



State of Utah

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Department of Administrative Services

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Division of Facilities Construction and Management

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ADDENDUM #1

Date: February 27, 2008

To: Contractors

From: Jeff Reddoor, Project Manager, DFCM

Reference: Water Line Replacement – Fremont Indian State Park
Division of Parks and Recreation – Sevier County, Utah
DFCM Project No. 07302510

Subject: **Addendum No. 1**

Pages	<u>Addendum</u>	32	pages
	Total	32	pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

- 1.1 **SCHEDULE CHANGES** – There are no changes to the project schedule.
- 1.2 **GENERAL** – Schedule of Items and changes to drawings.

**STATE OF UTAH - DFCM
 FREMONT WATERLINE REPLACEMENT PROJECT #P08FI00953
 DFCM PROJECT NO. 07302510**

SCHEDULE OF ITEMS

ITEM	SEC #	WORK OR MATERIAL	UNIT	QTY	UNIT PRICE	AMOUNT
1	8	MOBILIZATION	L.S.	1	\$	\$
2	47	2- INCH HDPE PIPE, DR 7	L.F.	4,100	\$	\$
3	47	2- INCH HDPE PIPE, DR 9	L.F.	5,900	\$	\$
4	72	1-INCH COMBINATION AIR RELEASE VALVE	EACH	4	\$	\$
5	72	1-INCH DRAIN VALVE	EACH	7	\$	\$
6	72	1-INCH GATE VALVE	EACH	1	\$	\$
7	75	GABION STRUCTURE	L.S.	1	\$	\$
8	93	IMPROVED ROAD CROSSING	L.F.	100	\$	\$
9	96	CLEANUP	L.S.	1	\$	\$

ADDENDUM NO. 1

STATE OF UTAH - DIVISION OF PARKS AND RECREATION

FREMONT INDIAN MUSEUM

NAME: FREMONT WATERLINE REPLACEMENT PROJECT

PROJECT #P08FI00953 - DFCM #07302510

February 28, 2008

TO ALL PROSPECTIVE BIDDERS, CONTRACTORS, OR OTHER INTERESTED PERSONS:

The following changes have been made to the bid documents:

1. Sheet 3, of the drawings, has been changed to make both Vacuum Valve details match. The vent pipe has been lengthened and inserted a 90 to match the lower detail.
2. Instructions have been made to include a #14 mesh screen inside the vent cap (Air Vac Detail).
3. The note to the Typical 1 detail, that the outlet shall be covered with a #4 screen to be 12 to 24 inches above the original ground surface.
4. Sheet 4, of the drawings, has been modified on the bridge crossing detail to show one typical drain 's outlet emptying to the inside corner of the bridge to prevent the drain pipe from being submerged during periods of high water runoff. It is also covered with a #4 screen at the outlet. The pipeline will be drained during the 'off season' and freezing will not be an issue.
5. In Technical Specification 47, on Item 'D' the following was added: "all HDPE pipe shall be NSF approved".
6. In the same specification, under 'Alignment and Grade', we clarified that when the water line crosses the sewer line they must be separated by 10 feet horizontally, and the water line will always be 18 inches above the sewer line at the crossings.
7. In Technical Specification 47, on page 47-7, we added item #10, which reads: "All test water and chlorine shall be extracted and contained. Under no circumstances shall the chlorine mixture be disposed of on site or allowed to enter Clear Creek."
8. In Specification 93 - the bid item for 'Stream Crossing' has been removed. Revised Specification is included in this addendum.

9. In Specification 96 – Seed Mixture requirements have been added.
10. On ALL ITEMS measurement and payment schedules have been changed to reflect measurement and payment will be made at the contract Lump Sump Price.
11. Schedule of Items – ‘Total Bid’ has been removed from the sheet.

The modified drawing sheets, specification pages, and Schedule of Items are enclosed.

YOU ARE ADVISED that the final contract will be supplemented by the fore-going addendum and that proper acknowledgment will be required on the bid.

BY ORDER OF: Jeff Reddoor, Project Manager

CONSTRUCTION SPECIFICATION

8. MOBILIZATION

1. **SCOPE**

The work shall consist of mobilization of the Contractor's forces and equipment necessary for performing the work required under the contract.

It shall include the purchase of contract bonds, insurances, transportation of the personnel, equipment, and operating supplies to the site; establishing of office, buildings, construction signing in accordance with the manual on "Uniform Traffic Control Device", and other necessary facilities at the site; and other preparatory work at the site.

It shall not include mobilization for any specific time of work for which payment for mobilization is provided elsewhere in the contract.

This specification covers mobilization of work required by the contract at the time of award. If additional mobilization costs are incurred during performance of the contract as a result of change or added items of work for which the Contractor is entitled to an adjustment in contract price, compensation for such costs will be included in the price adjustment for the items of work changed or added.

2. **PAYMENT**

Payment will be made as the work proceeds, after presentation of invoices by the contractor shown his own mobilizations costs and evidence of the charges of suppliers, subcontractors, and others for mobilization work performed by them. If the total of such payments is less than the contract lump sum for mobilization, the unpaid balance will be included in the final contract payment. Total payment will be the lump sum contract price for mobilization, regardless of actual cost to the Contractor.

Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated into the project, or the purchase costs of operating supplies.

Payment of the lump sum contract price for mobilization will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to completion of the work.

Compensation for any item of work described in the contract but not listed on the bid schedule will be included in the payment for the item or work to which it is made

subsidiary. Such items and the items to which they are made subsidiary in Section 3 of this specification.

3. **ITEMS OF WORK AND CONSTRUCTION DETAILS**

Items of work to be performed in conformance with this specification and the construction details are:

a. **Item 1, Mobilization**

1. This work shall consist of the contract bonds, traffic control, construction signing, and mobilization of the Contractor ' s forces and equipment, as defined in Section 1, required for performing the work under this contract.
2. Payment will be made at the lump sum contract price and will constitute full compensation for all bonds, insurance, mobilization, and all other items necessary and incidental to completion of this item.

CONSTRUCTION SPECIFICATION

47. WATER PIPELINE - PVC, PE, & HDPE

1. **SCOPE**

The work shall consist of furnishing and installing the underground pressure pipeline, all fittings and appurtenances, necessary for completion of the pipeline in accordance with the drawings and these specifications.

2. **MATERIAL SPECIFICATIONS**

a. **POLYVINYL-CHLORIDE (PVC) PIPE**

All PVC pipe materials shall conform to the requirements of ASTM D 1784, cell classification 12454 B compound. Only clean virgin material shall be used. Reground material will not be allowed.

All PVC pipe less than 12-inch diameter shall be series pressure rated pipe meeting the requirements of ASTM D 2241. The pipe shall have a pressure rating as noted in Section 11 of these specifications.

All PVC pipe over 12-inch diameter, shall meet the requirements of AWWA-C905. The pipe shall have a pressure rating as noted in Section 11 of these specifications.

