

RULE NO.: R161-21.25**NOTICE OF RULE ADOPTION****ADOPTION DATE: November 10, 2021**

By: Greg Meszaros, Director
Austin Water

The Director of the Department of Austin Water has adopted the following rule. Notice of the proposed rule was posted on October 6, 2021. Public comment on the proposed rule was solicited in the October 6, 2021 notice. This notice is issued under Chapter 1-2 of the City Code. The adoption of a rule may be appealed to the City Manager in accordance with Section 1-2-10 of the City Code as explained below.

This Notice of Rule Adoption was posted on the City website by the City Clerk. Date and time stamp are on the front of the notice.

EFFECTIVE DATE OF ADOPTED RULE

A rule adopted by this notice is effective on November 10, 2021.

TEXT OF ADOPTED RULE

The adopted rule contains no changes from the proposed rule.

R161-21.25: Proposed revision to the UCM 2.5.1, 2.5.2, 2.5.3, 2.9.2, & 2.9.3

Rule 1 – UCM 2.5.1, 2.5.2, 2.5.3, 2.9.2 & 2.9.3

- **Section 2.5** – Change City to Austin to the acronym COA throughout this section.
- **Section 2.5.1.A** – Require all final designs be submitted in CAD format.
- **Section 2.5.1.D** – Remove this sentence because it is obsolete.
- **Section 2.5.1.E** – Correct the name of the Planning and Development Review Department to Development Services Department.
- **Section 2.5.2.A.1** – Add “service” between “proposed connections” for clarification.
- **Section 2.5.2.A.2** – Remove the requirement of the Design Engineer and require AW project number.
- **Section 2.5.2.A.2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 14, and 15** – Remove “shall be shown” in all these sections. The phrase is redundant since it says at the beginning “All plan view drawings shall include all applicable items listed in the General Requirements above plus the following items:”
- **Section 2.5.2.A.16** – Require the locations of existing pipe joints and sections to be removed for CSC and Welded Steel pipes.
- **Section 2.5.2.C** – Add the requirements for Special Details to show materials and method of connecting proposed water mains to existing CSC water mains.

- **Section 2.5.3.A.1** – Add “service” between “proposed connections” for clarification and remove GIS numbers to be consistent with 2.5.2.
- **Section 2.5.3.A.2** – Remove the requirement of the Design Engineer and require AW project number.
- **Section 2.5.3.A.8** – Remove this sentence since state field book notes are no longer required.
- **Section 2.9.2.B.11** – Add information to forbid reconnections to existing tapping sleeves. This rule will prevent bad connections that can leak.
- **Section 2.9.2.B.20** – Add information of the design requirements for Engineers to connect a proposed main into an existing CSC main.
- **Section 2.9.2.C.1** – Add language to require bolt-through types of connections between the valve and the branch outlet.
- **Section 2.9.2.F.2** – Add language to provide the waiver requirements for needing an additional meter.
- **Section 2.9.2.F.6** – Add language to provide the requirements of the new automated metering infrastructure technology.
- **Section 2.9.3.E** – Add language to provide the requirements of the new automated metering infrastructure technology.

The adopted rule contains no changes from the proposed rule. This Notice of Rule Adoption was posted on the City website by the City Clerk. Date and time stamp is on the front of the notice.

SUMMARY OF COMMENTS

Austin Water did not receive comments regarding the rule adopted in this notice.

AUTHORITY FOR ADOPTION OF RULE

The authority and procedure for adoption of a rule to assist in the implementation, administration, or enforcement of a provision of the City Code is provided in Chapter 1-2 of the City Code. The authority to regulate the installation of water and wastewater facilities is established in the Texas Local Government Code Section 552.001 and Title 15 of the City Code.

