



Office of General Services

DESIGN & CONSTRUCTION GROUP
THE GOVERNOR NELSON A. ROCKEFELLER
EMPIRE STATE PLAZA
ALBANY, NY 12242

ADDENDUM NO. 5 TO PROJECT NO. 47164

CONSTRUCTION AND ELECTRICAL WORK
PROVIDE FOUNDATION REMEDIATION AND CONCRETE REPAIR
CONKLINGVILLE DAM
233 COUNTY ROUTE 8
HADLEY, NEW YORK

September 2, 2026

NOTE: This Addendum forms a part of the Contract Documents. Insert it in the Project Manual. Acknowledge receipt of this Addendum in the space provided on the Bid Form.
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CONSTRUCTION WORK SPECIFICATIONS

1. SECTION 314400 RELIEF WELLS: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 314400 – 1 thru 314400 – 16) noted “Addendum 5.”
2. SECTION 321216 ASPHALT PAVING: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 321216 – 1 thru 321216 – 5) noted “Addendum 5.”
3. SECTION 400561.46 LARGE PIPE COUPLINGS: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 400561.46 – 1 thru 400561.46 – 5) noted “Addendum 5.”

CONSTRUCTION WORK DRAWINGS

4. Revised Drawing:
 - a. Drawing No. S-785, noted Addendum #5, dated 9/01/2026, accompanies this addendum and supersedes the same numbered previously issued drawing.

END OF ADDENDUM

Brady M. Sherlock, P.E.
Director, Division of Design
Design & Construction

SECTION 314400 – RELIEF WELLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Construction of Relief Wells:
 - a. Drilling five relief wells at the approximate locations provided on the Contract Drawings.
 - b. Logging stratigraphy.
 - c. Providing stainless steel solid relief well riser pipe and slotted relief well pipe in accordance with the Contract Drawings.
 - d. Providing backfill materials around the relief well pipes in accordance with the Contract Drawings
 - e. Removal of all drilling fluids and drill cuttings and disposing of them off-site.
2. Performing development and pumping test of Relief Wells.
3. Placing the manholes and drainage pipes in accordance with the Contract Drawings.
 - a. Providing a check valve on top of the relief well pipes to prevent back flow into the relief well.
 - b. Providing a butterfly valve on the discharge pipe exiting the relief well manhole.
4. Providing Monitoring Equipment:
 - a. Providing flow monitoring equipment in the manholes to continuously measure the flows from the relief well.
 - b. Providing combined pressure transducer and data logger equipment to continuously measure the water levels in the structures (manholes, relief well pipe, and nearby existing standpipe piezometers).
5. Conducting Relief Well Testing Program.
 - a. Testing program to evaluate the effectiveness of the relief wells. The testing program will determine if changes need to be made to the locations or number of relief wells shown on the Contract Drawings. The Director's Representative will determine if changes are required and notify the Contractor.

B. Related Requirements:

1. Section 003132 – Geotechnical Data.
2. Section 310000 – Earthwork.
3. Section 310001 – Earthwork Materials.
4. Section 315200 – Cofferdams.
5. Section 330561 – Concrete Manholes.
6. Section 334213 – SICPP Drainage Pipes.
7. Section 400523 – Stainless Steel Drainage Pipes.
8. Section 400564 – Butterfly Valves.

1.3 REFERENCE STANDARDS

- A. American Water Works Association (AWWA)
 - 1. AWWA A100 – Water Wells.
- B. American Welding Society (AWS)
 - 1. AWS D10.18 – Guide for Welding Ferritic/Austenitic Duplex Stainless Steel Piping and Tubing.
- C. ASTM International:
 - 1. ASTM A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 2. ASTM A276 – Standard Specification for Stainless Steel Bars and Shapes.
 - 3. ASTM A312 – Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
 - 4. ASTM C150 – Portland Cement.
- D. USACE:
 - 1. EM-1110-2-1914 – Design, Construction, and Maintenance of Release Wells.
 - 2. ER-1110-1-1807 – Drilling and Invasive Activities at Dams and Levees.
- E. Federal Energy Regulatory Commission (FERC)
 - 1. Guidelines for Drilling in and Near Embankment Dams and Their Foundations
- F. Related Requirements:
 - 1. Geotechnical Data collected for the project is provided in the following:
 - a. Engineering Data Report - Conklingville Dam Spillway Foundation Remediation and Concrete Repair Project, Prepared by Schnabel Engineering, April 2019.
 - b. Field Investigation Report – Conklingville Dam, Prepared by Bergmann Associates and McMahon & Mann Consulting Engineering and Geology, June 2023.

1.4 DEFINITIONS

- A. Relief Well: A vertical well consisting of a slotted pipe, a riser pipe, and backfill material. The slotted pipe is located within the pervious stratum (fine sand layer) to reduce hydrostatic uplift pressures acting against the base of the confining layer (lower hardpan layer).
- B. Relief Well Pipe: A continuous string of pipes consisting of the stainless steel solid relief well riser pipe and stainless steel slotted relief well pipe.
- C. Riser Pipe: Solid stainless steel pipe that extends from the top of the slotted stainless steel pipe to the elevation shown in the Contract Drawings.
- D. Slotted Pipe: Stainless steel pipe with keystone (v-wire) wire-wrapped continuous slot that is within the pervious stratum (fine sand layer) at the bottom of the relief well.
- E. Relief Well Manhole: The 6-foot inside diameter concrete manhole that surrounds the relief well.
- F. Concrete Manhole: The 4-foot inside diameter concrete manhole that is located downstream of the relief well manhole.

- G. Stem Operator: The steel pipe that opens and closes the butterfly valve in the relief well manhole.
- H. Area/Velocity Sensor: The device that can continuously measure the flow out of the relief well.
- I. Data Logger: The device that continuously collects the data from the area/velocity sensor and sends the information to the site.
- J. Drainage Pipe: Pipe that runs between the relief well manhole and concrete manhole or between the concrete manholes.
- K. Cut Off Elevation: The final elevation at the top of the relief well pipe.
- L. Combined Pressure Transducer and Data Logger: The device that can continuously read and record the water level in a standpipe piezometer or manhole.
- M. Packer: Inflatable or mechanical device used to seal off weak or washed out, or fluid loss zones. Typically used to provide pressure tight barrier against irregular surfaces, bore casings, or open bore holes.

1.5 REGULATORY REQUIREMENTS FOR DRILLING AND RELIEF WELL INSTALLATION

- A. The dam is regulated by FERC. Drilling, backfilling, and installation of the relief wells shall follow FERC guidelines.

1.6 DISPOSAL OF DRILLING FLUIDS AND DRILL CUTTINGS

- A. Dispose of all drilling fluids and drill cuttings resulting from relief well installation at an approved off-site location. Disposal activities shall comply with local, state, and federal regulations.
- B. Maintain chain of custody for disposal activities and provide records at the discretion of the Director's Representative.

1.7 SUBMITTALS

- A. Submittals for this Section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
- B. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
- C. Before the planned start date, submit the following information, in writing, to the Director's Representative for review:
 - 1. Three projects within the past ten years on which the Driller has successfully completed drilling of similar type and capacity required for this project. A brief description of each project with the owner's name and current phone number shall be included. Submit information to the Director's Representative a minimum of 120 calendar days prior to start of work. Begin work only after receiving the Director's Representative approval.
 - 2. Submit documentation certifying that the welders, welding operations, and tackers are qualified in accordance with the AWS Standards covering the welding of stainless steel

- pipe, including but not limited to AWS D10.18, a minimum of 120 calendar days prior to start of work.
3. Shop Drawings (submit a minimum of 120 calendar days prior to start of work)
 - a. Centering devices and alignment tools.
 - b. Check valves.
 4. Product Data
 - a. Riser pipe.
 - b. Slotted pipe.
 - c. Sand Backfill.
 - d. Bentonite Seal.
 - e. Cement Bentonite Grout.
 - f. Drilling fluids.
 - g. Temporary steel casing for drilling.
 - h. Surface protective covers.
 - i. Locking caps.
 - j. Bottom cap material.
 - k. Couplings.
 - l. Centering devices.
 - m. Drilling additives.
 - n. Check valves.
 - o. Containers for collection of drilling fluids and drill cuttings for disposal off-site.
 - p. Catalog data shall include any information, written or otherwise, supplied by the manufacturers or suppliers of the above listed items.
 - q. Manufacturer's installation instructions shall be provided along with product data for the following products:
 - 1) Area/Velocity Sensor
 - 2) Data Logger
 - 3) Combined Pressure Transducer and Data Logger
 5. A Work Plan (submit a minimum of 120 calendar days prior to start of work), including:
 - a. Risk mitigation techniques for encountering artesian conditions during drilling of the relief wells, for abandoning a relief well in place, or any other risk that could be associated with drilling and installing the relief wells.
 - 1) Include materials, equipment, and procedures required for each condition stated above.
 - b. Locating relief wells in the field.
 - c. Equipment and sizes to be used for providing the relief wells.
 - d. Method of drilling for the relief wells.
 - e. Method to stop bore hole washout if encountered.
 - f. Proposed drilling fluids, materials, mix designs, fluid delivery and pressure monitoring methods, and fluid cleaning (i.e., de-sanding) methods and equipment.
 - g. Coupling of riser pipe and slotted pipe together.
 - h. Placement of centralizers.
 - i. Installing the riser pipe and slotted pipe.
 - j. Methods for placing relief well backfill materials (sand backfill, bentonite seal, and cement bentonite grout).
 - k. Removal of the upper portion of the riser pipe above the cut off elevation.
 - l. Well development methods and equipment, including the pump, motor, water level measurement, discharge location, and discharge measurement.
 - m. Installation of check valves.
 - n. Excavation, installation, and backfilling of relief well and concrete manholes and drainage pipes.

