2.9.1 General Criteria for Water, Reclaimed Water, and Wastewater Systems

A. Easements

1. Easements for water, reclaimed, and wastewater infrastructure shall be a minimum of 15 feet wide, or twice the depth of the infrastructure, measured from finished grade to infrastructure flowline, whichever is greater. Infrastructures shall be centered on the easement. Narrower easements will be considered where the Engineer provides evidence, to the satisfaction of AW, that maintenance activities will not be hindered by the reduced width. If fill is placed over an existing easement, the easement width will need to be adjusted to meet the minimum width requirements. When water, reclaimed water and wastewater infrastructures are located outside of the right-of-way, they shall be within a dedicated utility easement. See UCM 2.9.1.A.4 for exclusive water utility vault easement requirements.

2. Easement documents and the metes and bounds shall be reviewed and approved by AW Pipeline Engineering prior to recordation in the real property records of the appropriate county. Easement recordation in the real property records of the appropriate county is required prior to AW approval of construction plans.

3. Private plumbing may cross a Public Utility Easement (PUE) or easement created for the purpose of installing underground public utilities, perpendicular or no more than 45° from the perpendicular. At no time shall private plumbing be allowed to run in parallel with and within the easement boundaries.

4. All AW vaults within the ROW or easements require a minimum 5-foot exclusive space around and under the vault structure. With exception of an associated irrigation service, all other existing or proposed underground utilities, appurtenances, and structures shall adhere to this exclusive space criteria. AW maintained vaults outside of the ROW shall utilize an Exclusive Water Line Vault Easement.

B. Horizontal and Vertical Separation Distance

1. Main assignments in city streets must be coordinated with the AULCC. Assignments for these mains in county roads must also be approved by the county engineer. The separation between these mains must comply with the TCEQ rules. Assignments for these mains to be located within State or Federal Highway Right-of-Way shall also be approved and permitted by the Texas Department of Transportation (TxDOT). All

separation distances shall be from outside diameter of the pipe to outside diameter of the pipe (OD to OD).

2. A minimum horizontal separation of 5 feet shall be maintained between existing or proposed AW infrastructure and all other non-AW infrastructure in order to maintain trench integrity. ***On residential development projects, a*** ~~A~~ minimum horizontal separation ***of 3 feet may be allowed*** between water, reclaimed water and wastewater service lines and dry utility service~~s~~ ***lines*** ~~shall be 3 feet~~.

3. A minimum vertical separation of 12 inches (or 6 inches, only if approved by AW due to an unavoidable utility conflict) shall be maintained when water, reclaimed water and wastewater mains are located above non-AW infrastructure. Regardless of the vertical separation, the bedding of an existing water, reclaimed water and wastewater main, if disturbed, shall be reestablished using Controlled Low Strength Material (see Standard Specification Item 402S) that completely fills the excavation beneath the main and extends vertically to the spring line of the main.

   A minimum vertical separation of 18 inches (or 12 inches, only if approved by AW due to an unavoidable utility conflict) shall be maintained when water, reclaimed water and wastewater mains are located below non-AW infrastructure. When a new water or reclaimed water main crosses under an existing wastewater main or lateral, the water or reclaimed water main shall be encased in steel encasement at least 18 feet in length centered on the wastewater main and the encasement shall contain full-circumferential welded joints. No other form of encasement, including cement stabilized sand, will be allowed. A minimum vertical separation of 12 inches shall be maintained between the existing wastewater main and the top of the pipe within the steel encasement. When a water, reclaimed water or wastewater main is below 42 inches or larger storm drain, the main shall be steel encased with a minimum vertical separation of 18 inches between the top of the pipe within the steel encasement and storm drain. The encasement shall extend horizontally a minimum of 5 feet beyond the OD or edge of the storm drain. A minimum vertical separation of 18 inches shall be maintained for utility crossings by trenchless methods when crossing above water, reclaimed water and wastewater mains. See UCM 2.9.2.B.17 for instructions on trenchless methods when crossing under water mains. Regardless of the vertical separation, any bedding material for an existing water, reclaimed water and wastewater main above or beside the main that has been removed or disturbed shall be replaced with bedding material meeting Standard Specification Item 510 to a depth of at least 12 inches above the top of the main.

C. Location of Mains and Services in the Proximity of Street Trees and Planting Zones.

"Street Tree Utility Gap/Utility Gap" refers to the area between street tree planting zones where utility services will be located.