APPEAL OF ADOPTED RULE TO CITY MANAGER

A person may appeal the adoption of a rule to the City Manager. **AN APPEAL MUST BE FILED WITH THE CITY CLERK NOT LATER THAN THE 30TH DAY AFTER THE DATE THIS NOTICE OF RULE ADOPTION IS POSTED. THE POSTING DATE IS NOTED ON THE FIRST PAGE OF THIS NOTICE.** If the 30th day is a Saturday, Sunday, or official city holiday, an appeal may be filed on the next day which is not a Saturday, Sunday, or official city holiday.

An adopted rule may be appealed by filing a written statement with the City Clerk. A person who appeals a rule must (1) provide the person's name, mailing address, and telephone number; (2) identify the rule being appealed; and (3) include a statement of specific reasons why the rule should be modified or withdrawn.


Notice that an appeal was filed and will be posted by the city clerk. A copy of the appeal will be provided to the City Council. An adopted rule will not be enforced pending the City Manager's decision. The City Manager may affirm, modify, or withdraw an adopted rule. If the City Manager does not act on an appeal on or before the 60th day after the date the notice of rule adoption is posted, the rule is withdrawn. Notice of the City Manager's decision on an appeal will be posted by the city clerk and provided to the City Council.

On or before the 16th day after the city clerk posts notice of the City Manager's decision, the City Manager may reconsider the decision on an appeal. Not later than the 31st day after giving written notice of an intent to reconsider, the City manager shall make a decision.

CERTIFICATION BY CITY ATTORNEY

By signing this Notice of Rule Adoption R161-21.25, the City Attorney certifies that the City Attorney has reviewed the rule and finds that adoption of the rule is a valid exercise of the Director's administrative authority.

REVIEWED AND APPROVED



Greg Meszaros, Director
Austin Water

Date: 10/27/2021

Deborah Thomas for

Anne L. Morgan
City Attorney

Date: 11/1/2021

2.5.0 - CONSTRUCTION PLAN INFORMATION AND SUBMITTAL REQUIREMENTS

2.5.1 - General

- A. Construction plans for water, reclaimed water, and wastewater service shall be submitted to Austin Water's (AW) Utility Development Services (UDS) - Pipeline Engineering for verification of conformance to ~~the~~ City of Austin **(COA)** Standards and Specifications. All plat, preliminary plan, site plan and subdivision construction cases shall be submitted in PDF (.pdf) format to allow electronic review by AW. Any other file type(s) submitted **for review purposes** will be rejected. **In addition to providing PDF files, all final designs shall be submitted in Computer-aided design (CAD) format as follows: For AW funded Capital Improvement Projects, CAD files shall be in accordance with the COA Public Works Department Engineering Services Division Design CAD Standards Manual (<http://austintexas.gov/departments/engineering-services-division>), as amended, prior to AW approval; For water, wastewater, and reclaimed water infrastructure projects that are not AW funded Capital Improvement Projects, final designs shall be submitted in a CAD format (not necessarily using the City's CAD standards) prior to AW approval. Plans in CAD format shall only apply to base files and not sheet files (plan and profile) for all projects in which AW infrastructure is relocated, constructed, abandoned, or repaired.** The Pre-Construction Meeting must occur within two years of the date of AW plan approval, otherwise they must be resubmitted to the AW review team to ensure compliance with any changes in requirements related to health and safety.
- B. If the provider of service is a Municipal Utility District (MUD), Water Control and Improvement District (WCID) or private utility corporation, then prior approval by the provider of service is also required.
- C. Plans submitted to AW must show approved easements and/or permits on highway and/or railroad crossings.
- ~~D. A Development Permit must be obtained from the Planning and Development Review Department prior to final plan approval.~~
- ~~E~~**D.** Plans that include fire lines must ~~have~~ **obtain** approval by the City of Austin Fire Department and the ~~Planning and Development Review~~ **Services** Department.
- ~~F~~**E.** All water, reclaimed water, and wastewater plans will include the following items:
1. Engineer's dated signature and seal of a Professional Engineer licensed in the State of Texas on each plan sheet.
 2. Date of Plans and revisions.
 3. North arrow and scale must be shown. The standard horizontal scale for plan and profile sheets shall be 1" = 40', 30' or 20' for the plan view. The vertical scale shall be 1" = 4', 3' or 2', respectively. The same scale shall be used on all plan and profile sheets. For sheets other than plan and profile, horizontal scales of 1" = 40', 30' or 20' may be used as appropriate. Where relevant and applicable, a scale of 1" = 10' for plan views and a scale of 1" = 1', 2', 3', 4', or 5', as needed to fit the area on the page and provide the most clarity for profiles, shall be used for detailed water, reclaimed water, and wastewater connections, designs, utility crossings, and/or special detail drawings. The minimum size for plan and profile sheets shall be 22" x 34". Plan view and associated profile shall appear on the same sheet with the plan view at the top half of the sheet.
 4. A general location map, showing MAPSCO and grid numbers.
 5. Current standard ~~City of Austin~~ **COA** Water and Wastewater construction notes.
 6. Indicate on the cover sheet, the subdivision file number, include a copy of the service extension form, and show all required permit numbers such as development permit, Texas Department of Transportation permit, railroad crossing permit, etc.
 7. Volume and page number of recorded easement and of any temporary working space.