- o. Shop Drawings showing the type of slotted pipe and size, shape and pattern, bottom cap material, and installation detail.
 - p. Planned sequence of well installation with an explanation of crews and equipment proposed for work that align with the construction sequence provided on the Contract Drawings and in this Section.
 - q. Documentation of the experience for each driller, Professional Engineer, and Geologist staff.
 - r. Pumping test methods and equipment, including the pump, motor, sand test sampler and method, water level measurement, discharge location, and discharge measurement.
6. During and following construction, submit the following data to the Director's Representative for review within seven calendar days after completion of the work in each relief well:
- a. Borehole logs from sampling identifying subsurface soils, groundwater elevations, drilling conditions, drilling methods, and elevations of material change to the nearest 0.1 foot.
 - b. Relief well development, pumping test, and sand test records. The pumping test records must include:
 - 1) Rate of pumping and the amount of drawdown for each step.
 - 2) Length of time of each step of the pumping test conducted.
 - 3) Amount of sand infiltration during pumping.
 - 4) Plot of flow rate versus specific drawdown with each step of the pumping test.
 - 5) Equipment used, including types and sizes.
 - 6) Diagram showing elevation of pump intake.
 - 7) Method of water level measurement.
 - 8) All piezometer data used to monitor drawdown.
 - 9) Plot of drawdown versus time, including recovery.
 - c. Installation Diagram Submittals: The as-built installation diagram for each relief well installed.
 - d. Survey locations and elevations for the relief wells.

1.8 FIELD CONDITIONS

- A. Locate each well at the location provided on the Contract Drawings. If offsetting is needed to avoid obstructions, approval from the Director's Representative is required before relocating the relief well. Mark the proposed relief well locations in the field for inspection prior to drilling. The total number of wells and spacing between wells may be modified by the Director's Representative as the work proceeds, based on the results of the relief well testing program outlined in the Contract Drawings and in this Section.
- B. The length of the slotted pipe, length of the riser pipe, the well cut off elevation, and the drainage pipe elevations must conform to the elevations provided in the Contract Drawings. The length of the slotted pipe, length of the riser pipe, the well cut off elevation, and the drainage pipe elevations shown in the Contract Drawings are approximate and will be finalized by the Director's Representative based on the relief well boring logs and the results of the relief well testing program. The testing program is outlined in the Contract Drawings and in this Section.
- C. Utility Locator Service: Locate underground utilities, in accordance with Section 023313 – Underground Utility Locator Service, before beginning drilling.

PART 2 - PRODUCTS**2.1 MATERIALS****A. Drilling Fluids**

1. Water must be considered as the first alternative for drilling fluid. Water additives are limited to a liquid polymer emulsion (LPE) that can be broken down by adding a chlorine solution and removed from the filter pack during development. Do not use bentonite in the drilling fluid. If drilling fluid additives are to be used when placing the relief wells, submit product data sheet for the proposed drilling fluid. State why additives must be used and detail clean out methods so that the drilling fluid does not reduce the well effectiveness.
2. Locate or provide a suitable water source for use in drilling each relief well. Providing water for drilling will be considered incidental to the drilling process and must be performed by the Contractor at no additional cost to the Director.

B. Slotted Pipe

1. Provide pipe of the type and dimensions indicated. Submit the proposed pipe prior to installation.
 - a. Slots
 - 1) Slot openings must be uniform in size and pattern and spaced equally around the circumference of the pipe.
 - 2) Fabricate permanent pipe and fittings entirely from stainless steel conforming to ASTM A312, Type 304 with an inside diameter of 12 inches.
 - 3) Provide stainless steel pipe with a keystone (v-wire) wire-wrapped continuous slot. The pipe and fittings must have a clear inside diameter of 12 inches.
 - 4) Provide pipe with 0.07 inch sized slots.
 - b. Couplings
 - 1) Provide couplings for the stainless steel pipe consisting of the same material as the slots and thread or fit with a welding ring. Provide couplings recommended by the Manufacturer of the pipe.
 - c. Angular Face Rings
 - 1) Provide angular face rings conforming to ASTM A276 and made from the same stainless steel alloy as the riser pipe.

C. Temporary Steel Casing

1. Provide temporary steel casing conforming to ASTM A53 Grade B with a wall thickness of 0.375 inch or greater. Submit documentation of the steel casing to the Director's Representative that identifies the source and order details of the temporary steel casing to be used. Provide casing that is of sufficient diameter to permit drilling of the 24-inch diameter bore hole indicated on the Contract Drawings.

D. Riser Pipe and Well Cap

1. Provide riser pipe and well bottom cap material and method of manufacture conforming to the slotted pipe (12 inch inside diameter), except omit the slots. Provide riser pipe diameter and drainage details as shown on the Contract Drawings. Provide couplings to the slotted pipe and between riser pipe sections as specified in the Couplings Paragraph in the Slotted Pipe Paragraph.

E. Sand Backfill

1. Provide filter material for the annular space between the bore hole wall and the slotted pipe and riser pipe meeting the following requirements and in accordance with the depths provided on the Contract Drawings:
 - a. Sand Backfill – refer to Sections 310000 – Earthwork and 310001 – Earthwork Materials for gradations and material requirements and placement.
 - b. Store and stockpile the sand backfill material on the site in accordance with the Contract Drawings and Section 310000 – Earthwork.

F. Bentonite Seal

1. Provide ¼ inch (nominal diameter) bentonite pellets to the depths provided on the Contract Drawings.

G. Cement/Bentonite Grout

1. Provide cement/bentonite grout to the depths provided on the Contract Drawings.
2. Use grouting and sealing materials that conform to AWWA A100.
3. Mix grout to the satisfaction of the Director’s Representative generally conforming to the following requirements:

Component	Requirement	Proportion
Portland Cement Type 2	NYSDOT Standard Specifications Section 701-01	94 lbs (1 sack)
Water	NYSDOT Standard Specifications Section 712-01	30 gallons
Bentonite (Ground to pass a No. 200 mesh sieve)	N/A	25 lbs (as required)

H. Check Valves

1. Provide check valves that fit each relief well to prevent back flow and debris from entering the relief wells. Fabricate the check valves in accordance with the Contract Drawings.
2. Install check valves in accordance with the construction sequence described in this Section.

I. Containers for Drilling Fluids and Drill Cuttings – Fluids removed during drilling and drill cuttings shall be collected and containerized to be disposed of off-site.

J. Area/Velocity Sensor

1. Provide an area/velocity sensor that meets the following:
 - a. MACE Doppler Ultrasonic Area/Velocity Sensor, or approved equivalent that can measure the flow rate from each relief well.
 - b. Attach the area/velocity sensor to the inside of the drainage pipe in the concrete manholes at the locations shown on the Contract Drawings. The sensor can be attached with a MACE ZX Snapstrap, or approved equivalent.

K. Data Logger

1. Provide a data logger that meets the following:
 - a. MACE FloPro XCI Data Logger, or approved equivalent that can continuously collect the data from the area/velocity sensors.
 - b. Connect, configure, and calibrate the area/velocity sensors to the data logger through the scenario provided on the Contract Drawings. The data logger shall be able to collect and send data to the site’s data collector system.

- c. Coordinate with Director's Representative time and schedule to install, program, configure, and calibrate newly installed data loggers to existing on site Data Collector System.
- L. Combined Pressure Transducer and Data Logger
 - 1. Provide a combined pressure transducer and data logger that meets the following:
 - a. In-Situ Level 500 TROLL (Vented), or approved equivalent that can continuously collect water level measurements from relief well manholes, relief well pipes, and/or existing standpipe piezometers.
 - b. Associated cables and devices for In-Situ Level 500 TROLL, or approved equivalent, including 50 foot long twist-lock TROLL cable (Vented), TROLL Com Plus communication device, desiccant pack, and other recommended equipment by the supplier.

PART 3 - EXECUTION

3.1 PRELIMINARY RELIEF WELL LAYOUT

- A. Prior to the commencement of drilling operations, drive a wooden stake into the ground at each proposed relief well location to a horizontal accuracy of plus or minus 0.3 foot. Label each stake with the corresponding relief well number and the existing natural ground surface elevation to a vertical accuracy of plus or minus 0.01 foot. Notify the Director's Representative once the preliminary layout is complete. Within five days of receipt of notification, the Director's Representative will visit the site to review the proposed relief well locations and adjust as needed. Do not perform drilling, regardless of extent, until the Director's Representative has approved the proposed locations. Ensure the approved well locations remain clearly visible in the field until the relief wells are installed.

3.2 DRILLING

- A. Before drilling begins, demonstrate that the materials, equipment, and personnel necessary to successfully install each relief well are present and in good work order. Partial or total collapse of a bore hole due to lack of material, unsuitable or defective equipment, inefficient operations, or negligence on the part of the Contractor will be considered cause for the Director's Representative to order the Contractor to abandon the relief well and re-drill the bore hole at no additional cost to the Director.
 - 1. Drilling Method
 - a. Drill wells using the reverse circulation dual rotary method with continuous full-depth casing or other approved method suitable for the conditions encountered. Other drilling methods, such as jetting that impart substantial disturbance of the aquifer, radical displacement of the formation, that are unproven, not recognized by industry, or that may reduce the overall efficiency of the relief well, are prohibited.
 - b. Use only approved drilling fluid additives as described in Drilling Fluid Paragraph above.
 - c. Select a drilling method that will ensure acceptable placement of the slotted pipe, riser pipe, sand backfill, bentonite seal, cement-bentonite grout, and satisfactory well construction.
 - d. Dispose of cuttings and other excess material resulting from the drilling process off-site.

