



Village of Sackets Harbor
Water Treatment Facility – New Water Intake
and Seawall Replacement Project
Project No. 2014-094

Addendum No. 2
March 22, 2024

This addendum is hereby made part of the Contract Documents as though it were originally included therein and must be acknowledged by the bidder in the proper place on the bid form.

Project Manual

1. Reference Advertisement for Bids (EJCDC C-111)

- a. DELETE March 28th, 2024, from the following paragraph and REPLACE with April 3rd, 2024:**

Bids for the construction of the Project will be received at the Village of Sackets Harbor located at 112 North Broad Street P.O. Box 335 Sackets Harbor, New York 13685, until **March 28th, 2024**, at 2:00 PM local time. At that time the Bids received will be “publicly” opened and read.

2. Reference Technical Specifications

- a. DELETE Specification Section 01 7123 Layout of Work and REPLACE with attached updated Section 01 7123 Layout of Work.**
- b. DELETE Specification Section 03 2000 Concrete Reinforcement and REPLACE with attached updated Section 03 2000 Concrete Reinforcement.**
- c. DELETE Specification Section 03 3000 Cast-in Place Concrete and REPLACE with attached updated Section 03 3000 Cast-in Place Concrete.**
- d. DELETE Specification Section 03 3001 in its entirety.**
- e. DELETE Specification Section 33 1416 Site Water Utility Distribution Piping and REPLACE with attached updated Section 33 1416.**

Project Drawings


1. Raw Water Intake Site Plan and Profile

- a. DELETE Sheets S-3 and D-1 and REPLACE with attached Sheets AD2/S-3 and AD2/D-1.**

Please see attached Sign in Sheet from the Pre-Bid Walk Through held on March 20th, 2024 and the Request for Information (RFI) Question and Answer Log for RFI responses to date.

Respectfully submitted,

BERNIER, CARR & ASSOCIATES, ENGINEERS, ARCHITECTS AND LAND SURVEYORS, P.C.


Digitally signed by Timothy Barber, P.E.
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Date: 2024.03.22 10:32:19-04'00'

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Associate / Civil Engineer

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**SECTION 01 7123
LAYOUT OF WORK**

PART 1 GENERAL

1.01 SERVICES PROVIDED BY OWNER

- A. The Owner will establish principal base lines, benchmarks, and primary control points for the major types of work of the contract as the work proceeds.
- B. Unless otherwise noted in additional instructions or specification, the Owner will also establish such additional lines, grades, and elevations as he deems necessary and will include the following for all new construction:
 - 1. Structures and Buildings: Corner stakes at all principal corners of exterior walls or foundations and a benchmark in the vicinity of the structure or building.
 - 2. Sewer Manholes: Stake centerline manhole with two offset stakes. Grade to lowest invert on one stake.
 - 3. Parking Areas: Necessary stakes and grades at the corners of same.
 - 4. Other Types of Construction: The Owner will provide control stakes as he deems necessary for the Contractor to properly layout his work.
 - 5. Stakes will have the information marked on a witness stake beside the hub.

1.02 SERVICES PROVIDED BY THE CONTRACTOR

- A. The Contractor shall erect and establish all grade boards, batter boards, and construction control lines from the points set by the Owner.
- B. The Contractor shall layout the work to best suit his methods of operations using the Owner's control points to assure the construction will be in the position as designated.
- C. Contractor shall be responsible for layout of the new water intake as verified by the Engineer prior to commencement of work and at the completion of the work. Contractor shall provide means of access and transportation for the Engineer for such verification of the alignment. At a minimum, the Contractor shall establish a buoy line at the water surface, suspended above the proposed intake with visible floats for recording of position. Contractor is responsible for preserving the layout, and for any additional cost to reverify such work. A minimum of 48-hours notice shall be provided to Engineer for verification of layout and installation. No work shall commence until Engineer determines that layout is acceptable. Contractor shall notify Engineer once the intake has been installed for the verification of installation by Engineer.

1.03 OBLIGATIONS OF THE CONTRACTOR

- A. The Contractor shall carefully preserve and protect all stakes, marks, monuments, and points established by the Owner and shall reimburse the Owner for any and all additional engineering costs incurred because of the replacement or re-establishment of any such items which may be moved, removed, obliterated, or destroyed due to his construction operations. When directed, the Contractor shall provide suitable barricades for the protection of points.
- B. The Contractor shall bear the entire cost of rectifying work improperly done due to his own negligence in preserving and protecting marks or to moving or removing same without approval of the Owner.
- C. The Contractor shall inform the Owner a reasonable time in advance, no less than 48 hours, of his operations of the times and places he proposes to work so that lines, grades, and elevations may be established and necessary measurements for record and payment may be made with the minimum of inconvenience or delay to either himself or the Owner. No additional compensation will be paid the Contractor for any delay caused by insufficient notice.

1.04 LINES, GRADES, AND ELEVATIONS

- A. The terms "invert" and "grade" used in the Contract Documents in connection with pipes, sewers, and similar structures shall mean the inside bottom of the pipe or other surface on which the liquid flows along the center line of the completed work. "Subgrade" refers to the bottom line or surface to which excavations are necessarily made to construct the work as

shown or specified, exclusive of any additional depth of excavation required for any special foundation.

- B. All work shall be constructed in accordance with the lines and grades shown, specified, or directed. The Contractor shall be responsible for maintaining alignment and grade between points established by the Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 03 2000
CONCRETE REINFORCING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.
- C. Reinforcing steel for pre-cast concrete.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - CONCRETE FORMING AND ACCESSORIES.
- B. Section 03 3000 - Cast-in-Place Concrete.
- C. Section 04 2000 - Unit Masonry: Reinforcement for masonry.

1.03 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Concrete Construction; 2020.
- B. ACI 302.1R-04 Guide for Concrete Floor and Slab Construction.
- C. ACI 318 - Building Code Requirements for Structural Concrete; 2019 (Reapproved 2022).
- D. ASTM A1094/A1094M - Standard Specification for Continuous Hot-Dip Galvanized Steel Bars for Concrete Reinforcement; 2020.
- E. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- F. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- G. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
- H. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement; 2019, with Editorial Revision.
- I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
- J. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, with Amendment (2020).
- K. CRSI (DA4) - Manual of Standard Practice; 2018, with Errata (2019).
- L. CRSI (P1) - Placing Reinforcing Bars, 10th Edition; 2019.

1.04 SUBMITTALS

- A. See Section 01 3300 for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66 Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 318, ACI 301, and ACI 318.
 - 1. Maintain one copy of each document on project site.
- B. Delivery: Deliver reinforcement to the job site bundle, tagged and marked. Use metal tags indicating bar size, lengths and other information corresponding to marking shown on placement diagrams.

- C. Storage: Store reinforcement at the job site in a manner to prevent damage and accumulation of dirt and excessive rust.

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420) deformed bars uncoated.
- B. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.
 - 1. Form: Flat Sheets.
 - 2. Mesh Size and Wire Gage: As indicated on drawings.
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice and ACI 318. In the case of fabrication errors, do not rebend or straighten reinforcement in a manner that will injure or weaken the material.
- B. Unacceptable materials: Reinforcement with any of the following defects will not be permitted in the work:
 - 1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
 - 2. Bends or kinks not indicated on the drawings or on the final shop drawings.
 - 3. Bars with reduced cross-section due to excessive rusting or other causes.
- C. Welding of reinforcement is permitted only with the specific approval of Architect/Engineer. Perform welding in accordance with AWS D1.4.
- D. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing as follows:
 - 1. Walls (exposed to weather or backfill): 2 inch.
 - 2. Footings and Concrete Formed Against Earth: 3 inch.
 - 3. Slabs on Fill: 3/4 inch.
 - 4. Precast Concrete: 1-1/4"
- E. Conform to applicable code for concrete cover over reinforcement.
- F. All reinforcing shall be a minimum of 2" clear from all vertical forms at exterior exposed surfaces. This includes columns, beams and girders.
- G. Cutting of bars to clear openings in walls or slabs is strictly prohibited. Wrap bars around such openings. Provide two #5 diagonal bars at each corner of every rectangular opening in slabs or walls, unless shown otherwise on the Contract Drawings.
- H. Minimum clear distance between parallel bars, except in columns shall not be less than:
 - 1. Nominal diameter of the bar, or
 - 2. 1-1/3 times the maximum aggregate size, or
 - 3. 1 inch, whichever is greater.

- I. Provide bent bars 4'-2" long of same size and spacing as horizontal bars for all corners of foundation walls.
- J. Welded wire mesh in slabs to be supported in upper half of slab.
- K. All wall dowels in footings shall be tied in position before placing of concrete.

3.02 FIELD QUALITY CONTROL

- A. Placing of concrete shall not be scheduled until all of the reinforcing for this section is in place and the reinforcing has been approved by the testing laboratory, as specified in Section 01 4000. The Contractor shall notify the testing laboratory 24 hours prior to a concrete pour.
- B. An independent testing agency, as specified in Section 01 4000, will inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF SECTION

**SECTION 03 3000
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Floors and slabs on grade.
- B. Concrete foundation walls.
- C. Joint devices associated with concrete work.
- D. Concrete curing.
- E. Concrete Ballast Blocks
- F. Sidewalks and Curbs

1.02 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements.
- B. Section 03 1000 - CONCRETE FORMING AND ACCESSORIES: Forms and accessories for formwork.
- C. Section 03 2000 - CONCRETE REINFORCING.
- D. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

- A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- B. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.
- C. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.
- D. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- E. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.
- F. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.
- G. ACI PRC-308 - Guide to External Curing of Concrete; 2016.
- H. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- I. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- J. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
- K. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- L. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2021.
- M. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2023.
- N. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2012.
- O. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- P. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2020.
- Q. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.

- R. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- S. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.
- T. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019, with Editorial Revision (2022).
- U. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2023, with Editorial Revision.
- V. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2021.
- W. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete; 2010a (Reapproved 2015).
- X. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2020.
- Y. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2018.
- Z. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2018.
- AA. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers; 2020.
- BB. ASTM E1155M - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers (Metric); 2014.

1.04 SUBMITTALS

- A. See Section 01 3300 - SUBMITTAL PROCEDURES for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
 - 1. For membrane-forming, moisture emission-reducing, curing and sealing compound, provide manufacturer's installation instructions,.
- C. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI SPEC-301, Section 4 - Concrete Mixtures.
 - 2. Indicate proposed mix design complies with requirements of ACI CODE-318, Chapter 5 - Concrete Quality, Mixing and Placing.
 - 3. Indicate proposed mix design complies with fiber reinforcing manufacturer's written recommendations.
 - 4. Indicate proposed mix design complies with admixture manufacturer's written recommendations.
 - 5. For each different mix design submitted, indicate on the Mix Design cover sheet where and/or for what component of the Work that specific mix design is proposed to be used.
 - 6. Each mix design submittal shall include compressive strength testing data showing that the proposed mix design is capable of meeting the specified compressive strength requirements. This testing data can be obtained by testing a trial batch or from testing conducted for a past project but must be less than 12 months old.
- D. Test Reports: Submit report for each test or series of tests specified.
- E. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI SPEC-301, ACI PRC-302.1, and ACI CODE-318.
 - 1. Maintain one copy of each document on site.
- B. Follow recommendations of ACI PRC-305 when concreting during hot weather.
- C. Follow recommendations of ACI PRC-306 when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT MATERIALS

- A. Comply with requirements of Section 03 2000.

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
 - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
 - 1. Acquire aggregates for entire project from same source.
 - 2. Course aggregates shall be strong, clean, crushed limestone complying with ASTM C33/C33M, Size No. 67.
 - 3. Sand shall be clean, sharp, natural sand graded in accordance with ASTM C33/C33M.
- C. Fly Ash: ASTM C618, Class C or F.
- D. Silica Fume: ASTM C1240, proportioned in accordance with ACI PRC-211.1.
- E. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.
- F. Structural Fiber Reinforcement: ASTM C1116/C1116M.
 - 1. Fiber Length: 0.75 inch, nominal.
 - 2. Fiber Type: Alkali-resistant synthetic.
 - a. Products:
 - 1) Forta Corporation; FORTA ECONO-NET: www.forta-ferro.com/#sle.
 - 2) Or Approved Equal.

2.04 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.

2.05 BONDING AND JOINTING PRODUCTS

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
 - 1. Products:
 - a. W. R. Meadows, Inc; ACRY-LOK-: www.wrmeadows.com/#sle.
 - b. or approved equal. .
- B. Slab Isolation Joint Filler: 1/2-inch thick, height equal to slab thickness, with removable top section forming 1/2-inch deep sealant pocket after removal.
- C. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

2.06 CURING MATERIALS

- A. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C309 Type 1 Class A (vertical) surfaces only.

1. Products:
 - a. Sonneborne; Kure-N-Seal..
 - b. or approved equal.
- B. Moisture-Retaining Sheet: ASTM C171.
 1. Polyethylene film, clear, minimum nominal thickness of 4 mil, 0.004 inch.
 2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.
- C. Water: Potable, not detrimental to concrete.

2.07 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.
- B. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.
- C. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.
- D. Normal Weight Concrete:
 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 5,000 pounds per square inch.
 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 3. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
 4. Water-Cement Ratio: Maximum 40 percent by weight.
 5. Total Air Content: 6 +/-1.5 percent, determined in accordance with ASTM C173/C173M.
 6. Maximum Slump: Slabs - 3 inches.
 7. Maximum Slump: Footings and Walls - 4 inches.
 8. Maximum Aggregate Size: 5/8 inch.

2.08 MIXING

- A. All concrete shall be mixed until there is a uniform distribution of materials and shall be discharged completely before mixer is recharged.
- B. Ready-mixed concrete shall be mixed and delivered in accordance with requirements of ASTM C94/C94M.
- C. If concrete is not placed within 90 minutes after batched, or if the concrete has become partially set, the concrete will be rejected and shall be disposed of off-site.
- D. Should project conditions prevent the ready-mixed concrete from being transported and placed within the specified time, the concrete shall be mixed according to the MIXING ALTERNATE section of this specification.