Where Street Trees are placed within the right-of-way, root barriers shall be placed on all sides of the planting zone where AW mains and/or services are located. Root barriers shall be installed no closer than 7 feet from the tree trunk. Utilities shall be placed no closer than 2 feet from the root barrier. In no circumstances shall utility infrastructure be placed within the planting zone. Where "Street Tree Utility Gaps" are located between planting zones, the gap shall be a minimum of 8 feet wide between root barriers. Additional width will be required to allow for multiple utilities to be placed within the "utility gap."

D. Encasement Piping.

Encasement piping less than 24 inches diameter shall begin and end no closer than 3 feet to an adjacent appurtenance or connection. Encasement piping 24 inches diameter and larger shall begin and end no closer than 5 feet to an adjacent appurtenance or connection."

E. Structures in the Right of Way and In Easements

The design and construction of retaining walls, bridges, culverts, headwalls, junction structures, screening walls, and stormwater drainage pipe within the vicinity of AW utilities shall be in compliance with SECTION 13 ***of the COA's Transportation Criteria Manual.***

2.9.2 Water Systems

B. Mains

1. While looped systems are required, it is recognized that in certain situations, installation of dead end pipe may be necessary. When a dead end section of water main is approved for installation, the following requirements must be met:

    a. A gate valve shall be installed near the end of the main followed by an appropriate length of one joint of restrained pipe and a plug with a 1 inch or larger tap. Thrust blocking shall not be used as restraint at the end of the main. The engineer shall determine the necessary length of restraint on each side of the valve that will keep the main in place for future extension when the plug is removed. No services may be installed between the valve and the plug.

    b. Adequate water circulation must be provided to achieve turn-over of water in the dead end main every 72 hours. Until such time as water demand from active services on the dead end section of main results in the 72 hour turn over, an approved automatic flushing device must be installed and programmed such that the 72 hour criterion is met.

2. Water mains should normally be located on the high side of the street***. When required to satisfy 2.9.2.D.9, 2.9.2.E.8, or 2.9.3.D.10, water mains shall be installed on both sides of divided roads or highways. Divided roads or highways are where opposing lanes of vehicular traffic are currently or planned to be separated by a median, railroad tracks, or other vehicle obstruction***.

3. Piping materials and appurtenances shall conform to COA Standard Specifications and AW's Standard Products List (SPL).

4. Minimum depth of cover over the uppermost projection of pipe shall be at least 48 inches below proposed ground elevation. If fill or embankment placed over existing water mains or services exceeds 4 feet or results in a final depth exceeding two times the easement width if applicable, AW review and approval is required. If a cut over the existing mains or services results in less than minimum cover, AW approval is required. If manholes, valves, hydrants, meters, cleanouts, etc. are located within the cut or fill area(s), adjustment must be made to match final grade and plans must be reviewed and approved by AW and the construction inspected by the City. If the fill is located on top of an existing easement, see Section 2.9.1.A.1.

5. For mains 16 inches in diameter and larger and on smaller mains where appropriate, hydrants or drain valves shall be placed at low points and on the up-slope side of all valve locations.

6. All fire lines shall have a gate valve on the line at the connection to the main line and a backflow preventer inside the property line, but accessible for inspection by City personnel. All unmetered fire lines shall have an AW approved flow detection device. This flow detection service shall be located such that no more than 100 gallons of water is contained between the device and the point where the fire line is connected to the City's main.

7. The Engineer is responsible for determining the size and type of air release valves necessary to assure the water system operates properly based upon the water system characteristics and shall provide calculations determining the size and type of valves for review by AW when requested. Air release valves may be necessary on any size of main. Minimally, on water mains 16 inches in diameter and larger and on smaller mains where appropriate, combination air valves will be

placed at all high points and air/vacuum valves shall be placed at the down-slope side of all gate valve locations. Air/vacuum and vacuum release valves shall be approved on a case-by-case basis. All mains 24 inches and larger will include an 18-inch outlet with flange including a 1-inch corporation (minimum) for installation at high points where the installation of an air release valve (ARV) would be necessary. In the absence of an ARV requirement, an 18-inch outlet with flange including a 1-inch corporation shall be placed every 2,500 feet. Proposed waterline connections to air release valve piping are prohibited.

8. Joint restraint for pipes larger than 24 inches diameter shall be by use of integral, factory joint restraint systems. External mechanical joint restraint devices are allowed at all sizes of valves and fittings. Joint restraint for ductile iron pipes 24 inches and smaller may be by joint restraint gaskets.