- e. The diameter of the bore hole must be sufficient to accommodate the diameter of the slotted and riser pipe at 12 inches, along with required minimum filter pack thickness of 6 inches.
- B. Temporary Casing
 - 1. Make temporary casing in accordance with Casing Paragraph of sufficient length to stabilize the bore hole to the bottom of the bore hole as shown on the Contract Drawings. Provide a temporary casing with an inside diameter adequate to result in the bore hole diameter indicated on the Contract Drawings and a sufficient thickness to retain its shape and maintain a true section throughout its depth. The temporary casing may be in sections of any convenient length. Remove the temporary casing without disturbing the backfill material, riser pipe, and slotted pipe. Ensure cavities are not created outside of the temporary casing. If the temporary casing becomes distorted or bent, discard the casing and provide new casing.
- C. Obstructions
 - 1. If obstructions are encountered and the Director's Representative determines the obstacles prevent the Contractor from completing the relief well to the depths provided on the Contract Drawings, the Director's Representative may adjust the depth or direct the Contractor to abandon the relief well, plug the hole by backfilling with approved material by an approved procedure, and construct another relief well at an adjacent site. For procedures on abandoning the well refer to the Plugging of Abandoned Wells section.
- D. Groundwater
 - 1. If fluid is necessary to maintain bore hole stability during drilling, confirm that the groundwater at the site will be at least 10 feet below the level of drilling fluid in the bore hole.

3.3 INSTALLATION OF RISER PIPE AND SLOTTED PIPE

- A. Maintain drilling fluids, additives, and temporary casings to provide a stable and open bore hole while performing the work.
- B. Assembly
 - 1. Ensure the riser pipes and slotted pipes are in good condition and couplings and other accessory parts are securely fastened in place before installation. Arrange successful lengths of pipe to provide accurate placement of the slotted sections in the bore hole. Provide riser pipe with an approved cap and a flanged top section. Initially, set the top at or above the ground surface. The portion of the riser pipe above the cut off elevation will be removed later during the construction procedure described in this Section.
 - 2. Attach centering devices and alignment tools to the assembled riser pipe and slotted pipe to center the relief well pipes in the bore hole and hold them securely in position while the backfill material is placed around the pipes. Ensure the centering device alignment does not inhibit the placement of tremie pipes in the well.
- C. Joints
 - 1. Joints between lengths of riser pipe must have strengths equal to or greater than the pipes being joined, must be in accordance with Couplings Paragraph, and may be threaded, single bevel welded, or double bevel welded. Fully seat threaded joints. Weld metal for welded joints must have a corrosion resistance equal to or greater than that of the pipe or slot used.

Design and construct joints to support the weight of the slotted pipe as it is lowered into the bore hole. Welding must be performed by a certified welder using appropriate welding rods. Ensure the well assembly (i.e., riser pipes and slotted pipes) retains its circular cross-section and straight alignment both during and after the welding process. Ensure that slag and other weld metal is not deposited inside the circumference of the pipe.

2. A machine smooth joint shall be located at the well cut off elevation to allow for removal of the upper portion of the riser pipe during construction of the relief well as outlined in this Section and on the Contract Drawings.

D. Installation

1. Verify bore hole bottom elevations prior to installation of well components. Install each properly assembled well straight and plumb within the bore hole. Place the assembled riser pipe and slotted pipe in the bore hole, prevent jarring impacts, and ensure the assembly is centered, connected, and undamaged. Centering guides shall be installed on the bottom of the screen and then at intervals not greater than 20 feet. The slotted pipe must be suspended in the hole and not resting on the bottom of the hole. A cover shall be slipped over the top of the riser pipe to prevent sand backfill or other material from entering the well. Sand backfill shall be placed underneath, around, and above the slotted pipe to the dimensions indicated on the Contract Drawings and as specified in the Sand Backfill Placement section. Handle well components carefully and prevent structural damage, degradation, clogging, and contamination throughout the construction process. If the Director's Representative determine that well components (including but not limited to riser pipes, slotted pipes, couplers, bottom caps, well guards, check valves, and other fittings) are damaged, degraded, clogged, or contaminated during the construction process, repair, clean, or replace that component at no additional cost to the Director. This direction includes damage identified after well installation. Prevent mud, sand, organic materials, and other contaminants from entering the well bore hole during the installation process. Minimize deformation of the well screen during handling and installation. Avoid impacts between the well components and the sides of the bore hole during the installation process. Do not allow the well to rest on the bore hole bottom before the sand backfill is installed.

E. Alignment and Plumbness Test

1. Furnish a dummy cylinder, 10 feet in length and with an outside diameter $\frac{1}{2}$ inch smaller than the inside diameter of the well, to test the alignment of each well. Lower the cylinder to the full depth of the well and withdraw the cylinder from the well. The well will be considered properly aligned if the maneuver can be completed without binding against the sides of the well. Perform at least one alignment check on each well after placement of the sand backfill. Additional tests may be made during the performance of the work at the option of the Contractor.
2. Perform at least one plumbness test on each well after placement of the sand backfill, in accordance with AWWA A100, Appendix D, and using a plummet. The test must include at least two perpendicular measurements at every 10 feet and at the bottom of the well. A variation of 6 inches per 100 feet of depth will be permitted. Document the measurements on the well installation diagram.
3. If alignment and plumbness tolerances are not met and the Director's Representative determines that there is not adequate clearance for pumping, maintenance, and testing equipment, then the Director's Representative may order the Contractor to abandon the well and re-install the well at no additional cost to the Director.
4. For each relief well, submit an alignment and plumbness test report containing, at a minimum, information required by AWWA A100, Appendix D.

3.4 SAND BACKFILL PLACEMENT

- A. After the slotted pipe and riser pipe have been installed and alignment and plumbness tests are conducted, place the sand backfill material below, around the slotted pipe, and above the slotted pipe to the dimensions shown on the Contract Drawings. The material may be placed by tremie, in a manner that prevents segregation. Place the sand backfill at a constant rate from the start of placement until it has reached the top elevation shown on the Contract Drawings, 2 feet below the slotted pipe and 2 feet above the slotted pipe. Drilling fluid or water in the hole shall be kept at least 10 feet above the natural groundwater level until all the sand backfill is placed to ensure that the bore hole walls do not slough material into the sand backfill. The temporary casing shall be pulled as the sand backfill is placed. During this process the level of the sand backfill shall remain approximately 10 feet above the bottom of the casing. The sand backfill shall flow smoothly into the annular space without any sloughing of the bore hole walls. Measure the level of the sand often to verify the correctness of the backfill level.

3.5 WELL DEVELOPMENT

- A. Notify the Director's Representative within one day from the completion of the placement of the sand backfill. Conduct well development under the observation of the Director's Representative.
- B. Conduct the well development as soon as practical and no later than five days after the sand backfill placement is completed.
- C. Each well shall be developed by mechanical methods, i.e., surging, water jetting, or pumping methods, or a combination of any of these methods. A chemical development, which consists of chemical treatment in combination with mechanical development, shall be used if the LPE drilling fluid is utilized.
- D. At the time of development, ensure the well is free of drawdown or surcharge effects due to pumping tests, development, or drilling at another location. Maintain the required access, work area, and clearance in the relief well necessary to accomplish development. Provide the necessary discharge lines and troughs to dispose of the discharge at a sufficient distance from the work areas to prevent damage to the relief wells or surface erosion. Protection of where the discharge zone shall be installed as required.
- E. Measure the top of sand backfill elevation periodically during development. Add sand backfill to the annular space around the slotted pipe to maintain the top of the sand backfill to the specified elevation on the Contract Drawings if the top of the sand backfill elevation drops more than 6 inches. A combined pressure transducer and data logger shall be installed in the relief well to continuously measure the water level during development. The cable of the combined pressure transducer and data logger shall be secured so that it does not move and/or become tangled with the cable for the pump.
- F. Conduct development to achieve a stable well of maximum efficiency and repeat if the sand infiltration criteria are not met, as specified in the paragraph Sand Test, during the pumping test. Protection of where the discharge zone shall be installed as required.

3.6 PUMPING TEST

- A. Pumping Test Equipment

1. Pump – Provide at least three deep-well submersible test pumps and discharge piping, hose, valves, and fittings capable of producing test flows with approximate ranges from (a) 5 to 60 gallons per minute (gpm); (b) 60 to 200 gpm; and (c) 200 to 750 gpm. Provide, without additional cost to the Director, the electrical power, motor controls, and necessary cables, which shall be removed upon completion of the pumping test.
 2. Flow Meters – Provide three calibrated flow meters compatible with the pump and discharge lines (one for each test pump size listed in the paragraph above) with instantaneous and totalizing flow indicators for measuring the discharge from the wells tested. All flow meters shall be submitted to the Director's Representative for approval. The calibration of each flow meter shall be checked at regular intervals by timing the filling of a container of known volume in the presence of the Director's Representative. The flow meters shall be installed in accordance with the manufacturer's recommendations, with adequate lengths of straight pipe upstream and downstream of each flow meter. The flow meters shall be accurate to within one percent of the measured flow throughout the specified range listed in the paragraph above for each test pump size.
 3. Combined Pressure Transducer and Data Logger – Provide a combined pressure transducer and data logger to measure the water level in the well to within 0.01 feet before and during the pumping tests. Combined pressure transducer and data logger data shall be periodically checked against manual measurements to verify the accuracy of the automated measurements.
 4. Sand sampler – Provide an approved Rossum centrifugal sand sampler or approved equivalent and appurtenant piping and valves for accurate determination of the discharge sand content. Measure the flow through the sampler for every sand content test.
- B. Upon completion of well development but before acceptance, subject each well to a pumping test that includes a sand test. Provide a pump capable of producing the specified drawdowns over periods of time sufficient to satisfactorily perform the pumping test specified herein. Set the intake 10 feet below the maximum expected drawdown in the well. Measure the quantity of sand after each test. Provide a pump, complete with gasoline, diesel, or an electric motor, of adequate size. Provide a flow meter of approved design or other approved equipment for the purpose of measuring the discharge from the well during the pumping test. Provide the necessary pipeline, troughs, or ditches necessary to dispose of the discharge a sufficient distance from the work area to prevent damage to the relief wells or surface erosion. Conduct the tests under the observation of the Director's Representative. A combined pressure transducer and data logger shall be installed in the relief well to continuously measure the water level during pump tests.
- C. Use the following procedure for pump testing the relief wells:
1. Ensure that there is no more than 0.5 foot of sediment at the bottom of the relief well when the pumping test begins.
 2. Test the wells at five different pumped flow rates, measured in gallons per minute, and starting at the lowest rate. The minimum and maximum flows rates are estimated at 5 and 750 gpm, but final flow rates will be determined by the Director's Representative in the field. If these rates produce a well drawdown of less than 3 feet or more than 15 feet, field-adjust to stay within a range of 3 to 15 feet of drawdown. After the drawdown fluctuates less than 0.1 foot at or after 60 minutes at the initial pumping rate at each step, the pumping rate may be increased to the next higher target flow rate. Maintain continuous pumping while changing flow rates.
 3. Record water level readings inside the relief well to define the well drawdown curve for each discharge and create a continuous plot of drawdown versus time and flow. Take manual check measurements of water level in the well at short intervals (2, 4, 8, 10, 15, 20, 30, 45, and 60 minutes) at each flow rate.

