

**PRESSURIZED SECONDARY  
CONSTRUCTION SPECIFICATIONS**

**for**

Weber Basin Water Conservancy District

**October 2017**

## SECTION 1 GENERAL QUALITY CONTROL REQUIREMENTS

**1.1 SCOPE:** This section defines the general requirements a DEVELOPER (defined to include developer, contractor, subcontractors, or owner) must meet when installing a Secondary Irrigation system in a New Subdivision, to be accepted and maintained by the Weber Basin Water Conservancy District (DISTRICT). Any questions regarding these specifications should be directed to the DISTRICT Engineers at (801) 771-1677.

**1.2 PRELIMINARY PLAT:** The DEVELOPER shall give notice to the DISTRICT of his intention of providing secondary water to a new subdivision by sending the DISTRICT a master plan of the total property to be developed and a preliminary plat of the subdivision. The DISTRICT will then determine the water allotment requirements, identify any existing Bureau of Reclamation or District easements in the area, determine the best connection source for the subdivision, and determine inspection and review fees required by the DISTRICT. The DISTRICT will then notify the DEVELOPER in writing of these items and require that all necessary fees be paid and all requirements be met prior to connection of the secondary irrigation system to existing DISTRICT facilities.

**1.3 PRELIMINARY SECONDARY PLAN:** The DEVELOPER shall send one (1) set of plans, stamped by a Professional Engineer, for the secondary irrigation system, showing location, type, size, and class of:

- a) Pipe & fittings - including depth of cover and relationship to other utilities in plan and profile.
- b) Services - typical detail required, including type of fittings, saddles and meters.
- c) Valves
- d) Drains
- e) Thrust Blocks
- f) Metallic Indicator Tape
- g) Cast iron valve boxes
- h) Air-Vacs
- i) Pressure reducing stations (if required)
- k) Detectable Locating Wire
- 1) Meter Enclosures

Pipelines shall be designed to meet the demands of the development. Design must also provide for future extension to adjacent development. In the event that the DISTRICT determines that a larger line is needed to meet future demands of the system, the DEVELOPER shall be responsible to install the up-sized lines. All mains shall be installed to the boundary lines of the subdivision.

Following the preliminary plan review, the DISTRICT will return the plan set along with a review letter showing required changes, if any. Once the changes have been made, a revised set of drawings shall be resubmitted for final approval.

**1.4 FINAL SECONDARY PLANS:** The final plans are reviewed by the DISTRICT and if all requirements are met, the DISTRICT will send the DEVELOPER a letter of approval.

**1.5 BONDS:** Before construction begins, the DISTRICT reserves the right to require the DEVELOPER to furnish the DISTRICT with a PERFORMANCE BOND, warranting 100% of the cost of the secondary system. This warranty shall extend for one year following an approved inspection and the system being put into operation.

**1.6 PRECONSTRUCTION MEETING:** Following approval of the secondary water system plans, the DEVELOPER shall schedule with the DISTRICT, a preconstruction meeting to discuss clarifications or bring up any problems they may encounter during the review process. At the conclusion of the preconstruction meeting, if all concerns are answered, all fees are paid, water is purchased if needed and the SUBDIVISION TAKEOVER AGREEMENT is signed, the DISTRICT will give approval to proceed.

**1.7 CONSTRUCTION OBSERVATION:** All construction work involving the installation of the secondary irrigation system must be observed by the DISTRICT. It shall be the responsibility of the DEVELOPER to insure that these observations take place where and when required. Failure to have the system installation observed before backfilling occurs, will result in requiring the DEVELOPER to uncover the entire system again at the DEVELOPER'S expense. The DISTRICT will not allow any connections to their existing systems be made unless the subdivision system installation has been observed and approved by the DISTRICT. Points of required observation include: a) Pipe installation, including backfilling ; b) Services, including connections to main line and meter installation; c) Valves; d) Drains; e) Pressure Reducing Stations (if required); f) Thrust Blocks; g) Proper installation of metallic indicator tape; h) Connection to existing lines; and i) Proper installation of detectable locating wire.

After the proper installation of the system, but before connection to the DISTRICT'S existing lines, the DEVELOPER shall hydrostatically pressure test the subdivision system at a pressure of not less than 200 psi. for a period of not less than 2 hours. This test must be witnessed by the DISTRICT.

