4-inches and smaller pipe:

a. ASME B16.1, cast iron or ductile iron, 125 pounds; ASME B16.5, steel, 150 pounds, slip-on, or welding neck; or ammonia type for use on chlorine liquid or gas piping.

2. Larger than 4-inch to and including 12-inch pipe:

a. ASME B16.5, slip-on, or welding neck type.

3. Larger than 12-inch pipe:

a. ASME B16.5, steel, 150 pounds; galvanized in accordance with ASTM A153/A153M were used with galvanized pipe; or AWWA C207, steel plate or raised hub type.

D. Bolts:

1. Per Section 40 05 01.

E. Gaskets:

1. Per Section 40 05 01.

2.06 LINING AND COATING

A. Except where otherwise indicated on the Drawings, ~~**lining and**~~ **mortar** coating for steel pipe shall be as specified in Section 09 91 00 - Mortar Coating for Steel Pipelines.

B. Except where otherwise indicated on the Contract Drawings, polyurethane coating shall be specified per Section 09 97 13.23 - Polyurethane Coating.

C. Shop Lining and Coating Hold Backs:

1. Shop-applied interior linings and exterior coatings shall be held back from the ends of the pipe as indicated or as otherwise acceptable to the Engineer.

2. Field lining or coating of pipe, fittings and specials will not be allowed, except at field welded joints and repairs as accepted by the Engineer.

2.07 PIPE MARKING:

A. Legibly mark installation sequence number on pipe, fittings, and specials in accordance with lay drawings accepted for construction.

1. Special pipe sections and fittings shall be marked at each end with notation “TOP FIELD CENTERLINE.”

~~2. Mark/paint the word “TOP” on outside top spigot of each pipe section.~~

~~3. Mark “TOP MATCH POINT” for compound bends per AWWA C208 so end rotations can be easily oriented in field.~~

B. ~~Mark the joint stab depth on the exterior of pipe spigots to indicate the limits of the joint stab for installation.~~

2.08 SOURCE QUALITY CONTROL

A. Steel Toughness Testing:

1. Include three impact specimens; conduct test in direction transverse to final direction of rolling.

2. Coils:

a. Definitions:

1) Initial Charpy Testing requires each coil of each heat be tested to verify uniformity of steel. This test shall be done prior to Production Charpy Testing below.

2) Production Charpy Testing requires a random coil from each heat be tested to verify consistency. This test shall be done after to Initial Charpy Testing above.

b. Conduct Initial Charpy Testing of 5 percent of steel for pipe and specials. Take test coupons from each coil of each heat at locations of outer, middle, and inner wrap of coil. Middle coil test coupons may be taken from ends of full-length pipes that are closes to middle of coil.

c. Conduct Production Charpy Testing on random coil of each heat on 95 percent of steel for pipe and specials.

d. Coils that do not qualify shall not be used in production of pipe.

3. Plate:

a. Conduct Charpy Tests on each plate in accordance with ASTM A20.

b. Conduct on full size (10 mm by 10 mm) specimens from each plate in accordance with ASTM A20.

c. Plates that do not qualify shall not be used in production of pipe.

B. Shop Nondestructive Testing:

1. Welds: 100 percent visually examined by CWI to criteria in ASME BPVC SEC VIII, Division 1.

2. Fillet Welds: 100 percent examine using penetrant test method inspection **or magnetic particle test method inspection.**

3. ~~Welds in field joints not suitable for soap and compressed air testing shall be examined and evaluated by the liquid penetrant inspection procedure in accordance with this Section. Defects shall be chipped out; the section shall be rewelded and reexamined to ensure the defect has been removed.~~

4. Air test collars and wrappers in accordance with AWWA C606.

5. All shop weld tests shall be reviewed and signed by the CWI.

C. Source Quality Control - Liquid-Penetrant Testing:

1. At the discretion of the Engineer, each manual pass, back-chipped weld, and welding groove shall be inspected by liquid-penetrant testing or magnetic-particle testing before the ensuing pass is made.

2. When joints are modified to provide tapered transition reinforcement at joint offsets, the weld-metal buildup shall be examined over the full surface of the deposit by liquid-penetrant examination.

3. Shop welds not tested by the soap and compressed air test shall be tested by the liquid-penetrant inspection procedure specified in ASME BPVC, Section VIII. Welds shall be evaluated on the basis of the requirements provided in the Weld Quality and Repairs paragraph under Fabrication-Welding article herein above.

4. Where temporary attachments have been made, the base metal shall be tested by liquid penetrant and shall be inspected for base metal tears.

D. Owner reserves the right to hire an independent testing agency to observe pipe fabrication.

1. Agency staff shall have experience in observation of steel pipe is being fabricated and while pipe is being fabricated and while protective coating and lining is applied.

E. Provide a letter to Engineer certifying that pipe furnished meets requirements of this section.

2.09 CLOSURES AND CORRECTION PIECES

A. Closures and correction pieces shall be provided as required so that closures may be made due to different heading in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing specified.

B. Correction pieces and closure assemblies shall be shown on the pipe lay drawings and shall be subject to the Engineer's review. Changes in location our number of correction pieces or closure pieces shall be approved by the Engineer.

2.10 STULLING (STRUTTING)

A. Provide strutting for specials, fittings, and straight pipe to avoid damage or distortion during handling, storage, hauling and installation.

1. Strutting shall be placed as soon as practicable after the pipe is fabricated or the mortar lining has been applied and shall remain in place while the pipe is loaded, transported, unloaded, installed, and backfilled at the jobsite.

2. Install in accordance with accepted submittal and in manner that will not ham lining.

B. Materials, size and spacing shall be adequate to prevent deflection and support the earth backfill plus greater loads which may be imposed by the backfilling and compaction equipment. Materials:

1. Shop-Lined Pipe: Wood stulls

2. Unlined Pipe: Steel or wood.

3. The ends of stulls shall have cap which prevents the stull from damaging the polyurethane lining.

C. Spacing:

1. Great than 48 inch through 72-inch diameter pipe:

a. Install nominal 4 inch by 4 inch, minimum 6-point wooden stulls or equivalent with nailed wooden wedges, at the quarter pints, following the cure of the lining.

2. Greater than 30 inches to 48-inch diameter pipe:

a. Install nominal 3 inch by 3 inch, 4-point wooden stulls or equivalent with nailed wooden wedges at the quarter points, following the cure of the lining.

3. 30 inch and smaller diameter pipe:

a. Install 2-inch by 4-inch (nominal) stulls both ways 2 feet from the end of each pipe.

D. End of Pipe:

1. A set of struts shall be set 2 feet from each end of the pipe spool. Struts at the ends of the pipe shall be of an equally spaced six-point pattern with one of the struts placed in the vertical orientation.

PART 3 EXECUTION

3.01 DELIVERY AND TEMPORARY STORAGE AT SITE

A. Meet requirements of Section 01 60 00 - Product Requirements.

B. Transport pipe to the project site on padded bunks with nylon tie-down straps to protect the pipe.

C. Pipe must be supported and 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 or timber cradles.

D. Protect pipe form UV degradation using methods approved by Owners' Representative. **UV exposure of pipe shall not exceed 180 days.** After this period, pipe may be subject to rejection.