2.09 MIXING ALTERNATE

- A. Transit Mixers: Comply with ASTM C94/C94M. The concrete shall be mixed in an approved truck drum mixer. The truck mixer shall be equipped with a tank for carrying the mixing water, and the water shall be added to the tank at the proportioning plant. Water added to the mixer shall be measured to the nearest gallon by use of a water meter. The mixing equipment shall be capable of combining the aggregate, cement and water within the specified time in a thoroughly mixed uniform mass, and be capable of discharging the mixture without segregation of the ingredients.
- B. Any drum mixers suspected of not producing uniform mixes shall be tested for uniformity as outlined in ASTM C94/C94M. Slump variations in excess of one inch or air content variation in excess of 1.5% shall be cause for rejection of the truck drum mixer for use on this project. Trucks rejected may be retested at less than rated capacity and if found acceptable may be utilized on the project at the reduced capacity.
- C. A written delivery slip or ticket, prepared and signed by the licensed weighmaster, shall be made out at the proportioning plant for each truck drum mixer. The delivery slip shall be given to the Architect/Engineer/Resident Project Representative as soon as the truck arrives at the

job site. The contractor shall provide a copy of below listed information directly to the Architect/Engineer/Resident Project Representative at not less than weekly intervals. Each slip shall show the following:

1. Date and truck number. Mix designation of concrete. Cubic yards of concrete. Cement brand, type, and weight in pounds. Weight in pounds of fine aggregate (sand), #1 aggregate, and #2 aggregate. Weight in pounds of other aggregate, if applicable. Air entraining agent, brand, and weight in pounds and ounces. Other admixtures, brand and weight in pounds and ounces. Water in gallons stored in the attached tanks. Water in gallons actually used (by the driver). Time of loading and time of delivery to the job site (by truck driver).
- D. Any truck drum mixer delivering concrete to the job site, which is not accompanied by a delivery slip showing the above information will be rejected and such truck shall immediately depart from the job site.
- E. If the concrete is not poured within one hour after the addition of water, or if the concrete has become partially set, the concrete will be subject to review for temperature and consistency. If mix has developed signs of advanced hydration, load may be rejected. Mix shall be in accordance with the recommendations of ACI PRC-304.
- F. The mix shall be delivered to the job site when still dry. Any materials which have had water added before or during the delivery to the job site shall be rejected. The mixers may be started and the correct volume of water shall be measured and added only after receiving permission from the Architect/Engineer/Resident Project Representative. Mixing shall continue for a minimum of 70 revolutions at rated speed. If at any time additional water is added, mix 20 revolutions after such water is in the drum. Total mixing shall not exceed 150 revolutions at rated speed.
- G. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Confirm slab classifications, finish, and flatness and levelness requirements.
- B. Verify lines, levels, and dimensions before proceeding with work of this section.
- C. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Verify that forms are clean and free of rust before applying release agent.
- B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in accordance with bonding agent manufacturer's instructions.
 1. Use latex bonding agent only for non-load-bearing applications.
- D. In locations where new concrete is doweled to existing work, drill holes in existing concrete, remove dust and debris, fill hole with an approved adhesive, and insert steel dowels.

3.03 PLACING CONCRETE

- A. Confirm slab classifications, finish, and flatness and levelness requirements.
- B. Place concrete in accordance with ACI PRC-304.
- C. Notify Architect not less than 24 hours prior to commencement of placement operations.
- D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

- E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- G. Deposit concrete as nearly as practicable in its final location to avoid segregation due to rehandling and flowing.
- H. Do not subject concrete to any procedure which will cause segregation.
- I. Screed concrete which is to receive other construction to the proper level to avoid excessive skimming and grouting.
- J. Do not use concrete which becomes nonplastic and unworkable, or does not meet the required quality control limits, or which has been contaminated by foreign materials.
- K. Place concrete to ensure an even distribution of loads throughout the entire structure.
- L. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.04 CONCRETE CONVEYING

- A. Handle concrete from the point of delivery and transfer to the concrete conveying equipment, and to locations of final deposit, as rapidly as practicable and in methods which will prevent segregation and loss of concrete mix materials.
- B. Provide runways for wheeled concrete conveying equipment from the concrete delivery point to the locations of final deposit.
- C. Keep interior surfaces of conveying equipment, including chutes and tremies, free from hardened concrete, debris, water, and other deleterious materials.
- D. Pumps may be used only if they can pump the mix designed. Do not add fine aggregate or water to the mix to satisfy needs of a pumping device.
- E. Use chutes or tremies for placing concrete where a drop of more than 72" is required. Where the free drop through tremies exceeds 18'-0", use flow checking devices.

3.05 COLD WEATHER PLACEMENT

- A. Concrete work in cold weather placing shall comply with ACI PRC-306 to protect all concrete work from physical damage and reduced strength which would be caused by frost, freezing actions, or low temperatures.
- B. The Engineer may prohibit the placing of concrete at any time when atmospheric conditions are unsuitable. If permitted, concrete delivered when the surrounding air temperature is 40 degrees F or lower shall have a minimum temperature, as placed, of 55 degrees F and a maximum temperature, as placed, of 75 degrees F.
- C. All aggregate and water shall be preheated, and all reinforcement, forms, and ground with which the concrete is to come into contact shall be defrosted by an approved method. No concrete shall be placed on frozen ground.
- D. Precautions shall be taken to avoid the possibility of flash set, if aggregate or water is required to be heated to a temperature in excess of 100 degrees F, in order to meet concrete temperature requirements. The requirements of MIXING ALTERNATE, with respect to delivering the concrete mix to the job site while still dry, may be waived upon written request to the Engineer under these conditions.
- E. Unless otherwise ordered by the Engineer, suitable means shall be provided for maintaining the deposited concrete at a temperature of at least 70 degrees F for seventy two (72) hours after placing, or at least 50 degrees F for five (5) days after placing. The concrete shall be kept above freezing until 28-day strength is met.

3.06 HOT WEATHER PLACEMENT

- A. Concrete work in hot weather: When air temperature exceeds 85 degrees F, or when extremely dry conditions existing even at lower temperatures, particularly if accompanied by high winds, the Contractor and his concrete supplier shall exercise special and precautionary measures in preparing, delivering, placing, finishing, curing, and protecting the concrete mix. The Contractor shall consult with the Engineer regarding such measures prior to each day's placement operations, and the Engineer reserves the right to modify the proposed measures consistent with the requirements of this section of the specifications. All necessary materials and equipment shall be on hand and in position prior to each placement operations.
- B. The temperatures of the concrete mix when placed shall not exceed 80 degrees F. Temperature of mixing water and aggregates shall be carefully controlled and monitored at the supplier's plant, with haul distance to the job site being taken into account. Stockpiled aggregates shall, if necessary, be shaded from the sun and sprinkled intermittently with water. If ice is used in the mixing water for cooling purposes, it must be entirely melted prior to addition of the water to the dry mix.
- C. Delivery schedules shall be carefully planned in advance so that concrete is placed as soon as it arrives at the pouring locations, allowance being made for mixing time as specified elsewhere.
- D. The Contractor shall arrange for an ample work force to be on hand to accomplish transporting, placing, vibrating, finishing, and covering of the fresh concrete as rapidly as possible. Preparatory work at the job site shall include thorough wetting of all forms, reinforcing steel, and in the case of slab pours on ground or sub-grade, spraying the ground surface on the preceding evening and again just prior to placement. No standing puddles of water shall be permitted in those areas which are to receive the concrete.
- E. Extra care in placing and finishing techniques shall be utilized to avoid formation of cold joints and plastic shrinkage cracking. If ordered by the Engineer, temporary sun shades and/or windbreaks shall be erected to guard against such developments, including generous use of wet burlap coverings and fog sprays to prevent drying out of the exposed concrete surfaces.
- F. Immediately after screeding, horizontal surfaces shall receive an application of dissipating curing compound, Master Builders Confilm or approved equal. Apply in accordance with manufacturer's recommendations. Final finish work shall begin as soon as the mix has stiffened sufficiently to support the workmen.
- G. Curing and protection of the concrete shall begin immediately after completion of the finishing operation. Continuous moist-curing is mandatory for at least the first 24 hours. Wood forms shall be intermittently sprayed with water while still in place, and all exposed concrete surfaces shall be kept moist by fine spray techniques. Wet burlap coverings may be used if the finished surface is not marred or blemished during contact with the coverings. Burlap must be kept wet by continuous sprinkling with water.
- H. At the end of the initial 24 hour period, curing and protection of the concrete shall continue for at least four (4) additional days using one of the following techniques:
 - 1. Moist curing procedure utilized during the initial 24 hour period shall be continued.
 - 2. Curing paper or heat-reflecting plastic sheet coverings of all exposed concrete surfaces shall be installed. Such coverings shall be installed while the surface is still damp and shall be secured against action and escape of moisture.
 - 3. Approved chlorinated rubber based pigmented curing compounds shall be applied to exposed concrete surfaces, provided that the compound will not jeopardize subsequent appearance, painting or other treatment of the surface. Surface shall be damp or prewetted prior to application of the compound, consistent with the manufacturer's instructions. Compound itself shall be applied in strict conformance with the manufacturer's instructions and shall meet ASTM C309.

3.07 CONSOLIDATION

- A. General:

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1. Consolidate all concrete in accordance with provisions of ACI SPEC-301.
 2. Consolidate each layer of concrete immediately after placing, by use of internal concrete vibrators supplemented by hand-spading, rodding, or tamping.
 3. Do not use vibrators to transport concrete inside the forms.
 4. During all phases of operation, maintain a frequency of not less than 10,000 vibrations per minute per internal vibrator.
 5. Do not vibrate forms or reinforcement.
- B. Equipment:
1. Provide an adequate number of units and power source. Maintain spare units on hand to ensure adequacy.
 2. If, in the opinion of the Engineer, the equipment being used is not adequate to accomplish proper consolidation, the Engineer may order delay in further placement of concrete until such equipment is available for use at the location of placement of concrete.
- C. Procedures:
1. Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation of aggregates.
 2. Insert the vibrator so as to penetrate the lift to immediately below that one placed, and manipulate to blend the two lifts.
 3. Do not insert the vibrator into lower courses which have begun to set.
 4. Use the vibrator to melt down the concrete as it is being placed, and use the vibrator to consolidate the mass of concrete.
 5. In the case of wall construction, assign at least one vibrator and vibrator-operator to melting down the mix; and assign at least one other vibrator and vibrator-operator to consolidating the mass of concrete.
 6. Spacing between insertions of the vibrator which is unused to consolidate shall not be more than 18" apart.
 7. Maintenance of vibrators: Initiate a maintenance program for the vibrators to assure that they are operating at peak efficient at all times, and to facilitate effective

3.08 SLAB JOINTING

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation/Expansion Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
 2. Isolation/expansion material: Concrete expansion material shall be closed cell polyethylene foam, by Sonneborn, Sandell Mfg. Co., or approved equal.
- D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.
- E. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.
- F. Construction Joints:
1. Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.
 2. Horizontal construction joints will not be permitted except as may be shown on the Drawings.
 3. If construction joints necessary for the progress of the Work are not shown on the Drawings, show them in complete detail on the Shop Drawings.
 4. For slabs on grade, locate the undictated joints in a manner to divide the slab into areas not in excess of 600 sq.ft. with one dimension being not greater than 120% of the other

- dimension
5. Provide keyways at least 1-1/2 inch deep in all construction joints in walls, slabs, and between footings and walls.
 6. Place construction joints perpendicular to the main reinforcement.
 7. Prepare previously placed concrete by cleaning with sandblasting and apply bonding agent in accordance with manufacturer's instructions.
- G. Control Joints
1. Provide control joints in slabs on grade to form panels or symmetrical patterns as shown on drawings or at 30 times the thickness of the slab of 18 feet, whichever is less with joints following column lines or structural features which promote cracking. Joint layout to be confirmed with Engineer.
 2. In hot weather, control joints shall be cut within 4 hours following slab finishing. In cold weather, control joints shall be cut within 12 hours following slab finishing.
 3. Caulk in accordance with provisions of Section 07 9005 - Joint Sealers.

3.09 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. An independent testing agency, as specified in Section 01 4000, will inspect finished slabs for compliance with specified tolerances.
- B. Maximum Variation of Surface Flatness:
 1. Exposed Concrete Floors, Exterior Slabs, Slabs on Grade: 1/4 inch in 10 feet.
- C. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
 1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
- D. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- E. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.
- F. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Above floor slab, leave an open joint as indicated and fill with sealant and backing in accordance with the provisions of Section 07 9005.
- B. Filling in: Fill holes and openings left in concrete structures for the passage of work of other trades, unless otherwise directed, after work of other trades is in place. Mix, place, and cure concrete as specified herein, to blend with in-place construction. Provide all other miscellaneous concrete filling to complete the Work.
- C. Equipment bases and foundations: Provide machine and equipment bases and foundations as shown on the Contract Drawings or required for the machine or equipment actually furnished. Set anchor bolts for machines and equipment to template, at correct elevations, complying with certified diagrams or templates of the manufacturer furnishing the machines and equipment.
- D. Provide isolation joints surrounding bases where indicated or required. Fill joints with joint filler and sealant in accordance with the provisions of Section 07 9005.

3.11 CONCRETE SIDEWALKS

- A. Expansion Joints: Expansion joints shall be of the premolded type and not less than 1/2" thick. The joint filler shall consist of cane or other long fibers of cellular nature, uniformly impregnated with asphalt. The asphalt content shall be between 35 and 50 percent by weight.
 1. After sidewalk has cured, cut down expansion joints 1/2" below the surface of the sidewalk. Apply sealant per Section 07 9005 - Joint Sealers.
- B. Mixing Concrete: All concrete shall be machine mixed or transit mixed. Transit mixing shall conform to the requirements for transit mixed concrete as described in ASTM C94/C94M.

