TRENCH REQUIREMENTS

January 2026

1. Separation Requirements –

   Water lines shall be a minimum of twelve (12) inches from any rock, or any other obstructions.
   A minimum of twenty four (24) inches of separation is required for parallel communication utility lines.
   Gas and Power – Parallel Mainlines shall be a minimum of 5ft from Avion Mains and Services.
   Gas and Power – Parallel Services shall be a minimum of 3ft from Avion Mains and Services.
   Perpendicular Crossings shall have a minimum vertical separation of twelve (12) inches from any utility.
   See below for details regarding Non-Potable Water. (Any Non-Potable, Sewer, Storm)

   A reduction to six (6) inches of vertical separation for crossings may be allowed with prior approval from Avion Water and appropriate mitigation measures.

   Non-franchise utility (private utility) crossings of Avion facilities are prohibited.

   Horizontal pipelines from Non-Potable Water, Storm, and Sanitary Sewer shall be a minimum of 10ft separation, and vertical crossings shall be a minimum of 18in separation. See below for more detailed Non-Potable Water, Storm, and Sanitary Sewer crossings.

   All Non-Potable Water, Storm and Sanitary Sewer requirements shall be adhered to within any ROW as well as within private properties.

2. When a Non-Potable Water, Storm and Sanitary Sewer line is located above, or less than 18” below a crossing waterline, the sewer line shall be constructed of pipe conforming to water pipe standards. (AWWA C900) The minimum length of this strengthened sewer is 20ft. It is intended that a full 20ft stick of C900 pipe shall be used for the sewer line, to be centered over the water main and connected to the sewer line with City of Bend approved couplings.
   Must adhere to OAR 333-061-0050 (9) Construction Standards, regarding all Non-Potable Water, Storm, and Sewer Crossings.
   Note: Avion Water considers all non-Potable fluid sources, like Irrigation Water and Storm Sewer, to be treated the same as Sanitary Sewer Crossings.
   Anything NOT Potable will be treated as Sanitary Sewer, as referred to in OAR 33-061-0050 (9).

3. **No Grey Water** facilities or leech fields are allowed within any Avion Water easements. Avion Water considers Grey Water systems to be functionally equivalent to septic systems.

4. Rocks, trees, brush, or garbage shall NOT be used for backfilling.
   All rocks and debris shall be hauled away.
   The job site shall be returned, as close as possible, to its original condition.

TRENCH REQUIREMENTS cont'd

January 2026

5. Any use of a road right-of -way or road crossing must be approved by the appropriate County, City and/or State Highway Department. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAID ROAD CROSSINGS AND ALL REPAIRS TO THE ROAD SURFACE. …

6. Any water line crossing a canal shall be done to the specifications of the appropriate irrigation district. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAID CANAL CROSSINGS AND ALL REPAIRS TO THE CANAL.

7. Any water line crossing railroad, gas, sewer, power, telephone, or TV. cable lines shall be done to the specifications of the appropriate company. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAID RAILROAD AND UTILITY CROSSINGS AND ALL REPAIRS TO THE RAILROAD OR UTILITIES. …

8. All excavators hired by the customer should provide Avion with a certificate of insurance and follow the OSHA Safety Standards.

9. Minimum width and depth requirements for trenches: NOTE: YOU WILL NEED TO ADD SIX (6) INCHES TO THE TRENCH DEPTH AND PAD THE PIPE WITH A MINIMUM OF SIX (6) INCHES OF CLEAN, COMPACTED FILL MATERIAL ON THE BOTTOM, AND TWELVE (12) INCHES ON TOP OF THE MAINLINE.

Pipe Size	Width	Depth
Less than 6"	30"	36" + OD + Bedding
6"	30"	48"
8"	32"	50"
10"	34"	52"
12"	36"	54"
16"	40"	58"
24"	48"	66"
36"	60"	78"

12" Clearance at ALL Times!!!