**1.8 REQUESTS FOR OBSERVATION:** Requests for construction observation shall be made to the DISTRICT by the DEVELOPER or CONTRACTOR not less than two (2) business days in advance of the start of work requiring periodic observation, unless specific advance written approval is given otherwise by the DISTRICT.

**1.9 CONSTRUCTION TESTING:** At the discretion of the DISTRICT, density testing may be required. All in-place density testing shall be coordinated and paid for by the DEVELOPER. Any tests failing to meet 95% of modified proctor or the standards of the local governing agency will be retested at the CONTRACTOR'S expense.

**1.10 PLACEMENT OF INDICATOR TAPE:** Metallic indicator tape marked "Irrigation Water" and 6" in width shall be used when installing DISTRICT waterlines. The indicator tape shall be installed at a maximum depth of 12-inches below subgrade, but shall not be any closer than 12-inches above the top of the waterline.

**1.11 STAKING VALVE BOXES:** The DEVELOPER shall mark every meter box and end user control valve box with a 2"x2"x4' wood stake before final inspection. The stakes shall remain in place until the subdivision is fully developed.

**1.12 PLACEMENT OF LOCATING WIRE:** 12 gauge copper locating wire shall be installed with all DISTRICT waterlines. The locating wire shall be attached to the top of the waterline and shall be terminated and accessible at all valve boxes and air/vac structures.

**1.13 FINAL INSPECTION:** An inspection shall be made by the DISTRICT after all construction work is completed. Any faulty or defective work shall be corrected by the CONTRACTOR within a period of thirty (30) days. The date when the system is approved by the District and put into service will be the beginning of the warranty period. One year following this date, the DISTRICT will assume all operation and maintenance of the system.

**1.14 DRAWINGS:** All references within these specifications to "The Drawings" shall mean the DISTRICT'S own construction drawings attached, or such other construction drawings as shall be pre-approved in writing by the DISTRICT.

**1.15 GUARANTEE OF WORK:** Although the DISTRICT performs regular observations during installation to ensure compliance with DISTRICT specifications and standards, the CONTRACTOR is ultimately responsible for all workmanship in regards to construction of the secondary water system. The DEVELOPER shall warrant and guarantee that the secondary irrigation system provided for, and every part thereof, will remain in good condition and not fail for a period of one (1) year, following the Final Inspection approval and the system being put into service. The DEVELOPER agrees to make all repairs to and maintain the system, and every part thereof, in good condition during the warranty period with no expense to the DISTRICT.

**1.16 TAKEOVER INSPECTION:** The District shall perform a takeover inspection at the conclusion of the one (1) year warranty period. Notice of all items needing repair will be forwarded to the DEVELOPER in writing and said repairs shall be completed within (30) days of notification. The DISTRICT will assume operation and maintenance of the system only when all repairs have been completed, inspected and deemed acceptable.

**1.17 AS-BUILT DRAWINGS:** The DEVELOPER shall submit one set of as-built drawings to the DISTRICT following construction of the subdivision irrigation system.

**1.18 SYSTEM TAKEOVER:** Upon verification that all needed repairs noted during the takeover inspection have been completed, and receipt of an as-built drawing, the DISTRICT will issue a letter of acceptance and assume ownership, operation and maintenance of the system.

## **SECTION 2**

### **EXCAVATION AND BACKFILL FOR PIPELINES**

**2.1 GENERAL:** The work under this specification consists of furnishing all labor, tools, materials, equipment, and in performing all operations in connection with the excavation, trenching, and backfilling for underground pipelines and appurtenances.

**2.2 GROUNDWATER CONTROL:** Trenches must be kept free of standing water during excavation, pipe installation and joining, and pipe bedding operations. If the static level of ground water is above the bottom of the trench, such water must be lowered to the extent necessary to keep the trench free of water and stable when work is in process. Surface water shall also be kept from entering the trench.

**2.3 EXCAVATION FOR PIPELINES:** Trenches for pipelines shall be to the depths and widths required to accommodate the construction of the pipelines. The main pipelines must be installed in a line parallel to and a minimum of six (6) feet from the top-back of the proposed curb and shall be a minimum of thirty (30) inches deep with a maximum depth of six (6) feet to the top of pipelines. Variations of more than two (2) inches must be approved in writing by the DISTRICT.