8. For sites and subdivisions, show GIS numbers of all existing mains and appurtenances. For City-funded, City-reimbursed, and City-cost-participation projects, show GIS numbers for all existing and proposed mains and appurtenances.
 9. Property lines and dimensions, legal description, lot and block numbers, right-of-way dimensions, and curb and sidewalk locations and street names.
 10. Location, size, and material of all existing and proposed water, reclaimed water, and wastewater mains, lines and services with respect to easements and rights of way. Existing and proposed mains 24 inches and larger shall be shown by double lines indicating pipe outside diameter. The direction of flow in the wastewater mains shall be indicated on the drawings. ~~City of Austin~~ **COA** record drawings for potable water, wastewater, and reuse water may not be reliable. The Engineer is encouraged to collect subsurface utility data according to American Society of Civil Engineers (ASCE), Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data.
 11. Location, size, and description of other existing and proposed utilities within the limits of construction. Existing and proposed utilities 24 inches and larger shall be shown by double lines indicating the outside diameter.
 12. Curve data for roads, property lines, water, and reclaimed water lines.
 13. Final plat recording or land status report.
 14. Street address for all existing structures shall be shown on the lot(s) where the structures are located.
 15. Pressure zone designation for subject tract and zone boundaries where applicable.
 16. Where water, wastewater, and/or reclaimed water mains cross each other, details shall be shown to indicate compliance with TCEQ requirements.
 17. Typical cross sections showing multiple utilities proposed to be within private streets or easements.
 18. An index on the cover sheet or on the 2nd page of the drawings.
 19. Construction drawings shall contain Overall Location Maps and Key Maps for any individual water, reclaimed water, or wastewater line that requires three or more plan and profile sheets.
- GF.** Final plan approval may require additional authorizations such as:
1. Texas Department of Transportation permit.
 2. Railroad permit.
 3. Gas Company permit.
 4. Easement acquisition (Vol. and Page or document number listed on plans).
 5. County approval.
 6. Water District approval.
 7. Municipal Utility District approval.
 8. Texas Department of Health approval.
 9. Texas Commission on Environmental Quality.
 10. Non-occupancy letter.
 11. Service Extension approval.
 12. Planning and Development Review Department approvals.

Source: [Rule No. R161-17.06](#), 5-31-2017; Rule No. [R161-19.10](#), 5-15-2019; [Rule No. R161-19.18](#), 11-13-2019.