36" min Pipe Bury Depth

TRENCH REQUIREMENTS cont'd

January 2026

10. Compaction Requirements
    All trenches backfill within a City or County ROW shall meet each corresponding backfill, compaction and testing requirements. Avion Water's minimum compaction requirements for all waterline trenches are: Bedding and sides of waterline, to be compacted in 6" lifts with a Jumping Jack. From Spring line to Top of Pipe zone, 12in minimum above top of pipe, to be compacted in 6" lifts with a Jumping Jack. 1ft lifts are acceptable with a Hoe Pack Compactor. Compaction testing shall be performed at the top of pipe zone, 12" min above waterline. Compaction testing shall meet 92% and tested every 100ft. All compaction test results to be submitted to Avion Inspector within 24hrs upon receiving results from testing contractor.

11. The proper locating tape and **14 gauge**, or larger, wire shall be installed as directed. Proper wire nuts, **rated for direct bury, with silicone**, shall be used. (e.g., DryConn DBR/Y-600, or equivalent) Locate wires in Valve tubes shall run outside the 3034 Riser Sleeve and inside the 910 Cast Iron Valve tube.

12. Provision shall be made for the installation of meters and a stub trench shall be dug five (5) feet perpendicular to the main line for the installation of a tail piece and pipe. This will be decided before the construction begins. No meter box shall be set in sidewalks, driveways, curbs, or any hard surfaces.

13. Tapping Sleeves shall be wrapped in 4 mil plastic sheeting, with a concrete support block. The size of the support block will be determined by the Avion inspector on site.

14. When **Blasting** is utilized in excavation, Avion Water requires prior notification, no less than 24hrs, anytime Blasting will be within 50ft from any live or abandoned Avion Water mainlines or facilities.
    Avion Water will not allow any blasting within 10ft of any Avion Water mainlines or facilities.
    Avion Water will not give any additional blasting requirements or recommendations regarding blasting distances, charges, or vibration levels. Any such blasting distance, and the like, shall be the sole responsibility of the blasting contractor.
    The blasting contractor bears the sole responsibility for any damage to any Avion Water mainlines or facilities upon blasting. The blasting contractor remains the responsible party for a duration of 1 year, after the completion of ALL blasting within each Phase of the construction site.

15. Any deviation from the above requirements shall have prior approval from Avion Water Company, Inc.

WATER AND PIPE FITTINGS

January 2026

PIPE: 36" min Pipe Bury Depth

Avion will determine size, type, pressure rating, or class prior to construction.

All pipes used shall be C900 **(DR 18)** or Ductile Iron (DI, Thickness **Class 52**) and gasketed pipe.

NO GLUE pipe will be accepted within the Avion Water Co. domestic water system.

All gasketed pipes shall be joined using an approved water soluble, vegetable based non-toxic lubricant.

All pipe lengths shall meet: **Bell to Spigot, 5ft min., Bell, or Fitting, 5ft min., Fitting to Fitting, 2ft min.**

All mainline installed under a Concrete panel Round-a-Bout, shall be constructed of DI pipe, and fully restrained through the entire length of mainline under concrete panels.

All mainline installed at a depth of 6ft and deeper, shall be constructed of DI pipe, and be fully restrained through entire length of mainline at or deeper than 6ft.

All mainline installation utilizing **pipe deflection** shall not exceed One-Half of the pipe manufacturers recommended pipe deflection. (i.e., C900 use .5 degree per bell, because the manufacturer recommendation is 1 degree deflection per bell.) A **.5-degree deflection is equivalent to a 2" offset per 20ft length** of pipe. The contractor shall provide methods to measure and confirm the amount of deflection used during installation for Avion Water inspectors' verification.

All pipes shall have 2 Reference Marks on the spigot end of the pipe. (1 as the Insert Mark, and the 2nd being the Inspection Mark.)