4. The pump test for each discharge will be considered complete after 60 minutes or when the well is stabilized between two subsequent readings, whichever is a longer period of time.
5. At 15 minute intervals during the test, determine the inflow of sand. If the sand inflow exceeds 5 ppm for the final 15 minutes of the test, the well must be redeveloped and the pump test rerun until the sand inflow rate is less than 5 ppm. After six hours of pumping, if the rate is more than 5 ppm, the well should be abandoned as described in Plugging of Abandoned Wells Section.
6. Allow the fine sand aquifer to recover. Measure and document groundwater level during recovery period using the combined pressure transducer and data logger after pumps have been shut off. Monitor recovery until groundwater level returns to pre-pumping test level. If this process takes more than one hour, measure until the level returns to within 0.1 foot of pre-pumping test level.
7. Upon completing a pumping test, and before completing the well, ensure the well has adequate development. In two dimensions, plot flow rate on the X-axis versus specific drawdown on the Y-axis. Specific drawdown is the ratio of drawdown during the pumping test at a given flow rate divided by that flow rate. If plot shows that the slope of this line is positive, proceed with well development and pumping completion. If the slope of the plotted data is negative, run an additional cycle of well development and rerun the pumping test.

3.7 BENTONITE SEAL PLACEMENT

- A. After the well has been developed and pumping test complete, additional sand backfill should be added if necessary to reach the proposed top of sand backfill elevations provided on the Contract Drawings.
- B. Following completion of well development/pumping test and final sand backfill placement, place bentonite pellets in the annular space to form a 4-foot thick (minimum) seal above the sand backfill. The temporary casing shall be withdrawn in increments as the bentonite seal is placed.

3.8 CEMENT BENTONITE GROUT PLACEMENT

- A. Grout the hole with the cement/bentonite grout mixture from the top of the bentonite seal to the top elevation provided on the Contract Drawings using a tremie pipe.
- B. Withdraw the temporary casing in increments as the cement bentonite is placed.

3.9 PLUGGING OF ABANDONED WELLS

- A. The Contractor has the option of attempting to remove the slotted pipe. If the slotted pipe can be removed, grout the bore hole starting from the bottom of the hole to within 3 feet of the ground surface. Start grouting at the bottom of the bottom cap of the well using a tremie pipe. If the well screen cannot be removed or if the screen breaks off during the removal attempt, grout the well from the bottom cap to within 3 feet of the ground surface. Either of the above abandonment procedures may require the Contractor to redrill the hole so that the bore hole can be grouted. Grout the well from the bottom cap to within 3 feet of ground surface using a tremie pipe. After the grout setup, cut off the riser pipe 3 feet below the ground. Then backfill the hole. Submit the

cement grout mix to be used as part of the abandonment process to the Director's Representative for approval.

3.10 SEQUENCING OF RELIEF WELL CONSTRUCTION

- A. The construction of the relief wells will be a staged process that will align with the following steps as outlined in the Contract Drawings:
1. Drill and provide RW-1 riser and slotted pipe from the ground surface to the depths shown on Drawing C-714 and in accordance with this Section.
 2. Provide sand backfill around the RW-1 riser and slotted pipes to the depth shown on Drawing C-714 and in accordance with this Section.
 3. Notify Director's Representative within one day from the completion of Step 2. Develop/pump test RW-1 in accordance with this Section and within five days following completion of Step 2.
 4. Following completion of development/pumping test of RW-1, provide additional sand backfill to the depths shown on Drawing C-714 and in accordance with this Section if needed. Following completion of well development/pumping test and final sand backfill placement provide bentonite seal and cement bentonite grout around the RW-1 riser pipe to the depths shown on Drawing C-714 and in accordance with this Section.
 5. Following completion of placement of bentonite seal and cement bentonite grout, excavate to the grades shown on Drawing C-713 for the placement of concrete manholes RW-1 and MH-1 and the associated drainage pipes for RW-1 in accordance with Sections 310000 – Earthwork, 310001 – Earthwork Materials, 330561 – Concrete Manholes, 334213 – SICPP Drainage Pipes, 400523 – Stainless Steel Pipes, and this Section.
 6. Provide the concrete manholes and drainage piping between manholes for RW-1 in accordance with Drawings C-714 and C-715.
 7. Provide the butterfly valve and stem operator inside the RW-1 manhole as shown on Drawing C-716 and in accordance with Section 400564 – Butterfly Valves.
 8. Provide the area/velocity sensor in the drainage pipe inside MH-1 as shown on Drawing C-716 and in accordance with this Section. Provide the aluminum pole, data logger, solar panel, and antenna as shown on Drawing C-716 and in accordance with this Section. Extend cable from sensor through concrete manhole and aluminum pole into the data logger.
 9. Backfill the excavation surrounding the concrete manhole at RW-1 and MH-1 and the associated drainage pipes in accordance with Drawings C-713 and C-716 and Sections 310000 – Earthwork, 310001 – Earthwork Materials, 330561 – Concrete Manholes, 334213 – SICPP Drainage Pipes, 400523 – Stainless Steel Pipes, and this Section.
 10. Drill and provide RW-2 riser and slotted pipes from the ground surface to the depths shown on Drawing C-714 and in accordance with this Section.
 11. Provide sand backfill around the RW-2 riser and slotted pipes to the depth shown on Drawing C-714 and in accordance with this Section.
 12. Notify Director's Representative within one day from the completion of Step 11. Develop/pump test RW-2 in accordance with this Section and within five days following completion of Step 11.
 13. Following completion of development/pumping test of RW-2, provide additional sand backfill to the depths shown on Drawing C-714 and in accordance with this Section if needed. Following completion of well development/pumping test and final sand backfill placement provide bentonite seal and cement bentonite grout around the RW-2 riser pipe to the depths shown on Drawing C-714 and in accordance with this Section.

14. Remove the riser relief well pipe for RW-1 from the joint installed at the relief well pipe cut off elevation shown on Drawing C-714.
15. Drop the check valve for RW-1 into the riser pipe using a steel chain as shown on Drawings C-714 and C-716. Secure the steel chain to the top of the concrete manhole by the roof hatch.
16. Provide a combined pressure transducer and data logger inside the concrete manhole at RW-1, inside the relief well pipe for RW-2, and within nearby existing piezometers (B-301L, B202L, B204L, and B102).
17. Following installation of the combined pressure transducer and data logger, the Director's Representative will begin the relief well testing program for evaluation of RW-1. Refer to the General Relief Well Testing Program Procedure paragraph below for more details. Assume the relief well testing program will take up to two weeks to complete.
18. Complete Steps 5 through 9 for RW-2.
19. Complete Steps 10 through 13 for RW-3.
20. Complete Steps 14 through 15 for RW-2.
21. Provide a combined pressure transducer and data logger inside the concrete manhole at RW-1, RW-2, inside the relief well pipe for RW-3, and within nearby existing piezometers (B-301L, B202L, B204L, and B102).
22. Following installation of the combined pressure transducer and data logger, the director's representative will begin the relief well testing program for evaluation of RW-2. Refer to the General Relief Well Testing Program Procedure Paragraph for more details. Assume the relief well testing program will take up to two weeks to complete.
23. Complete Steps 5 through 9 for RW-3.
24. Complete Steps 10 through 13 for RW-4.
25. Complete Steps 14 through 15 for RW-3.
26. Provide a combined pressure transducer and data logger inside the concrete manhole at RW-1, RW-2, RW-3, inside the relief well pipe for RW-4, and within nearby existing piezometers (B-301L, B202L, B204L, and B102).
27. Following installation of the combined pressure transducer and data logger, the Director's Representative will begin the relief well testing program for evaluation of RW-3. Refer to the General Relief Well Testing Program Procedure Paragraph below for more details. Assume the relief well testing program will take up to two weeks to complete.
28. Complete Steps 5 through 9 for RW-4.
29. Complete Steps 10 through 13 for RW-5.
30. Complete Steps 14 through 15 for RW-4.
31. Provide a combined pressure transducer and data logger inside the concrete manhole at RW-1, RW-2, RW-3, RW-4, inside the relief well pipe for RW-5, and within nearby existing piezometers (B-301L, B202L, B204L, and B102).
32. Following installation of the combined pressure transducer and data logger, the Director's Representative will begin the relief well testing program for evaluation of RW-4. Refer to the General Relief Well Testing Program Procedure Paragraph below for more details. Assume the relief well testing program will take up to two weeks to complete.
33. Complete Steps 5 through 9 and 14 through 15 for RW-5.
34. Provide a combined pressure transducer and data logger inside the concrete manhole at RW-1, RW-2, RW-3, RW-4, and RW-5, and within nearby existing piezometers (B-301L, B202L, B204L, and B102).
35. Following installation of the combined pressure transducer and data logger, the Director's Representative will begin the relief well testing program for evaluation of RW-5. Refer to the General Relief Well Testing Program Procedure Paragraph below for more details. Assume the relief well testing program will take up to two weeks to complete.

36. Additional relief wells may be necessary based on the results of the testing program. assume for bidding purposes that no additional relief wells will be required. However, if additional relief wells are necessary, follow the same procedure as previously described to provide and test subsequent new relief wells. Director's Representative will make a determination on the need for additional relief wells and will provide all details for their construction.