E. Installation of pipe of fittings with damage or damaged linings or coatings is not allowed. Patching's/repairs as required by manufacturer's printed procedures. Where damage cannot be repaired to the approval of the Engineer, replace defective pipe and fittings.

3.02 HANDLING OF PIPE

A. Lifting points shall be no closer than the 1/3 and 2/3 points along the length of the pipe section. Lift pipes with spreader beams wide belt slings or as recommended by the pipe manufacturer. Do not use cable slings or chains directly bearing on the pipe.

3.03 SANITATION OF PIPE INTERIOR

A. Before placement of pipe in the trench, clean any foreign substances. Soil or debris observed shall be removed by brushing, scraping or washing.

B. During layout operations, do not place stools, food, clothing, trash or other material in the pipe. Keep pipe free of all debris.

C. When pipe laying is not in progress, including the noon hour, close the ends of the pipe with vermin and child-proof plug.

D. Completely clean the interior of the pipe following pipe laying and after necessary interior pipe repairs but prior to testing.

3.04 PLACEMENT OF PIPE IN TRENCH

A. Inspect each pipe and fitting before lowering into the trench. The Owners Representative may inspect all pipe prior to installation for damage to pipe, coatings, and linings. Clean ends of pipe thoroughly.

B. Install the pipe in accordance with AWWA C604.

1. Control water in trench; trench bottom shall be as dry as possible.

2. Horizontal and vertical deflections shall be on alignment show on plans. Fabricated horizontal and vertical elbows shall be at locations shown in plans.

C. Lay pipe directly on the bedding material so the bedding 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.

1. 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 of coating repair.

2. No blocking will be permitted unless otherwise specified or accepted by the Engineer as part to the accepted shop submittal.

D. Lay each section of pipe to line and grade as shown on the accepted lay drawing submittal. Installation tolerances shall be as follows:

1. 48 inches or less nominal diameter:

a. Line and grade, within plus or minus 2 inches horizontal deviation and plus or minus 1-inch vertical deviation.

2. 48 inches and larger nominal diameter:

a. Laid to line and grade, within plus or minus 5 percent of diameter horizontal deviation and plus or minus 2.5 percent of diameter horizontal deviation.

3. No high or low points other than those on the laying diagram are introduced.

4. Pipe deflection, after backfilling shall not exceed allowable limits for the provided pipe.

a. Deflection shall be measured by the difference in vertical inside diameter in the installed pipe and the manufactured pipe.

b. Minimum rate of deflection testing frequency shall be a minimum of on measurement of every 1000 feet of pipeline or as determined by the Engineer.

5. Pipe not conforming to these criteria, or which otherwise impact the ability to complete the Work shall be removed and reinstalled in full conformance with the Contract Documents.

E. Do not remove the stulls until the backfill is complete, or for at least 3 days after completing CLS placement, whichever is longer.

F. Coat and/or wrap buried flanges, bolts and metal as specified. Extend the coating or wrapping over the flanges and bolts and secure it around the adjacent pipe circumference.

G. Install appurtenances per the applicable specification section.

H. For each section of pipe, record the invert elevation at the lower end and incorporate the data on the record documents.

3.05 JOINTS

A. Joints shall be provided in accordance with the accepted shop submittals.

1. Make minor field adjustments by pulling standard joints.

a. Maximum Allowable Angle: 75 percent of manufacturer's recommended, or angle that results form 3/4-inch pull out form normal joint closure, whichever is less.

3.06 INSTALLING FLANGED PIPING

A. Install in accordance with AWWA C115/A21.15.

1. Set pipe with the flange bolt holes straddling the pipe horizontal and vertical centerline.

2. Fabricated pipe and outlets so the flange face is set flat and perpendicular to pipe centerline.

3. Install pipe without springing, forcing or stressing the pipe or any adjacent connecting valves or equipment. Before bolting up, align flange faces to the design plane within 1/16 inch per foot measured across any diameter. Align flange bolt holes within 1/8-inch maximum offset.

4. Inspect and clean bolts, nuts, washers, and flange faces by wire brushing before installing gasket and adjoining flange. Inspect gasket seating surfaces, gasket, each bolt, nut, washer, and facing on which the nuts will rotate. Replace any damaged item.

5. Lubricate threads of carbon steel bolts and nuts with oil and graphite prior to installation. Assemble all bolts, nuts and washers in the flange, then nuts in a progressive diametrically opposite sequence and torque with a calibrated torque wrench. All clamping torque shall be applied to the nuts only.

6. Bolt lengths shall extend completely through their nuts and project a minimum on 1/4 inch.

7. When bolting flange joints, exercise care to ensure that there is not restraint on opposite end of pipe or fitting which would prevent uniform gasket compression or would cause unnecessary stress, bending or torsional strains to be applied to cast flanges or flanged fittings. Allow one flange free movement in any direction while bolts are being tightened.

8. Gradually tighten flange bolts uniformly to permit even gasket compression.

a. Do not assemble adjoining flexible joints until flanged joints in piping system have been tightened.

b. Do not use more than one gasket between contact faces in assembling a flanged joint.

c. Place washer under all nuts and bolt heads. Do not damage coated surfaces during installation.

9. If flanges leak under pressure testing, loosen, or remove the nuts and bolts, reset or replace the gasket reinstall or retighten the bolts and nuts, and retest. Joints shall be watertight under full test pressure, Replace galled, cracked or distorted bolts and nuts.

3.07 FIELD WELDED JOINTS

A. After the pipe and pie joint are properly positioned the trench, weld and provide internal and external joint protection for all joints.

1. Remove tack welds or joint stop used to position the pipe during laying **if located on the interior of the pipe**.

2. Equally distribute any annular space between the laying surfaces of the bell and spigot around the circumference of the joint by shimming, jacking or other suitable means.

3. Where exterior welds are performed, provide adequate space for welding and inspection of the joints.

B. Make weld in accordance with AWWA C206.

1. Where more than 1 pass is required, peek to relieve shrinkage stresses on each pass except the first and final one; and remove all dirt, slag an flux before the succeeding bead is applied.

2. Place no more than a 1/8 inch of weld material on each weld pass using a combination of stitch and weave weld.

3. Do not weld galvanized pipe.

C. Welders shall be qualified pursuant to the provision of AWWA C206. Perform field welding by welders certified by ASME Boiler and Pressure Vessel Code.

1. Welders' testing shall be at the Contractor's expense, including cost of test nipples, welding rods and equipment.

2. Weld operators shall mark their assigned identification number and the last two numbers of the year in which the Work was completed on the completed weld or the Contractor may provide record system that traces a welders work completion to a specific joint. Steel stamping directly on pipe will not be permitted unless "low stress" die stamps, such as interrupted dot or round nose types are used.

D. Lap Welded Joints:

1. During installation of welded steel pipe in either straight alignment or on curves, the pipe shall be laid so that at any point around the circumference of the joint there is a minimum lap as show on the Drawings.