- C. Mixing shall not be started sooner than 3 minutes before the concrete is to be poured. Transit mixed concrete shall not be mixed while traveling.
- D. Mixing shall be continued at least one minute after all materials are in the drum, at a speed between twelve and eighteen revolutions per minute. The volume per batch shall not exceed the manufacturer's rated capacity of the mixer.
- E. Placing Concrete: Before placement, all hardened concrete and other foreign materials shall be removed from the space between the forms. All forms, unless oiled, shall be thoroughly wetted. The subgrade shall also be thoroughly wetted.
 - 1. Concrete shall be conveyed from the mixer to the forms as rapidly as possible and by such methods which will prevent the separation or loss of ingredients. If conveyed by chuting, the angle of the chute with the horizontal shall be such as to allow the concrete to flow without separation. The end of the chute shall be as close as possible to the point of deposit.
 - 2. Concrete shall be placed in the forms as near to the final position as possible in order to avoid rehandling.
- F. Forming: Forms for concrete sidewalks shall be set to the line and grade shown on the Contract Drawings or as established by the Engineer. Forms shall be set so as the finished slab shall pitch towards the street 1/4" per 1 foot of sidewalk width or as indicated on the Contract Drawings.
 - 1. In general, walks shall be 5 inches thick. The entire thickness shall be made in one monolithic pour.
 - 2. The type of form used, whether metal or wood, shall be of proper dimensions to provide the required depth for the full width of the slab.
- G. Wood forms shall be of sound lumber, free from knot holes, loose knots or other defects. Dressed 2" x 4" will not be allowed. Full dimensions shall be maintained.
 - 1. Forms shall be properly anchored and braced to prevent any movement or bowing of the forms during placement.
 - 2. Expansion joints of the type previously specified shall be placed along all curbs or structures, and transversely across the slab at each property line as determined by the Engineer. Joints shall extend the full depth of the slab.
- H. Dividers shall be placed so as to produce a transverse joint for the full depth of the slab at intervals of 4 times the sidewalk width, up to 7 foot or as directed by the Engineer. Dividers shall be of the same material as the side forms and shall produce a smooth surface for the full depth of the slab. Dividers are not to be removed until the concrete has hardened.
 - 1. After the dividers have been removed and before the next adjoining section of sidewalk is placed, one thickness of tar paper shall be placed between the finished slab and the newly placed concrete.
 - 2. In addition, transverse control joints shall be scored on the surface of the walk at 4 foot intervals for 4 foot wide walks and 5 foot intervals for 5 foot wide walks, and so on up to 7 foot in width. Sidewalk of greater than 7 foot width shall be scored so no blocks are less than 4 foot by 4 foot and greater than 7 foot by 7 foot. Scoring shall be done with an approved edging tool of 1/4 inch radius.
- I. Surface Finish: The surface of concrete sidewalks shall have a wood float or light broom finish. Care shall be taken that the surface is not over floated. All edges and joints shall have be finished with an approved edging tool of 1/4" radius.
- J. Curing: Immediately after finishing, the concrete shall be protected from fast drying by covering with heavy paper and straw or burlap. The covering shall be kept damp and remain in place for at least 7 days.
- K. Subgrading: Subgrading work shall be performed as specified in Division 31.

3.12 CONCRETE CURB

- A. Concrete curb shall be conventionally formed or slip formed to the size and shape as shown in the Contract Drawings.
- B. Conventionally Formed Curb:
 - 1. Casting Segments: Curb shall be cast in segments having a uniform length of approximately 20 feet.
 - 2. Segments shall be separated by construction joints with provisions made at each joint for 1/4 inch expansion. When the curb is constructed next to cement concrete pavement, the construction joint adjacent to the end of the pavement slab shall line up with the pavement joint.
 - 3. Expansion joints: Expansion joints 3/4 inch in width shall be formed with Premolded Bituminous Joint Filler, NYSDOT Standard Specification Section 705-07, placed at 20'-0" intervals or as shown on the Contract Plans.
 - 4. The filler material shall be cut to conform to the cross section of the curb. When curb is cast adjacent to cement concrete pavement constructed with expansion joints, expansion joints in the curb shall be located at expansion joints in the pavement.
- C. Forms: Forms shall be steel or wood, straight, free from warp, and of such construction that there will be no interference to inspection for grade or alignment. All forms shall extend for the full curb depth and shall be braced and secured adequately so that no displacement from alignment will occur during placement of concrete.
- D. Concrete Placing and Vibrating: Concrete shall be placed in the forms in accordance with the applicable requirements and shall be compacted with an approved, immersion type mechanical vibrator. The vibrator shall be of the size and weight capable of thoroughly vibrating the entire mass with damaging or mis-aligning the forms and shall be approved by the Engineer. Forms shall be left in place for 24 hours or until the concrete has sufficiently hardened as determined by the Engineer, so that they can be removed without injury to the curb or curb and gutter. Upon removal of the forms, the exposed faces of the curb or curb and gutter shall be immediately rubbed to uniform surface. Rubbing shall be accomplished by competent finishers. No plastering will be permitted.
- E. Concrete Curing: Curing of the curb or curb and gutter shall comply with the requirements of NYSDOT Standard Specification Section 502-3.10 Curing. Minimum curing periods for the various types of curing materials used shall comply with the requirements of Table 502-2.
- F. Protection: The Contractor shall keep the curb or curb and gutter clean, aligned, and protected from damage until final acceptance of the Work. Any curb or curb and gutter damaged prior to the final acceptance of the Work shall be repaired or replaced at the Contractor's expense.

3.13 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Provide as-cast rough form finish to formed concrete surfaces that are to be concealed in the finished work or by any other construction. Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal. Apply surface coating of silica sand and portland cement to achieve uniform smooth texture. Use Acryl 60 admixture with water by Thoro, Flex-Con by Euclid Chemical, or approved equal.
 - 2. Smooth Form Finish:
 - a. Provide as-cast smooth form finish for formed architectural concrete surfaces that are to be exposed to view, or that are to be covered with a coating material other than cement plaster applied directly to the concrete.

- b. Produce smooth form finish by selecting form material to impart a smooth, hard uniform texture and arranging them in orderly and symmetrically with a minimum number of seams. Place smooth form material on finish side of form face to implement acceptable/approved intent of finish appearance. Submit plan to Engineer for approval of method and verification of conformance requirements.
 - c. Repair and patch defective areas with all fins and other projections completely removed and smoothed.
 - d. Related unformed surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a smooth troweled finish.
 - e. Proportion concrete mixtures to maintain designated colors and uniformity of colors. Use the same material and proportions throughout the project. Avoid changes in quantity or cementitious materials per unit volume of concrete. Use only one type and one brand of cement from one mill, only one source and one nominal maximum size of course aggregate, only one source of fine aggregate, and only one placing consistency.
 - f. Do not allow vibrators to contact formwork for exposed concrete surfaces. Where a smooth-rubbed or similar finished is specified, work the course aggregate back from the forms by spading or form vibration, leaving a full surface of mortar but avoiding surface voids.
 - g. Prevent damage to concrete from formwork removal. Do not pry against face of concrete. Use only wooden wedges to separate forms from concrete.
 - h. Where as-cast finishes are specified, the total area requiring repair shall not exceed 2 sq.ft. in each 1,000 sq.ft. of as-cast surface. This is in addition to tie-hole patches.
 - i. Repairs in as-cast architectural concrete shall match color and texture of surrounding surfaces.
- D. Monolithic Slab Finishes:
- 1. Scratch Finish:
 - a. Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for terrazzo tile and other bonded applied cementitious-finish flooring material.
 - b. After placing slabs, plane the surface to a tolerance as indicated elsewhere in this specification.
 - c. Slope uniformly to drains where required.
 - d. After leveling, roughen the surface before its final set by using a stiff broom, a brush, or a rake.
 - 2. Float Finish:
 - a. Apply float finish to monolithic slab surfaces that are to receive trowel finish and other finishes as specified, and to slab surfaces which are to be covered with insulation and as otherwise shown on the Contract Drawings or in the schedules.
 - b. After placing concrete slabs, do not work the surface further until ready for floating.
 - c. Begin floating when the surface water has disappeared and when the concrete has stiffened sufficiently to permit operation of a power driven float.
 - d. Consolidate the surface with power driven floats, or by hand-floating if area is small or inaccessible to power units.
 - e. Check and level the surface plane to a tolerance as indicated elsewhere in this specification.
 - f. Cut down high spots and fill low spots.
 - g. Uniformly slope to drains where required.
 - h. Immediately after leveling, refloat the surfaces to a smooth, uniform, granular texture.
 - 3. Trowel Finish:
 - a. Apply trowel finish to monolithic slab surfaces that are to be exposed to view, unless otherwise shown, and to slab surfaces that are to be covered with resilient flooring, carpeting, paint, or other thin-film finish coating system.

- b. Steel trowel surfaces that will be left exposed:
 - 1) Chemical Hardener: After slab has cured, apply water-diluted hardener in three coats per manufacturer's instructions, allowing 24 hours between coats.
 - c. After floating, begin the first trowel finish operation using a power driven trowel. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface.
 - d. Consolidate the concrete surface by the final hand troweling operation, free from trowel marks, uniform in texture and appearance, and with a surface plane tolerance as indicated elsewhere in this specification.
 - e. Grind smooth those surface defects which would telegraph through applied floor covering system.
4. Nonslip Broom Finish:
- a. Apply nonslip broom finish to exterior concrete platforms, steps, ramps, and elsewhere as shown on the Contract Drawings or in the schedules.
 - b. Immediately after trowel finishing, slightly roughen the concrete surface by brooming in the direction perpendicular to the main traffic route. Use a fiber bristle broom.
 - c. Coordinate the required finish with the Engineer prior to application.

3.14 CURING AND PROTECTION

- A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than seven days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
 - 1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water-fog spray or saturated burlap.
 - a. Spraying: Spray water over floor slab areas and maintain wet.
 - b. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
 - 2. Final Curing: Begin after initial curing but before surface is dry.
 - a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.
 - b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.15 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 50 cubic yards or less of each class of concrete placed.
- F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

- G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.
- H. Perform one air content test for each set of test cylinders taken following procedures of ASTM C173/C173M.

3.16 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.17 REMEDIAL WORK

- A. General: Reinforce or replace defective work as directed by the Engineer and at no additional cost to the Owner.
- B. Patching: Repair defective areas and fill form-tie holes and similar defects in accordance with Chapter 9 of ACI SPEC-301. Where, in the opinion of the Engineer, surface defects such as honeycomb occur, repair the defective areas as directed by the Engineer.

3.18 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

**SECTION 33 1416
SITE WATER UTILITY DISTRIBUTION PIPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Raw water intake pipeline
- B. Water pipe for site conveyance lines.
- C. Pipe valves.
- D. Pipe and fittings for site water lines including raw water intake piping, domestic water lines and fire water lines.
- E. Valves, Fire hydrants, and Domestic water hydrants.

1.02 REFERENCE STANDARDS

- A. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast; 2017, with Errata (2018).
- B. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service; 2019.
- C. AWWA C502 - Dry-Barrel Fire Hydrants; 2018.
- D. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances; 2017.
- E. UL 246 - Hydrants for Fire-Protection Service; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. See Section 01 3300 for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
- E. Hydrostatic test results.
- F. T-bolts.
- G. Concrete mix design for thrust restraint at HDPE-to-DIP connections.
- H. Reinforcing shop drawing for thrust restraint at HDPE-to-DIP connections.
- I. PE wall anchor.
- J. Valves, fittings, and pipe assemblies
- K. Raw Water Intake Pigging Plan and Pig Manufacturer's Product Data.
- L. Horizontal Directional Drill Plan and Drilling Fluid MDS
- M. Pig Launch T-Bolt Closure Assembly

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers with labeling in place.
- B. Pipe and accessories shall be handled in such manner as to insure delivery to the trench in sound, undamaged condition. If coating or lining of any type of pipe or fitting is damaged, repairs shall be made as necessary. No other pipe or material shall be placed inside of a pipe or fitting after coating has been applied. Rubber gaskets that are not to be installed immediately, shall be stored in a cool, dark place.
- C. Polyethylene piping shall be handled carefully with any gouge larger than 10% of the pipe wall removed from the trench and taken off site.

PART 2 PRODUCTS

2.01 WATER PIPE

A. Ductile Iron Pipe: AWWA C151:

1. Ductile Iron Water Pipe: Ductile iron pipe shall conform to the latest revision of AWWA Specifications C151 cement lined with slip-type single rubber gasket joints or mechanical joints, as follows:
 - a. 4 in. Class 52.
 - b. 6 in. Class 52.
 - c. 8 in. Class 52.
 - d. 10 in. Class 52.
 - e. 12 in. Class 52.
 - f. 14 in. Class 52
 - g. 16 in. Class 52
 - h. 18 in. Class 52
2. Joints and Fittings: Use ANSI/AWWA C110 and C153 fittings except ductile iron only, ANSI/AWWA rubber gasket joints. Use flanged joint bolts, nuts, and gaskets conforming to ANSI/AWWA C110, Appendix A.
3. Use ring gaskets for pipe sizes 14 inches and larger. Do not use flanged joints for underground installation unless so specified. Unless otherwise specified, use fittings with a standard cement mortar lining per ANSI/AWWA C 104.
4. Unless otherwise specified, use ductile iron fittings with a rated working pressure of at least 250 psi.
5. Restrained joints (those types which provide thrust restraint without the use of the rods or thrust blocks) may be used provided that:
 - a. The joints conform to ANSI/AWWA C111 and ANSI/AWWA C151.
 - b. The rated working pressure of the restrained joint is at least 250 psi for 24 inch diameter and smaller or 200 psi for 30 inch diameter and larger.
 - c. Joint restraint is adequate to resist the maximum hydrostatic force developed at the full working pressure specified above.
 - d. The wall thickness of any pipe or fitting which is grooved to accept a lock ring is increased to compensate for the depth of the groove.
6. **Unless otherwise specified use Stainless Steel T-bolts.**

B. Polyethylene Encasement for Ductile Iron Pipe

1. Polyethylene encasement for use with ductile iron pipe shall meet all the requirements for ANSI/AWWA C105/A21.5, Polyethylene Encasement for Ductile Iron Pipe Systems.
2. In addition, polyethylene encasement for use with ductile iron pipe systems shall consist of three layers of co-extruded linear low density polyethylene (LLDPE), fused into a single thickness of not less than 8 mils.
3. The inside surface of the polyethylene wrap to be in contact with the pipe exterior shall be infused with a blend of anti-microbial biocide to mitigate microbiologically influenced corrosion and a volatile corrosion inhibitor to control galvanic corrosion.
4. Ductile iron pipe and the polyethylene encasement used to protect it shall be installed in accordance with AWWA C600 and ANSI/AWWA C105/A21.5 and also in accordance with all recommendations and practices of the AWWA M41, Manual of Water Supply Practices - Ductile Iron Pipe and Fittings. Specifically, the wrap shall be overlapped one foot in each direction at joints and secured in place around the pipe and any wrap at tap locations shall be taped tightly prior to tapping and inspected for any needed repairs following the tap.
5. All installations shall be carried out by personnel trained and equipped to meet these various requirements.
6. Polyethylene encasement shall also be included on hydrants legs and barrels.