Excavation in ledge rock, cobble-rock, stones, or other unsuitable materials shall extend at least six (6) inches below the elevation of the bottom of the pipe. A select material shall be used as bedding material to bring the elevation of the trench to the required grade. Where unstable material is encountered in the excavation, within 12-inches of the final grade of the pipe, a minimum of twelve (12) inches of material shall be removed below the grade of the pipe and select gravel shall be installed to provide a stable subgrade. All select material shall be approved by the DISTRICT prior to use.

**2.4 TRENCH SAFETY:** Excavation shall be sheeted, braced, and shored as required to support the walls of the excavation to eliminate sliding and settling and as may be needed to protect the workers and other structures and improvements. All safety measures shall comply with the requirements of the Utah State Industrial Commission and OSHA. Any damage, injury, or death resulting from the lack of adequate shoring and bracing shall be the responsibility of the DEVELOPER.

**2.5 BACKFILLING:** Care shall be taken while backfilling when pipe is exposed. Rock larger than 2-inches shall not be permitted to fall directly on the pipe from any height. Select pipe zone material shall be placed to twelve (12) inches above the top of pipe as directed by the DISTRICT. Trench backfilling above the level of the pipe bedding shall normally be done with native excavated materials. The backfill shall be compacted or consolidated to an in-place density of not less than 95% of modified maximum dry density, as determined by AASHTO T- 180 (ASTM D-1557) or the standard of the local governing agency. The backfill material shall be brought to within 2% of optimum moisture during compaction. No more than twelve (12) inch lifts shall be allowed when using mechanical compaction equipment. The DEVELOPER shall take all necessary precautions to prevent damage to the pipeline and fittings during backfilling.

**2.6 IMPORTED BACKFILL MATERIAL:** In the event that the native materials are too difficult to compact or consolidate to the required densities, or are unacceptable as backfill, as determined by the DISTRICT or other governing agency, the DEVELOPER may be required to provide select imported granular material. This granular material shall pass a 2-inch square sieve and shall not contain more than 15% of material passing a 200 mesh sieve, and shall be free from sod, or other organic or deleterious materials. All import material shall be approved by the DISTRICT in writing prior to use.

## **SECTION 3 PVC PRESSURE PIPE**

**3.1 GENERAL:** This specification consists of furnishing and installing the PVC pressure pipe as shown on the Drawings. This specification only applies to the main lines of the secondary irrigation system.

**3.2 MATERIALS:** All PVC pipe shall be furnished with integral bell and spigot joints and shall be made from clean, virgin, Type **1**, Grade **1**, non-plasticized polyvinyl chloride (PVC) and shall meet the requirements of AWWA C900 DR-14 and the latest revision of ASTM D-1784 unless otherwise approved.

**3.3 JOINTS:** The bell shall consist of an integral wall section with a cross-section rubber ring which meets the requirements of ASTM D-1869. The bell section shall be designed to be at least as strong as the pipe wall.

**3.4 FITTINGS:** Fittings shall be short body ductile iron, iron pipe size for PVC application, in accordance with AWWA C-110. They must be capable of withstanding hydrostatic tests of three times the rated working pressure of the pipe. All ductile iron fittings shall be wrapped with a three part wax tape coating system to prevent corrosion.

**3.5 PLACEMENT OF METALLIC INDICATOR TAPE:** Metallic indicator tape shall be a minimum of six (6) inches wide and shall be marked "IRRIGATION WATER". The tape shall be installed at a maximum depth of twelve (12) inches below subgrade, but shall not be installed closer than twelve (12) inches above the top of the waterline.

**3.6 THREE PART WAX TAPE COATING SYSTEM:** Wax tape material shall be manufactured in accordance with the following requirements:

1. The wax tape coating system shall be three-part, cold-applied, consisting of primer, wax tape and tape outerwrap in accordance with AWWA C217.
2. The wax tape coating system is for coating all buried pipe appurtenances, including but not limited to, valves, fitting and bolts.