9. Joint restraint shall be provided for all pipe bends and where necessary when joint deflection is utilized. A minimum safety factor of 1.5 shall be used when calculating restrained water pipe length. When joint restraint is required in intersections, extend the joint restraint, at a minimum, to the point of curvature (PC) of the curb line. Notes shall be placed in both plan and profile views and shall include at a minimum the type of restraint to be utilized and the beginning and ending stations of the restraint. Cast Iron and Asbestos Concrete Pipes cannot be mechanically restrained and shall be removed and replaced with Ductile Iron Pipe or PVC C-900 pipe to ensure adequate restraint. Concrete thrust blocking may be approved on a case by case basis. In cases where concrete thrust blocks are utilized, at a minimum the Engineer shall include block dimensions and locations on the plans. The proximity of other utilities and structures must be taken into account when specifying the use of thrust blocking. The use of thrust blocks will be prohibited in the downtown area (Loop 1 to I35 and Lady Bird Lake to 30th Street). All pipes, valves, and fittings, greater than 2 inches in size, installed in the TxDOT Right-of-Way (ROW), Austin Bergstrom International Airport (ABIA) property and University of Texas property shall be restrained ductile iron pipe.

10. Allowable pipe sizes. The following sizes will be the only sizes allowed for new watermains: 4 inches (see Section 2.9.2.A.4.a), 6 inches (fire-hydrant leads and services only), 8 inches, 12 inches, 16 inches, 24 inches, 30 inches, 36 inches, and 42 inches. Larger sizes may be approved on a case by case basis.

11. Connections 4 inches and larger of new mains to existing mains shall be made by cutting in a tee. Tapping sleeves may be allowed in lieu of cutting in a tee on a case-by-case basis. Full-body tapping sleeves shall be used. A tapping sleeve will not be allowed if the materials and conditions of the existing main preclude tapping. "Size on size" taps will not be permitted, unless made by use of an approved full bodied mechanical joint tapping sleeve. Reconnection to existing tapping sleeves shall not be allowed.

12. Wyes are not allowed on waterlines.

13. The maximum bend for waterlines is 45 degrees.

14. All potable water mains shall be constructed of ductile iron or PVC pipe. For ductile iron pipes, Pressure Class 350 minimum for pipe 12-inch diameter and smaller and Pressure Class 250 for pipes greater than 12-inch diameter shall be used. For PVC pipe 16-inch diameter and smaller conforming to the requirements of AWWA C-900, DR 14 shall be acceptable. Alternative pipe materials may be considered on a project by project basis.

15. All potable water pipe within utility easements on private property shall be Ductile Iron Pipe, Pressure Class 350 minimum for pipe 12-inch diameter and smaller and Pressure Class 250 minimum for pipes greater than 12-inch diameter. AWWA C-900 pressure class 305 (DR14) potable water line pipe may be considered to be installed within utility easements on private property only when it meets the following criteria:

    a. The finished surface of the water line easement over the potable water line must be paved. Where the water pipe is under HMAC or Portland cement concrete pavement designed structurally for automobile and truck traffic per the Geotechnical report, PVC pipe may be allowed just in those paved areas, provided it can be demonstrated that the pipe will not be damaged by construction traffic if it does not maintain a minimum of 48 inches of cover.

    b. The potable water line must maintain a minimum 48 inches of cover over the uppermost projection of pipe to the finished grade.

    c. The plan and profile must clearly identify the potable water line size, material type and class as well as the paved finished grade.

16. Changes in alignment in water lines, both horizontal and vertical, shall be achieved by deflection of joints or by use of fittings. Deflection of pipe joints at fittings is only allowed on ductile iron pipes. Longitudinal bending of pipe is not allowed. Deflection of joints in ductile iron pipe shall not exceed manufacturer's maximum allowable deflection. For PVC pipe, the deflection at pipe joints shall not exceed 1°, or the manufacturer’s maximum allowed deflection, whichever is less.

17. Utility crossings constructed under water lines by trenchless methods are allowed only if the distance between the outside surface of the water line and the top, crown, or roof of the excavation made for the crossing utility is at least two times the diameter or horizontal span of the trenchless excavation below the water line, or 36 inches, whichever is larger. The trenchless method shall support the advancing face and roof or crown of the excavation at all times when within a horizontal distance of 10 feet of the water line.

18. Utility crossings constructed under water mains by open cut methods are not allowed if the water main consists of asbestos cement pipe or cast iron pipe with lead caulk joints. In those instances, the main must be removed and replaced to accommodate construction of the subject utility. Replacement will be with new pipe of the type currently used in the AW system for comparable size pipe. In lieu of replacing the main, the Engineer may provide a design detail showing how the main shall be supported during the open cut method when the trench under the water main is 3 feet or less in width.

19. Bedding and backfill for that portion of a utility installed by open cut construction under and within 5 feet horizontally of a water main shall be made using controlled low strength material from the bottom of the subject utility to the bottom of the bedding envelope of the water line even if that water line is removed and replaced as described above.