2.5.2 - Water and/or Reclaimed Water System Plans

- A. All plan view drawings shall include all applicable items listed in the General Requirements above plus the following items:
1. Stations of all proposed **service** connections to existing or proposed mains, if the service line is not perpendicular from the main to the property line.
 2. For proposed connections to mains or facilities to be constructed by others: identify the project by **project** name, **AW project number**, ~~the design engineer~~, and service extension **request** number.
 3. Station numbers for mains ~~shall be identified~~ for beginning points, ending points, points of curvature, points of tangent, points of reverse curve, points of intersection, valves, fire hydrants, other appurtenances and grade breaks.
 4. Station numbers ~~shall be identified~~ for the mains where they cross any other utility.
 5. Details of appurtenances ~~shall be shown~~.
 6. The location of all existing and proposed services, mains, valves, fire hydrants, water meters, and backflow preventers ~~shall be identified~~.
 7. One hundred year flood plain limits ~~shall be shown~~.
 8. Proposed and affected existing mains shall be labeled with design velocities at maximum day plus fire flow and at peak hour flow.
 9. Calculated design pressure at highest and lowest lot served ~~shall be shown~~.
 10. Location (beginning and ending station numbers) and type of thrust restraint ~~shall be shown on the plan view~~.
 11. Retaining walls, including geogrid, straps, tiebacks and all other components ~~shall be shown~~.
 12. Culverts, bridges, and other drainage structures ~~shall be shown~~.
 13. Fire hydrants, located so as not to conflict with ADA features, traffic signal foundations, sign supports, and other surface features.
 14. Geotechnical borings ~~shall be shown~~ (required for City funded projects only).
 15. Auxillary water sources, if any, ~~shall be shown~~.
 16. **If the existing main is CSC or Welded Steel, show locations of the existing pipe joints and the specific sections of the pipe that must be removed to accommodate the proposed connection.**
- B. A profile drawing shall be provided for all water mains, per Austin City Code, Section 14-11-173 (C)(2), showing all applicable items listed in the General Requirements plus the following items:
1. The existing ground profile and proposed street finish grade or subgrade.
 2. Station numbers and elevations of all utility crossings.
 3. Station numbers and soil geology information at stream crossings to evaluate the need for special surface restoration.
 4. Identify pipe size, percent grade and pipe material to be used including ASTM and/or AWWA designation. If an alternate material is to be allowed, both should be listed (example "DI. or DR14 PVC"). Lines must be included to indicate pipe flowline and crown.

5. Station numbers and elevations for starting points, ending points, point of intersection, grade breaks, valves, fire hydrants, air release valves, pressure/flow regulating valves and at intermediate points every 100 feet.
6. Retaining walls, including geogrid, straps, tiebacks, and all other components.
7. Culverts, bridges and other drainage structures.
8. Curb elevations at fire hydrant locations.
9. Geotechnical boring graphic symbols, showing subsurface materials (required for City funded projects only).
10. Locations by station of restrained pipe, indicating type of restraint.
11. Beginning and ending stations for encasement pipe (per UCM 2.9.1.D).
12. Air valve vaults, and piping from the main to the vault shall be included in the profile view. The rim elevation for the vault shall be shown along with the ground profile from the main to the vault.

C. Special Details are required to show materials and method of connecting proposed water mains to existing CSC water mains. CSC water mains may be either bar-wrapped pipe (B303, P303, or P381) or pre-stressed pipe (L301 or E301), each requiring a different connection method. It is important that the pipe type and, for pre-stressed pipe, the locations of pipe joints be determined and identified in the plans during the design phase because these pipes typically consist of long lay lengths, which may result in substantial removal and replacement of the existing pipe and/or relocation of the proposed tie-in point because of joint locations, all of which may be highly problematic if not determined prior to construction. The Special Detail shall include the following at a minimum:

1. **Pipe material of existing main;**
2. **Locations of existing pipe joints if the existing main is pre-stressed pipe;**
3. **Limits of existing pipe that must be removed and replaced to accommodate the proposed connection, including limits of required thrust restraint;**
4. **Identification of each piping component necessary to complete the tie-in, including material specifications for each component;**
5. **Identification of method used to connect proposed pipe to existing pipe, e.g., welding or MJ connections;**
6. **Special Notes related to the connection.**

Source: [Rule No. R161-17.06](#), 5-31-2017; [Rule No. R161-19.18](#), 11-13-2019.