3.11 GENERAL RELIEF WELL TESTING PROGRAM PROCEDURE

- A. Record the initial static water level in the structures (manholes, relief well pipe, and nearby existing piezometers) that are equipped with combined pressure transducer and data logger.
- B. Open the butterfly valve in the manhole of the relief well being evaluated in the testing program to allow for discharge from the relief well through the drainage pipes.
- C. Record the flow rate from the relief well being evaluated using the area/velocity sensor. Flow rates will be collected continuously through the data logger. At a minimum flow rates will be collected at five minute intervals.
- D. Record the water levels in the structures (manholes, relief well pipe, and nearby existing piezometers) that are equipped with combined pressure transducer and data logger. Water levels will be collected continuously through the combined pressure transducer and data logger. At a minimum water levels will be collected at five minute intervals.
- E. Once the flow rates and water levels have stabilized to within 0.1 feet over the period of 1 hour or the maximum time length has occurred (three days), shut the butterfly valve in the relief well being evaluated.
- F. Record the water level in the manhole of the relief well being evaluated after closure of the butterfly valve for a secondary check on the flow rate out of the relief well.
- G. Director's Representative will review the water level and flow rate data from all structures. Director's Representative may request to repeat the test or to adjust the remaining relief well locations based on the results of the testing program. Any adjustments to the relief well locations will be provided by the Director's Representative.
- H. Once the relief well testing program is completed, open the butterfly valve on the relief well being evaluated. Director's Representative will inform the Contractor that the relief well testing has concluded.

END OF SECTION 314400

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Asphalt paving.

B. Related Requirements:

1. Section 024116 "Structure Demolition" for demolition and removal of existing asphalt pavement.
2. Section 310000 "Earthwork" for subgrade preparation.

1.2 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials

1. AASHTO M 29 - Standard Specification for Fine Aggregate for Asphalt Mixtures
2. AASHTO M 140 - Standard Specification for Emulsified Asphalt
3. AASHTO M 208 - Standard Specification for Cationic Emulsified Asphalt
4. AASHTO M 288 - Standard Specification for Geosynthetic Specification for Highway Applications
5. AASHTO M 320 - Standard Specification for Performance-Graded Asphalt Binder
6. AASHTO R 97 - Standard Practice for Sampling Asphalt Mixtures
7. AASHTO T 245 - Standard Method of Test for Resistance to Plastic Flow of Asphalt Mixtures Using Marshall Apparatus.

B. Asphalt Institute

1. AI MS-2 - Asphalt Mix Design Methods
2. AI MS-22 - Construction of Hot Mix Asphalt Pavements

C. ASTM International

1. ASTM D242 - Standard Specification for Mineral Filler for Asphalt Mixtures
2. ASTM D977 - Standard Specification for Emulsified Asphalt
3. ASTM D979 - Standard Practice for Sampling Bituminous Paving Mixtures
4. ASTM D1188 - Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
5. ASTM D2027 - Standard Specification for Cutback Asphalt (Medium-Curing Type)
6. ASTM D2041 - Standard Test Method for Theoretical Maximum Specific Gravity and Density of Asphalt Mixtures
7. ASTM D2397 - Standard Specification for Cationic Emulsified Asphalt

8. ASTM D2726 - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Asphalt Mixtures
9. ASTM D2950 - Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
10. ASTM D3141 - Standard Specification for Asphalt for Undersealing Portland-Cement Concrete Pavements
11. ASTM D3381 - Standard Specification for Viscosity-Graded Asphalt Binder for Use in Pavement Construction
12. ASTM D3549 - Standard Test Method for Thickness or Height of Compacted Asphalt Mixture Specimens
13. ASTM D3666 - Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
14. ASTM D3910 - Standard Practices for Design, Testing, and Construction of Slurry Seal
15. ASTM D6373 - Standard Specification for Performance Graded Asphalt Binder
16. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
17. ASTM D6927 - Standard Test Method for Marshall Stability and Flow of Asphalt Mixtures

D. New York State Department of Transportation (NYS DOT)

1. DOT 400 – Asphalt Mixture and Pavement
2. DOT 600 – Incidental Construction
3. DOT MM 5.16 - Asphalt Mixture Design And Mixture Verification Procedures

1.3 SUBMITTALS

- A. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
- B. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
- C. Product Data: Include manufacturer / provider / plant name, product name, technical data and tested physical and performance properties.
- D. Submit an Environmental Product Declaration (EPD) from the manufacturer for each asphalt mix within this specification section, if available. A statement of the contractor's good faith effort to obtain the EPD shall be provided if not available.
 1. Manufacturer-provided EPDs must be Product Specific Type III (Third-Party Reviewed), in adherence with ISO 14025 *Environmental labels and declarations*, ISO 14044 *Environmental management – Life cycle assessment*, and ISO 21930 *Core rules for environmental product declarations of construction products and services*.
- E. Asphalt Designs:
 1. Certification, by authorities having jurisdiction, of approval of each asphalt design proposed for the Work.
 2. NYSDOT Approved Plant name, Number, and location of the asphalt plant for each asphalt design proposed for the Work.

3. Asphalt Mix Design Test results that are less than 6 months old for each mix proposed for the Work.

F. Material Delivery Tickets for pavement materials including the following information.

1. Ticket Number.
2. Plant Identification.
3. Project Name.
4. Mix Type.
5. Quantity of material in vehicle.
6. Date and Time.

G. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by the NYS Department of Transportation.
- B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of NYS Department of Transportation Standard Specifications for asphalt paving work.
 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, or if rain is imminent or expected before time required for adequate cure.
- B. Discontinue paving when surface temperatures fall below requirements listed in NYSDOT Table 404-1 unless otherwise specified in the General Conditions of this Contract or as directed by the Director's Representative.
- C. Pavement is restricted by dates listed in the General Conditions.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. All aggregate used in design mixes shall be as specified in NYS DOT Specification Section 608-2.02.

2.2 ASPHALT MATERIALS

- A. Asphalt: Use aggregate and PG binder from suppliers listed in the NYS DOT's Approved List for Fine and Coarse Aggregates and Performance Graded (PG) Binders and Warm Mix Technology for Asphalt Paving respectively. Mineral filler shall meet the requirements of NYS DOT Section 703-08.
- B. Supply approved asphalt mixtures that meet the requirements of NYS DOT MM 5.16 *Asphalt Mixture Design and Mixture Verification Procedures*. Each mixture must be obtained from a single plant for the duration of the project. The following NYS DOT items only shall be utilized for this project:
 - 1. 9.5 Top Course Asphalt.
- C. Asphalt Cement Tack Coat.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.
- B. Subgrade compaction shall adhere to Section 310000.

3.3 SURFACE PREPARATION

- A. Prepare existing surfaces in accordance with DOT Section 404-3.05, Conditioning of Existing Surface.
- B. Ensure that prepared subgrade has been proof-rolled and is ready to receive paving. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces.

3.4 ASPHALT PLACEMENT

- A. Spread and Finish asphalt in accordance with DOT Section 404-3.06, Spreading and Finishing.
- B. Remove and restore paved areas that are defective or contaminated as delineated by the Director's Representative at no additional cost to the State.

3.5 JOINTS

- A. Asphalt joints shall be in accordance with DOT Section 404-3.09, Joints.

3.6 COMPACTION

- A. Provide compaction of asphalt mixtures in general accordance with DOT Section 404-3.07, Compaction, Paragraph D, 80 Series Compaction Methods, specifically meeting the minimum requirements as shown in Table 404-3 Number of Passes.
 - 1. The Director's Representative may increase or decrease the number of passes to obtain adequate density of the compacted asphalt.
 - 2. The Director's Representative may also approve alternate compaction procedures where the specified procedures are not applicable.
 - 3. Testing to be performed at the direction of and in locations chosen by the Director's Representative. Target compaction is 95% (92% - 97% range is acceptable; as mixture maximum theoretical density).

3.7 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce thickness indicated within the following tolerances:
 - 1. Top Course: Plus or minus ¼ inch.
- B. Pavement Surface Smoothness: Compact each course to produce surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Top Course: 1/4 inch.
 - 2. Variations exceeding ¼ inch will be appropriately corrected or the pavement be removed and replaced at no additional cost to the State.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Director's Representative may engage a qualified testing agency to perform tests and inspections.
- B. Thickness: In-place compacted thickness of asphalt courses will be determined in accordance with ASTM D3549.
- C. Surface Smoothness: Finished surface of each asphalt course will be tested for compliance with smoothness tolerances.
- D. Remove and replace or install additional asphalt where test results or measurements indicate that it does not comply with specified requirements.

END OF SECTION 321216

SECTION 400561.46 – LARGE PIPE COUPLINGS

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 40 05 24.01- Large Diameter Steel Pipe

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of other requirements of these specifications, all work specified herein shall conform to or exceed the applicable requirements of the referenced portions of the following documents to the extent that the requirements therein are not in conflict with the provisions of this Section.

- B. Commercial Standards:

ANSI/ASTM E165 Liquid Penetrant Inspection, Methods for

ANSI/AWS D1.1 Structural Welding Code - Steel

ANSI/AWWA C200 Steel Water Pipe 6 Inches and Larger

ANSI/AWWA C210 Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines

ANSI/AWWA C213 Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines

ANSI/AWWA C227 Bolted, Split-Sleeve-Type Restrained and Non-Restrained Couplings for Plain-End Pipe

ASTM F1476 Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications

ASTM D2000 Classification System for Rubber Products in Automotive Applications

AWWA M11 Steel Water Pipe - A Guide for Design and Installation

1.3 SUMMARY

- A. The Contractor shall furnish and install bolted, split sleeve mechanical couplings, complete in place, all in accordance with the requirements of the Contract Documents and Drawings. The couplings selected shall be designed for the type, size, and working pressure of the piping system with which they are to be used.