All pipe shall have rubber gasket joints conforming to the requirements of ASTM D 3139. Ample soap shall be supplied minimum of 6 gallon per truck. Pipe lengths shall not exceed 20 feet.

b. **POLYETHYLENE (PE PIPE)**

All material shall be NSF approved. All pipe materials shall conform to the requirements of ASTM D 1248, type III, Class C-Black (weather-resistant).

The pipe shall conform to the requirements of ASTM D 2239 and have a pressure rating of 200 psi.

c. **GASKETS**

All pipe shall have rubber gasket joints. Gaskets shall conform to the requirements of ASTM F477. Ample gaskets shall be supplied by manufacturer.

d. **HIGH DENSITY POLYETHYLENE (HDPE) PIPE**

All material shall be NSF approved. Pipe shall be manufactured from a PE 3408 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material will meet the specifications of ASTM D3350-99 with a cell classification of PE:345464C.

Pipe shall have a manufacturing standard of ASTM F714. Pipe shall be DR 7 & 9 unless otherwise specified on the plans. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material.

Butt Fusion Fittings - fittings shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99. Butt Fusion Fittings shall have a manufacturing standard of ASTM D3261. Molded and fabricated fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans. Fabricated fittings are to be manufactured using a Data Logger. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records.

Electrofusion Fittings - fittings shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99. Electrofusion fittings shall have a manufacturing standard of ASTM F-1055. Fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans.

Flanged and Mechanical Joint Adapters - Flanged and Mechanical Joint Adapters shall be PE 3408 HDPE, Cell Classification 345464C as determined by ASTM D-3350. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D-3261. Fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans.

3. **ALIGNMENT AND GRADE**

The water mains shall be laid and maintained to lines and grades established by the plans and specifications or as directed by the Engineer, with fittings, valves, hydrants and other hydraulic equipment at the required locations unless otherwise approved by the Engineer. Valve-operating stems shall be oriented in a manner to allow proper operation.

Prior to excavation, investigation shall be made to the extent necessary to determine the location of existing underground structures and conflicts. Care should be exercised by the Contractor during excavation to avoid damage to existing structures.

When obstructions that are not shown on the plans are encountered during the progress of the work and interfere so that an alteration of the plans is required, the Contractor shall notify the Engineer immediately so that the Engineer can alter the plans or order a deviation in line and grade or arrange for removal, relocation, or reconstruction of the obstructions.

When crossing existing pipelines or other structures, alignment and grade shall be adjusted as necessary, with the approval of the Engineer, to provide clearance as required by federal, state, or local regulations or as deemed necessary by the Engineer to prevent future damage or contamination of either structure.

Utah Department of Health requires that the horizontal distance between pressure water mains and sanitary sewer lines shall be at least ten feet. Where a water main and a sewer

line must cross, the water main shall be at least 18 inches above the sewer line. Separation distances shall be measured edge-to-edge (i.e. from the nearest edges of the facilities). When this separation is not possible, both mains should be constructed of mechanical-joint cast iron pipe, or equivalent, for a distance of at least ten (10) feet on either side of the point of crossing.

4. **LOCATION OF UTILITY LINES**

Sewer mains, water mains, gas mains, service connections and other utilities that are shown on plans are according to plats received from owners of utilities and or from field measurements. The accuracy of the locations shown is not guaranteed. The Contractor shall determine the location of existing service connections and take the necessary steps to avoid damage to them. The Owner and the Engineer assume no liability for utility line which may be damaged as a result of operations.

5. **RESTORATION OF EXISTING FACILITIES**

Any existing facilities which fall in the line of the work such as curbs, gutters, sidewalks, driveways, street pavement, bituminous or concrete, shall be removed and restored in kind by the Contractor unless otherwise directed, in accordance with specifications contained herein governing the various type of services involved.

a. **Cutting and Removing**

All asphalt pavements shall be cut vertically with an asphalt cutter prior to excavation. Excavation shall be done in such a way that existing pavement outside the cutting line will not be damaged. Pavement outside the trench line limits which is damaged shall be replaced by the Contractor without cost to the Owner. All waste materials shall be promptly removed from the site of the work.

b. **Restoration of the Existing Pavement**

The Contractor shall replace any pavement removed or damaged with the type and depth or pavement as shown on the drawings, including gravel base material. The Contractor shall provide temporary gravel surfaces in the good condition within one day after backfill over the pipe has been placed and shall complete repairs within thirty days after. The gravel shall be placed deep enough to provide a minimum of six (6) inches above the bottom of the bituminous or concrete surface. The temporary gravel surface shall be maintained until the final surface is placed by blading, sprinkling, rolling, adding gravel, etc., to maintain a safe uniform surface satisfactory to the Engineer.

6. **PIPE INSTALLATION**

Proper implements, tools, and facilities shall be provided and used for the safe and convenient performance of the work. All pipe, fittings, valves, and hydrants shall be lowered carefully into the trench in such a manner as to prevent damage to water-main

materials and protective coatings and linings. The trench shall be dewatered prior to the installation of the pipe.

a. **Examination of Material**

All pipe fittings, valves, hydrants, and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the materials.

b. **Pipe Cleanliness**

Foreign material shall be prevented from entering the pipe while it is being placed in the trench. During laying operations, no debris, tools, clothing, or other materials shall be placed in the pipe.

c. **Pipe Placement**

As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.

d. **Pipe Plugs**

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the Engineer. When practical, the plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe floatation should the trench fill with water.

7. **JOINTS AND APPURTENANCES**

a. **Joints**

Pipe joints shall conform to the details shown on the drawings and to the requirements for the type of pipe being installed. Pipe joints shall be sound and watertight at the pressure specified. The joints shall be made in such a manner that the inside of the line is left free of any obstructions that reduce the capacity of the line. All joints shall be made according to the manufacturer's recommendations.

b. **Fittings**

Where fittings made of steel or other metals subject to corrosion are used, they shall be protected by wrapping or painting. All surfaces to be protected shall be thoroughly cleaned and then coated with primer compatible with the method of protection used.

c. **HDPE Fusion**

Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. All field welds shall be made with fusion equipment equipped with a Data Logger. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the Quality Control records.

Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be 1/4 inch larger than the size of the outlet branch being fused.

Mechanical joining will be used where the butt fusion method can not be used. Mechanical joining will be accomplished by either using a HDPE flange adapter with a Ductile Iron back-up ring or HDPE Mechanical Joint adapter with a Ductile Iron back-up ring.

Socket fusion, hot gas fusion, threading, solvents, and epoxies will not be used to join HDPE pipe.

8. **PRESSURE TESTING**

When cemented or chemically welded joints are used, the assembled pipelines shall be allowed to lie in the trench for approximately 12 hours before flushing and testing, in order to insure complete setting of the joints.

