

STANDARD SPECIFICATIONS

RESIDENTIAL IRRIGATION WATER DELIVERY SYSTEMS

GREATER WENATCHEE IRRIGATION DISTRICT

2006

- 1) SYSTEM CAPACITY: Irrigation water allotment is 7.3 gpm per acre. The system shall be sized to deliver 130 percent of the total allotment, to the series of consecutive service risers located at the end of the system, at a rate of 10 gpm per service riser. Velocities shall not exceed five feet per second. The minimum pipe size (except for service risers) shall be 2 inch diameter. A sample calculation is included in the appendix.
- 2) PIPELINE CONSTRUCTION:
 - 2.1) MATERIALS:
 - 1.) PIPE: All pipe shall be polyvinyl chloride (PVC) schedule 40, C900 PVC class 200, ductile iron class 50 or as approved by the District.
 - A) Pipe three (3) inches and smaller shall be solvent welded.
 - B) Pipe four (4) inches and larger shall be ring gasketed joints.
 - 2.) FITTINGS:
 - A) PVC fittings three (3) inches and smaller shall be solvent welded or threaded. Solvent weld fittings must be schedule 40 or better and meet or exceed the pressure rating of the pipe. Threaded PVC fittings shall be Schedule 80. Tape or joint compound shall be used on threads.
 - B) Fittings larger than three (3) inches shall meet or exceed all standard engineering requirements. Fittings for ductile iron pipe or C900 shall be ductile iron meeting the requirements of AWWA C153 (MJ) and C110 (FL).
 - 3.) VALVES:
 - A) Gate Valves: Valves three (3) inches and smaller shall be bronze or cast iron gate valves. All valves will have a resilient seat or single bronze wedge gate. The operator will be a two (2) inch cast iron square nut for two (2) and three (3) inch valves and a cast iron handle for smaller valves. The working pressure will be 150 psi or greater. Three (3) inch

- valves shall have flanged connections while two (2) inch and smaller valves shall have threaded connections. All valves must meet or exceed current AWWA standards.
- B) Gate valves 4 inches and larger: Gate valves 4 inches and larger shall be resilient seated gates meeting AWWA C509 or C515, non rising stem, 2 inch nut operator. Gate valves larger than 12 inches shall include a gear operator and bypass if requested by the District.
 - C) Butterfly Valves: If used, butterfly valves shall have a gear operator that requires a minimum of 15 (fifteen) turns to reach full closure. It shall meet or exceed all normal engineering requirements for the highest pressures of that area, but be no less than 150 psi working pressure. Valves shall meet AWWA C504.
- 4.) VALVE BOXES: Valve boxes shall be installed on all buried valves.
- A) All valve boxes shall be cast iron, two-piece slip type standard design with base corresponding to the total size of the valve. The box shall be protected with coal-tar or other approved coatings, applied by the manufacturer. Valve boxes shall be "Rich Series 920" or "Tyler Number 6855". Cast iron lid shall be marked "IRRIGATION" "IRR" "I" "GWID" or blank.
- 5.) THRUST BLOCK: Thrust blocks are required at tees, bends and dead ends except tees leading to single service risers of 3 inch or smaller. Concrete for thrust blocks shall have a minimum 28 day compressive strength of 3000 psi. Thrust blocks should meet standard engineering design for the pipe size and soil type and poured against undisturbed earth. Thrust blocks shall have a bearing area as required for restraint of testing and working pressures.
- 6.) IDENTIFYING TAPE: Identifying tape shall be installed twelve (12) inches below finished grade over all PVC pipe. Pipe locator ribbon shall be two (2) inches wide plastic coated aluminum and shall be clearly marked, "CAUTION BURIED WATER LINE" continuously along the length of the ribbon with minimum 1 ½ inch letters. The ribbon shall be blue in color.
- 7.) ISOLATION VALVES: Isolation valves shall be installed within the system to allow the property owners to isolate a section of the system should a break or other situation arises. This will insure the least number of lots are without water. Number and locations of valves shall be as approved by the District.

2.2) PIPE INSTALLATION:

GENERAL: All pipe shall be assembled and installed in accordance with the pipe manufacturer's recommendations.

Thrust blocks shall be placed at locations described in Section 2.1.5 of this document and shown in Figure 1. Thrust blocks shall be placed such that accessibility to the pipe and the fittings is not impaired. Thrust restraint using methods other than standard thrust blocks shall be reviewed by the District on a case by case basis.

2.3) PIPE INSTALLATION, OUTSIDE STREET RIGHTS-OF-WAY

1) EXCAVATION: All pipe shall have a minimum of thirty (30) inches of cover. Utilities encountered in the pipe zone shall be crossed below. Pipe shall not be buried with more than 48 inches of cover without approval by the District.

2) PIPE BASE AND PIPE ZONE BEDDING MATERIALS: Pipe base and zone shall include the full width of the trench from four (4) inches below the bottom of the pipe to six (6) inches above the top of the pipe. Bedding material may be excavated native material containing no rock, organic matter, or materials larger than ½ inches. Where the volume or quality of native excavated materials is inadequate, sand will be used for pipe base and pipe zone bedding. The bedding material shall be placed in two lifts and compacted sufficiently to preclude future settlement.

3) TRENCH BACKFILL ABOVE PIPE ZONE: Native material not larger than six (6) inches may be used.

2.4) PIPE INSTALLATION: WITHIN STREET RIGHTS-OF-WAY

1.) EXCAVATION: All pipe shall have a minimum of thirty (30) inches to cover. The city or county may require burial of greater depth in some instances. Utilities encountered in the pipe zone shall be crossed below. Pipe shall not be buried with more than 48 inches of cover without approval by the District.