PIPE FITTINGS:

All fittings 3" and larger shall be ductile or cast iron with mechanical joints. All fittings shall be constructed to AWWA standards and be a Domestic product. **All direct bury fittings shall be MJ fittings. Fittings in a vault shall be Flange**, unless approved by Avion Water Co.

THRUST/STRADDLE BLOCKS:

Will ONLY be used when specifically noted by Avion Water Co., All Thrust/Straddle block specifications shall be determined by the design engineer and approved by the inspector.

RESTRAINT JOINTS:

All fittings shall be restrained with EBBA Mega, or equivalent, restraint joints. Bell joint restraints shall be installed per manufacturer's installation specifications. Specifications on bell joint restraints will be given by the Avion Water engineering department or the inspector at the time of pre-construction or construction.

If using **class pipe**, restraint joints with **TRANSITION gaskets MUST be used**. MJ gaskets must be pipe type specific gaskets. No universal gaskets will be accepted.

All Tee's and Cross's shall have a 25ft minimum Restraint Length on all sides. (Does not apply to Hydrant Lateral Tee's without an in-line mainline valve.)

WATER AND PIPE FITTINGS cont'd

January 2026

VALVES:

All valves shall be iron and shall be of the resilient seated type, with non-rising stems, and a 2" square operating nut. Butterfly valves shall be used in all applications 14" and larger (**GV for 12" and lower**) except for live line taps. All valves shall be AWWA approved, and a Domestic product.

VALVE BOXES OR TUBES:

Valve tubes shall be, East Jordan 910 18" Top, Valve Tube, and cast-iron lid with "AVION WATER" cast into the lid. The riser pipe shall be a 6" 3034 PVC pipe. All valve boxes NOT set in asphalt shall be set in a 4" thick concrete pad, 18" width minimum.

Locate wires in Valve tubes shall run outside the 3034 Riser Sleeve and inside the 910 Cast Iron Valve tube.

METERS:

All meters 1, or smaller, shall be provided by Avion Water Co. All meters larger than 1" shall be approved by Avion Water Co., shall read in cubic feet, and be remote read. Must be **compatible** with **Mueller's Mi.Node AMR** System and must **include** the **Mi.Node Radio Transmitter Unit with Nicor connectors and external battery**.
All lines from the main line to the meter stop shall be no less than 1" in size.

Avion Water recommends all service lines to be sized to meet 50Gpm at the end of the service line. (i.e.: service line longer than 60ft, to be 1 ¼" min., longer than 200ft, to be 1 ½" min., longer than 400ft, to be 2" min.)

Multi-Family Dwellings – A Duplex and a Triplex, each unit or residence shall have its own meter. A Fourplex is the smallest multi-family dwelling that can be master metered. (Serving multiple units with one meter.)

All meters to be paid for by the customer or contractor.

FIRE HYDRANTS:

All Fire Hydrants shall be RED.
Fire Hydrants that are scratched or dull will need to be re-painted by the contractor prior to issue of final inspection letter. Paint must be Fire Hydrant Red or Solar Red.

Approval of this drawing set by Avion Water Company representative(s) (as well as any prior suggestions, comments, or feedback) do not relieve the developer, engineer, or contractor from responsibility to design and construct the water system in accordance with good engineering and construction practices, Avion specifications, and applicable laws. Field changes shall be made only with the written approval of Avion Water Company and the engineer of record. Responsibility for errors and omissions lies exclusively with the engineer of record. The developer has financial responsibility for any necessary changes required for any reason whatsoever.

Policy for Water Services

January 2026

1. All services and Backflow Prevention Assemblies (BPA) shall be installed in a professional manner. Using the following guidelines provided by Avion Water Co. Inc. Must adhere to OAR 333-061-0070, or Illustration drawings.

2. No service, meter, or backflow assembly that falls under our tariffs shall be in concrete or asphalt, unless approved by Avion Water. (Driveways, Sidewalks, or Streets)

3. All service lines, 1" to 1 ½" shall have a Corporation Stop.
   All service lines 2" and larger shall have a gate valve, with a valve tube, at the tap.