C. HDPE Piping:

1. HDPE piping shall conform to AWWA C901 and 906 and be PE 3608 in accordance with ASTM D 3350 (minimum 160 psi rating). Raw Water Intake Piping to be DR-9 DIPS,

- contractor to provide NSF-61 certification.
- 2. The pipe shall be color coded for intended use. A blue stripe shall be used for water pipe.
- 3. All fittings, butt fusion connections, and electrofusion connections must be of equal or greater pressure rating than pipe.
- 4. HDPE services shall be installed using fusion saddle tapping tees. The tapping tees shall have integral brass corporation cutters.
- 5. Compression connections of polyethylene pipe shall be constructed using stainless steel inserts for reinforcement.
- 6. All fabricated piping and fittings shall be from the same pipe manufacturer.
- 7. Fusion Joining:
 - a. Pipe shall be joined by the fusion welding process. The welders must use the manufacturers instructions and procedures.
 - b. Electro-fusion couplings shall be allowed where typical fusion welding is impractical. Mechanical joints can be used at the direction of the Engineer.
 - c. All fusion welders must be qualified per the Department of Transportation, Code of Federal Regulations Title 49 Part 192.285.
 - d. The alignment and profile of the main shall be as shown on the Contract Drawings. All tees and valves shall be level and correctly installed not causing undo stress on the fitting. If fitting is oriented incorrectly due to improper installation or contraction and expansion of the polyethylene pipe, fitting shall be removed and correctly installed.

D. Tracer Wire:

- 1. Tracer wire shall be required on all non-ferrous water mains and services.
- 2. Tracer wire shall be 12 AWG wire coated with minimum 30 mil polyethylene jacketed designed specifically for buried use. Tracer wire shall be stainless steel in directonal drill areas and copper in all other areas.
- 3. Tracer wires shall be interconnected at all pipe tees, pipe crosses, and pipe services. Splices in the tracer wire shall be connected by means of a split bolt or compression type connector to ensure continuity. Wire nuts shall not be used. A waterproof or corrosion proof connector shall be used.
- 4. Tracer wire shall be placed outside the curb stop riser and be wrapped around the top of the riser. At all 6" gate valves to hydrants, SDR-35 PVC shall be installed to protect the tracer wire as shown on the details.
- 5. Tracer wire shall be attached to the top of the pipe at 10 feet intervals and at all crosses, tees, and elbows.
- 6. After backfill and compaction, but prior to paving, continuity testing of the tracer wire will be required. Any detected damages to tracer wire shall be repaired.

2.02 VALVES

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Gate Valves:
 - 1. Resilient seated gate valves for sizes 3 inches through 24 inches shall be manufactured and tested to the requirements of AWWA Standards C509 (cast iron), C515 (ductile iron), and C500 (most recent revisions) as applicable for a design working pressure of 250 psi. This pressure rating shall be cast on the outside of the valve.
 - 2. Gate valves are to be manufactured by Kennedy, Mueller, U.S. Pipe, or approved equal.
 - 3. 18" Gate Valves to include beveled gearing and to be installed horizontally.

2.03 T-BOLT ENCLOSURE ASSEMBLY

- A. T-Bolt Closure Assembly: Manufactured by Tube Turns Technologies, Inc, Model Class 75-TBV or Approved Equal.
 - 1. Assembly to be fabricated to include integral closure lid and welded flanged vertical barrel. O-Ring material to be Buna-N.
 - 2. Assembly shall be painted for exterior use.

2.04 BEDDING AND COVER MATERIALS

- A. Bedding: As specified in Section 31 2316.13.
- B. Cover: As specified in Section 31 2316.13.

2.05 JOINT RESTRAINT: THE CONTRACTOR HAS THE OPTION OF UTILIZING TIE ROD AND CLAMP OR CONCRETE THRUST BLOCK FOR JOINT RESTRAINTS.

- A. Tie Rods and Clamps: Use tie rod and clamp system conforming to Series 1300/1390 as manufactured by Uni Flange, MEGA LUG, or approved equal.
- B. Concrete Thrust Blocks: Use concrete conforming to ASTM C94 having a maximum slump of 4 inches and a minimum compressive strength of 2000 psi at 28 days.
- C. Connections to hydrant shoe when using polyethylene pipe shall utilize mechanical joint adapter butt fused on 6" PE main. Standard mechanical joints with stainless steel inserts will not be allowed for hydrants.

2.06 WATER FOR HYDROSTATIC TESTING, FLUSHING AND DISINFECTION:

- A. The Contractor shall be responsible for providing potable water for cleaning and testing. The contractor shall coordinate with the Owner prior to the use of on-site water source and be responsible for all costs associated with the use of on-site water should the Owner allow its use.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.02 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the engineer, cutting shall be done with an approved type mechanical cutter. Wheel cutter shall be used when practicable.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare pipe connections to equipment with flanges or unions.

3.03 TRENCHING

- A. As specified in Section 31 2316.13.

3.04 INSTALLATION - PIPE

- A. Handling: Pipe and accessories shall be handled so as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken not to injure the pipe coating or lining. If the coating or lining of any pipe or fitting is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner. No other pipe or material of any kind shall be placed inside a pipe or fitting after the coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects.
- B. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Owner. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place.
- C. Sewer Lines: Where the location of the water pipe is not clearly defined in dimensions on the drawings, the water pipe shall not be laid closer horizontally than 10 feet from a sewer pipe.

- D. Where water lines cross gravity-flow sewer lines, the water pipe shall be laid with a minimum separation distance of 18 inches for 10 feet each side of sewer pipe.
- E. Install ductile iron piping and fittings to AWWA C600.
- F. Route pipe in straight line.
- G. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- H. HDPE Piping by directional drill - Installation of all pipe, fittings, specials, adapters, and appurtenances shall conform to the manufacturer's recommendations and the following summary of installation recommendations. Where specifications and recommendations conflict, the strictest shall apply.
 - 1. Documented qualifications of the Contractor performing the directional drilling shall be submitted for review, including a list of completed projects within the last five years with names, addresses, telephone and facsimile numbers for these reference projects. Contractor shall have construction experience of at least five years in directional drilling. Construction experience shall be for drills of similar size as to the ones planned, including water crossings. Owner reserves the right to reject without penalty the proposed Contractor that does not meet the prior experience requirement.
 - 2. Proper implements, tools, and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work.
 - 3. All butt fusion and extrusion welding of HDPE pipe and fittings shall be accomplished by proper equipment and operated in a thoroughly workman manner and shall be in conformance with ASTM D 3261. All equipment must be in good repair and shall have manufacturer's written instructions and fusion pressures.
 - 4. The Contractor shall employ only skilled welders capable of meeting the qualifications set forth by the manufacturer's specifications or technical training department.
 - 5. All fabricated piping and fittings (shall be the same pipe manufacturer) shall be the product of a well equipped fabricating shop employing skilled tradesman.
 - 6. No field fabricating of fittings will be allowed.
 - 7. The alignment and profile of the main shall be as shown on the contract plans. The vertical profile as shown on the drawings is the minimum depth to which the pipe line shall be installed. The Contractor may at his option and with the permission of the Engineer elect to install the pipe at greater depth at no additional cost to the Owner.
 - 8. The rig side work space and the pipe side work space shall be determined subject to the approval of the Engineer. The working areas should not encroach on private property or interfere with existing schedule.
 - 9. Prior to beginning construction, the Contractor shall submit to the Engineer a detailed drilling procedure for installation of the crossing, a drill site layout drawing and a proposed work schedule.
 - 10. The Contractors attention is directed to the environmental constraints and restrictions in the permits and elsewhere herein. He is advised that all of his operations must be conducted in strict conformance and adherence thereto, all to the satisfaction of the Engineer.
 - 11. Special care in handling shall be exercised during delivery and distribution of pipe to avoid damage. Damaged pipe shall be rejected and replaced at the Contractor's expense. The pipe shall be stored prior to use in such a manner as to keep the interior free from dirt and foreign matter. Any pipe that becomes contaminated shall be hand cleaned and washed before it is incorporated in the work.
 - 12. The Contractor shall haul, heat fuse joints and hydrostatically test the pipeline in one section.
 - 13. The drilling operation shall be directed using steering and tracking systems capable of producing the required alignment. The control system shall provide an angle of inclination reading and the direction in which the cutting tool is pointed. The Engineer shall have access at all times to measuring or gauging devices used for the horizontal drill including drilling logs maintained by the Contractor. Drilling logs are to be submitted to the

Engineer as part of the Record Drawings. The Contractor shall mobilize the drilling equipment, erect the rig, drill a pilot hole, enlarge the hole as necessary and pullback the prefabricated pipe string through the borehole. The pipeline shall be adequately supported on rollers during pullback of the pipeline into the pre-drilled hole. The rollers and cradles shall be of a type that will prevent damage to the pipeline and will be of sufficient number to prevent over stressing during the pullback procedure. Pullback equipment shall be adequate for the required thrust. Procedures should be taken to avoid bentonite leakage. The Contractor shall supply water for mixing drilling fluid, and shall supply portable mud tanks or construct temporary mud pits to contain excess drill fluids during construction. Upon completion of the crossing, the Contractor shall dispose of any drill cuttings and excess drill fluids in a manner consistent with the local and state regulations.

14. In the event that the Contractor must abandon the drill hole before completion of the crossing, the Contractor shall seal the borehole and redrill the crossing at the Contractors expense.
15. Reinforced concrete anchors used as thrust restraints at HDPE-to-DIP connections shall be constructed utilizing the following:
 - a. Concrete shall have a minimum 28-day compressive strength of 3,000 psi, an air content of 5% (+/-1%), and a slump of 4" or less. Type I cement shall be used and the maximum water to cementitious material ratio shall be 0.50.
 - b. Reinforcing steel shall be ASTM A615, Grade 60 uncoated deformed bars tied down with 16 gage tie wire and supported using plastic chairs.
 - c. Formwork: The sides and bottom of the trench may be used as the forms for these locations. Formwork perpendicular to the pipe shall be good quality plywood or prefabricated forms.

3.05 INSTALLATION - VALVES AND HYDRANTS

- A. Set valves on solid bearing.
- B. Center and plumb valve box over valve. Set box cover flush with finished grade.
- C. Set hydrants plumb; locate pumper nozzle perpendicular to and facing roadway.
- D. Set hydrants to grade, with nozzles at least 20 inches above ground.
- E. Provide a drainage material consisting of 2 inches washed gravel to 6 inches above drain opening. Do not connect drain opening to sewer.

3.06 FIELD QUALITY CONTROL

- A. All pipe line shall be tested hydrostatically for 2 hours at a pressure 50 percent in excess of the pressures to which the pipe will normally be subjected, unless different test pressures are outlined in the Special Requirements; but in no case less than 150 pounds per square inch (psi). Any obvious leaks or ruptured piping disclosed by the tests shall be repaired or replaced, and the test repeated to the engineer's satisfaction.
 1. The contractor shall accomplish the required tests on the pipeline by individually testing each component section of main designed by the Engineer. The Maximum length of section permitted to be tested at any one time will be approximately one mile, and normally will be less. All water for tests shall be furnished and disposed of by the Contractor at his expense. Source and/or quality of water which the contractor proposes to use in testing the lines shall be acceptable to the Engineer.
 2. Leakage tests shall be conducted concurrently with the pressure tests. The duration of each test shall be at least two hours in length to coincide with the time of the pressure test. Leakage test shall be repeated as often as necessary until the leakage requirement is met.
 3. Leakage is defined as the quantity of water that must be supplied into a newly laid pipe or any valved section thereof to maintain the pressure within 5 psi of the test pressure after all the air in the pipeline has been expelled and the pipeline filled with water.
 - a. Allowable leakage will be determined by the formula:

- 1) $L = [SD (P)^{1/2}] / 148,000$.
 - b. in which L is the allowable leakage in gallons per hour (gph); S is the length of pipeline tested in feet; D is the nominal pipe diameter in inches; and P is the average test pressure during the leakage test in pounds per square inch gage (psig).
4. Test shall be performed in accordance with AWWA C600.
- B. Water Intake Post-Installation Survey
1. Upon completion of the installation of the submerged raw water intake pipeline the Contractor shall provide a written Post-Installation Survey and Inspection Report by a competent diver, to include the following:
 - a. Verification and CCTV inspection log of the new pipeline for conformance to the design plans and specifications including the following:
 - 1) The pipeline is located within the prescribed right-of-way and is generally straight, free of turns and bends
 - 2) The ballasts holding the pipe are properly resting on the bottom contour and that the line is not forced to bridge any changes in elevation
 - 3) Anchors are properly installed and straps are secured around the pipe.
 - 4) The pipe is not resting on any rocks, debris or material that could cause damage
 - 5) Any auxiliary lines, such as hoses, ropes, buoyancy blocks, or any other equipment used during construction is removed
 - 6) The concrete intake structure and screen is situated in the correct location, resting flat on the bottom contour and is not forced to bridge any changes in elevation
 - 7) All hardware is properly fastened on pipeline including fittings, screens, mechanical joint connections, etc.
- C. Raw Water Intake Post-Installation Hydraulic Pigging
1. Upon completion of the new water intake construction, hydraulic pressure testing, and post-installation survey the Contractor shall perform an initial intake cleaning "pigging" operation under coordination and direction of the Owner and Engineer. Successful completion and transmittance of the intake pig will be the final acceptance measure for the intake construction. If the pigging operation fails, Contractor shall be responsible to identify and repair or replace intake piping to successfully transmit the pig. Intake pigging procedure as set forth below:
 - a. Contractor shall furnish a low-density foam swab Model G1 By Pipeline Pigging Products, Bare Swab Polly Pig by Knapp Polly Pig or approved equal. One (1) swab shall be 16.0" O.D. and one (1) swab to be 17.5" O.D.
 - b. Contractor shall furnish and operate a solids/debris handling pump for testing that is capable of producing 1,500 gallons per minute at a system head of approximately 85 feet of water. Submit to Engineer the pump specifications including pump curve for approval. All necessary temporary hoses and fittings shall be furnished by Contractor. Raw water from the Lake shall be utilized for this testing operation.
 - c. Raw Water Intake Pigging Procedure:
 - 1) Contractor to notify Owner and Engineer in advance to coordinate the schedule and completion of this work. A written operational plan shall be submitted and approved by Engineer prior to commencement of the work.
 - 2) Contractor shall insert a new 12" blind flange over intake tee to divert flow to the 16" pig removal access point. 16" blind flange over intake flange access point to be removed for retrieval of the pig.
 - 3) A 6" diameter hose shall be connected to the new pig launch assembly via quick connect fitting from the Contractors pump at the lakeshore. A 6" diameter minimum suction pipe or hose shall be inserted into the Lake for pumping.
 - 4) Flush new intake line with raw water for a minimum of 30 minutes to remove any construction debris, continue flushing until line has been scoured.
 - 5) Contractor shall insert the 16.0" diameter pig into the new 18" diameter pig launch assembly with the process piping valve to the plant isolated, in the

"Closed" position.

