ITEM NO. 816
STEEL PIPE INSTALLATION

816.1 DESCRIPTION: This item shall consist of steel pipe installation in accordance with these specifications and as directed by the Engineer.

816.2 SUBMITTALS: Contractor shall submit manufacturer's product data, instructions, recommendations, shop drawings, and certifications.

816.3 MATERIALS: The materials for steel pipe shall conform to the specifications contained within the latest revision of SAWS' Material Specification Item No. 05-30, "Steel Pipe."

816.4 CONSTRUCTION:

1. **General**: Steel pipe shall be installed as specified within Item No. 812, "Water Main Installation" of these specifications. The Contractor shall furnish all steel piping including fittings, couplings, specials, pipe supports, eyebolts, nuts, and accessories which are shown in the contract documents and as required for proper connection to existing piping. The Contractor's attention is directed to the fact that the exact location and elevation of existing piping must be determined in the field prior to fabrication of connecting piping.

   All steel pipe and specials may be either milled pipe or fabricated pipe and, in either case, shall be fabricated to the sizes, dimensions and shapes as indicated in the contract documents. Unless otherwise indicated in the contract documents, all steel pipe, bends, or specials, shall have an outside diameter minimum wall thickness and unit weights as shown in Standard Drawing DD-856-01.

   Any pipe section, fitting, or special which shows dents, kinks, abrupt changes of curvature other than specified, or any other damage will be rejected. Any pipe section, fittings, or special section that has been dropped from a truck or crane will be rejected. The Contractor shall, at his own expense, replace or recondition each rejected section. All reconditioning procedures must first be presented to the Engineer for review and approval.

2. **Ends of Sections**: Ends of pipe sections, bends, and specials shall be beveled for field welding, unless shown otherwise in the contract documents.
records.

3. **Seams**: All piping shall be made from steel plate rolled into cylinders or sections thereof, with not more than two longitudinal butt welds, or shall be spirally formed and butt welded. Girth seams shall be butt welded and shall not be closer than 6 feet apart except in specials and bends.

4. **Length Tolerance**: Standard and special sections shall be within 1/16 inch (plus or minus) of the specified or theoretical lengths.

5. **Welded Joints**: Except where ends are shown in the contract documents to be joined by mechanical couplings, all joints for steel pipe installed on the bridge structure and in open trench shall be welded.

Welders appointed to do welding on steel pipe shall present to the Inspector and Engineer all applicable 4F and 5G certifications. All welds shall be sound; free from embedded scale and slag; shall have a tensile strength across the weld not less than that of the thinner of the connected sections, and shall be watertight. Butt welds shall be used for all welded joints in line-pipe assemblies and in the fabrication of bends and other specials. All welds shall be subject to pre-manufacturing inspection and available to the Inspector and Engineer upon request.

Welding for field joints shall conform to the latest provision of AWWA "Standard Specifications for Field Welding of Steel Water Pipe Joints, C206" or most applicable approved equal provision. Parties involved in the construction of main(s) shall pay special attention to the latest provision of AWWA "Standard Specifications for Field Welding of Steel Water Pipe Joints, C206, “Control of Temperature Stresses” or most applicable approved equal provision. After welding, the joints shall be prepared, primed, and painted, or wrapped in accordance with Item No. 816.4.6 "Protective Coating," of these Specifications. Joint preparation shall include mechanical grinding in order to remove all slag, splatter, rough edges, and surface irregularities.

Leaks in welds shall be repaired by chipping out the defective material and re-welded. No hammering will be permitted.

6. **Protective Coatings**: All steel pipe, bends, and specials shall be prepared, primed, painted, or wrapped in the field as specified herein.

   a. **Exterior Surfaces Above Ground**: Exterior surfaces of all new pipe
and appurtenances installed shall be thoroughly cleaned to bare metal by high speed wire brushing, scraping, or other suitable methods approved by the Engineer, given a single coat of industrial grade, rust inhibitive primer, and two finish coats of aluminum paint.

b. Exterior Surfaces Underground: Exterior surfaces of all steel pipe, bends, and specials which are to be installed in open trench shall be thoroughly cleaned to bare metal by high speed wire brushing, scraping, or other suitable methods approved by the Engineer, given a single coat of rust inhibitive primer, and wrapped with polyvinyl tape in accordance with the latest provision of AWWA C203-91, "Protective Coatings for Steel Water Pipelines, (Appendix C)” or most applicable approved equal provision.

c. Buried Couplings: Mechanical couplings which are to be installed underground shall be protected in accordance with Item No. 816.4.6, "Protective Coatings,” of these Specifications.

d. Field Welded Joints: After installation of pipe, bends, and specials, all ends of pipe adjacent to welded field joints, including the weld proper, shall be cleaned, primed, painted or wrapped as specified for the pipe adjacent to the weld.

e. Interior Surfaces: The interior surfaces of all steel pipe, fittings and specials shall be cleaned by sandblasting and then primed and coated with a cement mortar lining. Cement mortar-lined and coated steel pipe shall be used for mains 4 inches and larger.

f. All cement-lined steel pipe shall be prepared with the following processes:

(1) Steel pipe shall not be tested until the factory-applied mortar lining and coatings on all piping and specials have been in place for a minimum of 14 days. Steel piping with cement mortar field applied to the interior of the pipe shall not be filled with water until a minimum of 8 hours has elapsed after the final placement of cement mortar, unless otherwise approved by the Engineer.

(2) Contractor to submit details of all specials, and of the lining and coating.
Use lining conforming to the latest provision of AWWA C205 or most applicable approved equal provision, except as be noted otherwise in the contract documents.

Cement used in mortar lining shall be Portland Cement, per the latest provision of ASTM C150 or most applicable approved equal provision, Type II or V for lining.

Pipe shall be cement mortar lined in the shop by the centrifugal process, in accordance with the latest provision of AWWA C205 or most applicable approved equal provision.

Cement mortar-lined pipe shall be braced as required to maintain roundness during the shipping and handling activities and shall have ends capped prior to shipment. For pipe 14 inch nominal diameter and larger, the finished ID after lining shall be the nominal size. For pipe 12 inch nominal diameter and smaller, standard OD pipe sizes shall be furnished.

7. Trench, Bedding and Backfilling: All trenching, bedding and backfilling for steel piping to be laid in open trench shall be in accordance with the requirements specified in Item No. 804, "Excavation, Trenching and Backfill."

816.5 MEASUREMENT: Steel pipe will be measured by the linear foot for each size and type as follows:

Measurements will be from the center line intersection of runs and branches of tees to the end of the valve of a dead end run.

Measurements will also be between the center line intersection of runs and branches of tees. Where the branch is plugged for future connection, the measurement will include the entire laying length of the branch or branches of the fitting.

The measurement of each line of pipe of each size will be continuous and shall include the full laying lengths of all fittings and valves installed between the ends of such line except that the laying length of reducers will be divided equally between the connected pipe sizes. Lines leading to a tapping connection with an
existing main will be measured to the center of the main tapped.

816.6 **PAYMENT:** Payment for Steel Pipe installed will be made at the unit price bid per linear foot of pipe of the various sizes installed by the open cut method. Such payment shall also include excavation, selected embedment material, backfill, compaction, polyethylene sleeve, hauling and disposition of surplus excavated material, including all existing pipe, fittings, appurtenances to be abandoned (where specified or shown in the contract documents).

- End of Specification -