

RULE NO.: R161-19.18

NOTICE OF RULE ADOPTION

ADOPTION DATE: November 13, 2019

By: Greg Meszaros, Director
Austin Water

NOV 13 2019 AM 9:01

The Director of the Department of Austin Water has adopted the following rule. Notice of the proposed rule was posted on October 8, 2019. Public comment on the proposed rule was solicited in the October 8, 2019 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.

A copy of the complete text of the adopted rule is available for public inspection and copying at the following locations. Copies may be purchased at the locations at a cost of ten cents per page:

Austin Water, located at 3907 S. Industrial Dr., Ste. 236, Austin, Texas. See Mr. Eric Langhout, P.E.; and

Office of the City Clerk, City Hall, located at 301 West 2nd Street, Austin, Texas.

EFFECTIVE DATE OF ADOPTED RULE

A rule adopted by this notice is effective on November 13, 2019.

TEXT OF ADOPTED RULE

The adopted rule contains no changes from the proposed rule.

R161-19.18: Notice of Adoption to the UCM 2.5, 2.8, 2.9.2, 2.9.3, 2.9.4

UCM 2.5, 2.8, 2.9.2, 2.9.3, 2.9.4

- Section 2.5.1.F.3 – This added language is to provide Design Engineers the ability to use a scale other than 1" = 40', 30' or 20' when they provide smaller detailed drawings in their plans. The larger scales make it difficult to determine proper separations and conflicts with other utilities, hardscapes, etc.
- Section 2.5.1.F.9 – This language is being removed and added to Section 2.5.1.F.11 as the two sections duplicate and overlap each other.
- Section 2.5.1.F.11 – This language is being added from Section 2.5.1.F.9 as the two sections duplicate and overlap each other.

- Section 2.5.2.B – This change is being made because the Section number has changed in the Austin City Code.
- Section 2.8.1.C – Street and Bridge wanted us to make this change so the new pavement will follow their 1100S Standard Details and not match the existing pavement.
- Section 2.8.3 – This language is being requested by Watershed Protection because they are concerned that the language regarding revegetation needs to be enhanced. They want to specifically refer to ECM requirements or other standard specifications.
- Section 2.8.4.A – Street and Bridge wanted us to make this change so the new pavement will follow their 1100S Standard Details and not match the existing pavement.
- Section 2.8.5 – This language is being added to include the abandonment criteria for reclaimed valves and mains that are already provided for potable water mains.
- Section 2.9.2.B.15 – We are fine with allowing PVC pipes in easements on private property if they are under a pavement to ensure there is less of a chance someone will drill into the pavement and damage the water pipe.
- Section 2.9.2.C.9 – The ability to place a vault or manhole over a horizontal gate valve without damaging the valve is very difficult, so it shall not be required.
- Section 2.9.3.B.6 – These changes are to clean up the grammar in this section and to provide the reference to COA Standard Details.
- Section 2.9.4.D.7.Note 2 – This change is needed to ensure the mandrel apparatus does not get stuck in the manhole while testing the new wastewater mains and manholes.

The adopted rule contains no changes from the proposed rule. A copy of the complete text of the adopted rule is available for public inspection and copying at the following locations. Copies may be purchased at the locations at a cost of ten cents per page:

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Office of the City Clerk, City Hall, located at 301 West 2nd Street, Austin, Texas.

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.

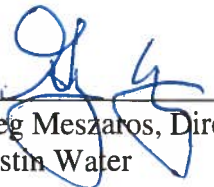
Notice that an appeal was filed and will be posted by the city clerk. A copy of the appeal will be provided to the City Council. An adopted rule will not be enforced pending the City Manager's decision. The City Manager may affirm, modify, or withdraw an adopted rule. If the City Manager does not act 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 R161-19.18, 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: 11/5/19



Anne L. Morgan
City Attorney

Date: 11/6/19

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 Standards and Specifications. The Pre-Construction Meeting must occur within two (2) 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. Plans that include fire lines must have approval by the City of Austin Fire Department and the Planning and Development Review Department.
- F. 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 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. Size, pipe material, and location of main 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.~~
 - ~~10~~⁹. Property lines and dimensions, legal description, lot and block numbers, right-of-way dimensions, and curb and sidewalk locations and street names.