- 6) Once the pig has been inserted and ready for discharge, Contractor shall operate the temporary pump and push pig at the design flow of 1,500 gpm which corresponds to a velocity of approximately 2.1 feet per second. Approximate volume of pipeline is 45,000 gallons.
- 7) Once the pig has successfully been transmitted to the intake, the initial pigging operation will be successfully completed. Contractor shall remove pig and repeat this process with the larger 17.5" diameter swab.
- 8) Upon successful completion of the second test, replace 16" blind flange on intake, remove 12" blind flange on intake flange, and install new 12" intake screen.
- 9) Engineer will inspect the pigs at the completion of the operation to assess condition. There shall be no visible observation of wear or degradation of the foam swab.
- 10) Pigs shall be transmitted to the the Owner upon completion. Upon concurrence from Owner and Engineer, Raw Water Intake may be placed online.

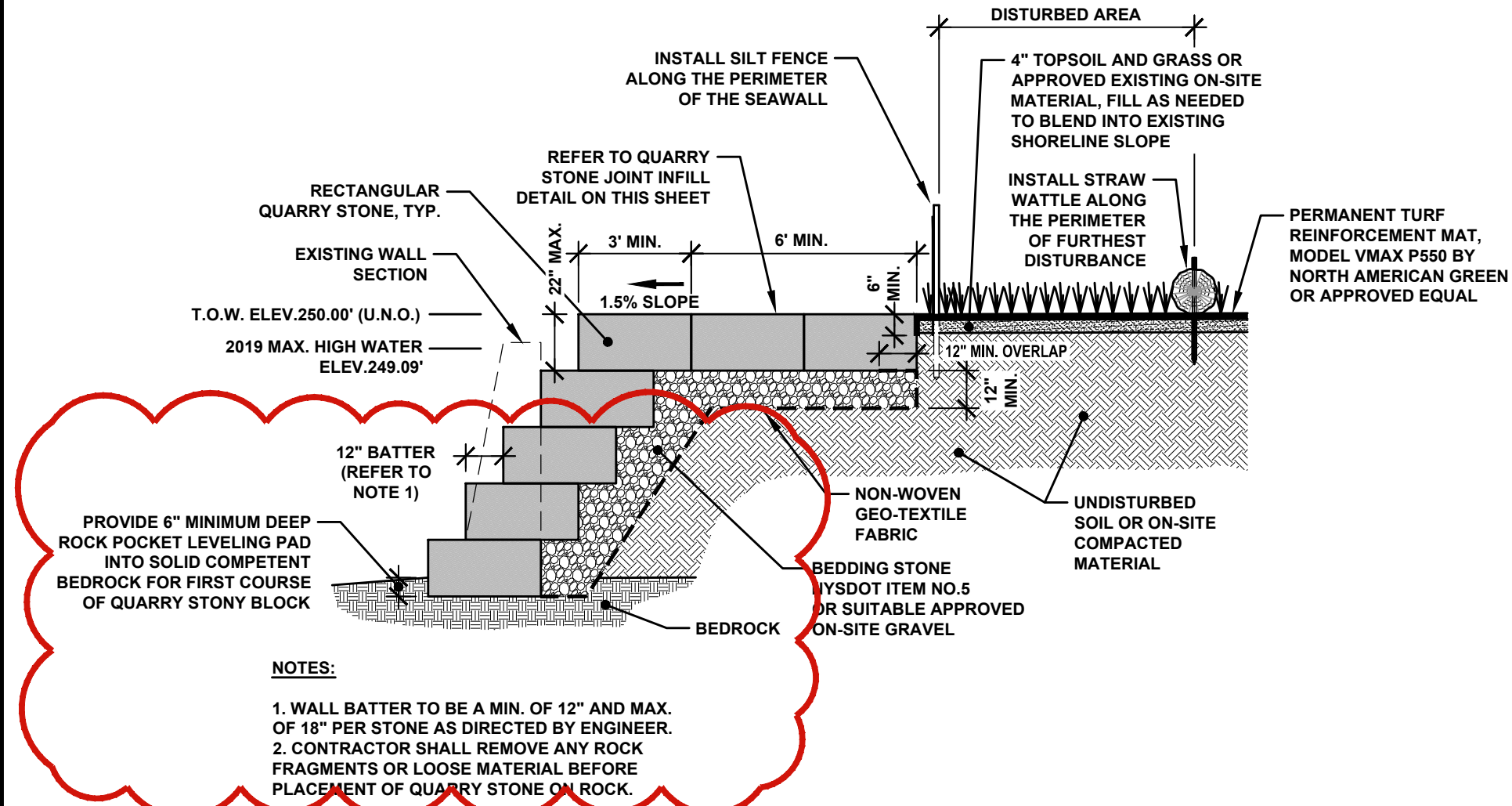
3.07 QUALITY CONTROL

- A. The Contractor shall establish and maintain quality control for operations under this section to assure compliance with contract requirements and maintain records of his quality control for all materials, equipment and construction operations including but not limited to the following:
 1. Hydrostatic tests
 2. Jointing
 3. Prevention of damage to pipe coating and lining.
- B. Temporary Plugging: At all times when pipe laying is not actually in progress, the open ends of the pipes shall be closed temporarily with pipe plugs or by other means. If water is in the trench when work is resumed, the plugs shall not be removed until all danger of water entering the pipe has passed.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

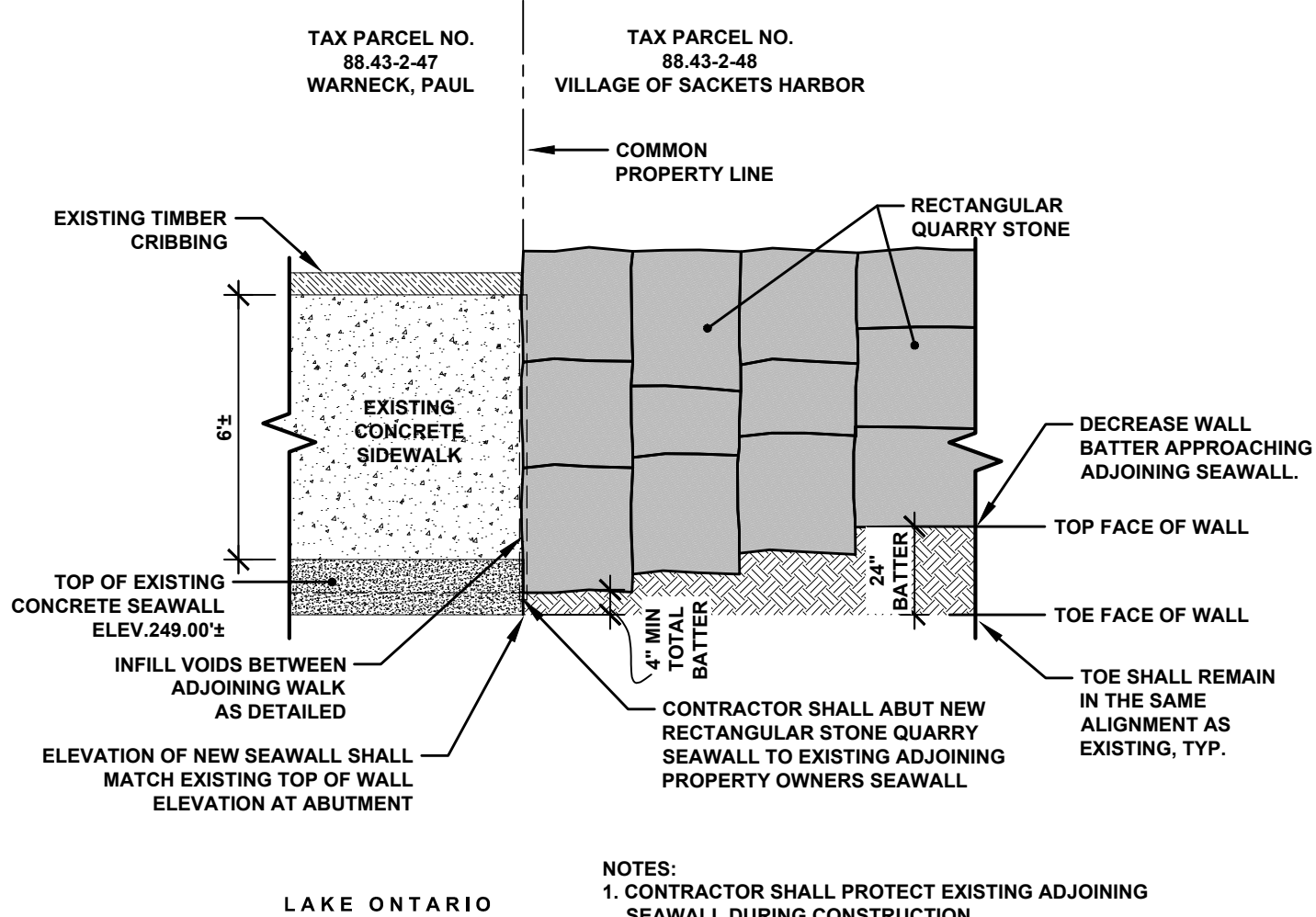
3.08 CLEANING

- A. Cleanup: Upon completion of the installation of the water distribution lines and water service lines, and appurtenances, all debris and surplus materials resulting from the work shall be removed.
- B. Potable Water Pipeline Cleaning: At the conclusion of the work and prior to disinfection of the water main, the Contractor shall thoroughly clean all new pipes by flushing with water or other means to remove all dirt, stones, pieces of wood, etc., which may have entered during the construction period. If, after this cleaning, any obstructions remain, they shall be corrected to the satisfaction of the Engineer. Pipes shall be flushed at a rate of 3 feet per second for a duration suitable to the Engineer.

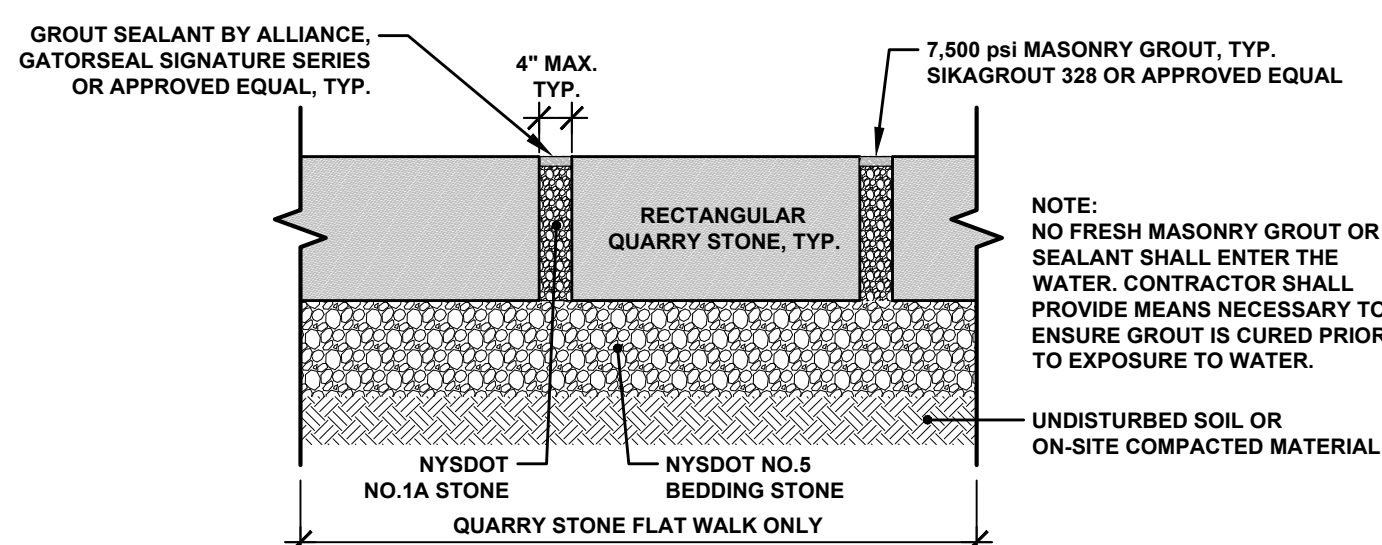
- SEAWALL NOTES:**
1. NEW QUARRY STONE WALL TO BE CONSTRUCTED IN THE SAME GENERAL ALIGNMENT AS THE PREVIOUS SEAWALL.
 2. THE TOE OF THE NEW SEAWALL SHALL BE IN THE SAME LOCATION AS EXISTING.
 3. APPROVED EXCAVATED ON-SITE MATERIAL MAY BE REUSED AS FILL IN AREAS AS INDICATED.
 4. POSITIVE DRAINAGE SHALL BE MAINTAINED.



