Montana Fish, Wildlife & Parks

SPECIFICATIONS FOR WORK
TECHNICAL PROVISIONS

Incorporation of Montana Public Works Technical Specifications.

The Technical Specifications as found in Montana Public Works Standard Specifications (MPWSS), Sixth Edition, April 2010 and/or current Addendums or Revisions; are hereby incorporated by reference and made a part of this Contract:

Incorporation of Montana Fish, Wildlife & Parks Technical Specifications and Modifications to MPWSS Technical Specifications.

In addition to the MPWSS Technical Specifications are the following Montana Fish, Wildlife & Parks Technical Specifications (modifications to MPWSS Technical Specifications).

SECTION 01010 - Summary of Work
SECTION 01029 - Utilities Within Work Area
SECTION 01450 - Mobilization
SECTION 01750 - Final Cleanup
SECTION 02229 - Trenching, Backfilling, and Compacting
SECTION 02665 - Water Systems
SECTION 02802 - Water Troughs

SECTION 01010 - SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Owner and Contractor Responsibilities

B. Contractor use of site and premises.

C. Scope of Work

1.2 Owner and Contractor Responsibilities

A. Owners Responsibilities:

1. Responding to project questions
2. Final Acceptance and inspections.
3. Submittal and material review.

B. Contractors Responsibilities:

1. Quality control of work.
2. Completion of project as bid.
3. Layout of Exact Waterline path.
4. Coordination with FWP Personnel.
5. Locating Utilities, including missile cable.

1.3 CONTRACTOR USE OF SITE

A. Limit use of site to allow:

1. Coordinate with FWP to limit public usage in work areas as necessary.

1.3 SCOPE OF WORK

A. Project Objective: The project generally includes installation of approximately 4140 linear feet of 1-1/2" water line from an existing waterline to a location designated for the installation of a new water trough. The project will include curb stops, air valves, trough installation, and watering assemblies.

B. Scope of Work:

Work includes the following but is not limited to the general description contained herein:

1. Mobilization

- General: This bid item shall include the costs associated with mobilizing to the project site, insurance, bonding, permitting, and submittals.

- Work Included:
  - All labor, tools, equipment, materials, royalties, and incidentals needed to complete the work as specified;
  - Transport and set up all equipment, materials, and other items needed to complete the project;
  - All permits, coordination, and compliance inspections required for the work;
  - Insurance and bonding;
  - Prepare and provide submittals, construction schedule, and all other paperwork required by the contract documents prior to construction startup.

- Measurement: No measurement shall be taken for this item.

- Payment: Payment shall be by the price bid for the lump sum bid item listed in the proposal on the schedule shown in Section 01450.

2. Installing 1-1/2" Dia. HDPE Water Line at 6' Bury Depth

- General: This bid item shall include the costs associated with trenching, backfilling, compacting, and placing the water line to a minimum 6' bury depth. Other installation methods must be approved by the Project Engineer.
- Work Included:
  - Furnishing 1-1/2" HDPE water line with submittals for the product being used;
  - Trenching, backfilling, and compaction of water line;
  - Revegetation of all excavations wider than 12"
  - Installation of bedding material where required;

- Measurement: Measurement shall be taken by the linear foot of actual water line installed. Measurement will rounded to the nearest foot.

- Payment: Payment shall be by the price bid for the linear foot of water line installed as listed in the proposal.

3. Attach Water Line to existing curb stop

- General: This bid item shall include the costs associated with attaching the new water line to the existing curb stop.

- Work Included:
  - Excavation of existing line extending from existing curb stop;
  - All necessary fittings and materials to properly attach the new water line to the existing curb stop;
  - Removal of existing cap on in-place water line;
  - Existing Line at Curb Stop is 1-1/2" HDPE Water line;
  - Backfilling and compacting curb stop back to existing condition;
  - Submittals to ensure material meets requirements

- Measurement: No measurement shall be taken for this bid item.

- Payment: Payment shall be by the price bid per "Attach Water Line to Existing Curb Stop" as listed in the proposal.

4. Install "T" and Curb Stop

- General: This bid item shall include furnishing and installing "T" connection and a curb stop on a secondary line for future tank development.

