***NATURAL RESOURCES CONSERVATION SERVICE***

***CONSTRUCTION SPECIFICTION***

***North Dakota***

**LIVESTOCK PIPELINE**

**(Code 516)**

1. ***SCOPE***

The work shall consist of furnishing and installing the pipe, fittings, and appurtenances as specified. Any materials or construction details contained within the design package supersede those of this construction specification.

1. ***LOCATION***

The pipeline shall be located as shown on the drawings or as staked in the field. Any deviations from the designed and laid out pipeline route or as noted in the Items of Construction Detail requires prior approval from NRCS.

1. **QUALITY CONTROL**

Quality Control of all materials and construction procedures is the responsibility of the producer and installer. NRCS will make periodic review(s) of the work for the benefit of the agency which will include the final construction inspection.

1. ***MATERIALS***

**Pipe**

Pipe and fittings shall conform to the requirements shown on the drawings, construction details, and as described below:

**Steel Pipe**

Steel pipe shall meet the requirements of either ASTM Specification A53/A53M or AWWA Specification C-200.

If a protective coating is specified for steel pipe, the coating shall meet the requirements of one of the following specifications:

* AWWA-C 203 – Coal-Tar Protective Coatings and Linings for Steel Water Pipelines-Enamel and Tape-Hot Applied
* AWWA-C 209 – Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines
* AWWA-C 210 – Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
* AWWA-C 214 – Tape Coating Systems for the Exterior of Steel Water Pipelines

**Plastic Pipe**

Plastic pressure pipe suitable for underground use shall conform to the requirements of the following specifications:

Kind of Pipe ASTM

PE D2239 (SDR-PR ID Controlled) – Includes HDPE Materials

 D2737 (PE Tubing)

 D3035 (SDR-PR OD Controlled) – Includes HDPE Materials

PVC D1785 (Sch 40, 80, and 120)

 D2241 (SRD-PR)

 D2672 (Sch 40 Bell End)

Plastic pipe installed above ground shall be of material manufactured from High Density PE (HDPE) pipe as shown below. HDPE Pipe must have a minimum pressure rating of 160 PSI.

Pipe Material ASTM

HDPE 3408, 3608, D2239 (SDR-PR Inside Diameter Controlled)

 & 4710 D3035 (SDR-PR Outside Diameter Controlled)

Plastic pipe shall be marked in accordance with the above standards or ASTM Specifications and shall include the following:

1. Nominal pipe size; e.g. 2”
2. Material Designation Code; e.g. PVC 1120
3. Pressure rating in PSI; e.g. 160 psi
4. ASTM designation with which pipe complies; e.g. ASTM D2241
5. Manufacture’s name or trademark
6. For water conveyance systems that may be used for human consumption, a seal of approval of the National Sanitation Foundation (NSF) or of some other accredited laboratory is required

**Joints**

All pipe joints shall be watertight and have the strength equal to that of the pipe. Couplers must be of similar material or completely insulated. Manufacturer’s installation specifications shall be followed.

Pressure pipe fittings shall conform to the requirements of the following specifications:

Kind of Fitting ASTM

PVC Plastic Pipe Fittings, Schedule 40 D2466

Socket-type PVC Plastic Pipe Fittings, Schedule 80 D2467

Threaded PVC Plastic Pipe Fittings, Schedule 80 D2464

Plastic Insert Fittings for PE Plastic Pipe D2609

Butt Heat Fusion PE Plastic Fittings, for PE Plastic Pipe and Tubing D3261

Socket-type PE Fittings for OD-Controlled PE Pipe and Tubing D2683

Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals D3139

Solvents for solvent-welded pipe joints shall conform to the following specifications:

Kind of Solvent ASTM

Solvent Cements for PVC Plastic Pipe and Fittings D2564

Making Solvent- Cemented Joints with PVC Pipe and Fittings D2855

Rubber gaskets for pipe joints shall conform to the requirements of the following specifications:

Kind of Gasket ASTM

Elastomeric Seals (Gaskets) for Joining Plastic Pipe F477

**Valves**

All valve types shall be constructed of materials suitable for the environmental exposure and installation. Size, pressure rating, and type of valves shall meet the requirements as described in the construction details and drawings.