The line may be tested in sections. The pipeline shall be filled with water taking care to bleed air and prevent water hammer when the line is full. The valves shall be closed to slowly build up pressure.

The conduit shall be tested at the specified test pressure for a period of at least two hours. Any leaks shall be repaired and the conduit shall be retested. The procedure shall be repeated until it is watertight. The pipe joints shall show no leakage.

9. **DISINFECTING WATER SUPPLY LINES**

The water supply lines shall be disinfected before being placed in service. The water lines shall be disinfected in accordance with the provisions of the Standard Procedure for Disinfecting Water Mains, AWWA C-601-68, of the American Water Works Association, the disinfecting water shall contain a minimum of 50 ppm of Chlorine with a 25 ppm Residual after 24 hours.

Care shall be taken to see that the disinfecting solution is flushed thoroughly from the water supply lines, and the water mains, and that the disinfecting solution is kept from entering water service lines. Disinfecting solutions must be kept from entering Clear Creek.

The entire cost of disinfecting the water lines and of furnishing all materials and equipment and accessories required for performing the disinfecting shall be included in the prices bid in the schedule for furnishing and laying various types and sizes of water pipe.

The following table gives the amount of calcium hypochlorite (70% available chlorine) to be used for each 20-foot length of pipe to give a concentration of 50 ppm of available chlorine. Powder shall be in solution before placing in the pipe.

10. **MEASUREMENT AND PAYMENT**

Measurement and payment will be by the laid length of pipe actually installed. Payment will be made by the unit price for the size and class of pipe shown on the bid schedule. Such payment will constitute full compensation for all excavation, pipe, installation, bedding, backfill, and all other items necessary for the completion of the work.

11. **ITEMS OF WORK AND CONSTRUCTION DETAILS**

Items of work to be performed in accordance with this specification and construction details are:

- a. Item 2, 2-inch HDPE Pipe, DR 7
Item 3, 2-inch HDPE Pipe, DR 9
 - 1. These items shall consist of furnishing, transporting, excavation, installation, and backfilling of the pipeline, including all necessary appurtenances, ties, and fittings as shown on the plans or as directed by the Engineer.
 - 2. The dimension ratio shall be 7 & 9, as shown on the plans.
 - 3. The coupling shall be brass. All other hardware and bolts shall be stainless steel.
 - 4. The pipeline shall be installed to the lines and grades shown on the plans. Compaction of backfill in all trenches shall be according to Construction

Specification No. 9, "Excavation and Backfill for Pipeline".

5. Bedding of the pipeline will be required. Bedding shall extend to the haunch of the pipe as shown on the drawings and shall consist of material conforming to the AASHTO Standard Classification A-3 as defined in designation M145.
6. The minimum cover depth is shown on the plans or as directed by the Engineer. Backfill shall be native material from the trench excavation.
7. Concrete thrust blocks shall be provided as shown on the drawings. The blocks shall be in the minimum size as shown on the drawings. Concrete shall have a minimum 28 days compressive strength of 2000 psi. Cement shall be Type II. Concrete thrust blocks shall be such that fitting joints are accessible for repair. Contractor shall supply and install the concrete thrust blocks.
8. Location of the valves shall be as shown on the drawings.
9. Disinfection of the water line will be required. The Contractor shall supply the necessary source of chlorine required to disinfect the water lines, and shall provide the Owner with the necessary chlorine residual test results.
10. All test water and chlorine shall be extracted and contained. Under no circumstances shall the chlorine mixture be disposed of on site or allowed to enter Clear Creek.
11. Pressure testing will be required. The test pressure shall be 200 psi.
12. The Contractor shall take care to protect the physical integrity of any existing buried pipelines and utilities.
13. Tracer wire is required along all water mains. Tracer wire will consist of Baron Wire, #E61390, 14 AWG, (UL), Type UF, 600 V, or approved equal. The wire will be placed at the bottom of the trench adjacent to the pipe line. Exit points will be at tracer wire boxes and valve boxes. The cost of furnishing and installing tracer wire will be compensated in this bid item.
14. Measurement and Payment will be made at the contract Lump Sump Price. The payment will constitute full compensation for all labor, materials, equipment, transportation, excavation, compacted fill, drain rock, and all other items necessary or incidental to the completion of the work.

CONSTRUCTION SPECIFICATION

72. HYDRAULIC EQUIPMENT

1. **SCOPE**

This specification designates the requirements for furnishing and installing of all appurtenant hydraulic equipment necessary for operation of the completed water pipeline. Work shall include but not be limited to valves, meters, gauges and etc.

2. **VALVES - GENERAL**

All valves shall be installed as shown on the plans. All valves shall be Mechanical Joint, unless otherwise shown.

a. **Bolts and Nuts**

Nuts and bolts used for bolting flanged-end valves shall be standard hexagonal head machine bolts and hexagonal nuts conforming to ASTM a 307, Grade B. All bolt threads shall be lubricated with graphite and oil prior to installation.

b. **Gaskets**

Gaskets for flanged-end valves shall be full face 1 1/16-inch "Cranite" with bolt holes prepunched, Johns-Manville No. 60, or equal.

c. **Exterior Coating**

All above ground valves shall be field painted the same as the adjacent piping as described in the paint coatings specification: universal primer with epoxy paint finish.

All below ground valves shall be coated at the place of manufacture as described in the paint coatings specification: universal primer with coal-tar epoxy finish coat, or equal. The coating shall be applied after the surface has been sand-blasted to commercial standard per SSPC-SP-6. The coating manufacturer's recommendations shall be followed.

d. **Interior Coating**

Interior surfaces shall be coated at the place of manufacture. Surfaces shall be sandblasted in accordance with SSPC-SP-5 (white metal blast cleaning). Two coats of epoxy resin (Brand name shall be from the "approved list" of the Utah Department

of Environmental Quality) shall be applied to a minimum dry-film thickness of 8 mils. The paint manufacturer's application recommendations, including minimum and maximum drying time between the required two coats, shall be followed. Special care must be taken to remove all contaminants adjacent to the seats in order to obtain a bond.

The following interior areas of valves shall not be coated: seating areas and bronze pieces.