- ~~11~~ **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" 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 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.
- ~~12~~ **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.
- ~~13~~ **12.** Curve data for roads, property lines, water, and reclaimed water lines.
- ~~14~~ **13.** Final plat recording or land status report.
- ~~15~~ **14.** Street address for all existing structures shall be shown on the lot(s) where the structures are located.
- ~~16~~ **15.** Pressure zone designation for subject tract and zone boundaries where applicable.
- ~~17~~ **16.** Where water, wastewater, and/or reclaimed water mains cross each other, details shall be shown to indicate compliance with TCEQ requirements.
- ~~18~~ **17.** Typical cross sections showing multiple utilities proposed to be within private streets or easements.
- ~~19~~ **18.** An index on the cover sheet or on the 2nd page of the drawings.

G. 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.

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 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 name, the design engineer, and service extension 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.
- B. A profile drawing shall be provided for all water mains, per Austin City Code, Section 14-11-~~183~~**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.

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.

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

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 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 name, the design engineer and the service extension 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. Retaining walls, including geogrid, straps, tiebacks and all other components.
 10. Culverts, bridges and other drainage structures.
 11. Locations of geotechnical borings (required for City funded projects only).
 12. Locations of bolted manhole covers.
 13. 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. 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.

(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.

2.8.0 - ABANDONMENT OF FACILITIES

If a new project will abandon existing facilities, the plans shall provide for the appropriate abandonment of these facilities. The plans shall include, at a minimum, the location, sequence, details, and methodology for abandoning the facility according to this section. Abandonment shall be considered permanent. Temporary abandonment must be approved on a case-by-case basis. For qualifying properties related to Ordinance 20141120-006 Austin Water (AW) will perform the necessary infrastructure work in the Right of Way. When the installation of new utility lines requires a trench to be cut through existing stormlines, waterlines, reclaimed lines, gas lines (if approved by the gas company) or wastewater lines, and the existing lines are confirmed to be abandoned, the abandoned lines shall be cut flush with the sides of the trench and blocked with an SPL approved plug or cap, or void filled with non-shrink grout in a manner satisfactory to the Owner's Representative.

Source: [Rule No. R161-15.07, 9-25-2015](#) ; [Rule No. R161-16.03, 5-25-2016](#) .

2.8.1 - Wastewater Mains and Services

- A. Abandonment of wastewater mains shall consist of filling the main with a pumpable grout or slurry and meeting requirements of the current specifications. Plans, drawings and specifications shall include method of abandoning or removing services and all other mains.
- B. If the existing wastewater service line and/or appurtenances are not to be used in the future, the plans shall call out and indicate the wastewater service line(s) to be abandoned and that they shall be cut and plugged at the main.
- C. Abandonment of wastewater force main valves shall be accomplished by removing the valve casing to the top of the subgrade or 24" below the surface, whichever is greater, and filling remaining casing with concrete such that the abandoned valve is not identifiable from the surface. The pavement repair shall ~~match the existing pavement section.~~ **follow the applicable 1100S Series Standard Detail(s).**

Source: [Rule No. R161-15.07, 9-25-2015](#) ; [Rule No. R161-16.03, 5-25-2016](#) .

2.8.2 - Manholes

Abandoned manholes shall be removed to a level not less than four feet below grade, inlets and outlets securely plugged, inlet and outlet pipes cut and plugged outside the manhole, and the structure filled with stabilized sand.

Source: [Rule No. R161-15.07, 9-25-2015](#) .

2.8.3 - Lift Stations

Abandonment of lift stations shall consist of removing all pumps, motors, couplings, valves, and controls from the dry well and all appurtenances above finished grade. Both the wet well and dry well shall be cut down five feet below grade, filled with cement stabilized sand, and covered with top soil to grade. The associated force main shall be properly abandoned. This includes cutting and plugging both ends and/or grouting gravity mains as appropriate.

Area shall be re-vegetated. **Revegetation of disturbed areas shall be completed in compliance with the Environmental Criteria Manual.** The Lift Station Maintenance Group shall be notified prior to abandonment.