20. Connections to Concrete Steel Cylinder Pipe.

    a. Special Details are required to show materials and method of connecting proposed water mains to existing Concrete Steel Cylinder, or CSC, water mains.

    b. Connections to Bar-Wrapped CSC Pipe shall be made by cutting and removing an appropriate pipe segment, and replacing with Ductile Iron fittings, valves, or pipe, using appropriate CSC to DI steel transition adapters and steel butt straps.

c. Connections to Prestressed Concrete Cylinder Pipe shall be by removing entire pipe segments, joint to joint, and replacing with Ductile Iron pipe or welded steel pipe, as designated by AW, using appropriate bell-to-Mechanical Joint Plain End (MJPE) and spigot-to-MJPE transition adaptors.

21. Mains shall be located so that isolation valves, air valves, and hydrants will be readily accessible during their service life for maintenance and operations personnel and equipment.

C. Valves (gate valves for isolation purposes)

1. There shall be a valve on each fire hydrant lead restrained to the main using bolt-through types of connections between the valve and the branch outlet from the main. These and all valves 24 inches and smaller shall be resilient seated gate valves.

2. Valves shall be located at the intersection of two or more mains and shall be spaced so that no more than thirty customers will be without water during a shutout. Water mains designated by Systems Planning for distribution, up to and including 24 inches in diameter, shall be valved at intervals not to exceed 500 feet in high-density areas and 1,200 feet in residential areas. Water mains 24 inches and larger designated by Systems Planning for transmission shall be valved at intervals not to exceed 2,000 feet or at a branched water main connection, whichever is less. High density areas shall consist of inside the Downtown Area Project Coordination Zone, commercial areas CBD, DMU, W/LO, CS, and CH or residential areas mixed with multifamily (MF) zoning designations MF-4, MF-5, and MF-6 as defined and described in the Land Development Code.

3. For valves at the end of dead end mains, see Section 2.9.2.B.1.a.

4. Branch piping (both new and future branches) shall be separated from the main with gate valves.

5. For all mains, valves at intersections shall be placed at point of curvature (p.c.) of the curb line.

6. Valves shall be located so that isolating any segment of water main requires closing of no more than three valves.

7. The operating nut or extension of any valve shall be between 18 inches and 24 inches below finished grade.

8. Valves with valve extensions and those at pressure zone boundaries shall be equipped with a locking type debris cap.

9. Each valve that is 16 inches and smaller in diameter shall be supported by a pre-cast or cast-in-place concrete pad conforming to details in COA valve installation Standards. Each valve that is 24 inches and larger in diameter shall be supported by a monolithic, cast-in-place reinforced concrete foundation conforming to project-specific detailed structural drawings. Cast-in-place supports shall not interfere with access to any nuts or bolts at the connecting pipes.

10. Valves having "push on" joints are not permitted for fire hydrant leads and laterals.

11. Butterfly valves shall not be allowed.

12. Water mains shall be designed so that valves can be installed vertically unless conditions dictate otherwise.

13. Water mains installed under TxDOT ROW, railroad ROW, or any flowing or intermittent stream, creek, river or semi-permanent body of water (water crossing), except when installed by

horizontal directional drilling technology (or HDD), shall be installed in a steel pipe encasement with spacers, pipe joint restraint and factory end seals. The crossing design shall include the installation of a drain valve assembly at the lowest point in the crossing, and an isolation valve at the high point on each side of the crossing with a CARV installed on the downslope side of each valve.

Water crossings shall conform to current COA Erosion Hazard Zone (EHZ) crossing criteria.

14. Valve operators shall be located a minimum of 24 inches from an existing property line.

15. Valves, regardless of their intended purpose, shall be located so that during their design service life they will be readily accessible for maintenance and operations personnel and equipment.

D. Fire Hydrants

1. Hydrants shall be installed at the intersection of two streets and between intersections where necessary, at distances not in excess of 300 feet between hydrants in commercial or other high-density areas and not more than 600 feet in residential areas.

2. Hydrants shall be installed on both sides of all divided road***s*** ~~/~~***or*** highways ***(as defined by 2.9.2.B.2) if required*** to provide adequate firefighting coverage. ~~Roads/highways where opposing lanes of traffic are separated by a vehicle obstruction shall be considered a divided road/highway.~~

3. The entire fire hydrant assembly shall have restrained joints.

4. Fire hydrants shall not be designed to be within 9 feet in any direction of any wastewater main, lateral, or service regardless of material of construction.