1.4 SUBMITTALS

- A. Certifications: the CONTRACTOR shall furnish a certified affidavit of compliance for all couplings furnished under this Section of the Specifications, as specified and applicable in ANSI/AWWA C210, C213, and C227, respectively, and the following supplemental requirements:
 - 1. Physical and chemical properties of all steel.
 - 2. Hydrostatic test reports (if required).

1.5 QUALITY ASSURANCE

- A. Inspection: All couplings shall be subject to inspection at the place of manufacture in accordance with the provisions of ANSI/AWWA C210, C213, and C227, respectively, as supplemented by the requirements herein. The Contractor shall notify the Director's Representative in writing of the manufacturing starting date not less than 3 calendar days prior to the start of manufacture.
- B. During the manufacture of the couplings, the Director's Representative shall be given access to all areas where manufacturing is in process and shall be permitted to make all inspections necessary to confirm compliance with these Specifications.
- C. Testing Requirements: One coupling of each diameter and pressure class shall be shop hydro tested per ASTM F1476 and certified to a pressure of at least 150% of the specified working pressure.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Couplings are to be bolted, split-sleeve type and consist of four basic components: one or more housing segment(s), gasket assembly, bolts and nuts, and restraint rings, if required for joint restraint.
- B. Approved Manufacturer: Couplings shall be split-sleeve as manufactured by Victaulic Company or Director's Representative approved equivalent, as follows:

Style Number	Coupling/Pipe Material	Split Sleeve Coupling Type
231	Carbon Steel	Non-Restrained Flexible Coupling

2.2 COUPLING DESIGN

- A. Couplings shall be designed to perform under the most critical combination of internal pressure and external loads as determined by the design procedures per AWWA M11 and the provisions of these specifications.

- B. Coupling shall be designed to allow movement on one end of the coupling only. That is, it shall be fixed on one end and allowed to slide on the other.
- C. Coupling Thickness for Internal Pressure: The thickness of the coupling body shall meet or exceed the design requirements specified in AWWA M11 Manual.

2.3 COUPLING HOUSING

- A. Material: Coupling shall be manufactured from ASTM A36 for carbon steel couplings.
- B. Description: The coupling shall be of the split-sleeve type with a single or double arch cross section which closes around pipe ends that are smooth for expansion or contraction requirements or pipe ends with steel restraint rings affixed for pipe end restraint requirements.
- C. As the coupling closes, it confines the elastomeric gasket beneath the arches of the sleeve to create the radial seal. The axial seal is affected at the sealing plates as the bolts pull the coupling snug around the pipe. Depending on the coupling style, Victaulic split-sleeve couplings may permit angular pipe deflection, flexibility, contraction and expansion as specified in the manufacture's latest literature.

2.4 O-RING / GASKET

- A. Material: Elastomers shall have properties as designated by ASTM D2000.
- B. Description: The sealing members are comprised of single gasket or two O-Rings and an elastomer-sealing pad bonded to the sealing plate. Internal pressure is not required to affect the seal.
- C. Service:
 - 1. Air: O-Ring / Gasket supplied shall be EPDM for temperatures of -30°F up to +230°F or Silicone for temperature of -30°F up to 350°F; conforming to ASTM D2000.
 - 2. Water: O-Ring / Gasket supplied may be Isoprene or EPDM conforming to ASTM D2000 for water and sewerage service within the temperature range of -40°F to +160°F.

2.5 STUDS AND NUTS

- A. Material: Carbon steel studs shall be zinc plated and conform to ASTM A193 Grade B7. Carbon steel nuts shall be zinc plated and conform to ASTM A194 Grade 2H. Stainless steel studs shall conform to ASTM F593 Class 2 Grade B8M. Stainless steel nuts shall conform to ASTM F594 Grade 8M, 316.
- B. Installation: The coupling shall be assembled with provided studs and nuts at the closure plates, tightened to assure snug coupling contact with the pipe. Follow the manufacturer's written instructions regarding installation and tightening of nuts.

2.6 RESTRAINT RINGS

- A. Material: Restraint rings shall be furnished with the couplings when required. Carbon steel restraint rings shall conform to ASTM A108 grade 1018.
- B. Application: Series 231 couplings allow for thermal expansion and contraction at the pipe joint. Two restraint ring(s) affixed to the end of one pipe keeps the coupling in the proper location. Follow the manufacturer's instructions for weld size and restraint ring location(s).

2.7 EPOXY COATINGS (WHERE SPECIFIED)

- A. Fusion Bonded Epoxy Coatings: Except as otherwise provided herein, the fusion bonded epoxy coating shall be applied to the inside and outside of the coupling in conformance with ANSI/AWWA C213.
- B. Liquid Epoxy Coatings: Except as otherwise provided herein, the liquid epoxy coating shall consist of an epoxy primer and a liquid epoxy finish system applied in conformance with ANSI/AWWA C210. Both primer and finish shall be spray applied to the inside and outside of the coupling in accordance with the manufacturer's recommendations.

2.8 SUPPLEMENTAL EXTERIOR COATING

- A. Supplemental Exterior Coating of Buried Couplings: Couplings installed underground shall receive additional protection against corrosion.

2.9 INSULATING SLEEVE (WHERE SPECIFIED)

- A. Insulating Sleeve: When specified, insulating sleeves shall be supplied to provide for electrical isolation between the two pipe ends. One sleeve shall be provided for each pipe end. The sleeve width shall be equal to $\frac{1}{2}$ the coupling body width plus 1 inch. Thickness shall be $\frac{3}{16}$ " inch. Each sleeve shall have a lip that extends down between the pipe ends that is $\frac{3}{8}$ inch thick by 1" inch deep, fully bonded to the sleeve. The insulating sleeve material shall be an EPDM elastomer (other elastomers are available) suitable for potable water service.

PART 3 - EXECUTION**3.1 INSTALLATION OF COUPLINGS**

- A. The Contractor shall inspect each coupling to ensure that there are no damaged portions of the coupling. Particular attention should be paid to the sealing pad/sealing plate area.
- B. Before installation of the couplings, each coupling shall be thoroughly cleaned of any foreign substance, which may have collected thereon and shall be kept clean at all times thereafter.
- C. In no case shall the deflection in the joint between pipe ends exceed the maximum deflection recommended by the MANUFACTURER. No joint shall be misfit any amount that will be

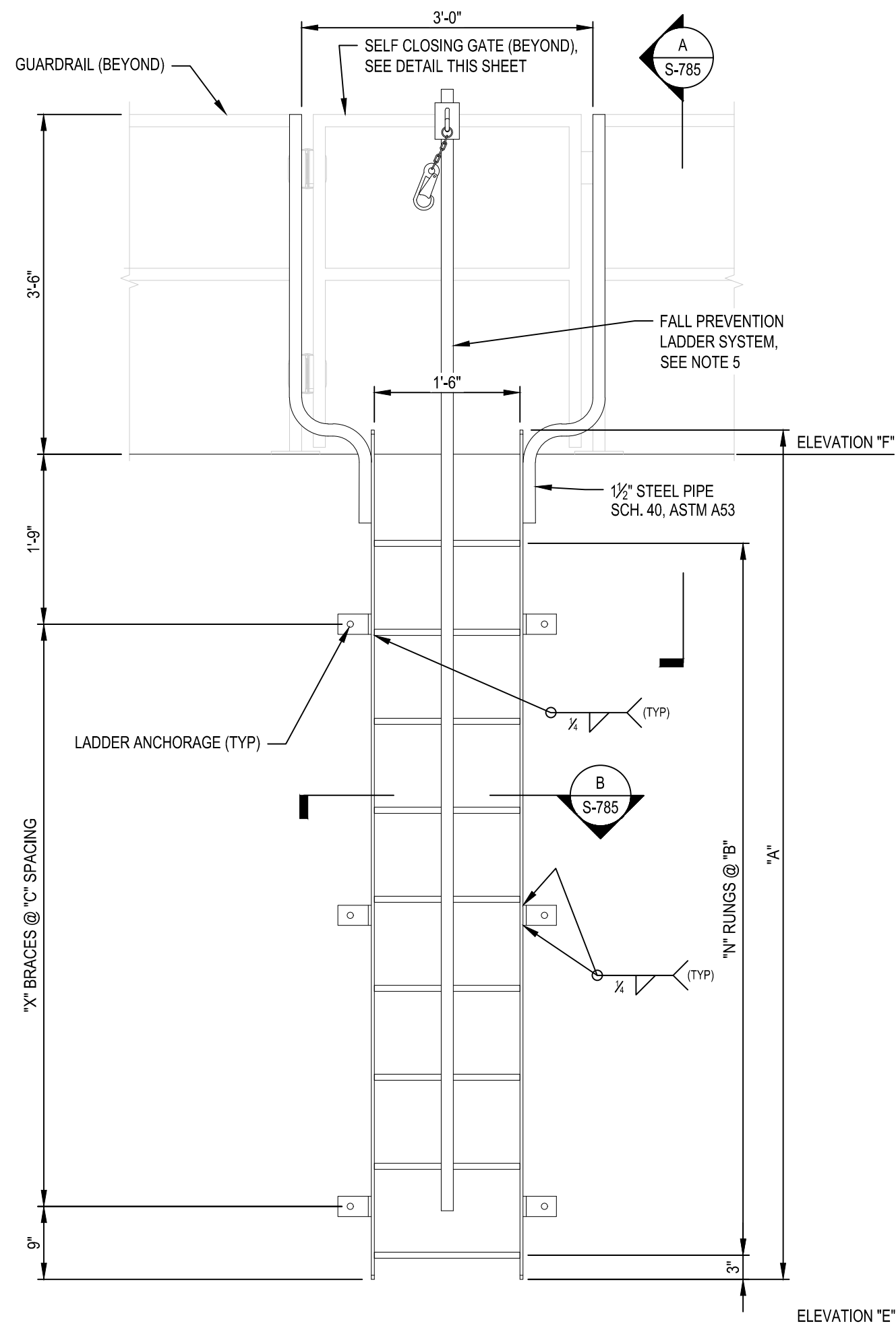
detrimental to the strength and water tightness of the finished joint. The couplings shall be assembled and installed in conformity with the recommendation and instruction of the MANUFACTURER.