3. **BUTTERFLY VALVES (Class 150)**

Butterfly valves shall be tight closing, rubber seated, conforming to AWWA C 504 and as herein described. Valves shall be Class 150B with a maximum working differential pressure across the disc of 150 psi and shall be manufactured by BIF Industries, Henry Pratt, Dresser, or equal.

a. **Valve Bodies**

Valves shall be flanged body, unless otherwise indicated on the plans or specified elsewhere. Flanged ends shall conform in dimension and drilling to ANSI B16.1, Class 125 cast-iron flanges.

b. **Valve Shafts**

Valve shafts may consist of straight through one-piece shafts or may be of the "stub shaft" type. Shaft material shall be ASTM A 276, Type 304 or 316 stainless steel; or carbon steel with Type 304 or 136 stainless-steel journals and static seals to isolate the interior of the disc and the shaft from water.

c. **Valve Discs**

Valve discs shall be cast iron conforming to ASTM A 48, Class 40; ductile iron conforming to ASTM A 536, Grade 64-45-12; or alloy cast iron, conforming to ASTM A 436, Type 1. The valve disc shall rotate 90° from fully open to the tightly shut position.

d. **Valve Seats**

Valve seat retention and fastening devices for rubber seats shall be either ASTM A 276, Type 304 or 316 stainless steel; or bronze containing not more than 7% zinc nor more than 2% aluminum. Where the rubber seat is applied to the disc, it shall be vulcanized to stainless steel seat-retaining ring which is firmly clamped to the disc by stainless-steel nylon locking screw fasteners.

e. **Valve Operators**

Valve operators shall be of the manual type. The operators shall be a worm gear, rack and pinion, or traveling nut type with adjustable stops to limit disc travel and shall be totally enclosed and self-locking. The number of turns to rotate the disc shall vary with the size, but not be less than 2 turns per inch diameter valve size through 8 inches nor less than 30 turns on a 10-inch and larger valves. The operator shall be of the size required for opening and closing the valve in accordance with Table 1, Class 150B per AWWA C509. All valve operators shall be designed for permanent installation and operation and shall be fully gasketed, sealed, and factory packed with grease.

Operators for valves to be buried below ground level shall be equipped with standard AWWA 2-inch-square operating nuts.

Operators for valves to be located above ground level or in vaults below ground level shall have a disc position indicator and a handwheel or crank.

4. **GATE VALVES**

All gate valves shall be nonrising stem, counter clockwise opening. Valves shall have the same type ends as the pipe or fitting on which they are installed. Exposed valves are to have handwheel operators, and buried valves are to have 2-inch-square cast-iron operating nuts and valve boxes. Valves indicating manufacture and working pressure. The minimum designated water working pressure shall be 200 psi.

Three-Inch and Smaller Gate Valves

The body and all interior working parts shall be constructed of ASTM B 62 (85-5-5-5) bronze. Stem bronze shall not contain more than 2% aluminum nor more than 7% zinc and shall have a minimum tensile strength of 60,000 psi, minimum yield strength of 30,000 psi, and a minimum of 10% elongation in 2 inches. Handwheels shall be brass. Valves shall be Crane 438, Jones 372, or equal.

Four-inch thru Twelve-inch Gate Valves

Valves shall be of the iron body, non-rising bronze stem, resilient seated wedge type conforming to all sections of the latest revision of AWWA C-509. Bronze for all internal working parts, including stems, shall not contain more than 2% aluminum nor more than 7% zinc. Bronze shall be ASTM B 62 (85-5-5) bronze, except that stem bronze shall have a minimum tensile strength of 60,000 psi, and a minimum of 10% elongation in 2 inches. Valves shall be equipped with operating nuts, unless otherwise indicated. Valves shall be Mueller Series A-2380, or equal.

a. **Valve Bodies**

Valve body, bonnet, stuffing box and disc castings shall be manufactured of ASTM A-126 Class B Grey Iron.

b. **Valve Discs**

The disc shall have an integrally cast ASTM B-62 bronze stem nut to prevent twisting and angling of the stem. Designs with loose stem nuts are not acceptable. The disc casting shall be open on one side so as to form no cavities or receptacles for accumulation of solids resulting in possible stem binding. Valves shall provide full opening flow way of equal diameter of the nominal size of connecting pipe.

c. **Valve Stems**

The structural design of the valve stem shall be such that if excessive torque is applies in the closing direction with the disc seated, failure of the pressure retaining parts shall not occur. Stem failure under such conditions shall occur externally enabling the stem to be safely turned in the opening direction by use of a pipe wrench or similar tool.

Valves shall be provided with two o-ring stem seals, one located below the stem thrust collar and bearing surfaces and one above. The area between the o-rings shall be filled with a lubricant to provide lubrication of the thrust collar, bearing surfaces and o-rings.

d. **Valve Sealing**

The sealing mechanism shall allow zero leakage at working water pressures through 200 psi with flow in either direction. The sealing mechanism shall consist of a separately molded replaceable rubber disc seat ring internally reinforced by a concentric steel ring. The seat ring shall be secured to the disc with self-locking stainless steel screws.

5. **MISCELLANEOUS VALVES**

a. **Hose Bibbs**

Hose Bibbs shall be bronze, size 1 inch, and shall be Crane Figure 58 or equal.

b. **Carbon Steel Ball Valves (1 inch and smaller)**

Valves shall be made with carbon steel bodies, ASTM A 216, Grade WCB. Seats shall be Teflon. Valves shall be Crane Figure 940-TF, Dyna-Quip Series VWE, or

equal. Valves shall be furnished with lever operator.

6. **DIAPHRAGM-ACTUATED GLOBE VALVES**

Diaphragm-actuated globe valves shall be of the size shown on the plans. The valves shall be of the flow control, pressure sustaining, or pressure-reducing type as called for on the plans and described in the technical specifications of Section 11. Electrically controlled valves shall have solenoid-type pilots.

Valves shall be as manufactured by Clayton Valve Co. or equal.

Materials:

Main Valve Body and Cover:

Cast Iron, ASTM A 48.

Main Valve Trim:

Brass Q Q-B-616
Bronze ASTM B61

Pilot Control System:

Cast Bronze, ASTM B 62 with Type 303 Stainless Steel
trim Flanges:

Cast Iron, ASTM A 48 in accordance with ANSI B16.1,
Class 125 or 250 as shown on the plans.

Pressure-Reducing Pilots

The pilot control system shall include a fixed orifice, and all major components of this system shall be manufactured by the same company that manufactures the main valve. The pressure-reducing pilot control shall be adjustable over a range of 30 to 300 psi. All elastomers shall be Buna-N, and the main valve diaphragm shall be vulcanized at the stem hole to ensure against wicking of the product within the diaphragm which could result in diaphragm failure. The diaphragm shall not be used as a seating surface. All necessary repairs and/or modifications other than the replacement of the main valve body shall be possible without removing the main valve from the line. The valve shall be globe pattern.

7. **CORPORATION STOPS**

Corporation stops shall have IP threads on inlet and CTS compression outlet and shall be

Mueller H-15028 or equal.

8. **COMBINATION AIR RELEASE VALVES**

The air and vacuum valve shall be designed to allow large quantities of air to escape out the orifice during filling sequence and to close water tight when the liquid enters the valve. The air and air vacuum valve shall also permit large quantities of air to enter through the orifice when the pipeline is being drained to break the vacuum. The discharge orifice area shall be equal or greater than the inlet of the valve. The valve shall consist of a body, cover, baffle, float and seat.