2.5.3 - Wastewater System Plans

- A. All plan view drawings shall include all applicable items listed in the General Requirements mentioned above plus the following items:
 1. Station numbers ~~and GIS numbers~~ at all proposed **service** connections to existing or proposed wastewater mains if the service line is not perpendicular from the main to the property line.
 2. For proposed connections to wastewater mains or facilities to be constructed by others, identify the project **by project** name, **AW project number**, ~~the design engineer~~, and service extension **request** number.
 3. The location, alignment and structural features of the wastewater main, including manholes and concrete retards, if applicable.

4. Station numbers and GIS numbers for beginning points, ending points, manholes, clean-outs and other appurtenances.
 5. Details of all required appurtenances.
 6. Location of all existing and proposed wastewater services, mains and manholes.
 7. One hundred year flood plain limits.
 - ~~8. A reference noting the field book notes for the original survey.~~
 - ~~9.~~**8.** Retaining walls, including geogrid, straps, tiebacks and all other components.
 - ~~10.~~**9.** Culverts, bridges and other drainage structures.
 - ~~11.~~**10.** Locations of geotechnical borings (required for City funded projects only).
 - ~~12.~~**11.** Locations of bolted manhole covers.
 - ~~13.~~**12.** A plan view detail of the invert of each manhole or junction box having three or more pipes connecting to it, regardless of the pipe sizes, or when two pipes connect to a manhole at an angle other than 180 degrees from each other.
 - ~~14.~~**13.** Station numbers shall be identified for the mains where they cross any other utility.
- B. A profile view shall be provided for all wastewater mains and shall include all applicable items listed in the general requirements above plus the following items:
1. The existing ground profile and proposed street finish grade or subgrade or finished grade if not under pavement.
 2. Station numbers and elevations of all utility crossings.
 3. Station numbers and soil geology information at stream crossings to evaluate the need for special surface restoration.
 4. Identify the pipe size, percent grade and pipe material to be used including ASTM and/or AWWA designation. If an alternate material is to be allowed, both should be listed (example "DI or PVC"). Lines must be included to indicate pipe flowline and crown.
 5. Station numbers and elevations for starting points, ending points, manholes, clean-outs and at intermediate points every 100 feet.
 6. Elevations shall be indicated on the profile showing the finish floor elevations of all existing structures. If the structure has an active septic tank or other disposal system, the flow line elevation of the plumbing where it exits from the structure is to be indicated. If a lot or tract is vacant, side shots may be required from the middle of each lot to ensure gravity service is possible from the lot to the main.
 7. Peak dry weather flow and peak wet weather flow, as well as the associated velocities in each pipe.
 8. Retaining walls, including geogrid, straps, tiebacks and all other components.
 9. Culverts, bridges and other drainage structures.
 10. Rim elevations for manholes.
 11. Flow line elevations for all pipe connections at manholes and junction boxes.
 12. Geotechnical boring graphic symbols showing subsurface materials (required for City funded projects only).
 13. Beginning and ending stations for encasement pipe (per UCM 2.9.1.D).
 14. (NOTE: AW plan Approval shall expire three years from the date of current approval. If construction has not begun on the facility within three years of the approval date, Plans

must be resubmitted for approval and must include all criteria in effect at the time resubmitted.)

Source: [Rule No. R161-17.06](#), 5-31-2017.