- Work Included:
  - Includes installation of treated Wood post;
  - Includes Curb box and all materials as shown in the detail required for a curb stop valve;
  - All additional excavation required for installation of the curb stop and "T";
  - Includes the additional water line segments require to stem from installed "T" to the new curb stop;
  - Includes installing minimum 6' of line from curb stop for future installers to locate;
  - Contractor is to supply two curb stop "T" wrenches that fit the new curb stops.

- Measurement: Measurement shall be per curb stop with drain installed

- Payment: Payment shall be by the unit price bid for each curb stop with drain installed as listed in the proposal.

5. Install Curb Stop with Drain

- General: This bid item shall include furnishing and installing curb stop with drain at the water trough.

- Work Included:
  - All labor, tools, equipment, materials, and incidentals needed to complete the work as specified;
  - Includes Curb box and all materials shown in the details;
  - Includes minimum 1 cubic foot of gravel required for sump;
  - Includes installation of treated Wood post;
  - All additional excavation required for installation of the curb stop.
  - Installation before all watering troughs.
  - Contractor is to supply two curb stop "T" wrenches that fit the new curb stops.

- Measurement: Measurement shall be per curb stop with drain installed

- Payment: Payment shall be by the unit price bid for each curb stop with drain installed as listed in the proposal.

6. Install Watering Assembly

- General: This bid item shall include furnishing and installing watering assembly at the water trough.

- Work Included:
  - All labor, tools, equipment, materials, and incidentals needed to complete the work as specified;
  - All items shown in the detail on page 4 of 6 of the plans.
  - Installation of Roberts Manufacturing Company Bob Float Model No. R400-1
  - Submittals for all products used

- Measurement: Measurement shall be per watering assembly installed.

- Payment: Payment shall be by the price bid per watering assembly installed as listed in the proposal.

7. Install Air Vent

- General: This bid item shall include installation of an air and vacuum release valve.

- Work Included:
  - All labor, tools, equipment, materials, and incidentals needed to complete the work as specified;
  - Furnishing and installing a 1 cubic foot gravel sump;
  - Furnishing and installing the PVC air vent riser;
  - Treated wood post upstream of valve;
  - Furnishing and Installing the air and vacuum release valve;
  - Submittals for all products used;

- Measurement: Measurement shall be per air vent installed;

- Payment: Payment shall be by the unit price bid for installing each air vent.

8. Install 1500 Gallon Stock Tank with Cattle Guards

- General: This bid item shall include furnishing and installing the 1500 gallon stock tank and all associated cattle guards and gravel.

- Work Included:
  - All labor, tools, equipment, materials, and incidentals needed to complete the work as specified;
  - Furnishing and installing 1500-gallon stock tank;
  - Furnishing and installing the gravel retainers as specified in the drawings;
  - Furnishing and installing the cattle guards as specified in the drawings;
  - Installing the 24’ diameter x 8” thick gravel base;
  - Gravel must be 3” minus” Pit Run Gravel from the pit located on the Beckman WMA;
  - Submittals for all timbers, stock tanks, and furnished gravel used.

- Measurement: Measurement shall be per stock tank installed;
- Payment: Payment shall be by the unit price bid per stock tank as listed in the proposal.

C. CONTRACTS:

All work shall be done under one general contract provided by the Montana Department of Fish Wildlife and Parks Design and Construction.

D. PROPOSAL:

1. Proposal shall include all costs to complete the work as described in the plans and specifications, utility locates, required insurance costs and 1% MDOR Contractor Gross Receipts Tax of 1%.

END OF SECTION

SECTION 01029

UTILITIES WITHIN WORK AREAS

PART 1 GENERAL

3.1 CONTRACTOR RESPONSIBILITIES

3. Notification: The Contractor shall contact, in writing, all public and private utility companies that may have utilities that may be encountered during excavation including Malmstrom Air Force Base for the Missile Cable Location. The notification shall include the following information:

    3. The nature of the work the Contractor will be performing.

    2. The time, date, and location the Contractor will be performing work that may conflict with the utility.

    3. Requests for field location and identification of utilities.

END OF SECTION 01029

SECTION 01450

MOBILIZATION/DEMOBILIZATION

Added Section.

PART 1 GENERAL

1.1 DESCRIPTION

A. This item shall consist of the prepatory work and operations necessary performed by the Contractor for the movement of personnel, equipment, supplies, and incidentals to and from the work site. The work includes those actions necessary for obtaining necessary permits required for mobilization; for the establishment of all offices and facilities necessary to work on the project; for premiums on contract bonds; for insurance for the contract; and for other work on the various items on the project site. Mobilization costs for subcontracted work shall be considered to be included.