4. All 1" to 2" mainline taps shall use a Double strap Service Saddle.
   All corporation stops shall be either: **Mueller** or **A.Y. McDonald**

5. All 1", 1 ½" and 2" service lines will be copper, unless approved by Avion Water Co.

6. All meters and BPA's shall be between the curb and sidewalk, or in a P.U.E., or as approved by Avion Water Co. Inc. All BPA installations must adhere to OAR 333-061-0070.

7. All 1 ½" and 2", meters and shall be served by a 2" service line and 2" Gate Valve (GV), and **in their own box.**

8. All meters, 1 ½" and larger, shall have a meter screen.

9. All ¾" and 1", meters and BPA's, shall be **in the same box**.

10. All boxes for **¾"** and **1"** meter and BPA's shall be either:
    For non-traffic areas:
    OldCastle 17"x30"x18" Straight Wall Polymer Box (#17302030)
    w/ 17"x30" Black/Gray Plastic Lid w/CI Flip Reader (#17304172)
    For light traffic areas:
    OldCastle 17"x30"x18" Straight Wall Polymer Box (#17302030)
    w/ 17"x30" Polymer Concrete Lid w/CI Flip Reader
    Any other box shall have prior approval before installation.

11. All boxes for **1½"** and **2"** meter and BPA's shall be either: **Meters and BPA's shall be in their own box.**
    For non-traffic areas:
    NDS 17"x30"x18" Flared Wall Plastic Bpx (#126BCDMCIFB)
    w/ 17"x30" Black Plastic Lid w/CI Flip Reader
    For light traffic areas:
    Hubbell 17"x30"x18" Flared Wall Polymer Concrete Box (#PT1730BA18)
    w/ 17"x30" Polymer Concrete Lid w/CI Flip Reader (#PG1730WAR250)
    Any other box shall have prior approval before installation.

Policy for Water Services cont'd

January 2026

12. Material under meter boxes shall be compacted with a plate compactor or Jumping Jack, to prevent settling.

13. All fittings shall be sized for 1" meters.

14. All fittings shall be set at 12" below finish grade, and 14" to the top of the box.

15. All brass to be rated at 150 psi, or greater, and meet the new "lead free" rules. Must adhere to OAR 333-061-0087.

16. All 1" meter stops shall be full port, either: **Mueller** – 1" part # B24258
or **A.Y. McDonald** – 1" part # 74602BQ

17. All Services that have been cut down after the initial pressure test **shall** have the **compression gaskets replaced** prior to the 2nd pressure test.

18. All services shall be **Flow Tested**, 50gpm minimum. Avion Water recommends all service lines be sized to meet 50gpm at the end of the service line. (i.e.: service line longer than 60ft, to be 1 ¼" min., longer than 200ft, to be 1 ½" min., longer than 400ft, to be 2" min.)

19. All spacers shall be level and properly threaded into the meter nuts.

20. All services shall be inspected by Avion Water Co. Inc. before the subdivision is accepted.

21. **All trees must be planted 5ft min from any water meter.**

22. **For all banks of water meters, in groups of 3 or more:**

    Prior to Avion Water Co.'s acceptance, contractor shall attach an anodized aluminum label engraved or stamped with the address and lot number of the corresponding service line to the meter and to the meter box lid. Contractor to submit label cut sheets for Avion approval prior to ordering.

Chlorination, Pressure Testing and Flushing

January 2026

1. Chlorination shall adhere to AWWA standards C651, as well as OAR 333-061-0050 (10) Disinfection Standards. Avion Water shall adopt the Hot stick method for most chlorination's. (Physical separation between existing and new system) **3ft/sec min. Flushing Requirement. (See Chart below)**

2. After the pipe is disinfected, flushed to **No Chlorine Present**, and filled with Avion source water, bacteriological samples must be collected to determine the procedures' effectiveness. At least **two cycles of samples** must be collected from the new pipe. The first cycle of samples shall be collected at least 16 hours after flush (**16hrs to 24hrs**), and the second cycle of samples shall be collected **48hrs** after the **result** of the first bacteriological samples.