The baffle will be designed to protect the float from direct contact of the rushing air and water to prevent the float from closing prematurely in the valve. The seat shall be fastened into the valve cover, without distortion, and shall be easily removed, if necessary.

The float shall be stainless steel and center guided through bushings for positive shut-off into the seat.

Valve exterior to be painted Red Lead TT-P86, Type IV, or equivalent, for high corrosion resistance.

All material of construction shall be certified in writing to conform to ASTM specifications as follows:

<u>Body, Cover and Baffle</u>	<u>Cast Iron</u>	<u>ASTM A 48 C1.30</u>
Float	Stainless Steel	ASTM A240
Seat	Buna - N	

The air vacuum valves shall be designed to withstand 200 psi operating pressure.

The combination air release valves shall be housed in a corrosion resistant chamber accessible with a removable corrosion resistant cover with 8-1/2 inch diameter holes. The housing shall be of sufficient size to permit servicing, removal, etc., of the valve.

9. **PRESSURE GAGES**

Pressure gages shall have a range of 0 to 200 psi, unless otherwise shown on the plans. Dial face shall be 4-1/2 inches in diameter. Gages shall have 2 inch NPT threaded inlets for mounting. Accuracy shall be within +1%. All internal wetted parts shall be Type 316 stainless steel. Dial, pointer, and all exposed metal parts shall be Type 304 or Type 316 stainless steel. Gages shall be Marshall Town "Ultragage," Sahcraft Model 1320, or equal.

10 **TURBINE TYPE WATER METERS**

Turbine type water meters shall meet requirements as specified in AWWA C701, latest revision.

a. **Registration Accuracy**

Meters furnished shall meet requirements for accuracy with water at a temperature less than 80° F.

Class I meters shall register not less than 98 percent and not more than 102 percent of the water that actually passes through it at any rate of flow within the normal test flow range specified.

Class II meters shall register not less than 98.5 percent and not more than 101.5 percent of the water that actually passes through it at any rate of flow within the normal test flow range specified.

b. **Register**

The register shall be hermetically sealed. Registers shall be of similar size and registration and shall have a standard ratio gear reduction to permit interchangeability. Registers shall be standard AWWA straight reading with totalizer, calibrated to read the units specified.

c. **Accessibility**

Meters shall be designed for easy removal of all interior parts without disturbing the connections to the pipeline. Meters shall be furnished with an appropriate blind flange such that flow through the meter case is possible with the measuring chambers of cages removed.

d. **Strainers and Straightening Vanes**

Unless specified otherwise, strainers and straightening vanes shall be required with all meter installations.

11. **MEASUREMENT AND PAYMENT**

Measurement and payment for hydraulic equipment shall be made at the contract unit price for each item listed on the bid schedule furnished and installed in accordance with these specifications. Payment shall constitute full compensation for furnishing, installing, and calibrating hydraulic equipment as shown on the drawings and as called for in these specifications.

Payment for any hydraulic equipment which is not separately listed on the bid schedule shall be included in that item in which it is required. Any unlisted equipment or appurtenances which are required for the completion of the work shall be included in the appropriated bid item.

12. **ITEMS OF WORK AND CONSTRUCTION DETAILS**

Items of work to be performed in conformance with this specification and construction details thereof are:

a. Item 4, 1-inch Combination Air Release Valve

1. This item shall consist of furnishing and transporting, excavating, installing and backfilling around the combination air release valves, including boxes, covers, insulation, and appurtenances necessary to complete the work as shown on the drawings.
2. The Contractor shall supply the items as shown on the plans. All hardware and bolts shall be stainless steel.
3. Measurement and Payment shall be at the contract Lump Sum Price. The payment will constitute full compensation for all labor, materials, equipment, transportation, excavation, compacted fill, drain rock, and all other items necessary or incidental to the completion of the concrete work.

b. Item 5, 1-inch Drain Valve

1. This item shall consist of furnishing, installing, and backfilling, including all valves and 1-inch pipe required to 'day-light' the drain, and necessary fittings as shown on the plans or as directed by the Engineer.
2. Measurement and Payment shall be at the contract Lump Sum Price. Such payment will constitute full compensation for all labor, materials, equipment, excavation, fill and all other items necessary or incidental to the completion of the work.

c. Item 6, 1-inch Gate Valve

1. This item shall consist of furnishing and transporting, excavating, installing and backfilling around the required gate valve, valve box and lid as shown on the drawings.
2. The Contractor shall submit information and data for all supplied valves

for approval by the Engineer.

3. The valve location shall be as shown on the drawings or as directed by the Engineer.
4. The valve box shall be plumbed straight over the valve nuts. The lid shall be placed at 8-inches above ground level. All bolts shall be stainless steel.
5. Measurement and payment shall be at the contract Lump Sum Price. Such payment will constitute full payment for all labor, materials, equipment, excavation, fill and all other items necessary or incidental to the completion of the work.

CONSTRUCTION SPECIFICATIONS

75. - GABION WIRE BASKET (PVC COATED)

1. **SCOPE**

The work will consist of furnishing and installing the gabion baskets filled with rock to the line and grades as shown on the drawings:

2. **MATERIALS**

Wire shall conform to the following requirements in accordance with QQW-461-G Class 3, Finish 5-Soft.

Wire for Fabric (diam.).....3.00 mm.
(.1181") ± 2 1/2%

Wire for selvages and corners (diam.).....3.90 mm.
(.1535") ± 2 1/2%

Wire for binding and connecting (diam.).....2.20 mm.
(.0866") ± 2 1/2%

Tensile Strength (P.S.I.).....60.000 - 75.000
Elongation (per cent) - not less than.....12%

Weight of Zinc Coating for all wire.....(oz./sq.ft.).80

Tensile strength and elongation shall be measured before fabrication of the netting.

Gabions shall be manufactured by Maccaferri Bekairt and PVC coated, or approved equal.

3. **CONSTRUCTION**

Gabions shall be so fabricated that the sides, ends, lid, base, and diaphragms can be readily assembled at the construction site into rectangular baskets of the specified sized. Where the length of the gabion exceeds on and one half time its horizontal width. Diaphragms shall be secured in the proper position on the base section such that no additional tying will be required at this juncture.

Gabions shall consist of uniform hexagonal wire mesh woven in a triple twist pattern with roping 8 x 10 (3 1/4" x 4 1/2" Approx.), fabrication in such a manner as to be non-raveling and designed to provide the required flexibility and strength.

The perimeter edges of the twisted wire mesh shall be woven around a reinforcing wire in a manner designed to prevent slippage and the edge of the mesh shall be securely selvaged. All corner shall be reinforced by heavier wire.

DIMENSIONS AND TOLERANCES

All dimensions are subject to tolerance limit of ± 5 per cent, except the length of the gabion which is subject to a tolerance of ± 3 percent.