Source: [Rule No. R161-15.07, 9-25-2015](#).

2.8.4 - Water Mains and Service

- A. Abandonment of a water main shall be accomplished by disconnecting the pipe from intersecting pipes that are to remain in service and the installation of a plug on the tee and/or cross at the point of intersection. If the cross and/or tee cannot be securely plugged or is a leaded connection, the cross and/or tee shall be removed. If a valve is located at the tee for the line being abandoned, it shall be removed. In no instance will mains be abandoned by valve closure. Abandonment of water valves located on abandoned mains shall be accomplished by removing the valve casing to the top of the subgrade or 24" below the surface, whichever is greater, and filling remaining casing with concrete such that the abandoned valve is not identifiable from the surface. The pavement repair shall ~~match the existing pavement section~~ **follow the applicable 1100S Series Standard Detail(s)**.
- B. All water service lines (including fire lines) that are being abandoned and not transferred to a new distribution line shall be disconnected at the corporation stop at the main and all other valves and appurtenances, including the water meter, removed. When meters are to be abandoned, the Engineer shall call out the size, type, and use (domestic or irrigation) of all proposed water meters (to include existing water meters to be relocated and/or re-purposed). Water meter numbers will not be required to be placed on the plan sheet. A separate Austin Water Taps Office form will be used by the Applicant/Representative to fill relevant information for the existing water meters to receive appropriate credits. The Applicant/Representative shall have this form directly submitted to AW Taps Office for review and processing.

Source: [Rule No. R161-15.07, 9-25-2015](#); [Rule No. R161-16.03, 5-25-2016](#).

2.8.5 - Reclaimed Water Mains and Services

- A. Abandonment of a reclaimed water main shall be accomplished by disconnecting the main from intersecting pipes that are to remain in service and installing a plug on the tee and/or cross at the point of intersection. If the tee and/or cross cannot be securely plugged, the tee and/or cross shall be removed. In no instance will reclaimed water mains be abandoned by valve closure.**
- B. Valves located on abandoned mains shall be abandoned by removing the valve casing to the top of the subgrade or 24" below the surface, whichever is greater. The remaining casing shall be filled with concrete such that the abandoned valve is not identifiable from the surface. The pavement repair shall follow the applicable 1100S Series Standard Detail(s).**
- C. All reclaimed water service lines that are being abandoned and not transferred to a new distribution main shall be disconnected at the corporation stop at the main. All other valves and appurtenances, including the water meter, shall be removed. When meters are to be abandoned, the Engineer shall call out the size, type, and use (domestic or irrigation), including existing meters to be relocated and/or repurposed.** The drawings shall include a note requiring notification of AW for meter removal.

Source: [Rule No. R161-15.07, 9-25-2015](#).

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 Fire Code and associated rules under Chapter 25-12 Article 7. Where the City of Austin 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" 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. The separation between water, reclaimed water and wastewater mains must comply with the Texas Commission on Environmental Quality (TCEQ) rules. When a new waterline crosses under an existing wastewater main or lateral, the waterline shall be encased in steel encasement at least 18' in length centered on the wastewater main and the encasement shall contain full-circumferential welded joints. No other form of encasement will be allowed, including cement stabilized sand. A minimum vertical separation distance of 12" measured from OD of pipe to OD of pipe, shall be maintained between the existing wastewater main and steel encasement. A minimum horizontal separation distance of five (5) feet, measured from OD of pipe to OD of pipe, shall be maintained between existing or proposed AW infrastructure and all other non-AW mains in order to maintain trench integrity. A minimum horizontal separation between water service lines and dry utility services shall be three (3) feet OD-OD.

Water mains should normally be located on the high side of the street. However, mains shall be installed on both sides of all divided roads/highways. Roads/highways, where opposing lanes of traffic are separated by a vehicle obstruction, shall be considered a divided road/highway.

When mains must be located outside of the right-of-way, they shall be within a dedicated utility easement. Main assignments in city streets must be coordinated with the Austin Utility Location and Coordination Committee. Assignment for mains in county roads must also be approved by the County Engineer. Assignments for 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).