3. After the new mainlines pass all pressure and bacteriological tests, then the new system can be tied into the existing water system. All **tie in parts, valves, and fittings**, shall sit in a chlorine bath with a **50 mg/l** chlorine solution for a **minimum of 6hrs**. Any large diameter fittings or pre-built assemblies, that do not get a chlorine bath, shall be filled with a **50 mg/l** chlorine solution for a **minimum of 6hrs**. This process must ensure the least amount of air pockets as possible. All pipes shall be **swabbed** with a **200 mg/l** chlorine solution. Any pipe not being installed immediately shall have the ends covered (bagged) with plastic sheeting. Any **spray** solution shall be a minimum of **200 mg/l**. Sprayed and swabbed chlorine solution needs to sit for a minimum of **30 minutes**. OAR 333-061-0050 (10)(e)

4. All Service Lines shall be chlorinated, and pressure tested with the main system. When services are set above grade, during the initial test, there will be a 2nd pressure test after the services have been cut to the required grade specifications. **The meter stop compression gaskets MUST be replaced prior to the 2nd pressure test.**

5. Avion Water Co. reserves the right to choose the Contractor responsible for the Chlorination, Hot Tapping and Pressure testing procedures. **Avion Water Co. may require a different Contractor from the Pipe and Parts Supplier, to perform the Chlorination, Hot Tapping and Pressure Testing.**

6. After the Hot Stick tie in has been completed, a **2nd pressure test** may be required.

Chlorination, Pressure Testing and Flushing, cont'd

January 2026

When a new system has failed its first round of chlorination and Sampling.

1. Any samples fail after 1st chlorination. - Heavy flushing, exceeding 3ft/sec, and repeat sample procedure, same as after 1 chlorination. If there are still any failed samples, continue to a 2nd round of chlorination.

2. **2nd Chlorination** 70ppm – Heavy flushing is mandatory and 3 rounds of samples. Repeat sample procedure, same as after 1 chlorination. The 3rd round of samples will be minimum 72hrs after result of round 2.

   If any sample fails after 2nd chlorination, and there is E Coli present, the line shall be pigged with scrubbing and pusher pigs. Must use new pigs. Then the chlorination rounds process starts over, starting at Round 2 Chlorination.

   If any sample fails after 2nd chlorination. If Total Coliform Only, proceed to Round 3 chlorination.

3. **3rd chlorination** (70 – 100ppm) may be done, but this time it will have 4 rounds of samples. Will follow procedures after 1 and 2 chlorination's, and the 4th round of samples will be a full 7 days after the 3rd round of results.

   Any fails after 3 chlorination's the line shall be pigged with scrubbing and pusher pigs. Must use new pigs. Then the chlorination rounds process starts over, starting at Round 3 Chlorination.

   Example: 4 rounds of samples. 1st samples at 16-24hrs after flushing, 2nd samples at 48hrs after 1st result, 3rd samples at 72hrs after 2nd round results, and 4th samples at full 7 days after 3rd round results. That is a month of sampling after a 3rd round of chlorination.

4. If after pigging and 3 rounds of chlorination is still resulting in **any** failed samples, **removal of the entire water line** and starting over with water main installation, **shall be mandatory**.

   Approval of this drawing set by Avion Water Company representative(s) (as well as any prior suggestions, comments, or feedback) do not relieve the developer, engineer, or contractor from responsibility to design and construct the water system in accordance with good engineering and construction practices, Avion specifications, and applicable laws. Field changes shall be made only with the written approval of Avion Water Company and the engineer of record. Responsibility for errors and omissions lies exclusively with the engineer of record. The developer has financial responsibility for any necessary changes required for any reason whatsoever.