B. Contractor's cost for administration, bonding, insurance, and site documents shall be included in mobilization and shall not be paid as a separate item.

C. All equipment moved to the project sites shall be in good mechanical condition and free of fuel, oil, lubrication, or other fuel leaks. The Contractor shall immediately remove any equipment potentially or actually discharging environmentally damaging fluids.

D. All equipment moved to the project sites shall be thoroughly cleaned before it is brought to the sites to prevent the introduction of weed seeds. Equipment removed fro the sites may not be returned to the sites again until it is thoroughly cleaned again.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. There will be no measurement of this item.

4.2 PAYMENT

B. Partial payments for mobilization/demobilization will be made based on the lump sum bid price as follows:

- 25% of the amount bid for mobilization/demobilization when the Contractor has moved on-site and begun construction activities.
- 50% of the amount bid for mobilization/demobilization when 25% of the contract amount (exclusive mobilization/demobilization) has been completed.
- 75% of the amount bid for mobilization/demobilization when 50% of the contract amount (exclusive mobilization/demobilization) has been completed.
- 100% of the amount bid for mobilization/demobilization when 75% of the contract amount (exclusive mobilization/demobilization) has been completed.

END OF SECTION 01450

SECTION 01750

FINAL CLEANUP

Added Section.

PART 1 GENERAL

1.1 DESCRIPTION

A. This work consists of final cleanup of the project site prior to final acceptance.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 CONTRACTOR RESPONSIBILITES

The contractor shall be responsible for final clean up at the end of the project to a level satisfactory to the owner. All construction debris, no mater how small, shall be collected and removed from the site. All wheel ruts shall be filled in and be leveled to match the adjacent grade and material. Re-seeding or re-sodding, or other re-surfacing may be necessary to repair any construction related impacts or damage.

All survey markings, stakes, temporary paint marks, flagging and other devices shall be removed regardless of who installed them. All excess pavement, concrete, gravel, soil, or other construction materials not intended for permanent use shall be removed.

All final slopes shall be dressed manually to remove woody debris, accumulated trash and oversized material. Any new slope or topsoil surfaces shall be hand raked to provide a uniform appearance. The contractor shall dress all gravel, pavement and concrete edges to eliminate abrupt edges and provide a smooth transition. All construction related temporary sediment control devices shall be removed as soon as practical.

PART 4 MEASUREMENT AND PAYMENT

4.1 PAYMENT

Unless specifically noted otherwise, all final cleanup work shall be incidental to other work items in the contract and no separate payment shall be made.

END OF SECTION 01750

SECTION 02229

Trenching, Backfilling and Compacting

Added Section.

PART 1 GENERAL

1.1 SUMMARY

A. Section includes trenching, backfilling and compacting for the installation of utility and water lines

1.2 DEFINITIONS

A. Unclassified Excavation: Unclassified excavation shall consist of the material excavated and its placement regardless of its nature.

1.3 QUALITY ASSURANCE

A. Failure Criteria: not Limited to the following:
   1. Settlement of backfill below natural ground surface.
   2. Bury depth less than the minimum.
   3. Compaction (Where required) less than the minimum.

1.4 PROJECT/ SITE CONDITIONS

A. Environmental conditions: hand rake as necessary to remove excess material in areas inaccessible to construction equipment. Grade the backfill to produce a well-drained surface. Excess materials from the trench excavation shall be placed over the backfill in an inverted 'U' shape.

PART 2 PRODUCTS

2.1 MATERIALS:

A. General: Material excavated shall be unclassified. Backfill material shall be approved before use. Material from excavations shall be used, unless it contains ice or frozen earth, debris, earth with high moisture content, or other objectionable material. Material removed in clearing and grubbing shall not be used for backfilling.
B. Backfill: Shall conform to the general requirements for the soil materials above and shall not contain rock larger than 3 inches in diameter.
C. Bedding: Shall be native materials from the excavation that contain no rocks or cobbles greater than 2" in diameter.

D. Topsoil: Topsoil material shall be material which will sustain plant growth and includes sod, roots, or other vegetative matter which can be uniformly placed to a thickness of 3 inches without protruding from the finished grade.