### **MATERIALS**

#### **Wax-Tape Notes**

1. All parts of the wax tape coating system shall be from a single manufacturer.
2. Coating system shall be applied according to the manufacturer's recommendations.
3. Filler mastic shall be used to smooth all irregular angles around flanged and mechanical joint fittings.

#### **Part 1 Primer**

- a. Description: Blend of petrolatums, plasticizers and corrosion inhibitors having a paste-like consistency.
- b. Acceptable Materials: Trenton Wax-Tape Primer or Denso Paste.

**Part 2 Wax Tape**

- a. Description: Non-woven, non-stitch bonded synthetic fabric saturated with a blend of petrolatums, plasticizers and corrosion inhibitors forming a tape-coating that is easily formable over irregular surfaces.
- b. Acceptable Materials: Trenton Wax-Tape or Denso Densyl

**Part 3 Tape Outerwrap**

- a. Description: Plastic wrapper consisting of three membranes of 0.5-mil, clear, 50 gauge plies wound together as a single sheet.
- b. Acceptable Materials: Trenton Poly-Ply or Denso Poly-wrap



## **SECTION 4 SERVICE CONNECTION**

**4.1 GENERAL:** This specification consists of the requirements for the service line connections, materials, installation, and inspection.

**4.2 SERVICE SADDLES:** Service saddles shall meet all applicable parts of ANSI/AWWA C800, and shall be rated for a minimum 250 psi operating pressure. Body shall be ASTM A536 ductile iron with 10 to 12 mil nylon or FBEC coating. Strap shall be Type 304 heavy gauge stainless steel with a minimum 2" width. Nuts, bolts and washers shall be 304 stainless steel; nuts shall be coated to prevent galling. Service saddles shall be manufactured by Ford, Mueller Co., or Romac Industries, Inc.

**4.3 SERVICE LATERALS:** Pipe for service laterals shall be flexible polyethylene plastic pipe (PE) PE 3408, CTS ASTM D-2737, SDR-9. The pipe shall be marked to show the pressure rating, pipe size and type. All connections on PE pipe shall be made with compression style couplings with stainless steel inserts. COMPRESSION COUPLINGS SHALL BE MUELLER H-15428, FORD C84-66-Q, OR EQUAL AS PRE-APPROVED BY THE DISTRICT IN WRITING.

**4.4 METERS:** Meters shall be as specified by the DISTRICT for the particular installation and shall report instantaneous flow in gallons per minute (gpm) and totalized flow in gallons via encoded register output. The meter shall be installed within a corrugated plastic meter enclosure. The meter enclosure shall be set so that the elevation of the top of the box is equal to that of the top back of the curb or sidewalk. ONE (1) INCH METERS SHALL BE SENSUS IPERL. ONE AND ONE HALF (1 ½") INCH AND LARGER METERS SHALL BE ELSTER EVOQ4. NO "OR EQUAL" PRODUCTS WILL BE ALLOWED.

**4.5 AMR TRANSMITTERS:** Each meter shall be fitted with an AMR transmitter with integral connector. The transmitter shall be mounted through the meter enclosure lid in a 1.75" diameter hole. When connecting to a Sensus iPerl type meter the transmitter shall be a Sensus 520M pit set single port radio with TR/PL touch coupler connection. When connecting to an Elster EvoQ4 type meter the transmitter shall be a Sensus 520M pit set single port radio wired unit. NO "OR EQUAL" PRODUCTS WILL BE ALLOWED.

**4.6 END USER VALVE BOXES:** The control valve box shall be 14" x 18" x 12" and shall be marked "Sprinkler" or "Irrigation" and be purple in color. The control box shall be set so that the elevation of the top of the box is equal to that of the top back of the curb or sidewalk. Control boxes shall be as manufactured by CARSON or equal as pre-approved by the DISTRICT in writing.

**4.7 METER ENCLOSURE LIDS:** Corrugated meter enclosures shall have a ring, as detailed in the appropriate meter size detail, and purple polymer cover stamped "WBWCD IRRIGATION" DFW800X.5W+T or approved Equal.