~~**2. Weld inside and outside of all lap welds for pipe 24 inches in diameter and larger.**~~

2. All welds shall be inspected visually and using the liquid penetrant test per this section of the specifications.

3.08 PIPE INSTALLED INSIDE AN EXISTING PIPE

A. See Section 33 05 23.02 - Steel Liner Installation Inside Existing Pipe

3.09 FIELD HYDROSTATIC TESTING

A. Preparation:

1. The Contractor shall supply all equipment, materials, and labor required to perform hydrostatic testing.

2. All lining, welding, testing of field joints, curing, and backfilling shall be completed before hydrostatic testing.
3. After appurtenant structures have reached their 28-day strength, the Contractor shall test the line or structure under the hydrostatic pressure specified in this section.
4. Subject to the approval of the Engineer, the pipeline may be tested as a single unit or in multiple reaches. Contractor shall furnish and install the required bulkheads. The location and design of bulkheads shall be approved prior to fabrication. Bulkheads shall be adequate to withstand the required pressures without causing damage to or excessive stresses in the pipe.
5. Water for hydrostatic testing shall be secured by the Contractor.
6. Contractor shall furnish meters for measuring the water used; valves and fittings for making connections to outlets; and hoses, piping, pumps, and other materials required to convey water to the test reaches.
7. Contractor shall provide suitable calibrated tanks or flowmeters for the measurement of leakage, and shall furnish the piping, gauges, pressure-sensing and pressure-recording devices, pumps, electrical power, and anything else required for filling the pipeline to be tested and for obtaining and maintaining the required water pressure.
8. Pipelines shall be properly braced before tests are conducted. On lines that require thrust blocks, the thrust blocks shall have been placed and the concrete shall have set to the satisfaction of the Engineer before the test is conducted.
9. At the end of the test reach of pipeline, the Contractor shall provide adequate anchorage to restrain the pipe sections being tested. The design of the anchorage shall be submitted for approval. These anchorages shall be removed upon completion of the test.
10. Just prior to hydrostatic testing, the piping shall be cleaned or flushed out with clean water to the satisfaction of the Engineer so that it is free from obstructions, dirt, or other foreign matter.
11. Contractor shall obtain, use, and dispose of the water used for test purposes. The quality of water shall be acceptable to the Engineer.
12. The completed length of pipeline to be tested shall be filled with water as soon as practicable. Until the field hydrostatic test is conducted, the water pressure shall not be greater than that necessary to keep it filled.
13. After a reach has been filled with water, it shall be allowed to stand under pressure for sufficient time to allow air to escape before testing. Air and vacuum valves or corporation stops shall be installed to remove air from high points of the pipeline.
14. Contractor shall be responsible for damage to the pipe as a result of stresses imposed during filling, testing, and draining of the pipeline. At the end of testing, the pipeline shall be restored to a condition satisfactory to the Engineer.

B. Safety:

1. A safety valve shall be added to the system to protect equipment from overpressure during the hydrostatic testing of lines and equipment. This valve shall be set at 10 percent above the calculated hydrostatic test pressure.
2. Permanently installed instrumentation shall be removed from the pipe prior to testing. As determined by the Engineer, pumps and other permanently installed equipment that may be damaged during testing shall also be removed or isolated.

C. Pipe Test Standards:

1. Hydrostatic test pressures for the reach being tested shall not deviate from those shown on the Steel Pipe Schedule.

2. During hydrostatic testing, the test pressure shall be maintained for not less than 24 hours.

3. Leakage will not be allowed for welded steel pipe.

D. Disposal of Test Water:

1. Water used in hydrostatic testing shall be disposed of as approved by the Engineer. Permits required for the discharge of water in drainage channels or systems shall be obtained by the Contractor from the agencies having jurisdiction.

E. Bulkheads:

1. Following successful completion of hydrostatic testing, bulkheads used during testing shall be removed, unless otherwise shown on the drawings or as directed by the Engineer.

2. At each location where a bulkhead is removed, the pipe shall be completely restored to a condition in accordance with the requirements for the finished work.

3. Test valves and pipe nipples shall be removed from test bulkheads required to remain in place. Threaded plugs in accordance with Section 02662 shall be screwed into the test-valve openings. The plug surfaces on both sides of the bulkheads shall be cleaned and appropriately primed for coating. The plug surfaces shall be coated with the same type of coating applied to the bulkheads or pipe surfaces. Necessary repairs shall be made to the bulkheads.

4. The bulkheads removed shall become the property of the Contractor and shall be disposed of by the Contractor.

See Next Page for Continuation

Steel Pipe Design Schedule			
	Description	**Design Parameters**	**Allowable Stress**
1.01	Service	Water	
1.02A	Size	65" OD Polyurethane lining	
1.02B	Size	36” OD Polyurethane lining	
1.03	Working Pressure	HGL = 825 ft	Allowable stress = 16 ksi
1.04	Working + Transient Pressure	HGL = 920 ft	Allowable stress = 0.75 Fy
1.05	Test Pressure	HGL = 920 ft	Allowable stress = 21 ksi
1.06	Cover	Liners shall be designed to carry the soil load acting on the existing host pipe. The host pipe will be assumed to carry none of the soil load. The design shall consider the following three conditions where the cover is less then 3 feet: Minimum Cover of 1 ft shall be used + H20 Loading Minimum cover of 4 ft shall be used + H20 loading Actual cover + H20 loading if the cover is more than 4 feet	
1.07	Trestle Design	Design liner to span 25 ft and support the existing PCCP, steel liner and water. Liner must also resist all internal pressures mentioned in this table.	
1.08	Live Load	H20 loading	
1.09	Other design parameters	Per Design Section of this Specification	
1.10	Minimum wall thickness	t_{min} = 0.375 inch for 65” OD ~~t_{min} = 0.25 inch for 36” OD~~	
1.11	Vacuum Pressure	Full vacuum (-14 psi)	
1.12	Groundwater	Assume groundwater to top of pipe	

Notes:

Pipe Design thickness shown on Drawings shall be verified by Pipe manufacturer. The pipe manufacturer is responsible for the final design of the pipe wall thicknesses.

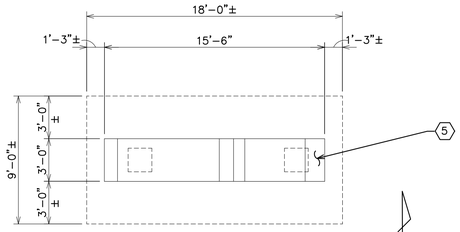
W soil = weight of soil cover above pipe

W LL = Traffic load above pipe

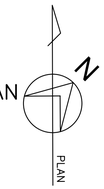
W pipe = weight of pipe filled with water

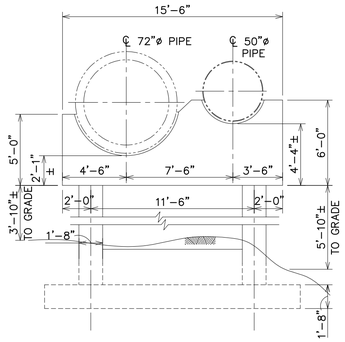
*Minimum wall thickness based on larger of specified minimum thickness, maximum D/t ratio, external load, buckling, or yield strength of 42,000 psi. Lower yield strength steel will result in increased thickness where yield strength controls thickness. Additional wall thickness shall be provided as required to meet all design requirements.