PART 3 EXECUTION

3.1 PREPARATION:

A. Clearing: Where grass and sagebrush is encountered, the right of way shall be mowed to a maximum width of 20 feet to eliminate incorporation of trash in the backfilling process. Where rough or uneven terrain is encountered along the route, blading the route shall be limited to a maximum of 12 feet to allow the trencher to maintain an even depth and level trench bottom.

B. Utilities: before starting excavation, establish location and extent of overhead and underground utilities in the work area. Protect active utility services uncovered by excavation. Damage to any utilities shall be repaired or replaced at the contractor's expense. Repair to damaged utilities shall be started immediately unless otherwise authorized by the State of Montana.

3.2 INSTALLATION:

A. Trench Excavation: excavated trenches shall be a maximum of 24" in width unless written authorization from the State of Montana is obtained. The minimum bury depth shall be 6 feet.
B. Pipeline bedding: the pipe shall typically be bedded on the bottom of the trench. The state will determine if a separate bedding zone is required because of trench bottom conditions. If rock is encountered, 2 inches of approved bedding material shall be placed under the pipe. The minimum bury depth shall not change.
    a. There are no soil boring logs available for this project.
C. Pipeline Trench backfill: Prior to testing, the pipe may be center loaded with maximum of 12 inches of approved material. Two feet of pipe at the joints and connections shall be left uncovered. After testing and approval, the trench backfilling shall be completed, Excess backfill material from the trench excavation shall be placed over the trench in an inverted 'U' shape. All backfill shall be uncompacted except within roadways and other specified areas which shall be compacted to the same density as the original roadway. Compacted backfill shall be placed in lifts no greater than 6".

END OF SECTION 02229

SECTION 02665

WATER SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Furnishing and Installing Contractor-furnished labor and materials to complete a stock- water system and assemblies as shown on the drawings and specified herein.

1.2 REFERENCES

A. American Society for Testing and Materials:

ASTM A 53 REV	Pipe, Steel, Black and Hot-Dipped Zinc-Coated Welded
A-89 ASTM D	and Seamless Rigid Poly (Vinyl Chloride) (PVC)
1784-81	Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D 1785-89	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40,
ASTM D 2241-89	80, and 120. Poly (Vinyl Chloride) (PVC) Pressure-Rated
ASTM D 2466-89	Pipe (SOR Series)
ASTM D 2467-89	Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
ASTM D 2564-88	Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2672-89	Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic
ASTM D 2774-72	Pipe and Fittings Joints for IPS PVC Pipe Using Solvent
ASTM D 2855-83	Cement
ASTM F 656 REV	Underground Installation of Thermoplastic Pressure Piping (R 1983) Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings
A-89 ASTM	Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings
A865-97	Specification for Threaded Couplings, Steel, Black or Zinc- Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints
ASTM A53/A53M-99b	Specification for Pipe, Steel, Black and Hot-Dipped, Zinc- Coated, Welded and Seamless

1.3 SUBMITTALS

A. Manufacturer's Literature: Submit 1 copy of the manufacturer's descriptive data including the manufacturer's list number for valves to be used on this project.

B. Certificates of Conformance: Submit 1 copy of written certification from the supplier of the Contractor-furnished pipe to be used on this project that it conforms to the requirements of this specification section.

1.4 QUALITY ASSURANCE

A. Failure Criteria: Not limited to the following:
1. Evidence of leakage
2. Evidence of breakage of pipe
3. Malfunctioning valves
4. Blockage of piping
5. Contamination of water, rendering it not usable
6. Pressure drops

B. Labeling Requirements:
1. The factory labels shall remain fixed on "all" the materials, fittings, and devices. Any materials, fittings, or devices that are missing legible factory labels will be considered unidentifiable and not suitable for use on this project. The materials shall be removed from the site at the contractor's expense.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage: Store materials and equipment according to the manufacturer's instructions. Store plastic piping under cover out of direct sunlight.

PART 2: PRODUCTS

2.1 CONTRACTOR-FURNISHED MATERIALS

A. Pipe and Fittings: Pipe size, type and ratings shall be as shown on the Work Data Sheet and drawings or as specified. Unless specified, fittings shall be the same size as the adjoining pipeline except where reducers are required to enter a valve body or reduce to another pipe size. Fitting pressure ratings shall be equal to or greater than the rating for the adjoining pipeline size. Pipe and fittings shall be manufactured of material approved by NSF for potable water systems.