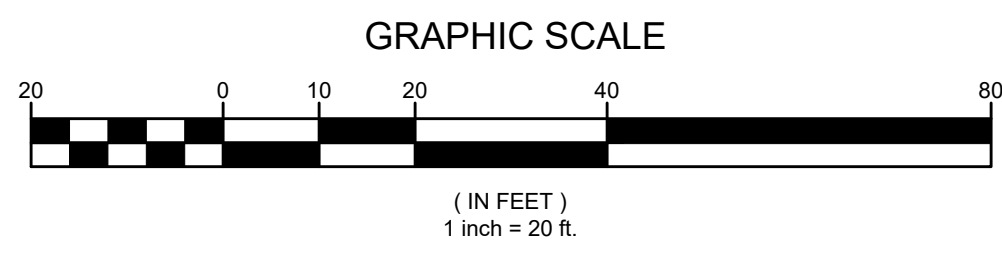
RECTANGULAR QUARRY STONE SEAWALL SECTION
NOT TO SCALE



ADJACENT SEAWALL ABUTMENT PLAN
NOT TO SCALE



QUARRY STONE JOINT INFILL DETAIL
NOT TO SCALE



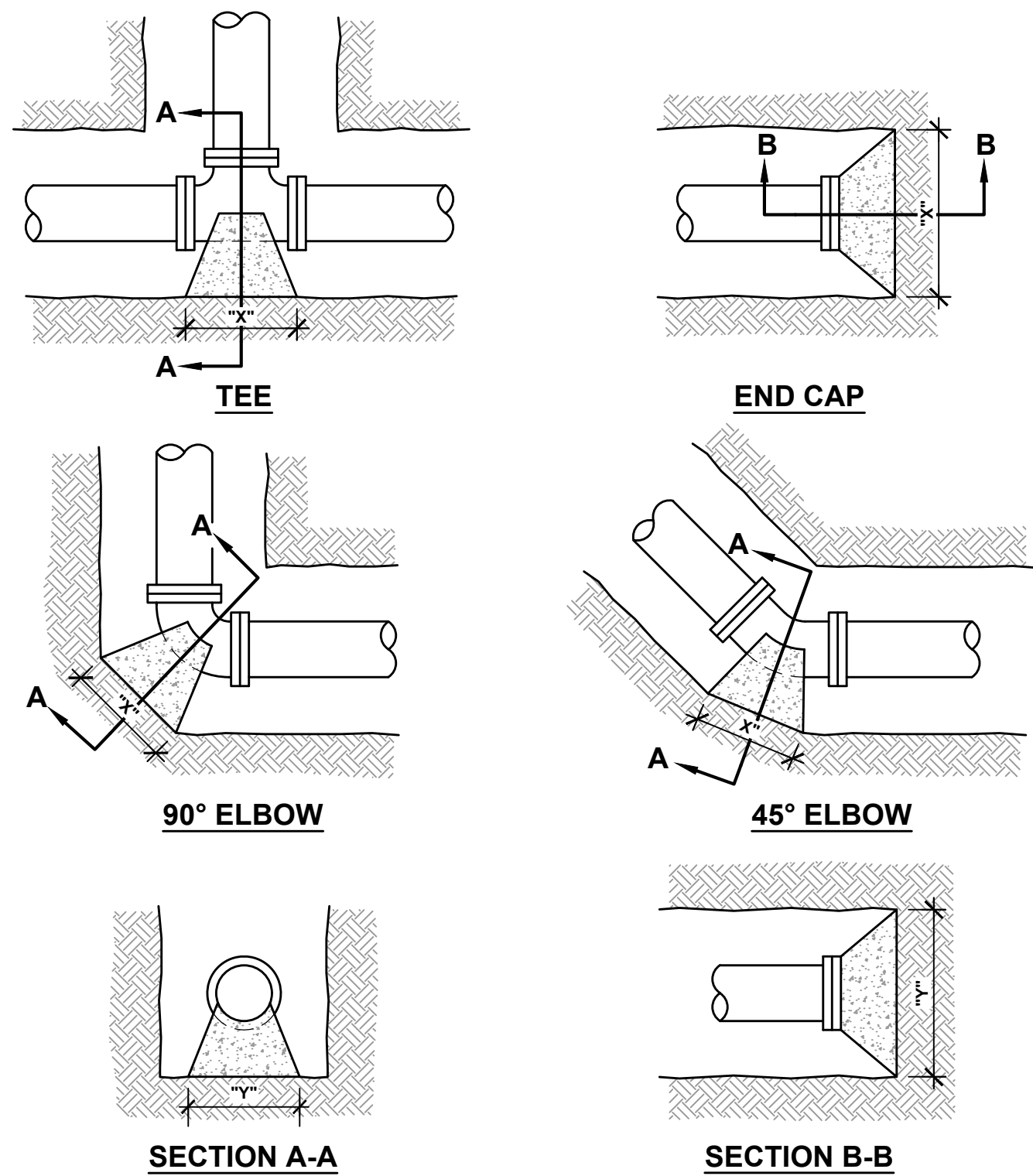
SITE IMPROVEMENT PLAN AND SECTIONS
VILLAGE OF SACKETS HARBOR
WATER TREATMENT FACILITY
NEW WATER INTAKE AND SEAWALL
REPLACEMENT PROJECT



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NEW YORK STATE EDUCATION LAW FOR ANY UNAUTHORIZED
ALTERATIONS TO THIS DOCUMENT AS PER ARTICLE 145 AND 147.
THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AT THE SITE
& NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES.

CHECKED BY:	TJB	SHEET NO.	
DRAWN BY:	JBE		
DATE:	02/20/2024		
LAST REVISION:	AD2 - 03/21/2024		
SCALE:	AS NOTED		
PRINTED FOR:	BID	PROJECT NO.	2014-094

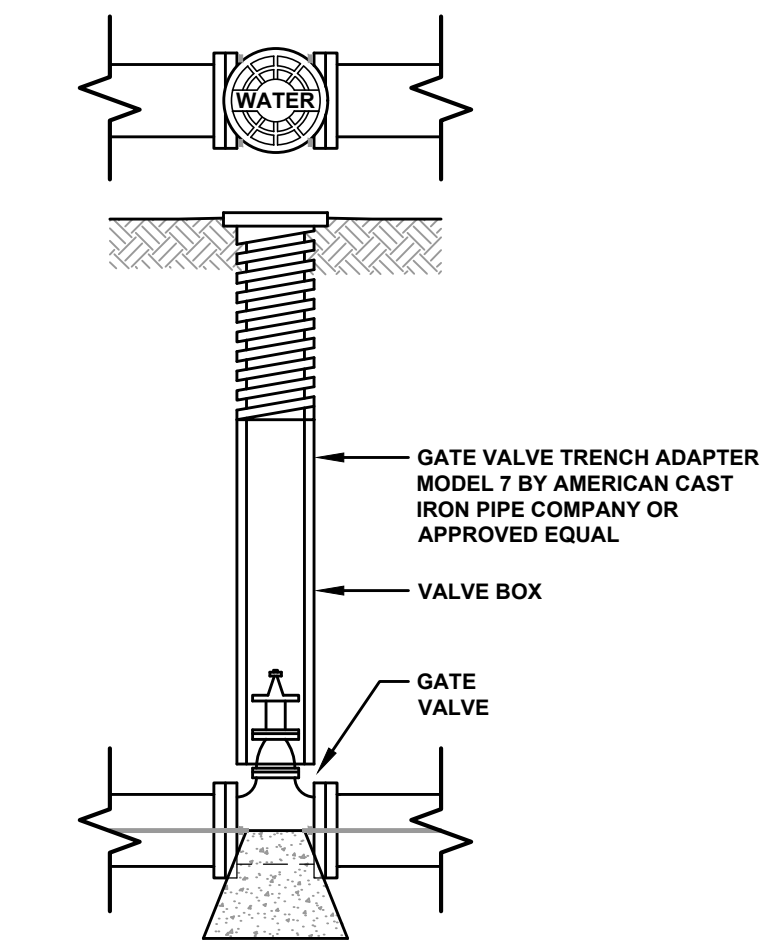
AD2/S-3



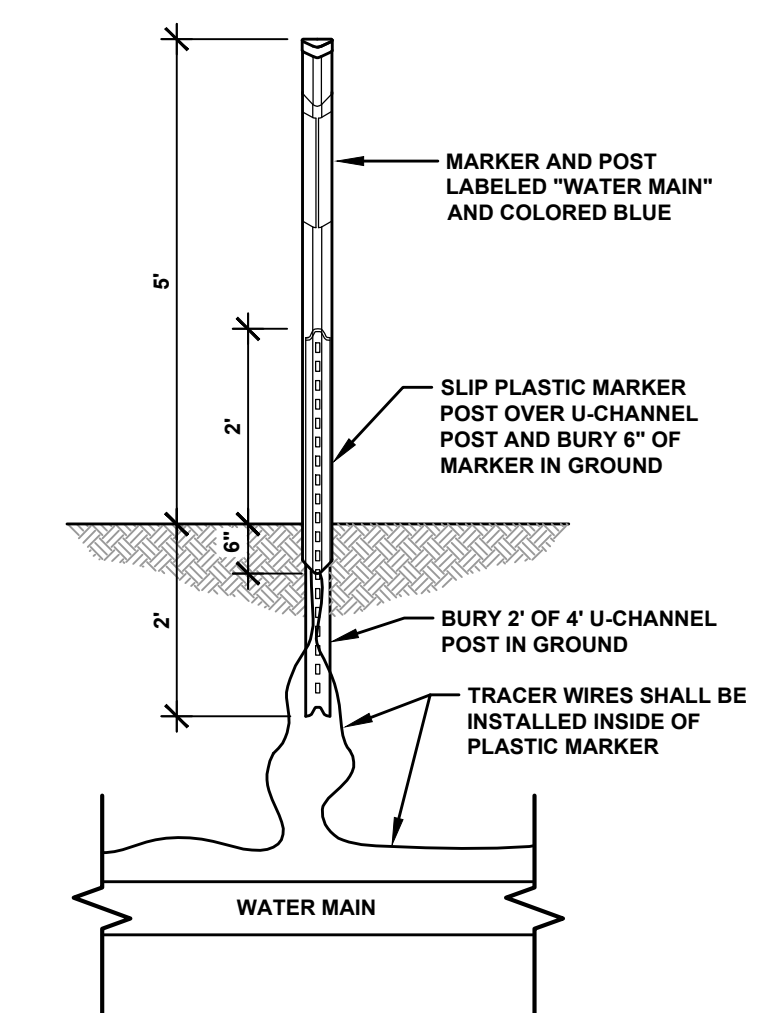
DESIGN BASIS
(200 PSI HYDROSTATIC PRESSURE AGAINST UNDISTURBED SOIL OF 2000 PSF BEARING CAPACITY W/1.5 SAFETY FACTOR)

PIPE SIZE	MINIMUM EFFECTIVE AREA IN SQ. FT. (PRODUCT OF "X" TIMES "Y")						HYDRANT	GATE VALVE
	END CAP	TEE	90°	45°	22 1/2"	11 1/4"		
16"	36	36	60	27	14	7	-	6
14"	28	28	39	21	11	5	-	5
12"	21	21	29	16	8	4	-	4
10"	15	15	21	11	6	3	-	3
8"	10	10	14	7	4	2	14	2
6"	6	6	8	4	2	1	8	-
4"	3	3	4	2	1	1	4	-