5. Fire hydrants shall be designed so as not to interfere with sidewalk ramps, trash receptacles, and street light and signal pole foundations.

6. To avoid sidewalks, ramps, and other features, fire hydrants placed near a street corner should in general be located outside the curve radius and a minimum of 4 feet from ramps. Exceptions may apply in existing neighborhoods or long (>5 feet) radius curb return.

7. Placement of fire hydrants should take into consideration above ground improvements, landscaping, critical root zones, grades and other utilities.

8. In existing neighborhoods, new fire hydrants should be placed as close as possible to the existing fire hydrant locations with the exception of new hydrants needed to meet minimum spacing requirements.

9. Fire hydrants should be placed on the short side of the street where possible unless there are site constraints. ***Fire Hydrant lead lines shall not cross a divided road or highway (as defined by 2.9.2.B.2) or exceed 55 feet in length.***

10. When fire hydrants are subjected to pressures above 150 psi, they shall have an attached PRV installed and set to reduce the operating pressure of the fire hydrants below 150 psi.

11. When new water lines are installed along with new fire hydrant leads, the drawings shall indicate existing fire hydrants are to be replaced with a new one, if the existing fire hydrant is older than 10 years old.

12. Fire Hydrants shall not be designed in such a manner as to provide fire flow for developments served by other water utility service providers.

13. Fire hydrants shall be located so that during their design service life they will be readily accessible for maintenance and operations personnel and equipment.

E. Services

1. Water services shall be in accordance with COA Standard Details.
2. Individual meter services and fire lines will not be taken from transmission lines. Transmission lines are generally considered to be 24 inches in diameter or larger.
3. Water meters shall be placed within the public ROW or in an easement immediately adjacent to the ROW. Meters may not be located inside fences and must be accessible by vehicle. Water meter boxes and its appurtenances are not allowed in sidewalks, paved areas, driveways or load bearing pavement.
4. Service taps to the main shall have a minimum separation distance of 3 feet.
5. Service taps, regardless of type, shall not be made in vaults.
6. Domestic water services shall not be supplied from fire hydrant leads.
7. Per the Texas State Department of Health Services, hospitals shall have no less than two approved potable water services that are installed in such a manner as to prevent interruption of service. The two services shall be from two different water mains, if possible, and separated by a gate valve. If served by the same main, the services shall be separated by a gate valve on that main.
8. ***Individual water meter services and fire lines shall not cross a divided road or highway (as defined by 2.9.2.B.2) or exceed a length of 55 feet from the water main to the water meter.***

Source: Rule No. R161-16.03, 5-25-2016 ; Rule No. R161-16.18 , 11-28-2016; Rule R161-17.18 , 11-28-2017; Rule No. R161-18.12 , 9-14-2018; Rule No. R161-19.12 , 5-15-2019; Rule No. R161-19.18 , 11-13-2019; Rule No. R161-20.11 , 8-14-2020; ordbank" web="yes">Rule No. R161-21.15 , 5-14-2021; Rule No. R161-21.25 , 11-10-2021.

2.9.3 Reclaimed Water Systems

D. Services

1. Reclaimed water services shall be in accordance with City of Austin Standard Details.
2. The plans shall show the locations of backflow prevention assemblies.
3. The plans shall show irrigation lines, sizes, and specify pipe color (purple). All sprinkler heads and sprinkler control box covers shall be purple.
4. The plans shall show reclaimed meter locations and specify a color (purple).
5. Services for cooling towers or interior building use shall have a separate meter.
6. Meter boxes and vaults shall be square or rectangular with "Reclaimed Water" cast into the lid.
7. Reclaimed water meters shall be placed within the public ROW or in an easement immediately adjacent to the ROW. Meters may not be located inside fences and must be accessible by vehicle. Reclaimed water meter boxes and its appurtenances are not allowed in sidewalks, paved areas, driveways, or load bearing pavement.
8. Service taps to reclaimed mains shall be separated from other taps and pipe joints by a minimum distance of 3 feet.
9. Service taps, regardless of type, shall not be made in vaults.
10. ***Individual reclaimed water meter service lines shall not cross a divided road or highway (as defined by 2.9.2.B.2) or exceed a length of 55 feet from the reclaimed water main to the reclaimed water meter.***

Source: Rule No. R161-14.05, 2-20-2014 ; Rule No. R161-18.13 , 9-14-2018; Rule No. R161-19.13 , 5-15-2019; Rule No. R161-19.18 , 11-13-2019; Rule No. R161-20.11 , 8-14-2020; ordbank" web="yes">Rule No. R161-21.15 , 5-14-2021; Rule No. R161-21.25 , 11-10-2021.