1. HDPE Pipe: HDPE SDR 13.5, 1.5” Diameter.

2. Contractor shall use heat fused butt welded HDPE. Contractor must provide submittals to substantiate performance for approval. This will require that the manufacture provide a certification of compliance with respect to all physical properties of the HDPE pipe.
    a. The contractor shall submit manufactures certifications and specifications detailing that the proposed product will perform with adequate reliability.
    b. The contractor shall be responsible for adapting the HDPE pipe to all required metal pipe. valves. and devices. This must also be submitted on.
    c. All joints must be heat fused; internal sleeves and mechanically fastened joints will be unacceptable.

B. Air Relief Valves: Bermad Model No. 4415 or equal with these features: automatic continuous air bleed and vacuum relief type, 2 to 170 psi working pressure range, minimum vent discharge rate of 0.01 cu. ft. /sec. at 50 psi.

C. Curb Stop Valve: Mueller H-10287 or equal with these features: 1-1/2 inch and 2-inch diameter O-ring type valve, 1/4 turn check, 175 psi working pressure, Minneapolis top threads. The body, tee-head and stem shall be made of brass or bronze. No drain ports.

D. Curb Stop Valve W/Drain: Mueller H-10288 or equal with these features: One-inch diameter O-ring type valve, I.P. threaded inlet and outlet, 1/4 turn check, 175 psi working pressure,

E. Curb Box: Ford or equal, with these features: telescoping type, cast iron and steel construction, brass pentagon head plug, Minneapolis pattern base, 66-inch minimum length stationary shut-off rod, asphalt base coating. The curb box shall be compatible with curb stop valves described herein. The curb box shall extend 4 inches above ground surface when attached to valve buried at pipe depth shown on Work Data Sheet. Note the threads shall be such that they screw onto curb stop as per manufacture's specifications.

F. Curb Box Key: Shall have a minimum length of 18 inches. Tee handles type, for removing the pentagon plug and operating stationary shut-off-rod. Compatible with curb boxes described herein.

G. Sump Gravel: Gravel shall be 1/2 inch to 3/4 inch and shall be washed free of all fines under 1/2 inch in size.

H. Float Valve: Roberts Manufacturing Co. Bob Float model# R400-1-5, valve, arm, and float for 1" dia. pipe. The assembly shall have these features: 1" valve, complete with rod, chain and 6" ball, all constructed of non-corrosive material or salient equal.

K. Wood Fence Posts: Posts shall be straight, single stem and sound. Treatment

shall be in accordance with section titled - Water Troughs.

L. Site Seed Specifications:

Grass Species	% PLS Count	lbs./Acre
Western Wheatgrass	30%	Drilled Rate
Stream bank Wheatgrass	20%	(8 lbs. / Acre)
Green Needlegrass	20%	
Slender Wheatgrass	15%	Broadcast Rate
Thick spike Wheatgrass	15%	(16 lbs/ Acre)

PART 3 EXECUTION

3.1 PREPARATION

A. Clearing and Grubbing: Shall be according to Section titled - Trenching, Backfilling, and Compacting.

B. Excavation and Backfill: Shall be according to Section titled - Trenching, Backfilling and Compacting.

3.2 INSTALLATION

A. General: Interior of the pipe shall be kept clean. The pipe shall not be covered until the pressure tests have been approved.

B. The ends of the pipe shall be covered during the progress of the work to keep the interior of the pipe clean.

C. Thread Compound: Thread Compound used shall be suitable for potable water systems.

D. Bedding: Shall be according to Section titled - Trenching, Backfilling and Compacting.

E. Assemblies: Refer to the drawings for locations of all assemblies. All pipe and fittings in assemblies shall be the same size as the adjoining pipeline except where otherwise specified or where reducers are needed to enter a valve body.

F. Curb Stop Valve Assembly: Install curb stop valve, curb box, stationary rod, slip-to-thread adapters, reducers if required and a 6 inch by 4-foot-long treated wood post set in the ground 30 inches. Set the post 24 inches upstream of the valve. Each curb stop requires a 6" long brass or stainless-steel nipple on each side. No Male threads shall be used at the assembly.