- D. Wrenches used shall be of a type and size recommended by the MANUFACTURER. Nuts shall be tightened so as to secure uniform gasket compression between the coupling and the body of the pipe with all nuts tightened approximately the same amount. Final tightening shall be by hand (no air impact wrenches) and is complete when the coupling is in uniform contact around the circumference of the pipe.
- E. The coupling Manufacturer's factory-trained representative shall provide on-site training for the Contractor's field personnel in the use of installation tools and installation of couplings. The representative shall periodically visit the job site to ensure best practices in coupling installation are being followed. (A distributor's representative is not considered qualified to conduct the training.)

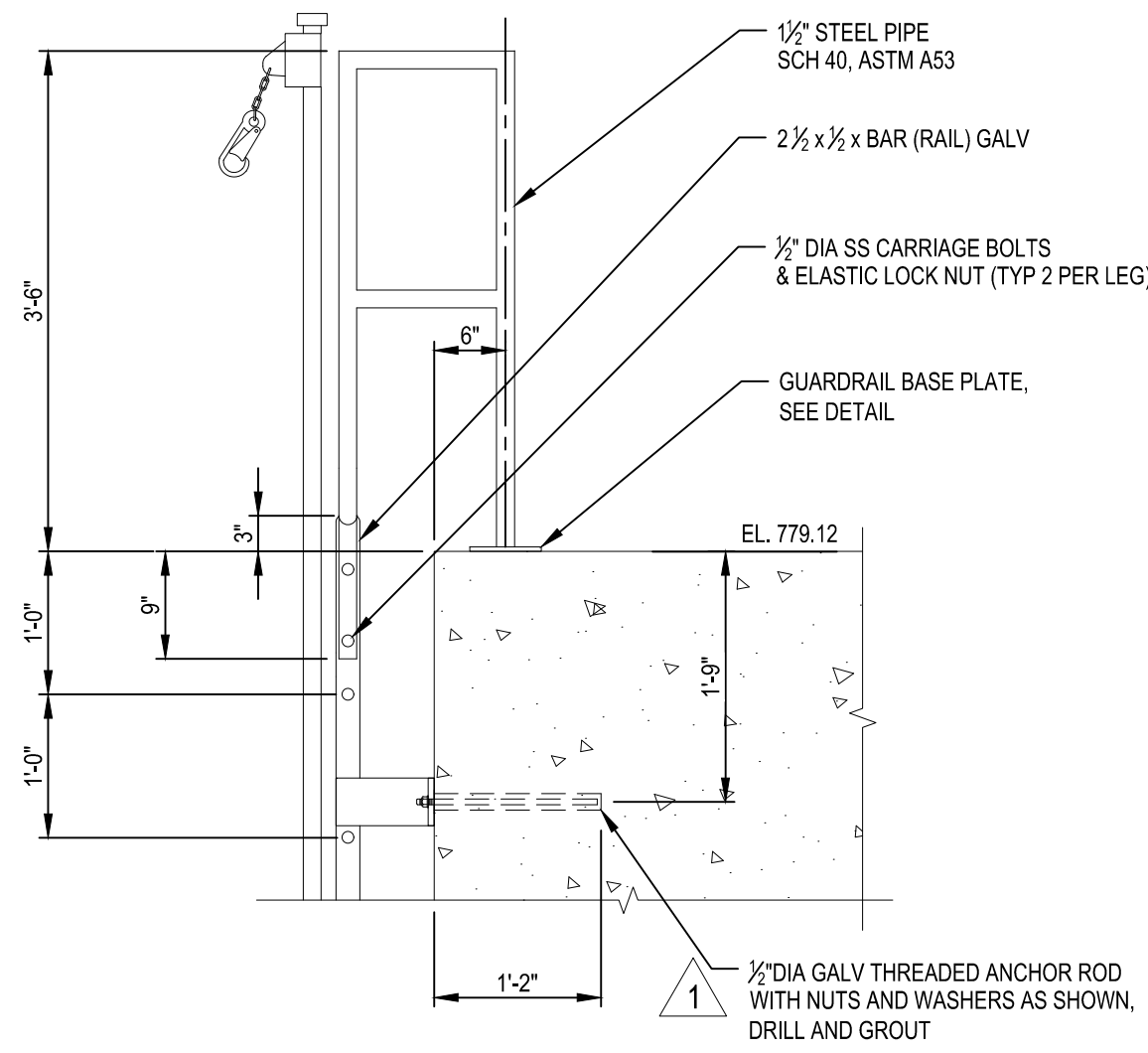
3.2 TESTING

- A. There shall be no visible leakage allowed at any pipe joints that utilize couplings. Any visible leaks at coupled pipe joints shall be repaired to the satisfaction of the Director's Representative.