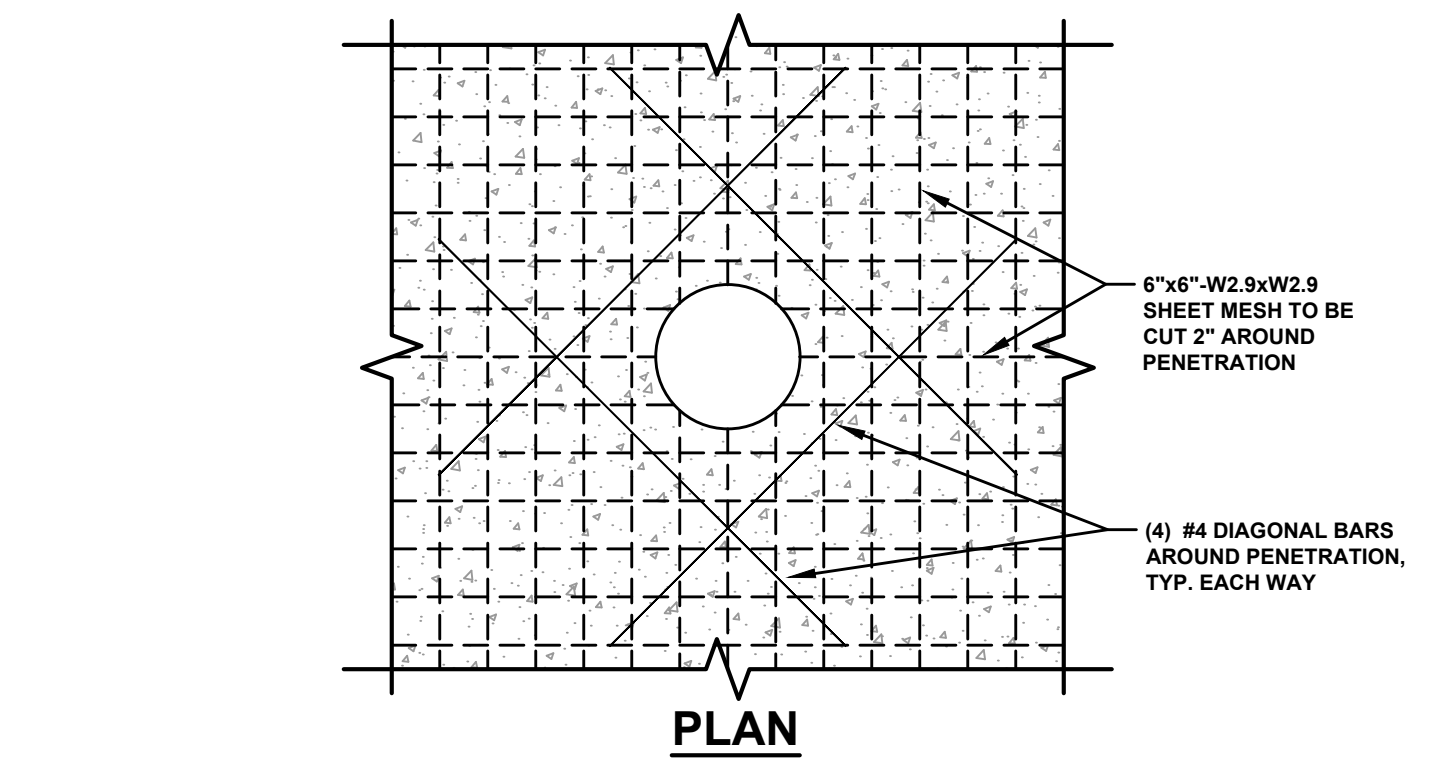
1. THRUST BLOCK DETAILS
NOT TO SCALE



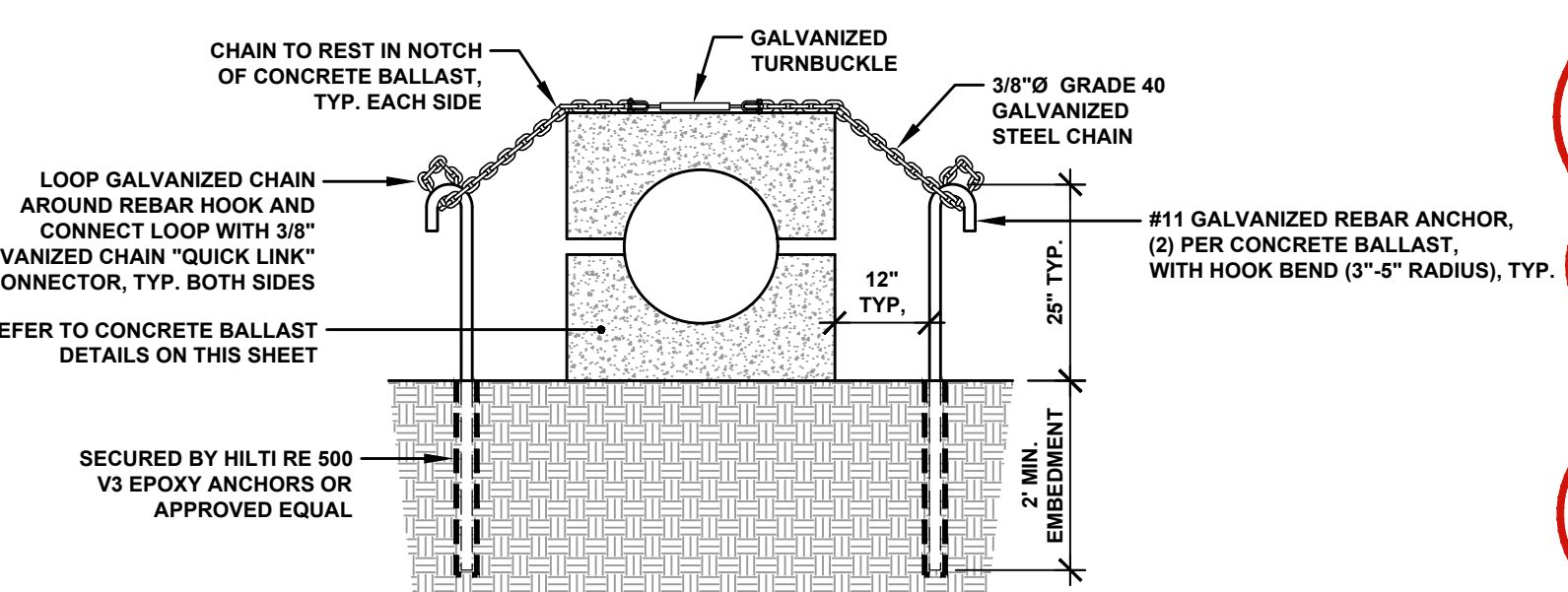
2. GATE VALVE DETAIL
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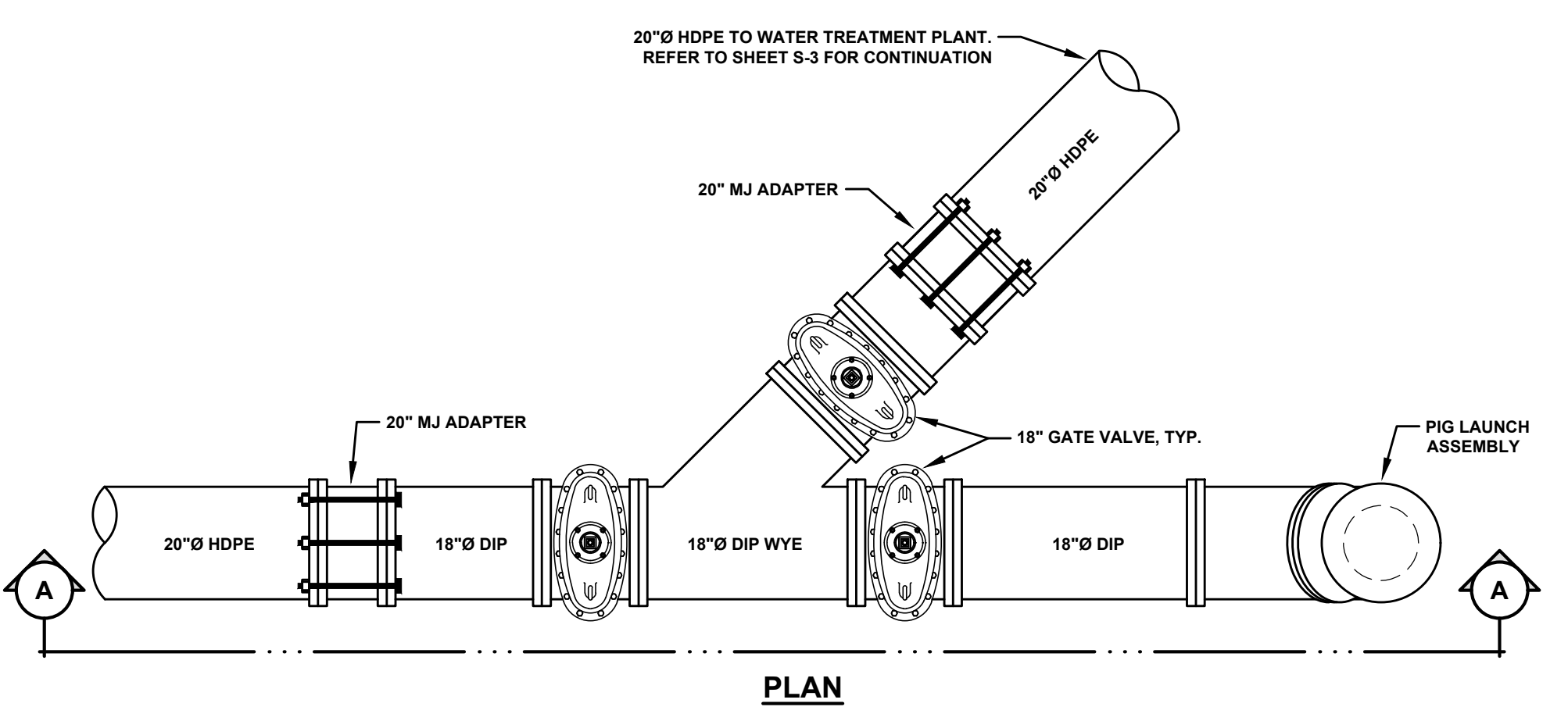
3. PLASTIC MARKER POST DETAIL
NOT TO SCALE



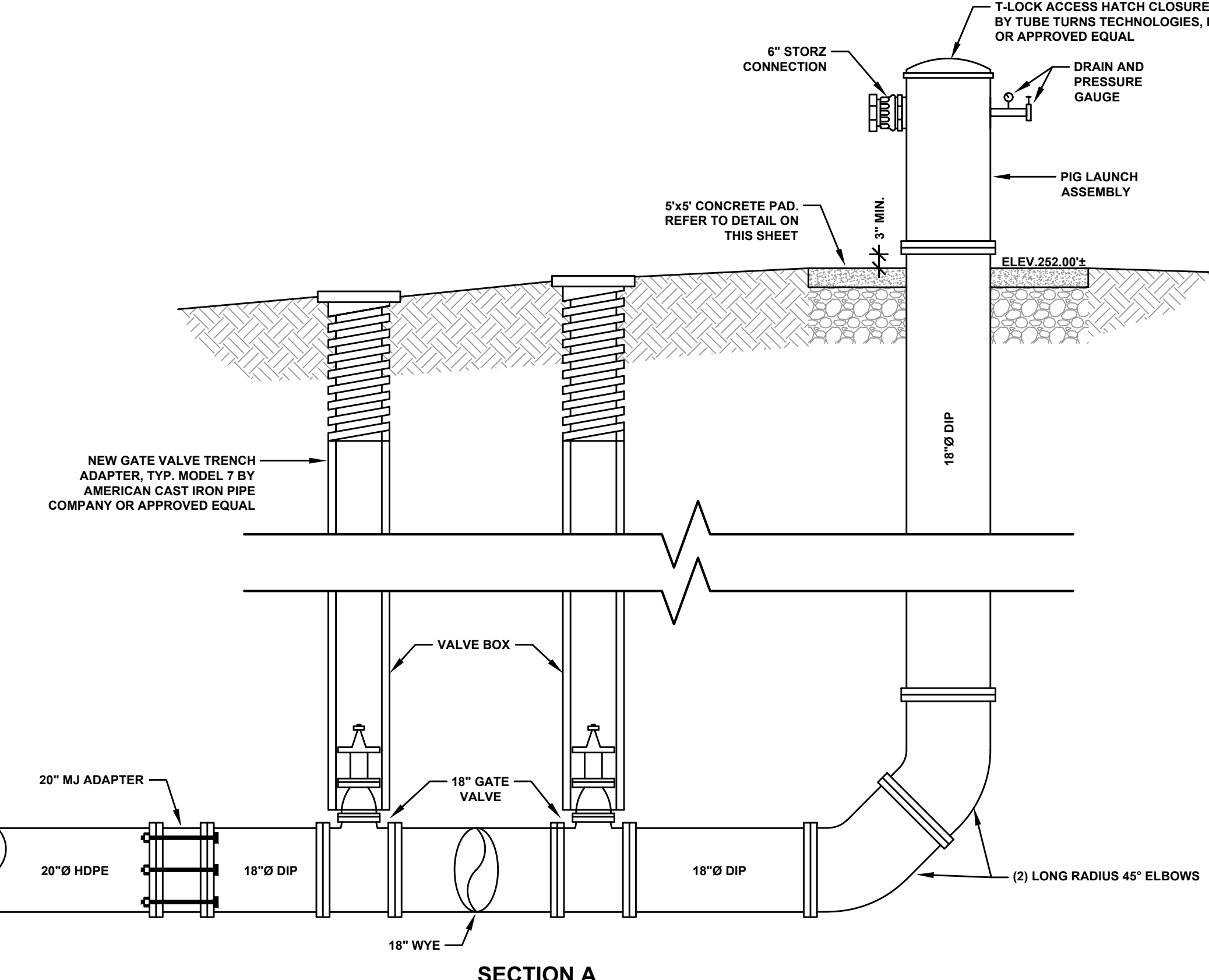
5. CONCRETE PAD DETAIL
NOT TO SCALE



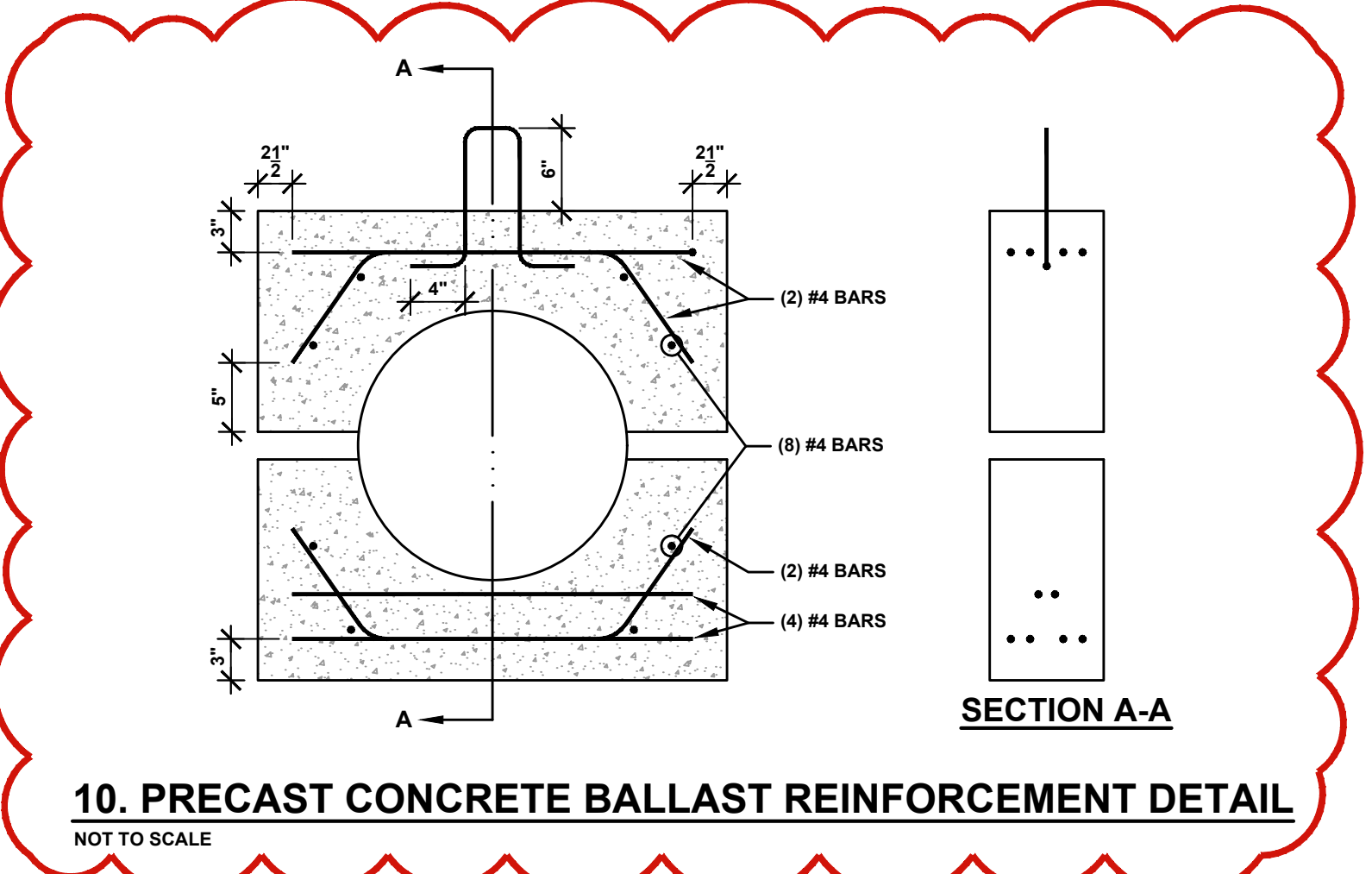
6. INTAKE PIPE ANCHORING DETAIL
NOT TO SCALE