G. Curb Stop Valve w/Drain Assembly: Install curb stop valve w/drain, a one cubic foot gravel sump with 6 mil polyethylene covering, curb box, stationary rod, slip-to-thread adapters and reducer. Install a 6 inch by 4-foot-long treated wood post set in the ground 30 inches. Set the post 24 inches upstream of the valve. Each curb stop requires a 6" long brass or stainless-steel nipple on each side.

H. Air relief Valve Assembly: Install air relief valve, PVC tee, (the same size as the adjoining pipeline), reducer, slip-to-thread adapters, 8 inches of 2 inch diameter schedule 40 PVC pipe, 6 inch PVC riser, 6 inch PVC slip cap and a 6 inch diameter by 4 foot long treated wood post. Each curb stop requires a 6" long brass or stainless-steel nipple on each side. No Male threads shall be used at the assembly. Drill six 1/4-inch dia. holes in the 6-inch PVC riser, spaced evenly around the circumference of the pipe. The wood post shall be set in the ground 30 inches deep, 24 inches upstream of the valve.

I. Watering Assembly: Install 20 foot of 1-inch schedule 40 PVC pipe, (14' horizontal & 6' vertical) starting at the Curb Stop Valve w/Drain Assembly. Install PVC (Slip x Slip) elbow, PVC reducing elbow (Slip x Fipt), a male 3/4-inch threaded plug and a 6-inch diameter by 7-foot-long treated wood post to be used as one post in the Water Trough Assembly. The wood post shall be set 30 inches deep and backfill around the post shall be firmly tamped. Install two 3/4-inch threaded elbows, two 3/4 inch by 6-inch threaded nipples, one Roberts Bob Float Valve Assembly and one flow restrictor. The 1-inch schedule 40 galvanized pipe shall be secured to the wood post with two 1-inch metal galvanized straps completely encircling the post and PVC pipe.

3.3 FIELD QUALITY CONTROL:

A. General: It is the contractor's responsibility to perform all required tests. The contractor shall supply and temporarily install a gauge on each portion of pipeline being pressure tested, to monitor any pressure drop during the test. The four-hour pressure tests, before backfill shall be performed immediately when a segment as detailed by the contractor's work schedule, is completed and flushed. The flow tests shall be done before backfilling.

B. Pressure Testing Procedure: Tests shall be conducted as follows:

1. The presence of the Contracting Officer or his representative is not required at the first pressure test. The portion to be tested shall be pressurized to the maximum operating pressure. Fill and flush the line being tested to

eliminate air from the line. Do not fill the pipe at a rate greater than 1 ft. per second. Correct all deficiencies evident during this test and repeat the test.

2. For the second pressure test, the contractor shall notify the Contracting Officer 24 hours prior to testing. The State or their representative shall witness this test. Failure to notify the State shall result in a repeat of the test even if that requires re-excavation of the portion being tested. The portion being tested shall be pressurized to maximum operating pressure. Do not fill the pipe at a rate greater than 1 foot per second. The pressure shall be held for a minimum of 4 hours; then inspected for failure criteria. Failure shall be considered a pressure drop in excess of 5 PSI over the 4-hour test. Correct deficiencies evident during the test and repeat the test until approved. After approval, the contractor shall perform the flow test.

3. In the event water enters the trench, and pressure testing with water indicates a leak which cannot be visibly or otherwise located for repair, the contractor shall at his option; either dewaters the trench or air test the line. When the line has been repaired, repeat the 4-hour water test.

C. Flow Tests: The flow tests shall be completed at the tank after completion of the pipeline and before installation of the float valve. The Contractor shall install necessary equipment to determine the flow rate and document the time, location, test method, flow rate, name of testing personnel. The documentation shall be provided to the Contracting Officer. After approval the Contractor may backfill the tested section of pipeline.

D. Final Test: A final test shall be conducted on the total system after completion of backfilling. Pressurize the system in accordance with 3.3.B. The pressure shall be maintained for a period of 24 hours; then the system inspected for failure criteria.

END OF SECTION 02665

SECTION 02802

WATER TROUGHS

Added Section.

PART 1 GENERAL

1.1 WORK INCLUDED

A. Description: Furnishing and installing water trough assemblies in accordance with these specifications and to the sizes, types, and dimensions as shown on the drawings.