2.) PIPE BASE AND PIPE ZONE BEDDING AND PLACEMENT: Pipe base and pipe zone shall include the full width of the trench from four (4) inches below the bottom of the pipe to six (6) inches above the top of the pipe. Pipe base and pipe zone shall be bedded with a commercial pipe bedding material or an approved alternate, free of hu-

mus, organic matter, frozen material and debris, conforming to the gradation specified below:

<u>U.S. Standard/sieve Size</u>	<u>Percent Passing/By Weight</u>
3/4"	100
3/8"	95-100
#4	90-100
#10	90-100
#40	15-80
#100	0-25
#200	0-10

Bedding shall be placed in lifts, not to exceed six (6) inches, except for the initial lift which shall be four (4) inches. All bedding shall be compacted to 95% of maximum density in accordance with ASTM D 698 by means of mechanical compaction. A minimum three (3) inch sand cushion shall be installed between the irrigation pipe and any existing pipes or conduits encountered.

- 3.) BACKFILL ABOVE PIPE ZONE: Backfill above the pipe zone and below road surfacing shall be done according to the requirements of the agency in whose right-of-way the pipe is being installed.
- 4.) All work within public road rights-of-way shall meet these specifications, those of the agency having jurisdiction over the road right-of-way and current APWA specifications.
- 5.) All street crossings shall be sleeved in conduit PVC. Carrier pipes 6 inches and larger shall be installed with manufactured pipe runners through the casing.

3.) SERVICE RISERS FOR LID INSTALLATIONS ONLY:

3.1) MATERIALS:

- 1.) PIPE: Pipe shall be galvanized steel, Schedule 40. Joint compound shall be used on all threads.
- 2.) FITTINGS: Threaded, galvanized, malleable iron fittings shall be used with all steel pipe.
- 3.) VALVES: Valves shall conform with Section 2.1.3 of this document.

- 4.) VALVE BOX: Valve boxes for service risers located in yards (Type B) shall be Carson series "1234", equal, or better. Valve Boxes shall be constructed of reinforced fiberglass or better. All valve boxes shall be installed flush with the finished ground surface.
- 3.2) CONSTRUCTION: Service risers are to be constructed in conformance with the Standard Details. Lateral pipelines extending to the service riser shall be two (2) inch pipe meeting the requirements of Section 2.1.1 of this document.
- 4.) ADDITIONAL REQUIREMENTS:
- 4.1) Air release valves shall be installed, in a vault, at all high points and drain valves shall be installed, in vaults, at all low points.
- 4.2) Isolation valves shall be installed on all laterals and at the point of delivery.
- 4.3) The proposed design and drawings shall be submitted to the Greater Wenatchee Irrigation District for review prior to construction. Plans shall be stamped by a Washington State Registered Professional Engineer.
- 4.4) As-constructed drawings detailing pipe, service riser and isolation valve locations and pipe depths shall be provided to the Greater Wenatchee Irrigation District.

SAMPLE CALCULATION

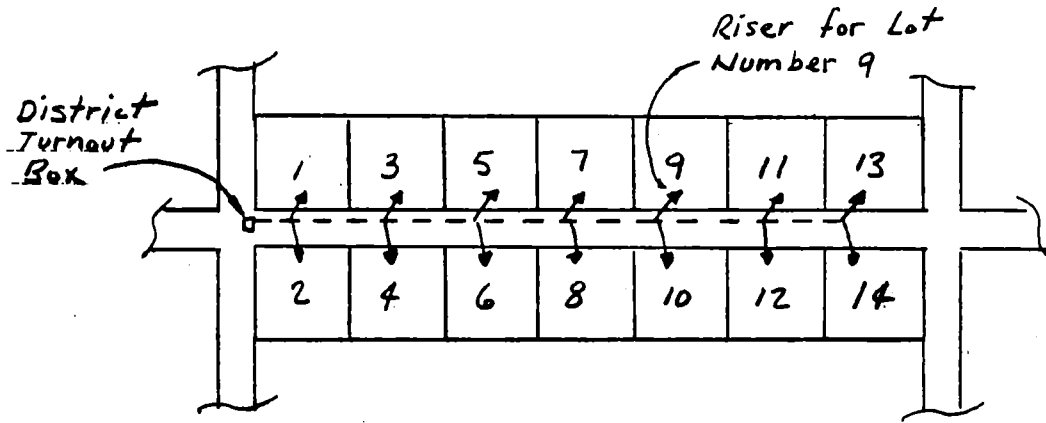
Assume a 6-acre subdivision with fourteen lots. The irrigation water allotment would be:

$$(7.3 \text{ gpm/ac}) \times (6 \text{ acres}) = 44 \text{ gpm}$$

As stated in Article 1 of the Standard Specifications, the system must be sized to deliver 130% (one hundred thirty percent) of the allotment to the series of risers located at the end of the system at a rate of ten (10) gpm per riser. In this sample calculation, 130% (one hundred thirty percent) of the allotment would be:

$$(44 \text{ gpm}) \times (1.3) = 57 \text{ gpm}$$

At a flow of 10 gpm per riser, this flow could be served to the six risers at the end of the system, i.e. lots 9 through 14 in the sketch below.



According to the attached head loss table, 2 1/2-inch pipe is required for a velocity of less than 5-feet-per-second-between the District's delivery box and the risers for lots 9 and 10. Two (2) inch pipe may be used beyond that point. (See attached.)