END OF SECTION 33 05 32

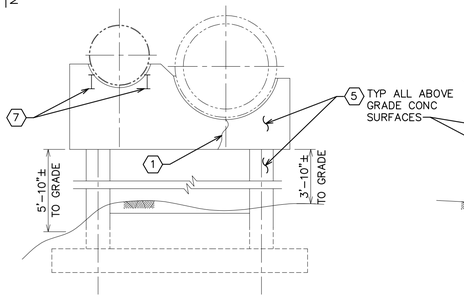


TRESTLE T-1 TOP PLAN
SCALE: 3/16" = 1'-0"

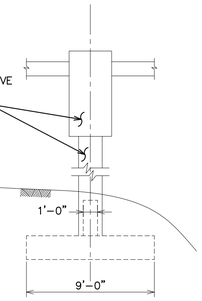




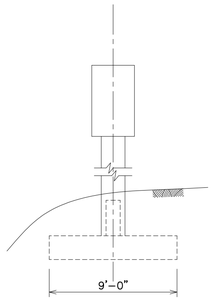
TRESTLE T-1 NORTH FACE
SCALE: 3/16" = 1'-0"



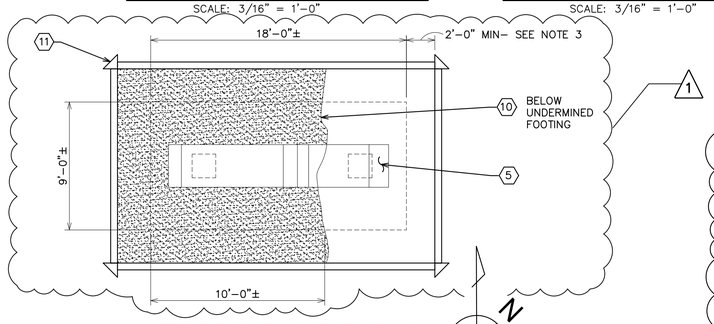
TRESTLE T-1 SOUTH FACE
SCALE: 3/16" = 1'-0"



WEST
SCALE: 3/16" = 1'-0"



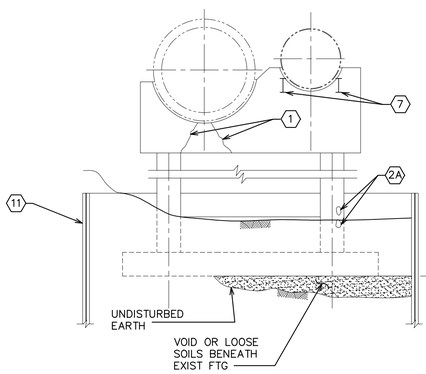
EAST
SCALE: 3/16" = 1'-0"



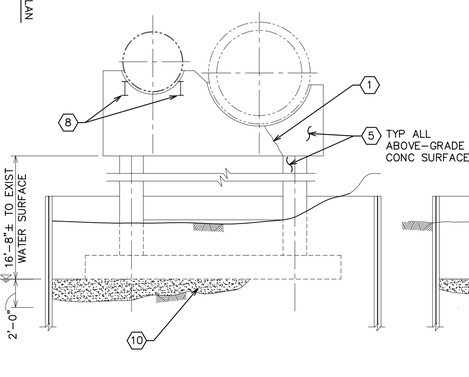
TRESTLE T-2 TOP PLAN
SCALE: 3/16" = 1'-0"

CONTRACTOR NOTE:

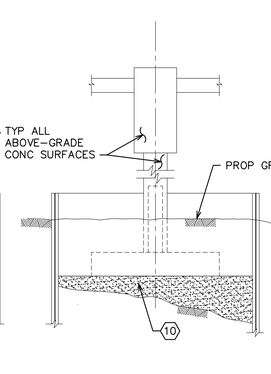
1. HEAVY CONCRETE RUBBLE IN STREAM AT T-2.
2. DEPICTION OF UNDERMINED FOOTING IS FOR ILLUSTRATIVE PURPOSES ONLY BASED ON FIELD INVESTIGATION PERFORMED IN NOVEMBER 2023. DEPICTIONS MAY NOT REPRESENT ACTUAL PHYSICAL CONDITIONS AT THE TIME OF BID. SITE VISIT PRIOR TO SUBMITTING BIDS IS MANDATORY.
3. CONTRACTOR'S ENGINEER TO DETERMINE WIDTH NEEDED AROUND T-2 FOOTING FOR WORK AREA. SEE SPEC SECTION 02 04 00.
4. EXISTING GRADE, INCLUDING RIPRAP AND BACKFILL SOILS NOT SHOWN. FOR ADD'L INFO ON PREPARATION OF AREA FOR SLIDE RAIL SYSTEM INSTALLATION, SEE SPEC SECTION 02 04 00.
5. FOR PROPOSED GRADES, SEE SHT C-601.



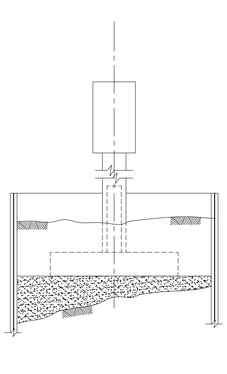
TRESTLE T-2 NORTH FACE
SCALE: 3/16" = 1'-0"



TRESTLE T-2 SOUTH FACE
SCALE: 3/16" = 1'-0"



WEST
SCALE: 3/16" = 1'-0"



EAST
SCALE: 3/16" = 1'-0"

TRESTLE T-1 & T-2 REHABILITATION QUANTITIES

	PROPOSED WORK ITEM DESCRIPTION	UNIT	AMOUNT
1	PRESSURE INJECTION OF NON-WEEPING CRACKS REPAIR TYPE 1	LF	10
2A	CONCRETE SURFACE REPAIR TYPE 2A	SF	5
5	PROTECTIVE COATING REPAIR TYPE 5	SF	600
7	REPLACEMENT STEEL SUPPORT BEAMS ITEM 7	LB	1450
8	BLAST AND RECOAT STEEL SUPPORTS ITEM 8	SF	330
~~9~~	~~GROUT BAG CLOSURE WALL ITEM 9~~	~~CF~~	~~450~~
10	FLOWABLE FILL BENEATH FOOTINGS ITEM 10	CY	12
11	SLIDE RAIL SYSTEM ITEM 11 (SEE NOTE 3 BELOW)	EA	1

NOTES:

1. THE QUANTITIES FOR THE WORK ITEM DESCRIPTIONS ABOVE ARE APPROXIMATE. CONTRACTOR SHALL BE PAID IN FULL FOR ACTUAL AS-CONSTRUCTED AMOUNTS USED ABOVE/BELOW BASE QUANTITY SHOWN. CONTRACTOR TO FILL IN THE PROPOSAL IN SPEC SECTION 00 42 43.
2. ALL ITEM DESCRIPTIONS SHOWN AS LUMP SUM FOR THE UNIT AND ANY WORK NOT SPECIFICALLY GIVEN A UNIT QUANTITY/DESCRIPTION SHOWN ON THESE SHEETS SHALL BE INCLUDED IN THE LUMP SUM PRICE TOTAL FOR THE PROJECT.
3. FOR SLIDE RAIL SYSTEM ITEM 11 REQUIREMENTS, SEE SPECIFICATION SECTION 02 04 00.