1.2 REFERENCES

A. American Wood Preservers Association

AWPA C 1-92	All timber Products- Preservative Treatment by Pressure Processes
AWPA C 5-92	Posts, Pressure Treatment
AWPA C 2-92	Lumber, Timbers, Bridge Ties and Mine Ties, Pressure Treatment
AWPA P 5-92	Waterborne Preservatives
AWPA M 4-91	Care of Pressure Treated Wood Products

1.3 SUBMITTALS

A. Certification: The contractor shall furnish written certification from the treating plant stating that chemicals and methods used, for wood preservation and net amount of preservative retrained are in conformance with applicable standards. Furnish written certification from the manufacturer that the contractor furnished fence posts and sawn members conform the requirements of this section.

PART 2 PRODUCTS

2.1 CONTRACTOR-FURNISHED MATERIALS:

A. Stock water trough: Tank shall be Component Structure Systems model R-12 or equal.

Equal shall have these salient features:

1. Constructed of fiberglass reinforced plastic; consisting of approximately 35% glass, 65% resin, and a minimum of 3/16” thickness.
2. Resin shall be orthopthalic polyester with an ultimate tensile strength of 13,000 psi minimum, an ultimate flexural strength of 20,000 psi minimum, a compressive strength of 24,000 psi minimum and a minimum Barcol hardness of 30.

3. Nonskid bottom interior surface which is sanded and slip resistant. Interior surfaces shall be gel coated, othopthalic, with a minimum Barcol hardness of 30. Thickness of gel coat shall range from 12-15 mil.
4. Equal shall have walls and floor which are seamless, ribbed, and reinforced for additional strength.
5. Color shall be tan.
6. Shall be constructed with a threaded ¾" drain hole with threaded plug.
7. Shall be constructed with tapered sides from top to bottom to reduce ice damage and facilitate storage and handling. The lip shall be rolled or flat. If rolled, it shall be 3/8" minimum thickness and if flat, it shall be ½" minimum thickness. **The bottom shall be flat so the trough may set on a flat level surface and shall have bird ramps molded into the structure. One supplier is Fiberglass Structures, Inc in Laurel, MT.**

B. Gravel: Pit Run ¾" to 1-1/2".

C. Wood: All wood members shall be of the lengths and sizes shown on the drawings.

1. Sawed Members: the sawed members shall have minimum nominal dimensions as shown on the drawings.
2. Treating: All wood products shall be full length treated unless listed as untreated on the schedule.

D. Connectors: All bolts, lag screws, rods and other connectors shall be galvanized.

2.4 WOOD TREATMENT PRACTICES

A. General: The following treatments shall be used. Minimum net retention and penetrations shall be according to AWPA C 5 for posts and AWPA C-2 for lumber. Treatment method shall be according to AWPA C 1, except as noted. When a treatment member must be bored or cut during construction, thoroughly swab untreated surfaces with copper naphthenate or an approved preservative according to AWPA M4.
B. Chromated Copper Arsenate (CCA): Waterborne preservative according to Type A, B, or C in AWPA P 5.

PART 3 EXECUTION

3.1 PREPARATION:

A. Clearing and Grubbing: An area approximately 20' in dimeter shall be cleared of all brush and large rock. The tank appurtenances at each water facility shall then be installed as shown on the drawings.

3.2 INSTALLATION:

A. General: Special care shall be taken to place the tank gravel on a firm base. The installed stock tank shall be level to a tolerance of +/-0.1'. Excavation for each plank and post

footing shall be made individually, disturbing the least area possible. The backfill around the footings (and in the event of over-excavation for the supports) shall be compacted at optimum moisture content by means of hand or mechanical tampers to the density of surrounding undisturbed soils. The water trough shall be place at the watering assembly as shown on the drawings.

B. Wood members: When boring or cutting is required at the construction site, the exposed untreated surface of the member shall be thoroughly swabbed with an approved preservative. All of the braces shall be securely bolted.
C. Gravel: Place the gravel to the depth as shown on the drawings.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Units: The water trough assemblies will be measured and paid for per unit for each water trough assembly, including appurtenances, acceptably installed in accordance with the drawings and specifications.

4.2 BASIS OF PAYMENT:

A. Payment: Prices and payment will be full compensation for the work described in this section. Payment will be by the price bid under “Install 1500 Gallon Stock tank with Cattle Guards” as listed in the proposal.

END OF SECTION 02802