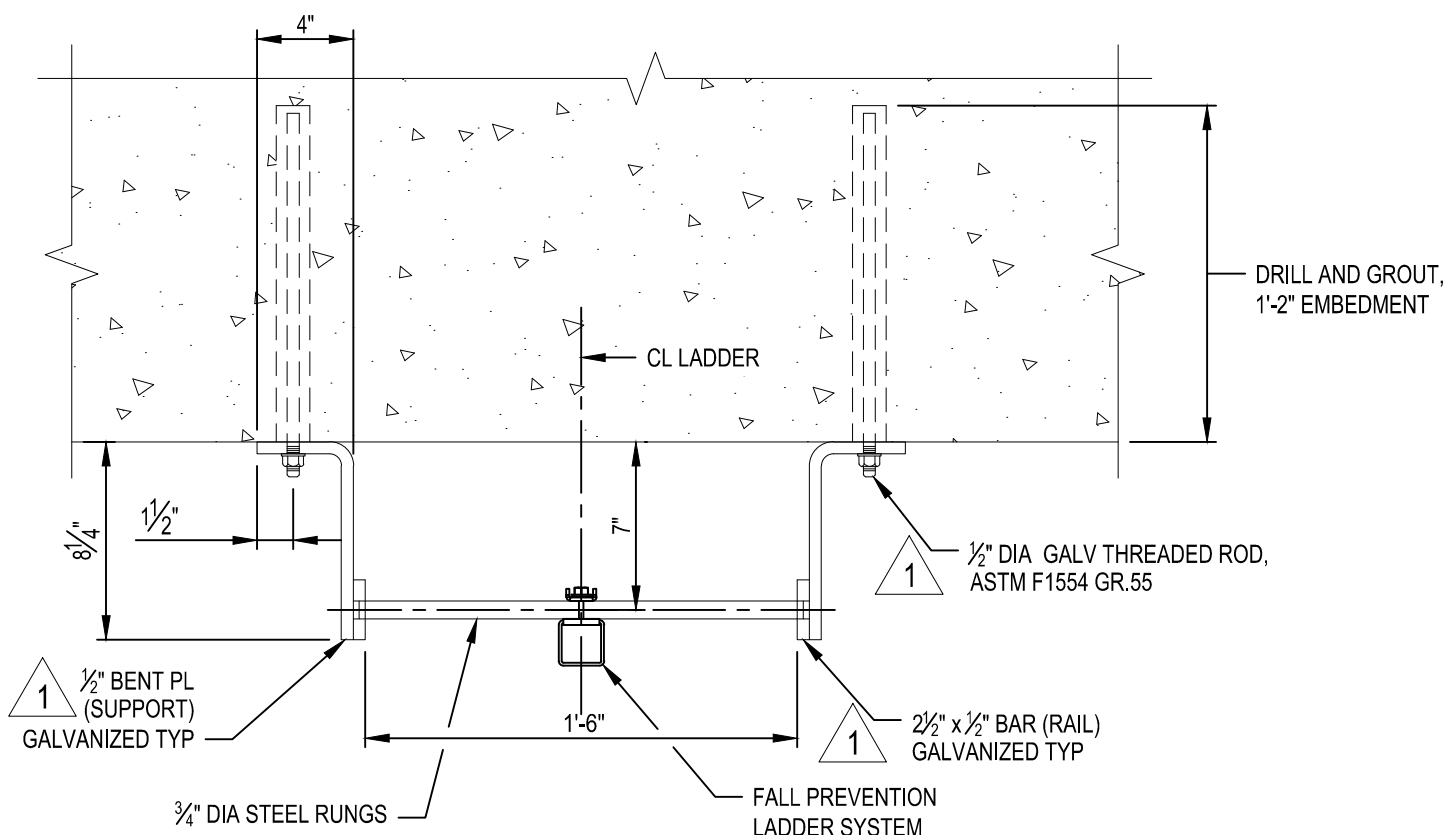
END OF SECTION 400561.46



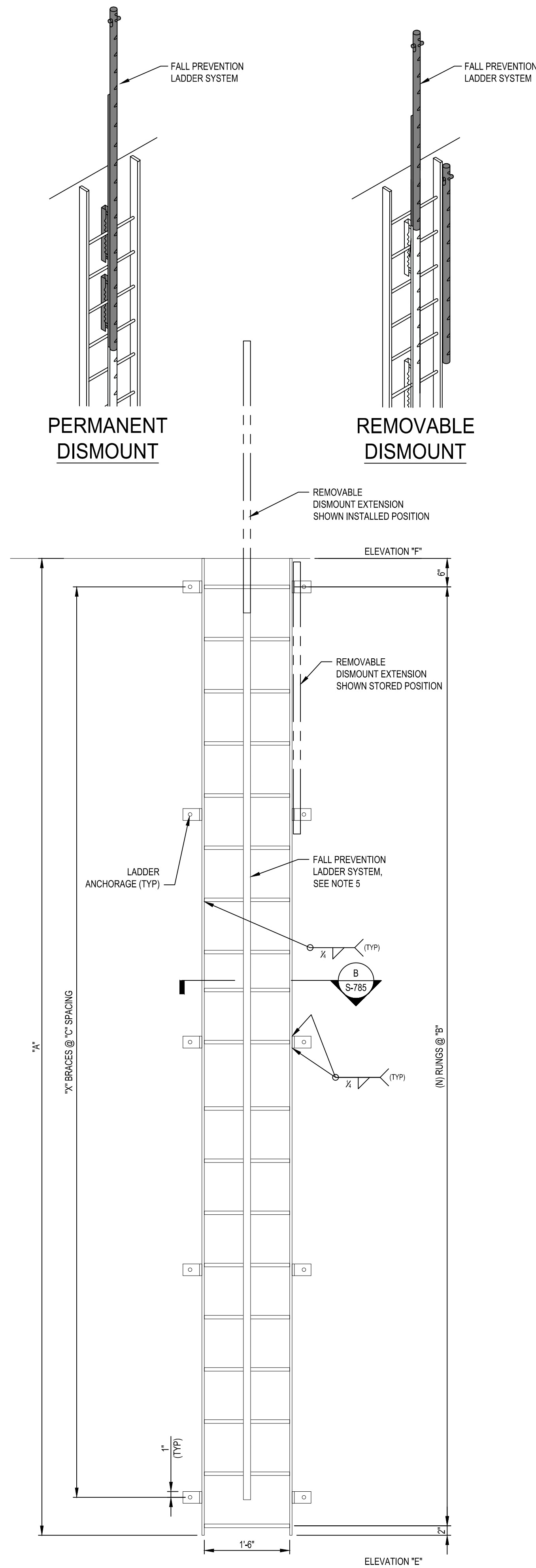
1 LADDER ELEVATION - TYPE 1
SCALE: 3/4" = 1'-0"



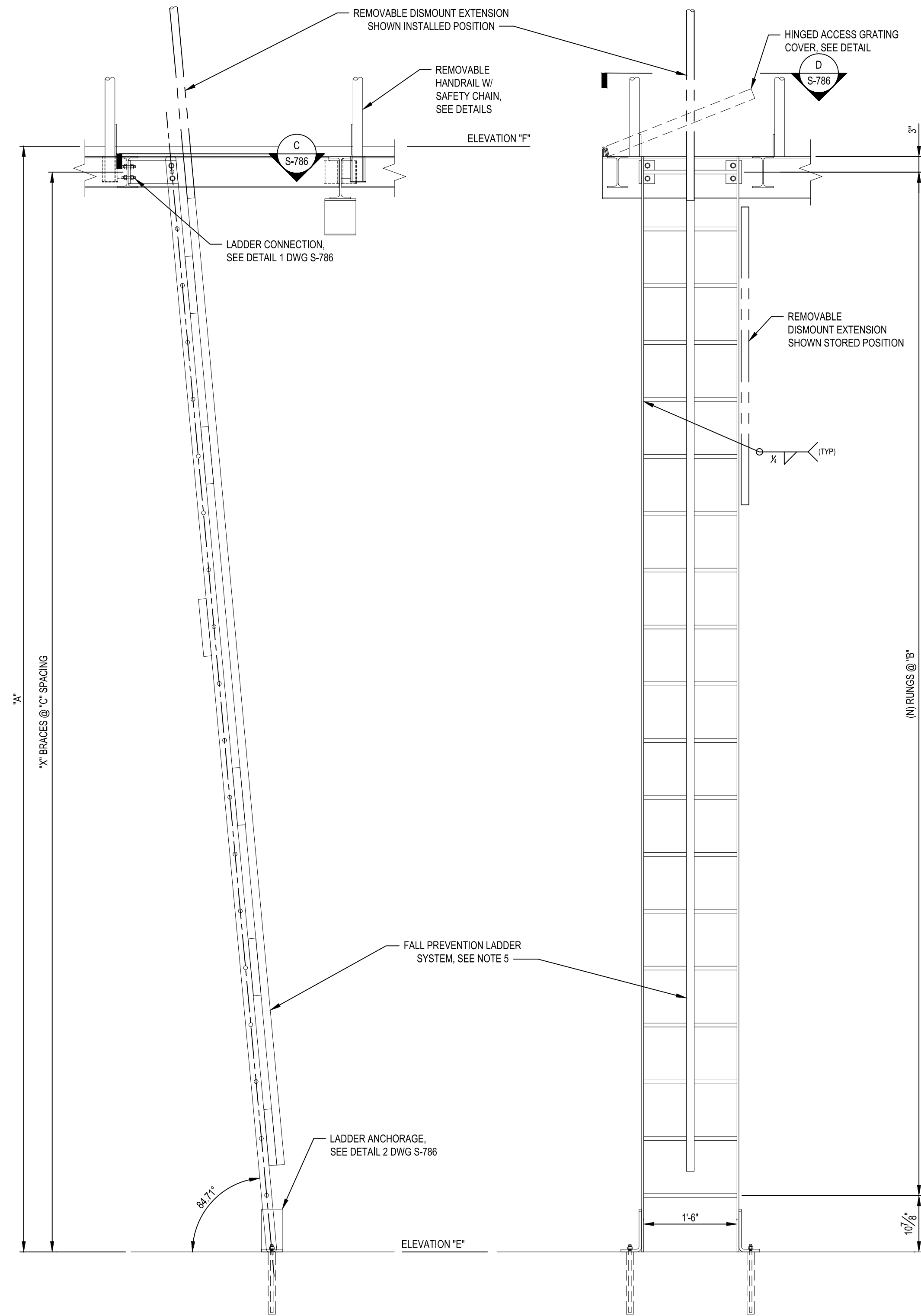
A SECTION - TYPE 1 RAILING
SCALE: 3/4" = 1'-0"



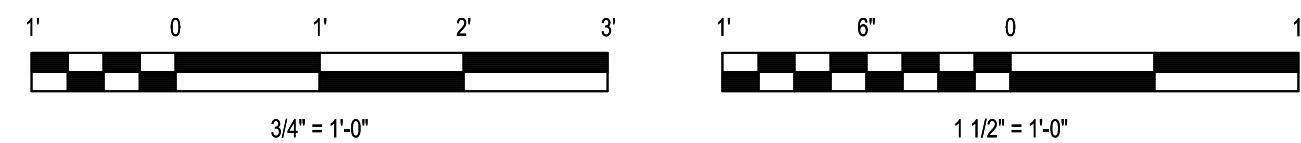
B LADDER SECTION - TYPE 1 & 2
SCALE: 1/2" = 1'-0"



2 LADDER ELEVATION - TYPE 2
SCALE: 3/4" = 1'-0"



3 LADDER ELEVATIONS - TYPE 3
SCALE: 3/4" = 1'-0"



DRAWING NOTES

1. SEE DRAWINGS G-003 & G-004 FOR ADDITIONAL NOTES.
2. FIELD VERIFY ALL RAILING DIMENSIONS PRIOR TO FABRICATION.
3. ALL LADDER RUNGS, ANGLES, LADDER MOUNTING PLATES AND STEEL PIPE TO BE GALVANIZED.
4. STAINLESS STEEL ANCHOR RODS, BOLTS, ELASTIC NUTS, AND WASHERS CONFORMING TO ASTM A193, GRADE B8, AND ASTM A194, GRADE 8.
5. FALL PREVENTION SAFETY DEVICE SHALL BE MILLER SAF-T-CLIMB LADDER SYSTEM WITH DISMOUNT EXTENSION OPTIONS, OR APPROVED EQUAL.

LADDER SCHEDULE										
TYPE	NO. REQ'D	DIMENSION			ELEVATION		NO. BRACES (X)	NO. RUNGS (N)	MATERIAL	RAILING
		A	B	C	E	F				
1	2	8'-9"	0'-11"	3'-0"	770.12	779.12	3	9	GALV. STEEL	WALK-THRU
2	1	17'-2"	0'-11"	4'-0"	695.12	712.87	5	19	GALV. STEEL	-
3	2	17'-9"	0'-11"	17'-4"	695.20	712.87	2	19	GALV. STEEL	REMOVABLE

DESIGN & CONSTRUCTION

CONSULTANT

CERTIFICATE OF AUTHORIZATION #: 0020747



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UNIFORM CODE STATEMENT:

TO THE BEST OF THE REGISTERED DESIGN PROFESSIONAL'S KNOWLEDGE, BELIEF, AND PROFESSIONAL JUDGEMENT THESE PLANS AND/OR SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2025 UNIFORM CODE.

ENERGY CODE STATEMENT:

TO THE BEST OF THE REGISTERED DESIGN PROFESSIONAL'S KNOWLEDGE, BELIEF, AND PROFESSIONAL JUDGEMENT THESE PLANS AND/OR SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2025 ENERGY CODE.

WARNING:

THE ALTERATION OF THIS MATERIAL IN ANY WAY, UNLESS DONE UNDER THE DIRECTION OF A COMPARABLE PROFESSIONAL, I.E. ARCHITECT FOR AN ARCHITECT, ENGINEER FOR AN ENGINEER OR LANDSCAPE ARCHITECT FOR A LANDSCAPE ARCHITECT, IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW AND/OR REGULATIONS AND IS A CLASS 'A' MISDEMEANOR.



CONTRACT:

CONSTRUCTION

TITLE: PROVIDE FOUNDATION
REMEDATION AND CONCRETE
REPAIR CONKLINGVILLE DAM
NYS DAM ID #205-0415

LOCATION: 233 COUNTY ROUTE 8
HADLEY, NY
SARATOGA COUNTY

CLIENT: NYS DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

BID DOCUMENTS

MARK	DATE	DESCRIPTION
2	09/01/2026	ADDENDUM #5
1	08/28/2026	ADDENDUM #4
0	06/22/2026	BID DOCUMENTS

PROJECT NUMBER: 47164-C

DESIGNED BY: RCP

DRAWN BY: MDI

FIELD CHECK: -

APPROVED: JMR

SHEET TITLE:

METALS
DETAILS - 5

DRAWING NUMBER:

S-785

SHEET 112

OF 148