2.9.2 - Water Systems

A. Size/Capacity Determination

1. General

- a. Hazen Williams Friction Coefficient $C = 80$, higher C coefficient may be used for new mains only upon approval by Austin Water (AW) with sufficient documentation to show effects of long-term use.
- b. Average day demand = 200 gal/person/day.
- c. Peak day demand = 530 gal/person/day.
- d. Peak hour demand = 900 gal/person/day.
- e. Pressure reducing valves (PRV), as required by the plumbing code, that are to be installed outside of the footprint of a building must be illustrated and identified on site utility plans and must be located on private property outside of any public utility easements.
- f. Minimum operating pressure is 50 psi at the highest elevation meter location using average day demand.

2. Peak Hour Demand Requirements

- a. The maximum allowable velocity shall not exceed 5 feet per second (fps).
- b. The minimum pressure at any point in the affected pressure zone must not be less than 35 psi.

3. Emergency Demand Requirements

- a. Emergency demands are considered to be fire flow requirement plus peak day demands.
- b. Fire flow requirements (flow rate and duration) will be determined in accordance with the City of Austin (COA) Fire Code and associated rules under City Code. Where the COA Fire Code does not apply, the fire flow requirement (flow rate and duration) will be determined by the regulating fire department.
- c. The maximum allowable velocity shall not exceed 10 fps.
- d. The minimum residual pressure at any point in the affected pressure zone at peak day plus fire flow must not be less than 20 psi.
- e. Required fire pumps, for high-rise buildings, as defined in the building code, shall be supplied by connections to a minimum of two water mains. The domestic water line will be allowed off one of the fire lines. Domestic water lines must be metered either after the fire line or along the fire line that includes the domestic water line. Separate supply piping shall be provided between each connection to the water main and the pumps. Each connection and the supply piping between the connection and the pumps shall be sized to supply the flow and pressure required for the pumps to operate.

Exception: Two connections to the same main shall be permitted provided the main is valved such that an interruption can be isolated so that the water supply will continue without interruption through at least one of the connections.

4. Sizing of Water Mains

- a. Computer modeling is preferred for sizing water mains. However, for water mains less than 16 inches in diameter other engineering calculation methods may be accepted. The largest size, as determined by comparing the service area's peak hour demand and peak day plus fire flow demand, shall be used. The minimum size for any street

type, however, will be governed by various factors which include fire protection requirements, high density land usage, and the designer's consideration of general system gridding, future transmission mains, neighboring developments and area configuration. Transmission line sizes will be determined on a case-by-case basis. Minimum main size shall be 8 inches with consideration for 4-inch pipe in cul-de-sacs less than 200 feet in length. Provisions must be made in these cases for a flush valve at the end of dead end lines.

- b. For purposes of water main sizing the emergency demand shall be assumed at a single point on the existing or proposed water main at the subject tract or development phase, unless otherwise approved by AW.
5. Storage Requirements - If it is determined by AW that additional storage is required, the following criteria shall be used:

Effective Storage = 100 gal/connection

Emergency Storage = 100 gal/connection

TOTAL STORAGE = 200 gal/ connection

Effective Storage is defined as storage, which will provide a minimum of 35 psi of pressure at the highest service elevation in pressure zone.

The Owner's Consulting Engineer may be required to provide computer simulations as determined on a case-by-case basis.

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.
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 2500 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) and Austin Bergstrom International Airport (ABIA) property shall be restrained.
10. Allowable pipe sizes. The following sizes will be the only sizes allowed for new water mains: 4 inches (see 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.
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. If the utility crossing under the water main is a water or wastewater service line, 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.
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 adapters.

C. Valves

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.
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.

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/highways 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.
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.

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.