4. CONSTRUCTION METHODS

Gabions shall be installed to lines and grades and as directed by the Engineer as follows:

- a. Unfold individual gabion. Flatten out bottom on a hard surface.
- b. Fold up ends, sides and diaphragms and tie together at top.
- c. Secure the designated binding wire at the top corner of the panels. Lace the edges with alternating single and double loops no more than 5- inches between them. This includes sides of diaphragms.
- d. Place gabion in place and stretch to take out any kinks and to bring to proper size.
- e. Filling will be with 4-inch to 6-inch rock. Any practical filling equipment which does not damage the gabion may be used. Some manual stone adjustment during the filling operation is required to prevent undue voids.
- f. Gabions, which are 1-foot 6-inches high, will be filled 1/2 full; then connecting, or bracing wires will be tied across the gabion before the filling is completed.
- g. Gabions 3-feet 0-inches high shall be filled as above but in three equal lifts with connecting or bracing wires between lifts as shown on the drawings.
- h. Connecting wires shall be placed at right angles across each cell between lifts, complete filling, close tops and lace around sides and along tops of diaphragms as in Step 3 above.

- I. Subsequent Gabions shall be placed adjacent to existing filled ones. They shall be securely laced and joined to existing Gabions by the lacing procedure in Step 3. The unfilled gabions shall then be stretched and filled as outlined above.
- j. Only materials specified shall be used in this project. No substitute wire or other materials will be allowed.
- k. The accepted quantities of this item shall be paid for at the contract unit price per each, such payment shall be considered complete compensation for all work and materials necessary for the completion of this item in place.
- l. All steel wire used in the gabions will be PVC coated steelwire diameter for binding the units together will not be less than (U.S. Gage No. 11), for corners and selvages (U.S. Gage No. 9).
- m. Wire Baskets will be cut and molded to conform to the lines and grades as shown on the drawings.

5. **WORK AND CONSTRUCTION DETAILS**

- a. **Item 7, Gabion Structure**
 - 1. This shall consist of furnishing and installing the gabion baskets filled with rock to the line and grades as shown on the drawings, or as directed by the Engineer.
 - 2. The gabion wire shall conform to the requirements in Section 2. All wire shall be PVC coated.
 - 3. Trevira Spunbond #1115, Mirafi 100X Geotextile Fabric will be placed as shown on the drawings. Fabric will be subsidiary to this item and not paid for separately.
 - 4. All gabions shall be installed in accordance with Sections 3 and 4 of this Specification.
 - 5. Measurement and Payment will be made at the contract Lump Sum Price. Such payment will constitute full compensation for all labor, materials, equipment, transportation, excavation, compacted fill, and all other items necessary or incidental to the completion of the work.

CONSTRUCTION SPECIFICATION

93. AUGURING, JACKING AND TUNNELING

1. **SCOPE**

This specification covers installation of underground pipeline using auguring, jacking or tunneling methods to avoid interference with and damage to existing surface facilities such as railroads, roads, streets and canals. Casing shall be required on all installations.

2. **INSTALLATION**

The casing pipe shall be installed utilizing one of the following methods.

a. **Auguring**

The Contractor shall auger the casing pipe in place true to the lines and grades established on the plans. The casing pipe shall follow the auger as closely as possible. Casing diameter and wall thickness, and carrier pipe support shall be as specified on the plans.

b. **Tunneling or Jacking**

Where specifically called for in the plans the Contractor shall tunnel or jack the carrier pipe into place. The casing pipe shall be installed such that the carrier pipe may be placed true to line and grade. The casing pipe shall be kept pushed as close to the working face as possible at all times. Casing diameter and wall thickness shall be as called for in the plans when the jacking method is used. The minimum diameter of casing using the tunneling method shall be 36-inches. The carrier pipe shall be supported using standard methods as called for in the plans or by encasement in sand as directed by the Engineer.

3. **RESPONSIBILITY FOR WORK**

All of the operations of the Contractor in constructing the portions of the work under canals, railroad tracks, streets, roads, etc. shall be subject to the approval of the appropriate canal, railroad, highway, or street department. The contractor shall enter any agreements with and shall furnish any and all indemnity and other bonds that may be required for the protection of the railroad, street, or highway against injury and interference with traffic and service by operations of the Contractor.

The Contractor shall provide services of watchman, flagmen, etc. as required by the interested Railroad Company, Street or Highway Department.

The Contractor shall secure permission from the interested irrigation company, railroad company, street or highway department before commencing on the portion of work within

the right of way and under the street, highway, tracks, or canal.

The Contractor shall be solely responsible for the safety and adequacy of his construction plans and methods and for any damage which may result from their failure. If the Contractor's methods appear to the Engineer to be inadequate to provide safety for workmen or traffic or to provide adequate quality of work, the Engineer will instruct the Contractor to increase his safety precautions and quality of work. These demands shall be met and will not relieve the Contractor of the responsibility of safety or quality of work described above.

4. **MEASUREMENT AND PAYMENT**

The quantity of casing shall be determined to the nearest foot measurement of the laid length along the invert of the pipe. Contractor shall be responsible for determining the appropriate size of casing required and incorporate the cost thereof in the cost per linear foot. Payment will constitute full compensation for furnishing, transporting, and installing the casing complete in place. Compensation for any work required by the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary.

5. **ITEMS OF WORK AND CONSTRUCTION DETAILS**

Items of work to be performed in accordance with this specification and the construction details are:

a. **Item 8, Improved Road Crossing**

1. This item shall consist of all materials, labor, excavation and backfill necessary for installation of two underground crossings for the size and type of casing as shown on the drawings.
2. Casing pipe will be required on the County Road #70 crossing and the State Road crossing.
3. Casing shall be steel and conform to requirements of ASTM A53. The casing shall be steel with a minimum thickness of .313 inch. The diameter of the casing shall be sufficient to carry the specified PVC pipe size.
4. Casing pipe shall be so constructed as to prevent leakage of any substances from the casing throughout its length except at ends. Casing shall be so installed as to prevent the formation of a waterway under the roadway, with an even bearing through its length, and shall slope to one end. Bored or jacked installations shall have a bored hole diameter essentially the same as the outside diameter of the pipe. If voids should develop, boring operations shall be stopped, if such sloughage would be detrimental to the highway.

Tunneling operations shall be conducted as approved by the Engineer. If voids are caused by the tunneling operations, they shall be filled by pressure grouting or by other approved methods which will provide proper support.

5. The ends of the casing are to be suitably protected against the entrance of foreign material, but are not to be tightly sealed. "PCI, Model A8G-1", casing seals and insulators are acceptable.
6. Pipe will be supported on the inside of the casing by sand or redwood strips. The pipe shall not rest upon the bells.
7. The road crossing shall be constructed in conformance with the drawings or as directed by the Engineer.
8. All applicable UDOT requirements will be required of the Contractor.
9. Measurement and Payment will be made at the contract Lump Sum Price. Such payment will constitute full compensation for furnishing and installing the casing as shown on the drawings, including all items necessary and incidental to the completion of the work.