TRESTLE T-1 SOUTH FACE

TRESTLE T-2 NORTH FACE

ALL PHOTOS TAKEN IN NOVEMBER 2023
FOR ADDITIONAL SITE PHOTOS SEE SHT S-15.

REV#	DATE	DESCRIPTION	BY
1	06/24/24	ADDENDUM #2	SK

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Brown AND Caldwell

CITY OF FLINT
THIRD AVENUE PUMPING STATION
FORCE MAINS REHABILITATION
SRF# 5739-01
LOCATION 1: T-1 & T-2

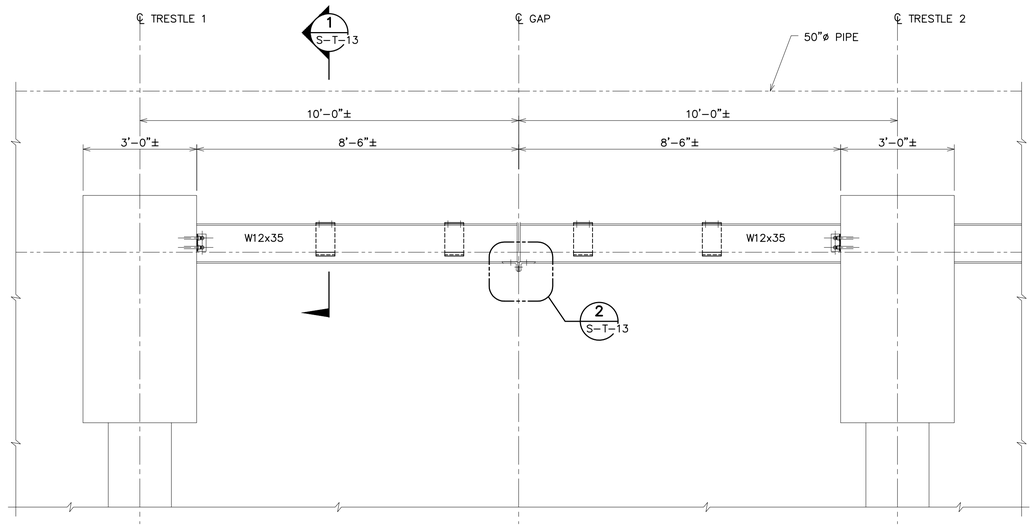
ISSUED FOR:	DATE:	BY:
60% SUBMITTAL TO EGLE	3/8/2024	SAK
FINAL SUBMITTAL TO EGLE	4/26/2024	SAK
BIDS	5/24/2024	SAK

JOB NO.
COF1081.01F

SHEET
S-T-002

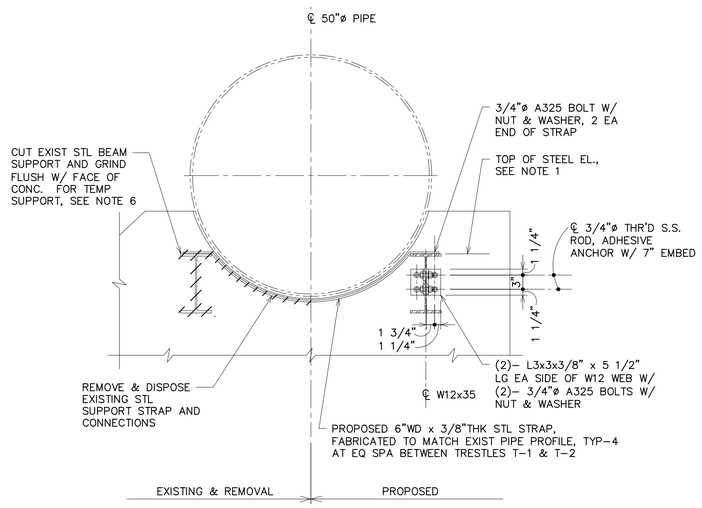
THIRD AVENUE PUMPING STATION FORCE MAINS REHABILITATION

PROJECT MANAGER: STEVE KALINOWSKI, PE
V:\2023\04\2023043215\S_T_002PLOT.DWG - 22X34 - PLOTTED 6/21/2024 9:59 AM BY HAATAJA, PAMELA, M
FIELD BOOK INFORMATION:-



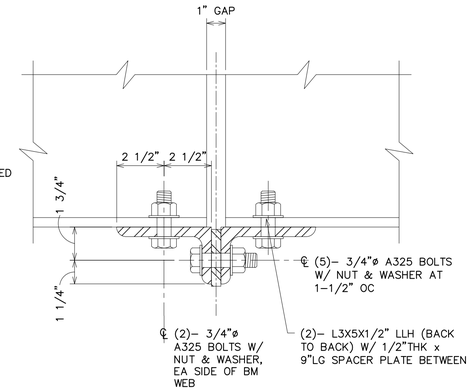
ELEVATION VIEW

SCALE: 1/2" = 1'-0"



SECTION 1 S-T-13

SCALE: 3/4" = 1'-0"



DETAIL 2 S-T-13

SCALE: 3" = 1'-0"

REPLACEMENT STEEL SUPPORT BEAMS ITEM 7 NOTES:

1. TOP OF STEEL ELEVATION TO BE DETERMINED IN FIELD. ELEVATION SHALL BE SET TO PROVIDE FULL SUPPORT OF PROPOSED STRAPS BENEATH PIPE AND FULL CONTACT BEARING BETWEEN STRAPS AND PIPE UNDERSIDE.
2. STRUCTURAL STEEL AND CONNECTIONS SHALL BE PER SPECIFICATION SECTION 05 10 00.
3. ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER ASTM A123 AND PAINTED PER SPECIFICATION SECTION 09 96 00.
4. ALL BOLTS AND HARDWARE SHALL BE GALVANIZED PER ASTM F2329.
5. EPOXY ANCHORS INTO CONCRETE SHALL BE PER STRUCTURAL PROJECT NOTES SHEET.
6. PRIOR TO REMOVAL OF THE EXISTING BEAM AND STRAP SUPPORTS, THE CONTRACTOR SHALL INSTALL TEMPORARY SUPPORT OF THE STEEL FORCE MAIN PIPE.
   - CONTRACTOR IS RESPONSIBLE FOR MEANS AND METHODS.
   - ASSUME STEEL PIPE WEIGHS 1,500 LBS PER FOOT (UNFACTORED) FOR DESIGN OF THE SHORING SYSTEM.
   - PROVIDE MATS OF INTERLOCKING TIMBERS AT THE BASE OF THE SHORING COLUMNS TO MAINTAIN STABILITY.
   - PROVIDE PLATES, BEAMS, STRAPS OR SIMILAR TO UNIFORMLY DISTRIBUTE THE SUPPORT REACTION ACROSS THE UNDERSIDE OF THE PIPE.
   - SUBMIT A DIMENSIONED PLAN SHOWING SHORING SCHEMATIC. SUBMIT CUT SHEETS FOR SHORES, INCLUDING SAFE LOAD CAPACITY TABLE. FOR OTHER SHORING ELEMENTS, PROVIDE DIMENSIONAL AND MATERIAL PROPERTIES INFORMATION.
   - SUBMIT SHORING PACKAGE A MINIMUM OF 8 WEEKS PRIOR TO MOBILIZATION IN THIS AREA OF WORK. INCOMPLETE SUBMITTALS WILL BE REJECTED WITHOUT REVIEW.
   - SHORING IS TO REMAIN IN PLACE UNTIL THE INSTALLATION OF THE PROPOSED BEAMS AND STRAPS IS COMPLETE AND EPOXY ANCHORS HAVE FULLY CURED. THIS SHALL BE ACCOUNTED FOR IN THE DESIGN OF THE SHORING SYSTEM.
7. INCLUDES THE PROVIDING OF ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO PERFORM ALL WORK ASSOCIATED WITH THE INSTALLATION OF THE "REPLACEMENT STEEL BEAM SUPPORT ITEM 7." CONTRACTOR SHALL BE PAID IN FULL FOR ALL COSTS ASSOCIATED WITH THIS WORK AFTER COMPLETION OF THE WORK. ITEMS INCLUDED (NOT PAID FOR SEPARATELY):
   - FURNISHING, INSTALLATION AND REMOVAL OF THE SHORING SYSTEM.
   - SUBMITTAL OF SHORING PLAN AND PRODUCTION/MATERIAL SPEC DATA FOR REVIEW AND ACCEPTANCE.
   - SUBMITTAL OF STRUCTURAL STEEL SHOP DRAWINGS FOR REVIEW AND ACCEPTANCE.
   - REMOVAL AND OFF SITE DISPOSAL OF EXISTING STEEL BEAMS AND STRAPS.
   - GRINDING EXISTING STEEL EMBEDMENTS FLUSH WITH FACE OF TRESTLE CONCRETE.
   - FABRICATION, PROVIDING AND INSTALLATION OF PROPOSED STEEL BEAM SUPPORT SYSTEM, INCLUDING STRAPS.