F. Water Meters

1. Properties with two, three, or four individual dwelling units (attached or detached) shall have an individual AW water meter serving each dwelling unit. Dwelling units are defined as a residential unit providing independent living facilities. Accessory uses defined in the Land Development Code, are not viewed as dwelling units and will not be required to provide multiple meters.
2. **Commercial and Multi-family separate meter requirements:**
 - a. Except as provided by subsection b. of this section, c** Commercial and multi-family properties shall purchase and install a separate AW meter or meters to measure water used for all common areas and outdoor purposes, including swimming pools, fountains, permanently installed irrigation systems, and irrigation with quick-coupler hose bibbs.
 - b. Upon receipt of a completed application on a form approved by AW, AW may grant a waiver from this requirement if:** The potable water line must maintain a minimum 48 inches of cover over the uppermost projection of pipe to the finished grade.
 - 1) the development does not include any landscaping; or**
 - 2) a permanent automatic irrigation system does not exist nor is planned to be installed and multiple hose bibs are available for any necessary hand watering; or**
 - 3) commercial landscaping requirements do not apply to the property; or**
 - 4) there is impervious cover of 90% or more; or**
 - 5) the water is being used for a new fire in-line installation; or**
 - 6) air conditioning condensate or other alternative on-site water is being required to meet common areas and outdoor water demands; or**
 - 7) there has been a change of use for interior remodeling; or**
 - 8) well water is being used to meet all common areas and outdoor water demands.**
3. For properties with five or more attached or detached living units on a single lot, including mobile home communities, commercial facilities with multiple occupants, and/or multi-use facilities, that do not have public water meters for each unit, owners must comply with private submetering requirements established by plumbing code and/or TCEQ.
4. Requirements for meters 3 inches and larger
 - a. Bypasses shall be provided on all meters 3 inches and larger except those used for irrigation only.
 - b. Pipe and meter size shall be determined by Owner based upon plumbing code and AWWA Water Meter Standards. Plans must be prepared by a Licensed Engineer Registered in the State of Texas.

5. Fire Demand Meters (4"x2", 6"x2", 8"x2", 10"x2", 12"x2") shall be allowed only if domestic demand necessitates a domestic meter of 3 inches or larger. If domestic demand does not require a 3 inches or larger meter, required fire flow shall be provided via an appropriately sized dedicated fire line with a double check detector backflow prevention assembly per AW Standard Detail. For small fire demand applications where both fire demand and domestic demand can be provided with 2 inches or smaller meter, a single meter may be used for both fire and domestic.

6. New water meters, meter boxes, and meter box lids shall be in conformance with AW's automated metering infrastructure technology, and with the applicable standard product list. Applicants filing a tap plan will be responsible for the costs of extending AW's technology to the tract of land requiring service through the granting of an easement to the City as applicable. Applicants filing a site plan or subdivision plan will be responsible for the costs of extending AW's technology to the tract of land requiring service including technical assessments by AW and its agent; an easement granted to the City; poles, street lights, or other structures to locate a data collection units upon; and providing electrical service to the data collection units where solar power is not practical. AW or its agent shall determine the location of the data collection units, and perform the installation, and ongoing maintenance and repair of such infrastructure.

G. Reserved

2.9.3 - Reclaimed Water Systems

A. Size/Capacity Determination

1. General

- a. Hazen Williams Friction Coefficient $C = 100$ for ductile iron or 120 for plastic pipe.
- b. Maximum static pressure = 120 psi.

2. Peak Demand Requirements

- a. The maximum velocity shall not exceed 5 feet per second (fps).
- b. The minimum pressure at any point in a pressure zone shall not be less than 35 psi.
- c. Mains shall be sized to accommodate max day flows of:
 - i. 8100 gallons per irrigated acre.
 - ii. 28 gallons per ton of cooling.
 - iii. Indoor use based on fixture units.

3. Emergency Demand (Fire Flow) Requirements

None - fire flows are provided by the water system.

4. Plans shall include a detail of a reclaimed water identification sign. Plans shall show the posting locations for the sign.