CONSTRUCTION SPECIFICATION

96. CLEAN UP

1. **SCOPE**

The work shall consist of all work necessary, including seeding, to restore the construction zone to its original condition prior to the installation of the pipelines. It also includes meeting the requirements of all right-of-way agreements both private and public.

2. **MATERIALS**

All damaged improvements shall be replaced with new material.

3. **CONSTRUCTION REQUIREMENTS**

The construction requirement is that necessary to restore the entire area of disturbance. This includes restoration of contouring, ditches, washes, fences, reseeding, furrows, rock removal, leveling, construction debris, and etc.

4. **MEASUREMENT AND PAYMENT**

The work will not be measured. Payment will be made at the Contract lump sum price. Such payment will constitute full compensation for all seeding, labor, materials, equipment and all other items necessary and incidental to the completion of the work including restoration of all improvements and property condition in accordance with these specifications.

5. **ITEMS OF WORK AND CONSTRUCTION DETAILS:**

Items of work to be performed in conformance with this specification and the construction details are:

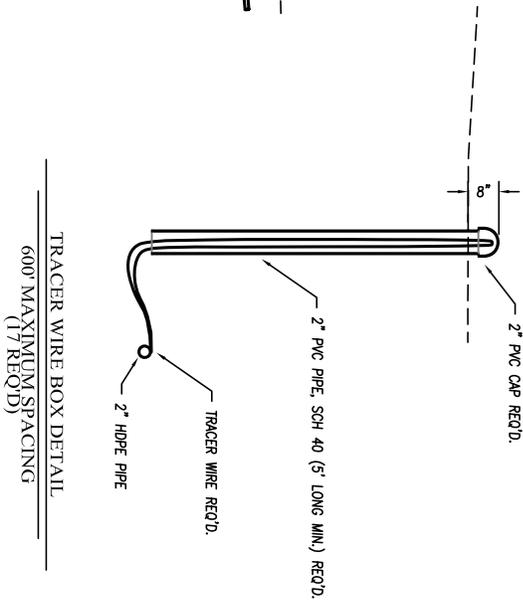
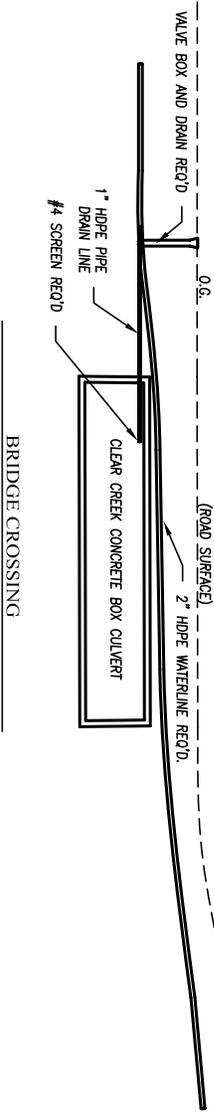
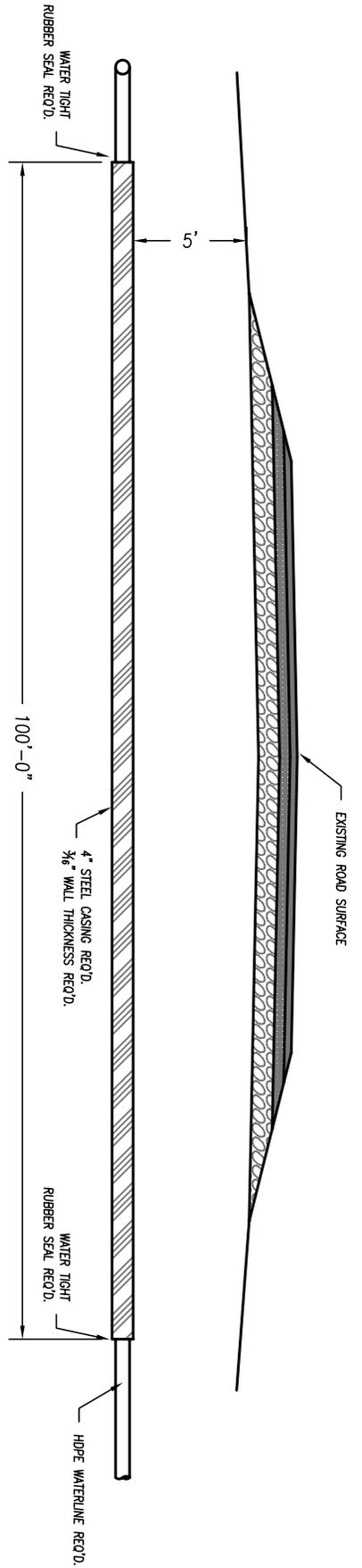
a. **Item 9, Clean Up**

1. This item shall consist of restoring the disturbed areas to its original condition.
2. The Contractor shall restore all trails and road crossings.
3. All disturbed areas outside the existing four-wheeler trail shall be reseeded with the following seed mixture:

Species	Lbs/Acre	% of Mix
Meadow Brome	2	11.11%
Mountain Brome	2	11.11%
Smooth Brome	2	11.11%
Orchardgrass	2	11.11%
Big Bluegrass	2	11.11%
Slender Wheatgrass	2	11.11%
White Clover	1	5.56%
Alfalfa	1	5.56%
Western Wheatgrass	2	11.11%
Thick Spike Wheatgrass	2	11.11%
Total lbs/acre	18	100.00%

All seed must be “WEED FREE” and from an approved seed supplier.

4. Measurement and Payment will be at the contract Lump Sum Price. Such payment will constitute full compensation for labor, materials, equipment, seeding and all items necessary and incidental to the completion of the work.



DESIGNED	HRT	6-07	CHECKED	CEJ	6-07
DRAWN	DMF	8-07	CHECKED	CEJ	6-07
SURVEYED	BHT	5-06	CHECKED	LMS	5-06
R.O.W.	LMS	5-06	CHECKED	CEJ	5-06

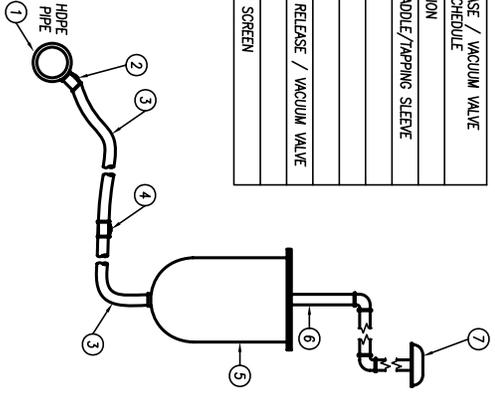
ENGINEERING INC.
 BOX 487, CASTLE DALE, UTAH 84513 (435) 381-2523
 FAX (435) 381-2522 EMAIL JT@etv.net