Valve risers or manholes shall be as shown on the drawings and be constructed in such a manner that they will be resistant to damage or deterioration caused by the elements, leaking water, livestock, vandals, ranch equipment or other hazards.

Air valve types are defined as follows and shall be of the type specified on the drawings:

Air-Release Valve (1-way valve)

A continuous acting valve that has a small venting orifice, generally ranging between 1/16 and 3/8 inch in size. This valve releases air from the pipeline once the line is filled and under working pressure.

Air-and-Vacuum Valve (2-way valve)

A large venting orifice which exhausts large quantities of air during filling operations and allows air to re-enter the line to prevent vacuum buildup during emptying. It is not continuous acting since air cannot escape once water enters the valve.

Combination Air-Vacuum-Air Release Valve (3 way valve)

Combines the functions of air-release and air-and-vacuum valves.

1. ***INSTALLATION***

**General**

The work shall be constructed to the lines and grades shown on the drawings, as specified, or as staked in the field. Minimum depth of pipeline shall be as shown in the construction details or drawings. Slopes shall be uniform and shall conform to the drawings. Earthfill shall be constructed to not less than design elevations and grades.

**Above Ground Pipe**

Installation of above ground pipe including anchoring shall be done as detailed in the construction package and drawings.

**Pipe Placed in Trenches**

For trench grades greater than 5%, waterbars shall be constructed as shown in the construction drawings.

The bottom width of the pipe trench shall be sufficient to provide clearance on both sides of the pipe at all locations including the joints. For trenches deeper than 2 feet, minimum trench width shall be 6 inches or twice the pipe diameter, whichever is greater.

The bottom of the pipe trench shall be free of rocks, clods, and other obstructions. If uniform support cannot be obtained because of rocks, dense or wet soils, or when trenches are excavated in rock or coarse gravelly materials they shall be over-excavated to a minimum of 4 inches and backfilled with 4 inches of sand or other fine soil material before the pipe is placed.

Pipe shall be carefully placed to prevent damage. Sharp bends in the pipe to conform to abrupt changes in grade or alignment shall be made using angle fittings rather than bending the pipe. Manufacturer’s recommendation for joint defection and pipe bending radius shall be followed.

Flexible plastic pipe shall be placed in a "snake-like" position in the trench before backfilling. Pipe shall be near the same temperature as the adjacent trench at the time of backfill.

When personnel enter trenches or other excavations, safety requirements of the Occupational Safety and Health Administration (OSHA) Safety and Health Standards, Part 1926, Safety and Health Regulations for Construction, Subpart P, Excavations, shall be followed.

**Plow-in Placed Pipe**

Flexible plastic pipelines may be placed by plow-in equipment if soils are suitable and rocks and boulders will not damage the pipe.

Temperature of the pipe during placement and connection with fittings shall be between 40 and 85 degrees F.

Minimum radius of the pipe placing shoe shall be:

2 inch pipe – 48 inches

1½ inch pipe – 40 inches

1¼ inch pipe – 36 inches

1 inch pipe – 24 inches

Throat and shoe assembly shall be designed and operated so no scuffing of the pipe occurs.

Under rocky conditions where rocks can damage the pipe, one or more preliminary passes with a ripper shall be completed to eliminate obstructions prior to installing the pipeline.

**Backfilling**

All backfilling shall be completed before the line is placed in service. Prior to backfilling, the trench shall be dewatered.

Initial backfill for trenches constructed by backhoe or trenching machines shall consist of a 4-inch layer of selected material which is free of rocks or other sharp-edged material, vegetation, frozen clods, or ice chunks. If adequate selected material cannot be obtained from the excavated material, it shall be imported. Deformation or displacement of the pipe must not occur during backfilling.

Except at road crossings and other critical areas as shown on the drawings, stock water pipeline backfill need not be compacted. The final fill shall be mounded over the top of trench. Provisions shall be made for filling settled areas along the pipe trench which occur after the original backfill operation is complete.

Plastic pipelines installed by the plow-in method require surface compaction and shaping in addition to the normal plow-in operations.

1. ***MEASUREMENT***

The amount of pipeline completed as specified will be determined by measuring the length, in feet, of each method of installation, size and kind of pipe installed.

1. ***ITEMS OF CONSTRUCTION DETAIL***