B. Mains

1. Sizing of Mains - Computer modeling is preferred for sizing reclaimed water mains. However, for mains less than 16 inches in diameter other engineering calculation methods may be accepted. Standard main sizes are: 6 inches, 8 inches, 12 inches, 16 inches, 24 inches, 30 inches, 36 inches, 42 inches, and 48 inches.
2. All reclaimed water mains shall be constructed of ductile iron pipe, Pressure Class 350 minimum for pipe 12-inch diameter and smaller and Pressure Class 250 for pipe greater than 12-inch diameter. For mains 12-inch diameter and smaller, PVC pipe, conforming to the requirements of AWWA C-900, DR 14 shall be acceptable. Plans shall indicate that all mains and appurtenances shall be manufactured in purple, factory painted purple or bagged in purple. Color shall match Pantone 522.
3. Piping materials and appurtenances shall conform to City of Austin Standard Specifications, Standard Details, and AW Standard Products List (SPL).
4. Minimum depth of cover over the uppermost projection of the pipe and all appurtenances shall comply with City of Austin (COA) Standard Details. Maximum depth will be approved by AW for the specific materials, application and conditions. If fill or embankment placed over existing reclaimed water mains or services increases by more than 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 reclaimed water mains or services results in less than the minimum cover required by COA Standard Details, AW approval is required.
5. For mains of 16 inches and larger, drain valves shall be placed at low points.
6. On mains 12 inches in diameter and larger, automatic air release valves will be placed at all high points. Mains larger than 16 inches shall have an automatic air release valve placed at the down-slope side of all valve locations. Air/vacuum and vacuum release valves shall be approved on a case-by-case basis. All reclaimed mains 24 inches and larger will include an 18 inches outlet with blind flange installation at high points where the installation of an ARV would be necessary. In the absence of an ARV requirement, an 18 inches outlet with blind flange shall be placed every 2500 feet.

7. Dead-end mains shall terminate with a flushing device and flushing devices shall be installed as necessary to facilitate flushing of the system.
8. Mains shall have an approved flushing device located at the high point between main intersections.
9. Joint restraint for pipes larger than 16-inch diameter shall be by use of integral, factory joint restraint systems, or by restraint gaskets.
10. Joint restraint shall be provided for all pipe bends, reducers, and tees. When joint restraints are required in intersections, the joint restraints shall extend, 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.
11. 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) due to the congestion of utilities, structures and excavations in the right of way. Concrete thrust blocking may be approved on a case by case basis.
12. Connections of new reclaimed mains to existing reclaimed 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.

C. Valves

1. 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. Reclaimed Water mains designated by AW 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. Reclaimed Water mains 24 inches and larger designated by AW for transmission shall be valved at intervals not to exceed 2,000 feet or at a branched reclaimed water main connection, whichever is less.
3. At dead ends, gate valves shall be located one pipe length 10-ft. minimum from the end points of the main. The Engineer shall provide - and show drawings - complete restraint for all such valves, pipe extensions and end caps.
4. Branch piping (both new and future branches) shall be separated from the main with gate valves.
5. For all reclaimed 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 main intersection 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 City of Austin 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. Butterfly valves shall not be allowed.
11. Valve boxes and lids shall be square, with "Reclaimed Water" indicated on the lid.
12. Reclaimed water mains shall be designed so that valves can be installed vertically unless conditions dictate otherwise.
13. Reclaimed 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.

Reclaimed 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.

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.

E. ~~Reserved~~ **Automated Metering Infrastructure**

New reclaimed water meters, reclaimed meter boxes, and reclaimed meter box lids shall be in conformance with AW's automated metering infrastructure technology, and with the applicable standard product list. Applicants filing a tap plan will be responsible for the costs of extending AW's technology to the tract of land requiring service through the granting of an easement to the City as applicable. Applicants filing a site plan or subdivision plan will be responsible for the costs of extending AW's technology to the tract of land requiring service including technical assessments by AW and its agent; an easement granted to the City; poles, street lights, or other structures to locate a data collection units upon; and providing electrical service to the data collection units where solar power is not practical. AW or its agent shall determine the location of the data collection units, and perform the installation, and ongoing maintenance and repair of such infrastructure.