UTAH STATE DFCM
 FREMONT INDIAN STATE PARK
 WATERLINE REPLACEMENT PROJECT
 PROJECT No. P08FI00953 DFCM#07302510

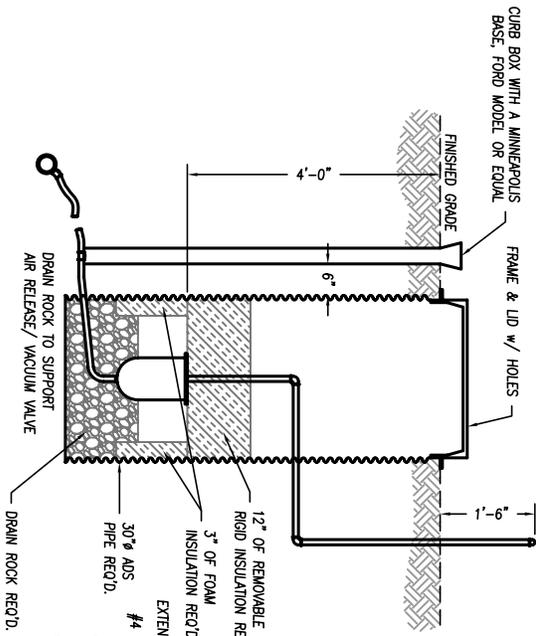
PIPELINE DETAIL
 DATE
 8/10/07
 SHEET NO.
 4

THIS DRAWING IS TO BE USED FOR THIS PROJECT AND THIS PROJECT ONLY UNLESS AUTHORIZED BY THE PROJECT ENGINEER AT JOHANSEN & TUTTLE ENGINEERS, INC.

ITEM	DESCRIPTION
1	1" COMBINATION AIR RELEASE / VACUUM VALVE
2	THREADED SERVICE SADDLE/TAPPING SLEEVE
3	1" HDPE CORP STOP
4	1" HDPE PIPE
5	1" VALVE
6	1" GALVANIZED PIPE
7	VENT w/ # 14 MESH SCREEN

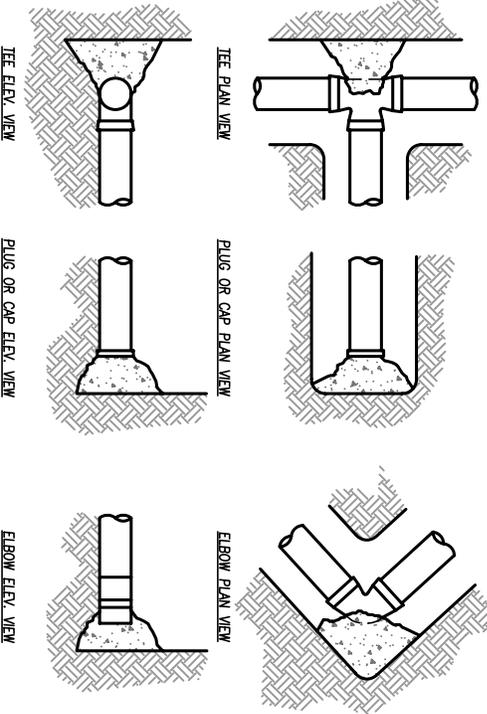


TYPICAL AIR RELEASE / VACUUM VALVE

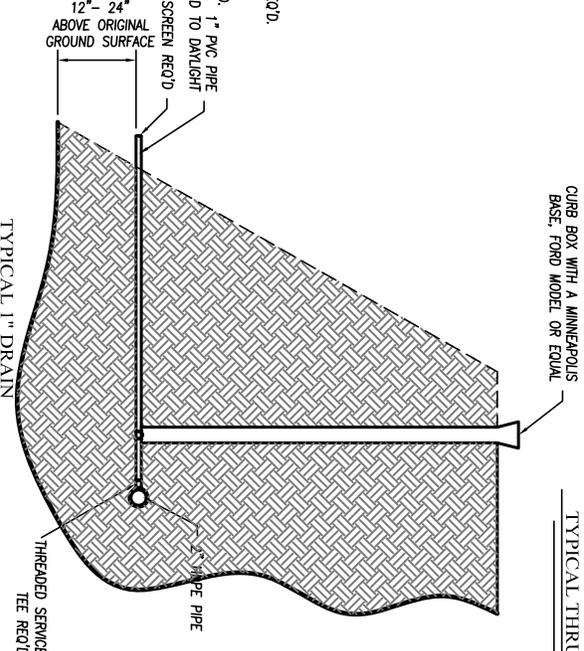


TYPICAL AIR RELEASE / VACUUM VALVE
LONGITUDINAL SECTION

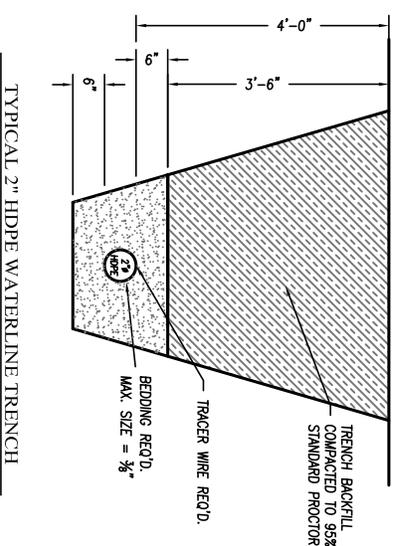
- THRUST BLOCK CONSTRUCTION NOTES:
1. ALL THRUST BLOCK FACES SHALL BE POURED AGAINST UNDISTURBED SOIL OR COMPACTED BACKFILL.
 2. CONCRETE SHALL BE READY MIX.
 3. IN UNSTABLE SOILS A SPECIAL DESIGN IS REQ'D.
 4. MIN. SIZE OF THRUST BLOCK SHALL BE 9 CU. FT.
 5. DO NOT POUR OVER THE TOP OF FITTINGS.
 6. ALL FITTINGS ARE TO BE COVERED WITH PLASTIC SHEETING BEFORE POURING CONCRETE THRUST BLOCKS.
 7. ALL BEND FITTINGS SHALL RECEIVE A THRUST BLOCK, (GREATER THAN 22.5)
 8. ALL THRUST BLOCKS SHALL BE ADEQUATELY CURED PRIOR TO PRESSURIZING THE PRELINE.



TYPICAL THRUST BLOCK DETAILS



TYPICAL 1" DRAIN



TYPICAL 2" HDPE WATERLINE TRENCH

REV	DESCRIPTION	BY	DATE	DESIGNED	HRT	6-07	CHECKED	CEJ	6-07
				DRAWN	DMF	8-07	CHECKED	CEJ	6-07
				SURVEYED	BHT	5-06	CHECKED	LMS	5-06
				R.O.W.	LMS	5-06	CHECKED	CEJ	5-06