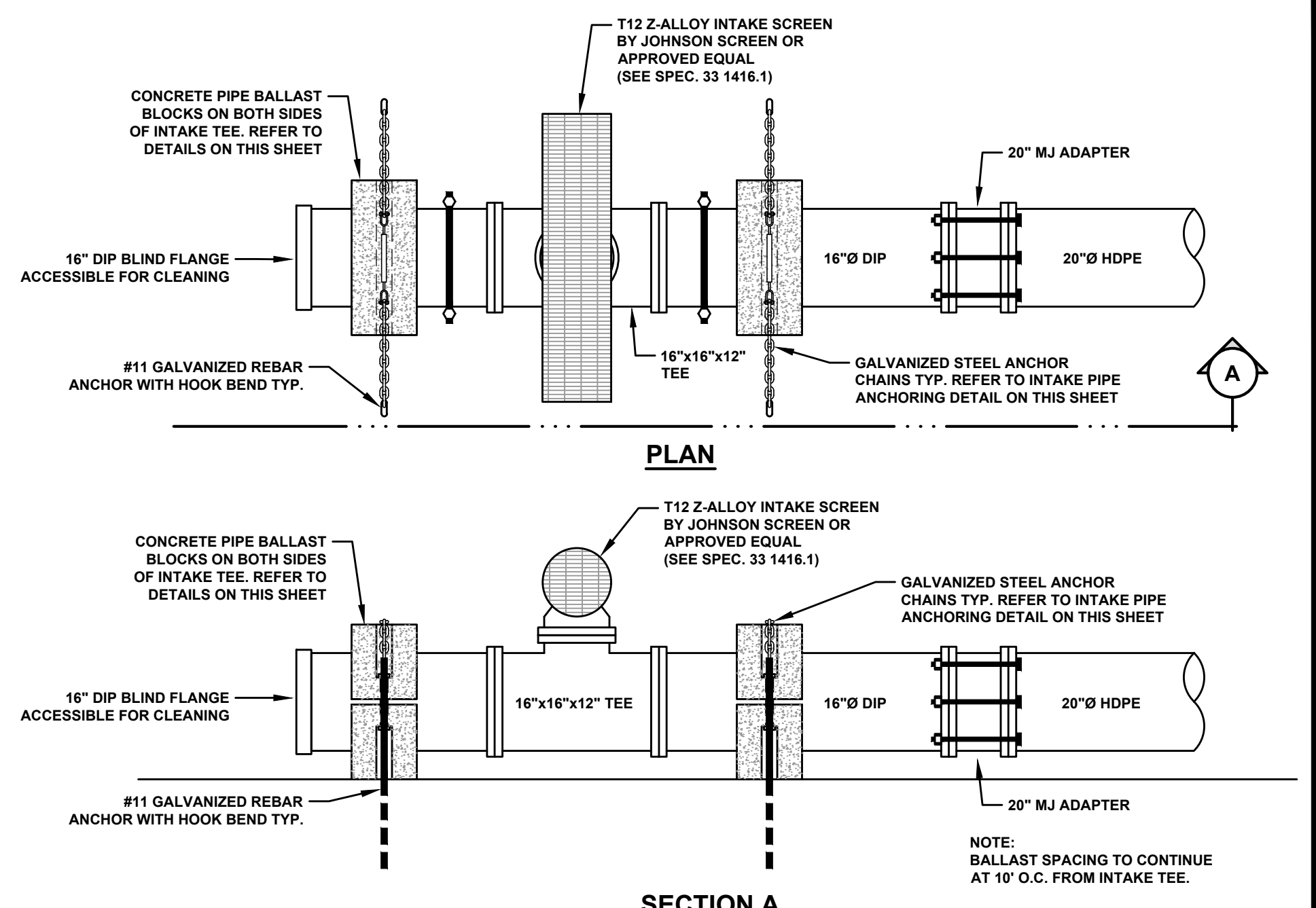
4. TYPICAL PIG LAUNCH DETAIL



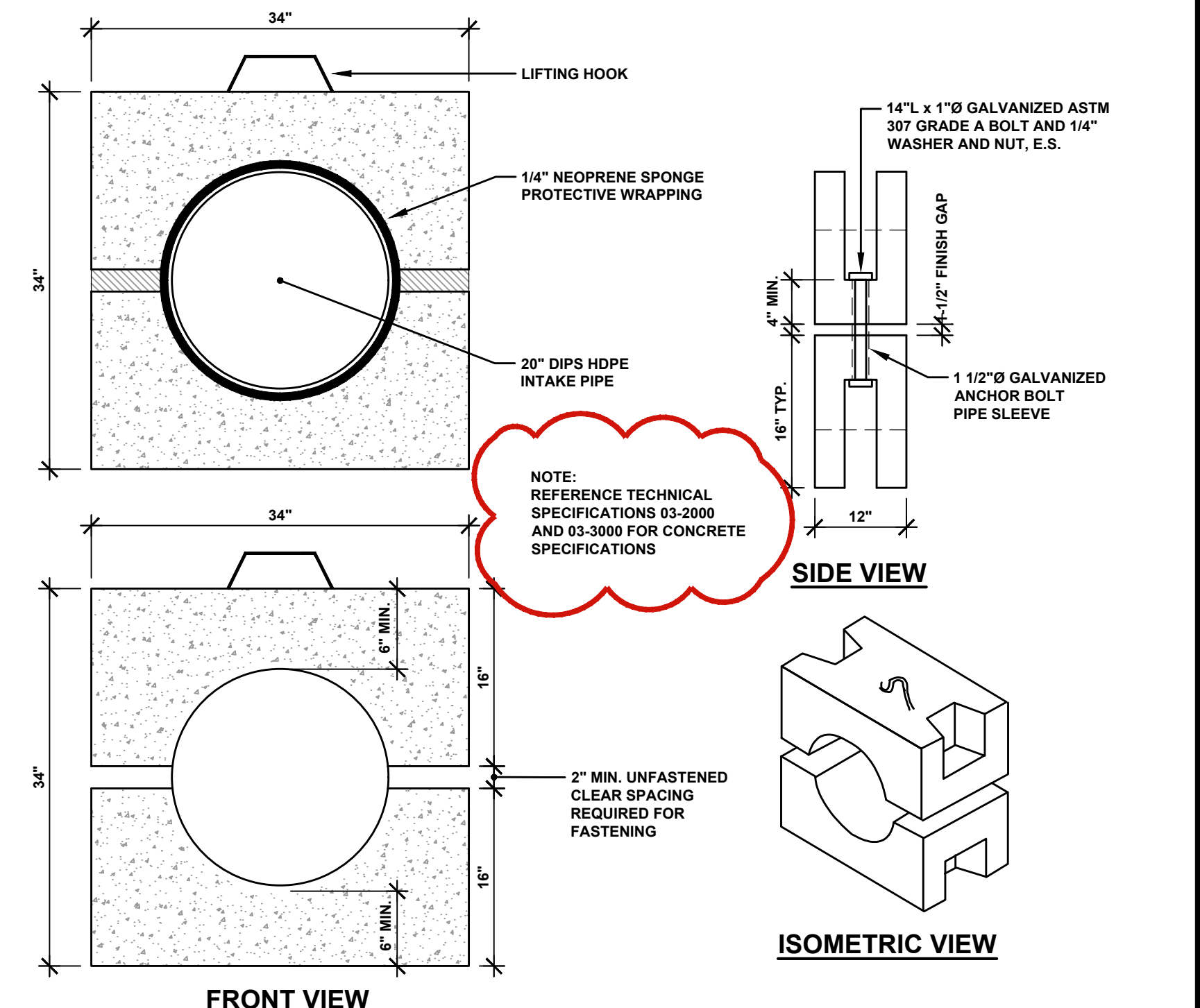
SECTION A



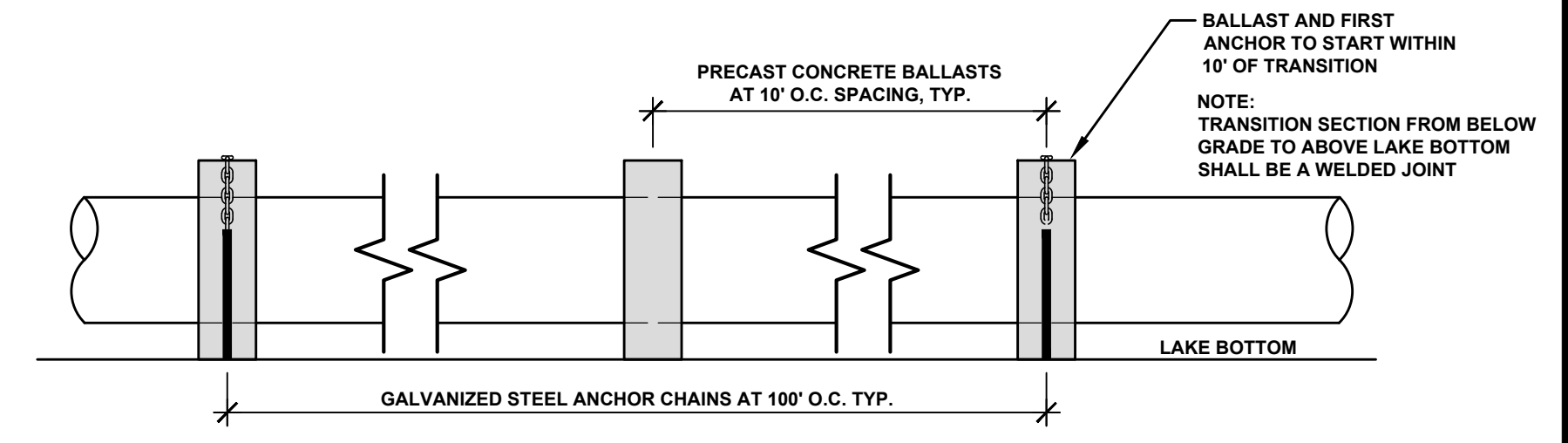
10. PRECAST CONCRETE BALLAST REINFORCEMENT DETAIL
NOT TO SCALE



7. PRECAST CONCRETE INTAKE STRUCTURE DETAILS
NOT TO SCALE



8. PRECAST CONCRETE BALLAST DETAILS
NOT TO SCALE



9. TYPICAL BALLAST AND ANCHOR PROFILE
NOT TO SCALE

SITE DETAILS VILLAGE OF SACKETS HARBOR WATER TREATMENT FACILITY NEW WATER INTAKE AND SEAWLL REPLACEMENT PROJECT		Bernier, Carr & Associates, Engineers, Architects and Land Surveyors, P.C. 15 Public Square, Watertown, NY 13601 (315) 782-8130 - WWW.THEBCGROUP.COM	CHECKED BY: TJB SHEET NO.
		15 Public Square, Watertown, NY 13601 (315) 782-8130 - WWW.THEBCGROUP.COM <small>COPYRIGHT 2024 - BERNIER, CARR & ASSOCIATES, ENGINEERS, ARCHITECTS AND LAND SURVEYORS, P.C. IT IS A VIOLATION UNDER THE NEW YORK STATE EDUCATION LAW FOR ANY UNAUTHORIZED ALTERATIONS TO THIS DOCUMENT AS PER ARTICLE 145 AND 147. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AT THE SITE & NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES.</small>	DRAWN BY: JBE DATE: 02/20/2024 LAST REVISION: AD2-03/21/2024 SCALE: AS NOTED PRINTED FOR: BID

AD2/D-1

PROJECT NO.
2014-094



Pre-Bid Walk Through
~~PROGRESS MEETING~~ SIGN-IN SHEET

Thursday, March 20th, 2024
10:00 A.M.

Name	Representing	Phone # / EMAIL Title or Position
John Borowicz	Hohl	716-912-6000 jborowicz@hohl.com
Bunky Jordan	Hohl 440-228-0084	bunky.jordan@handhenta.com
Don Schiedel	Hohl 716.359.7846	DSCHIEDEL@HohlIND.com
John Papin	MCI	JohnPapin@marcellusconstruction.com
Paul Nichols	MAINE Drilling & Blasting	PNICHOLS@MAIN78.COM
LARRY COBURN	BCA	
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DANA HUNT	Hunt International Specialist	Teamidors30@gmail.com
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Jake VanKeenen	Seaway Marine	jake@seawaymarinegroup.com
Jon Osborn	DRS Enterprises Inc.	josborn@drsent.com
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FRED BACH	BACH & CO	FREDBACHJR@BACHANDCO.COM
Tim Barber	BCA	tbarber@thebcgroup.com
Tyler Rook	BCA	TRook@theBCGroup.com

Status	RFI ID	Subject	Question	Answer	Closed
Closed	00001	Village of Sackets Harbor WTF New Water Intake and Seawall Replacement Project	<p>Tim,</p> <p>Can you please clarify what the MWBE goals/requirements are for this project?</p> <p>Thank you,</p>	See Addendum No. 1	3/14/2024
	00002	NEW WATER INTAKE AND SEAWALL REPLACEMENT AT WATER TREATMENT FACILITY VILLAGE OF SACKETS HARBOR	<p>Hello,</p> <p>Can you please provide the contact info for the MBO? I'm having a difficult time figuring out the percentage for MWBE participation. Thanks!</p>	Please See Addendum No. 1	3/14/2024
	00003	Sackets Project	<p>Hey Tim,</p> <p>I'm working on the Sackets intake project, and I'm trying to find a spec for the T-Lock access hatch closure by Turns Tube technologies on the pig launch assembly.</p> <p>Do you have a model number you are looking for?</p> <p>Also, the 18" gate valve spec does not clarify if they need bevel gearing or not. Typically with a valve 14" and larger, it is recommended as they can be harder to operate without.</p> <p>Thanks,</p>	Please see attached Addenda No. 2	3/22/2024

Total RFIs: 3