REPLACEMENT STEEL SUPPORT BEAMS ITEM 7

NOTE:

1. THIS SHEET TO BE WORKED WITH STRUCTURAL PROJECT NOTES AND SPECIFICATION DOCUMENTS FOR ALL MATERIAL AND PRODUCT INFORMATION.

BLAST & RECOAT STEEL SUPPORTS ITEM 8 NOTES:

1. BLAST CLEAN AND RECOAT EXISTING STRUCTURAL STEEL PIPE SUPPORTS AND RELATED CONNECTIONS.
2. FOR SURFACE PREPARATION AND PAINT SYSTEM, SEE DIVISION 09 SPECIFICATIONS.
3. CONTRACTOR TO BLAST CLEAN SURFACES IN INCREMENTS THAT WILL ALLOW FOR PROMPT APPLICATION OF PRIMER TO AVOID THE RE-DEVELOPMENT OF SURFACE CORROSION PRIOR TO PRIMER APPLICATION.
4. ALL COATINGS IN THE SYSTEM SHALL BE SUPPLIED BY A SINGLE COATING MANUFACTURER AND ARE TO BE APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
5. INCLUDES THE PROVIDING OF ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO PERFORM ALL WORK ASSOCIATED WITH BLAST AND RECOAT STEEL SUPPORTS ITEM 8". CONTRACTOR SHALL BE PAID IN FULL FOR ALL COSTS ASSOCIATED WITH THIS WORK AFTER COMPLETION OF THE WORK. ITEMS INCLUDED (NOT PAID FOR SEPARATELY):
   - SUBMITTAL OF PRODUCT DATA, COLORS AND SAMPLES FOR REVIEW AND ACCEPTANCE.
   - CONTAINMENT, COLLECTION AND OFFSITE DISPOSAL OF SPENT ABRASIVE BLAST MEDIA AND DEBRIS GENERATED DURING BLAST CLEANING PROCESS.
   - PROVIDING AND INSTALLING COATING SYSTEM IN ACCORDANCE WITH DIVISION 09 SPECIFICATIONS AND MANUFACTURER'S RECOMMENDATIONS.

BLAST AND RECOAT STEEL SUPPORTS ITEM 8

NOTE:

PHOTO IS PROVIDED TO ILLUSTRATE STACKING PATTERN OF GROUT BAGS ONLY. PROVIDE WALL CONFIGURATION AND HEIGHT PER DRAWING DETAILS.

GROUT BAG CLOSURE WALL ITEM 9 NOTES:

1. PREPARE AREA BY CLEARING AROUND AND UNDER TRESTLE AND HEADWALL FOUNDATIONS TO REMOVE BACKFILL SOILS, WOOD, DEBRIS AND LOOSE RUBBLE TO UNDISTURBED EARTH.
2. USING PRE-PACKAGED BAGS OF (60 LB, MIN) CONCRETE MIX (QUIKRETE OR EQUAL), CONSTRUCT A CLOSURE WALL IMMEDIATELY AGAINST THE FACE OF THE UNDERMINED FOOTINGS AND TOE THE BAGS INTO THE UPSTREAM SIDE OF THE EMBANKMENT.
3. PLACE BAGS AT LEAST TWO LAYERS DEEP (THICKNESS OF WALL), ROTATING EVERY OTHER BAG 90 DEGREES AS SHOWN IN EXAMPLE PHOTO ABOVE. STACK BAGS TO PROVIDE A SLIGHT BATTER IN TOWARD THE FACE OF THE FOOTING.
4. SHORTLY AFTER PLACEMENT, DRIVE REBAR (MINIMUM #5 BAR) VERTICALLY AT REGULAR INTERVALS INTO THE BAGS AND STREAM BANK BELOW TO REINFORCE THE WALL. SPACE BARS TO ANCHOR EACH BAG INTO THE ROW BELOW, DRIVING THEM 4 FEET BELOW BOTTOM ROW OF BAGS AND CUTTING FLUSH WITH TOP ROW.
5. THE HEIGHT OF THE WALL SHOULD BE AT LEAST THREE COURSES HIGHER THEN THE TOP OF EACH FOOTING.
6. THE LENGTH OF THE WALL SHOULD EXTEND AS SHOWN IN THE PLANS.
7. AFTER INSTALLATION OF THE GROUT BAG CLOSURE WALL IS COMPLETE, PROCEED WITH INSTALLATION OF "FLOWABLE FILL BENEATH FOOTINGS ITEM 10."
8. INCLUDES THE PROVIDING OF ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO PERFORM ALL WORK ASSOCIATED WITH THE INSTALLATION OF THE GROUT BAG CLOSURE WALL. CONTRACTOR SHALL BE PAID IN FULL FOR ALL COSTS ASSOCIATED WITH THIS WORK AFTER COMPLETION OF THE WORK. ITEMS INCLUDED (NOT PAID FOR SEPARATELY):
   - TEMPORARY MEASURES TO DIVERT FLOW IN THE WATERWAY FOR INSTALLATION OF GROUT BAG CLOSURE WALLS.
   - SUBMITTAL OF COMPLETE WORK PLAN, INCLUDING FLOW DIVERSION, FOR REVIEW AND ACCEPTANCE.
   - BACKFILL SOILS AND DEBRIS REMOVAL AND PREPARATION OF AREA AROUND AND UNDER FOUNDATIONS.
   - PROVIDING, INSTALLATION, FINISHING AND SECURING OF GROUT BAG CLOSURE WALL AS DETAILED ABOVE.