## **SECTIONS VALVES**

**5.1 GENERAL:** This specification consists of the requirements for valves.

**5.2 GATE VALVES:** Valve sizes 4" through 12" shall be gate valves of the iron body, non-rising bronze stern, resilient seated type, manufactured to equal or exceed all applicable AWWA standards of C-509 latest revision and all specific requirements outlined in these specifications. Gate valves shall open left and be provided with 2" square operating wrench nuts unless otherwise specified. The valves are to be Mechanical Joint or Flanged type as directed by the DISTRICT and shall be furnished with all necessary glands, followers, bolts and nuts to complete installation. The disc shall have integrally cast ASTM B-62 bronze stern nut to prevent twisting, binding or angling-of the stern. Designs with loose stern nuts are not acceptable. Provide fusion bonded epoxy lining and coating in compliance with AWWA C550. It shall protect all seating and adjacent surfaces from corrosion and prevent build-up of scale or tuberculation. Valve design shall incorporate a positive metal to metal stop to prevent over- compression of the sealing element. GATE VALVES SHALL BE MUELLER 2361. NO 'OR EQUAL' PRODUCTS WILL BE ALLOWED.

**5.3 BUTTERFLY VALVES:** Valve sizes 14" and greater shall be butterfly valves of the short body type, cast iron body, cast or ductile iron disc, Type 304 stainless steel shafts, Buna-N or EPDM rubber seat bonded or molded in body only, and stainless steel seating surface. Provide fusion bonded epoxy lining and coating in compliance with AWWA C550. Valve manufacturers shall be approved by the District prior to installation.

**5.3 BALL VALVES:** At the end of each service, the DEVELOPER shall install a hand operated ball valve. The manufacturer shall be WATTS, MODEL #B-6080 OR EQUAL AS PRE-APPROVED BY THE DISTRICT IN WRITING.

**5.4 METER VALVES:** The meter valves shall be manufactured and tested to ANSI/AWWA C800 and shall be quarter-turn ball type constructed of solid ASTM B62 brass with blow-out proof stern, double O-rings, and minimum 300 psi working pressure. Connections shall be as required for the District-specified meter. METER VALVES SHALL BE AS DIRECTED IN THE DRAWINGS FOR THE SIZE OF METER INSTALLED. NO 'OR EQUAL' PRODUCTS WILL BE ALLOWED

**5.5 AIR VACUUM RELIEF AND DRAIN VALVES:** Air vacuum relief valves, permanent drain valves and temporary drain valves shall be constructed at locations determined by the Engineer who designed the system and pre-approved by the DISTRICT in writing, in accordance with the attached drawings. All lids shall be marked "IRRIGATION".

**5.6 VALVE BOX LIDS:** All valve box lids within the street right of way shall be stamped "IRRIGATION".

## **SECTION 6 TESTING OF WATERLINES**

**6.1 GENERAL:** This specification consists of the requirements for flushing and testing the secondary irrigation waterlines.

**6.2 TESTING:** Tests shall be made upon completion of the system installation, but prior to any connection to existing DISTRICT facilities. All tests shall be made at the expense of the DEVELOPER and in the presence of the DISTRICT.

Lines shall be slowly filled with water, venting off all air. All main line valves shall be in the fully open position during the test. The line shall be pressurized to a minimum of 200 pounds per square inch. This pressure shall remain steady for a minimum of 2 hours.

**6.3 FLUSHING:** If cleaning practices during installation are questionable, the DISTRICT may require the DEVELOPER to flush all lines after the pressure test. Flushing shall be accomplished through the end of the line blow-offs or drains, with a minimum of four (4) inch diameter pipes. The velocity in the largest pipe shall be a minimum of 2.5 feet per second.

## **SECTION 7 THRUST BLOCKS**

**7.1 GENERAL:** This specification consists of the requirements for thrust blocks on the installed water lines.

**7.2 PLACEMENT:** Thrust blocks are required at points where the pipe changes direction such as; at all tees, elbows, caps, valves, reducers, crosses, etc. Thrust blocks should be constructed so that the bearing surface is in direct line with the major force created by the pipe or fitting. The earth bearing surface shall be undisturbed. Refer to the Drawings for thrust block details.

**7.3 CONCRETE DESIGN:** The concrete used for thrust blocks shall have a minimum 28-day compressive strength of 3,000 psi and shall comply with the requirements of class C concrete. Thrust block dimensions and size shall be calculated by the DESIGN ENGINEER.