GROUT BAG CLOSURE WALL ITEM 9

FLOWABLE FILL BENEATH FOOTINGS ITEM 10 NOTES:

1. FOLLOWING INSTALLATION OF "GROUT BAG CLOSURE WALL ITEM 9," PUMP FLOWABLE FILL BENEATH UNDERMINED FOOTING AND BEHIND CLOSURE WALL UNTIL REFUSAL IS OBSERVED IN MULTIPLE LOCATIONS AROUND CLOSURE WALL PERIMETER. FIELD ENGINEER SHALL BE PERMITTED ACCESS TO CONFIRM THAT ENTIRE VOID SPACE BELOW THE FOOTING HAS BEEN FILLED UP TO THE UNDERSIDE.
2. SUBMIT DESIGN MIX PER SPECIFICATION SECTION 02 04 00.
3. INCLUDES THE PROVIDING OF ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO PERFORM ALL WORK ASSOCIATED WITH THE INSTALLATION OF THE FLOWABLE FILL BENEATH THE UNDERMINED FOOTINGS. CONTRACTOR SHALL BE PAID IN FULL FOR ALL COSTS ASSOCIATED WITH THIS WORK AFTER COMPLETION OF THE WORK. ITEMS INCLUDED (NOT PAID FOR SEPARATELY):
   - CONTRACTOR SHALL PROVIDE ALL ACCESS LADDERS AND TIME NECESSARY FOR ENGINEER'S CONFIRMATION THAT ENTIRE VOID SPACE BELOW THE FOOTING HAS BEEN FILLED.
   - SUBMITTAL OF DESIGN MIX AND WORK PLAN FOR REVIEW AND ACCEPTANCE.
   - PROVIDING, INSTALLATION, FINISHING AND CURING OF FLOWABLE FILL AS INDICATED ABOVE.

FLOWABLE FILL BENEATH FOOTINGS ITEM 10

REV#	DATE	DESCRIPTION	BY
1	06/24/24	ADDENDUM #2	SK

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WEB SITE: http:// www.hrc-engr.com

Brown AND Caldwell

CITY OF FLINT THIRD AVENUE PUMPING STATION FORCE MAINS REHABILITATION

SRF# 5739-01

STRUCTURAL DETAILS

THIRD AVENUE PUMPING STATION FORCE MAINS REHABILITATION

ISSUED FOR:	DATE:	BY:
60% SUBMITTAL TO EGLE	3/8/2024	SAK
FINAL SUBMITTAL TO EGLE	4/26/2024	SAK
BIDS	5/24/2024	SAK
ADDENDUM 2	6/21/2024	SAK

JOB NO. COF1081.01F

SHEET S-T-013

PROJECT MANAGER:STEVE KALINOWSKI, PE
V:\2023\04\2023043Z\S\S_T_013PLOT.DWG - 22X34 - PLOTTED 6/21/2024 10:00 AM BY HAATAJA, PAMELA, M
FIELD BOOK INFORMATION:-

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915
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P.O. BOX 824
48303-0824

JOB NO. 20230432

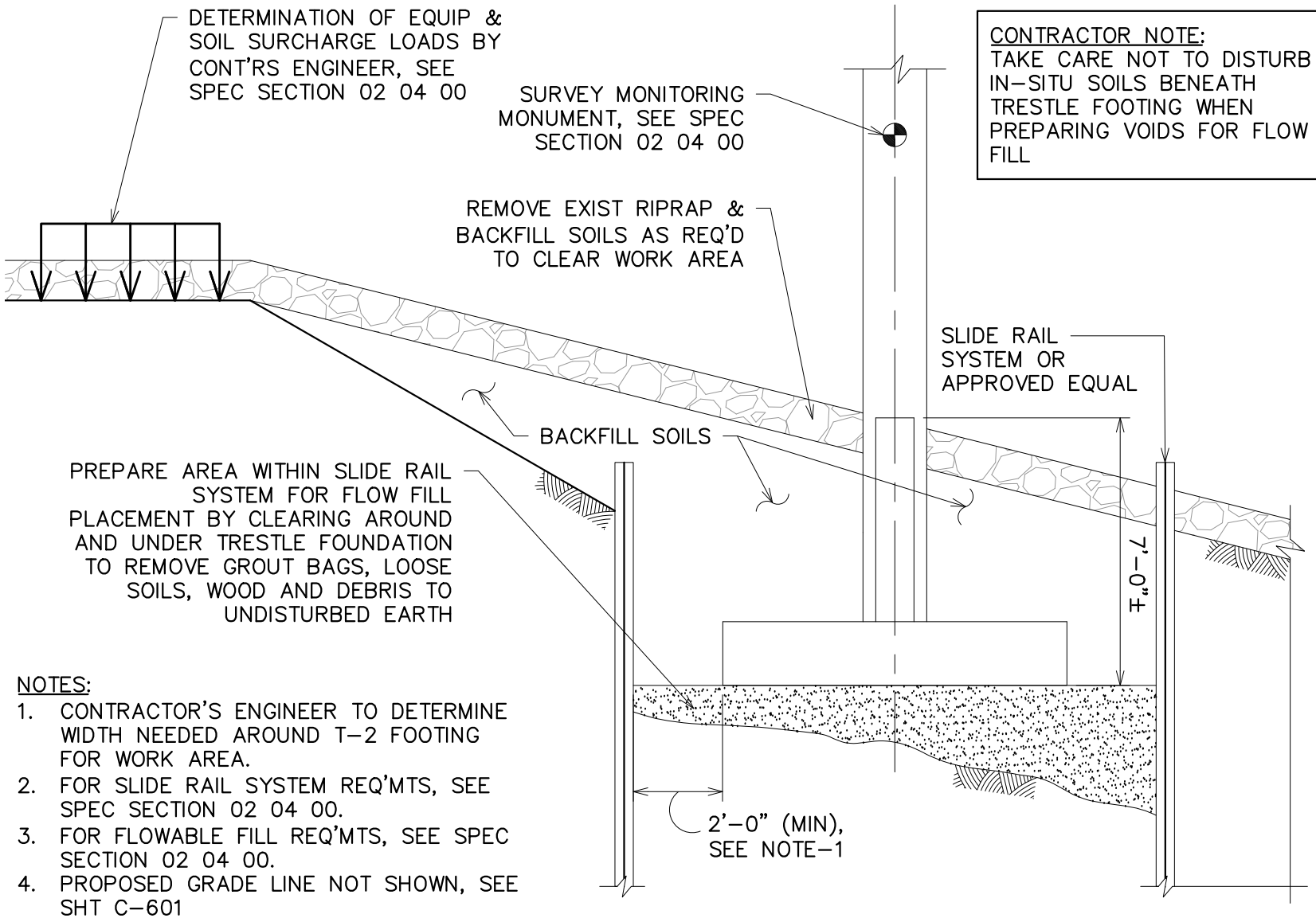
DATE 06/24/24

CITY OF FLINT

THIRD AVENUE PUMPING STATION

FORCE MAINS REHABILITATION

FIGURE NO. SK-1 OF 1



NOTES:

1. CONTRACTOR'S ENGINEER TO DETERMINE WIDTH NEEDED AROUND T-2 FOOTING FOR WORK AREA.
2. FOR SLIDE RAIL SYSTEM REQ'MTS, SEE SPEC SECTION 02 04 00.
3. FOR FLOWABLE FILL REQ'MTS, SEE SPEC SECTION 02 04 00.
4. PROPOSED GRADE LINE NOT SHOWN, SEE SHT C-601

(LOOKING WEST)

TRESTLE T-2 ELEVATION

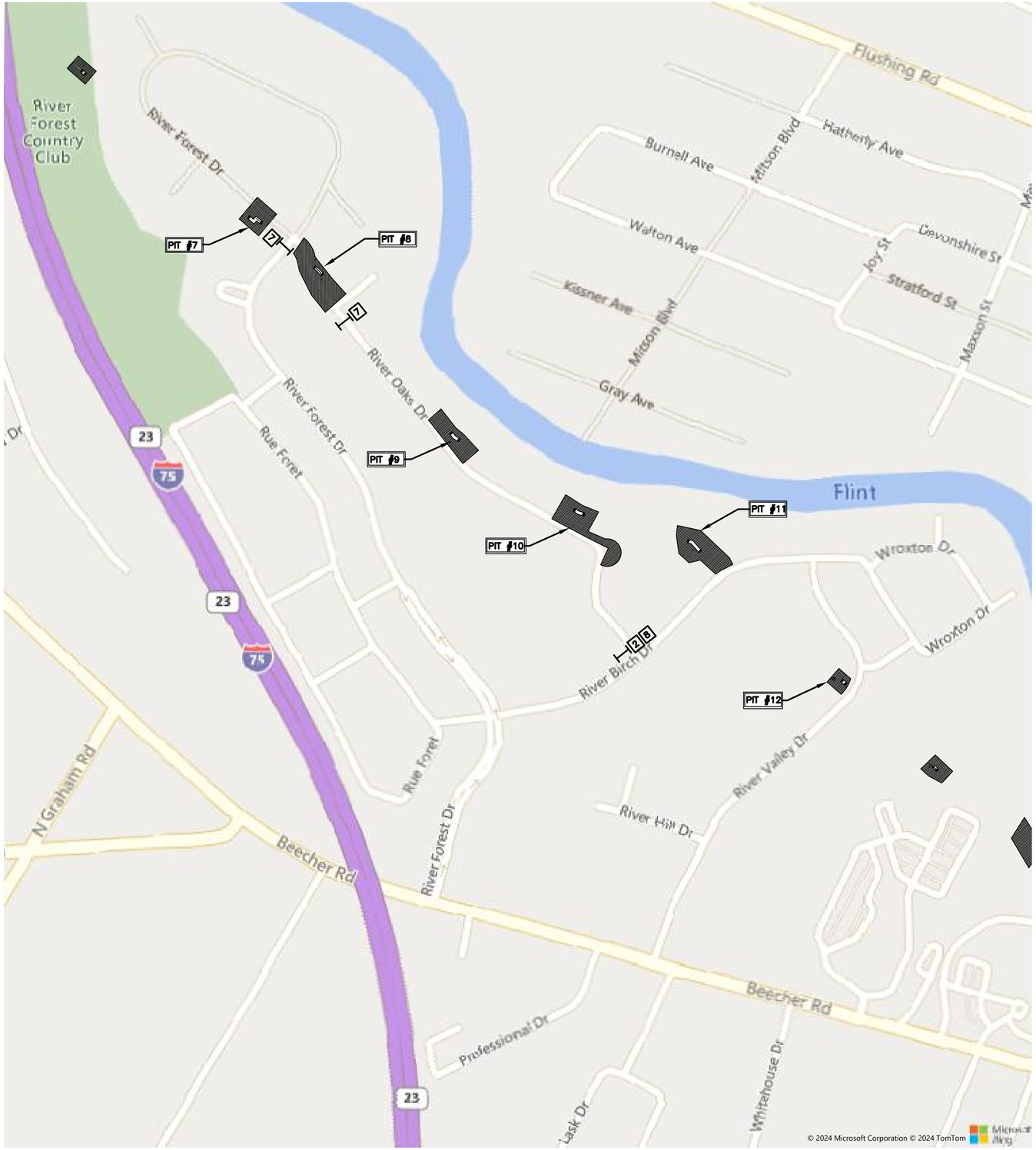
N.T.S.

LEGEND

SIGN

BARRICADE

N



2 — ROAD CLOSED AHEAD — W20-3 (48"X48")

RIVER FOREST — W16-8P (48"X18") 6"C

PLACE W20-3, WITH SUPPLEMENTAL PLAQUE (W16-8P) AT THE FOLLOWING INTERSECTIONS: RIVER OAKS AND RIVER BIRCH; 1 EACH

7 — ROAD CLOSED

TYPE III BARRICADE (DOUBLE SIDED, LIGHTED) WITH R11-2 (48" X 30") ROAD CLOSED SIGN

8 — ROAD CLOSED TO THRU TRAFFIC

TYPE III BARRICADE (DOUBLE SIDED, LIGHTED) WITH R11-4 (60" X 30") ROAD CLOSED TO THRU TRAFFIC SIGN

TRAFFIC CONTROL NOTES

1. WORK AREAS AT PIT NUMBERS 9, 10, 11, AND 12 SHALL NOT CAUSE A FULL ROAD CLOSURE. ACCESS MUST BE MAINTAINED AT ALL TIMES. WORK AREAS AT PIT NUMBERS 7 AND 8 A FULL ROAD CLOSURE IS PERMITTED.
2. RESIDENTS SHALL HAVE ACCESS TO THEIR DRIVEWAYS AT ALL TIMES.
3. WHEN THE ROADWAY IS CLOSED, TYPE III BARRICADES WILL BE PLACED FROM FACE OF CURB TO FACE OF CURB TO COMPLETELY BLOCK TRAFFIC FROM ENTERING THE ROAD.
4. CONSTRUCTION, WARNING, REGULATORY, AND GUIDE SIGNS SHOWN MUST BE PLACED ACCORDING TO MDOT'S WORK ZONE SAFETY AND MOBILITY MANUAL AND MAY REQUIRE FIELD ADJUSTMENTS AS DIRECTED BY THE ENGINEER.

REV#	DATE	DESCRIPTION	BY
1	06/24/24	ADDENDUM #2	SAK

CITY of FLINT MICHIGAN

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Brown AND Caldwell

CITY OF FLINT
THIRD AVENUE PUMPING STATION FORCE MAINS REHABILITATION

SRF# 5739-01
MAINTENANCE OF TRAFFIC PLAN

ISSUED FOR:	DATE:	BY:
60% SUBMITTAL TO EGLE	3/8/2024	SAK
FINAL SUBMITTAL TO EGLE	4/26/2024	SAK
BIDS	5/24/2024	SAK

JOB NO. COF1081.01F

SHEET C-701

THIRD AVENUE PUMPING STATION FORCE MAINS REHABILITATION

PROJECT MANAGER:STEVE KALINOWSKI, PE
C:\PW_WORK\MFLANAGAN\D1404195\CDP-PLTS-WT-MOT.DWG - MOT 2 - PLOTTED 6/24/2024 1:59 PM BY FLANAGAN, MARTIN
FIELD BOOK INFORMATION:-