3. Piping materials and appurtenances shall conform to City of Austin 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 four (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 2.9.2.G.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 twenty-four (24) inches and larger will include an 18" outlet with flange including a 1" 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" outlet with flange including a 1" 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" 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" 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" 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 watermain: 4"(see 2.9.2.A.4.a), 6" (fire-hydrant leads and services only), 8", 12", 16", 24", 30", 36", and 42". Larger sizes may be approved on a case by case basis.
11. Connections 4" 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.
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" of cover.*
 - b. *The potable water line must maintain a minimum 48" 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 ten 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. 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 seven (7) feet from the tree trunk. Utilities shall be placed no closer than two (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 eight (8) feet wide between root barriers. Additional width will be required to allow for multiple utilities to be placed within the "utility gap."

C. Valves

1. There shall be a valve on each fire hydrant lead restrained to the main. These and all valves twenty-four (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 (30) customers will be without water during a shutout. For lines smaller than twenty-four (24) inches, typical spacing should be 500 feet in high-density areas and 1,200 feet in residential area. Mains twenty-four (24) inches and larger shall be valved at intervals not to exceed 2,000 feet.
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 (3) valves.
7. The operating nut or extension of any valve shall be between eighteen (18) inches and twenty-four (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. All vertical gate valves larger than sixteen (16) inches shall have the bonnet located in a vault or manhole. ~~All horizontal gate valves larger than sixteen (16) inches shall have the valve actuator (gearing) located in a vault or manhole.~~
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.

D. Fire Hydrants

1. Hydrants shall be installed at the intersection of two (2) 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 nine 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 City of Austin 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 right-of-way (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 Land Development Codes 25-2-893 and 25-2-901, are not viewed as dwelling units and will not be required to provide multiple meters.
2. 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.
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" and larger
 - a. Bypasses shall be provided on all meters three (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" or larger. If domestic demand does not require a 3" 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 Austin Water Standard Detail. For small fire demand applications where both fire demand and domestic demand can be provided with 2" or smaller meter, a single meter may be used for both fire and domestic.

G. Easements

1. Easements for water mains shall be a minimum of 15 feet wide, or twice the depth of the main, measured from finished grade to pipe flowline, whichever is greater. Mains 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.
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.

H. Requirements for Existing and Proposed Water Infrastructure beneath Circular Intersections or Other Geometric Street Features

1. Installation of Circular Intersections or Other Geometric Street Features over existing water infrastructure.
 - a. Existing water infrastructure may be allowed to exist beneath circular intersections or other geometric street features such as, but not limited to, modern roundabouts, medians, bulb-outs, splitter islands, channelization islands, and other types of physical roadway features. These features may contain hardscaping, landscaping, water quality features, public art, permanent structures, street furniture, or other similar amenities.
 - b. The planning and design of these features and their amenities shall include consideration for access, maintenance, protection, testing, cleaning, and operations of

the water infrastructure. Where existing water facilities are to remain, trees with root zones of 18 inches in depth or greater at maturity may be considered for inclusion provided the drip lines at maturity of the proposed trees are not located within a minimum horizontal separation of 7.5 feet from any water infrastructure. Public art, permanent structures, and other similar amenities may be considered for inclusion provided they are not located within a minimum horizontal separation of 7.5 feet from any water infrastructure. The drip lines at maturity of ornamental trees with root zones at maturity of less than 18 inches in depth, grasses, woody or herbaceous shrubs, and street furniture may be located within a minimum horizontal separation of 7.5 feet from any water infrastructure.

- c. The need for relocating, replacing or protecting in place existing water infrastructure beneath these features and their amenities shall be determined on a case-by-case basis by AW.
2. Installation of Circular Intersections or Other Geometric Street Features in new areas of development with no existing water infrastructure.
 - a. Proposed water infrastructure may be placed beneath proposed circular intersections or other geometric street features such as, but not limited to, modern roundabouts, medians, bulb-outs, splitter islands, channelization islands, and other types of physical roadway features. These features may contain hardscaping, landscaping, water quality features, public art, permanent structures, street furniture, or other similar amenities.
 - b. The planning and design of these features and their amenities shall include consideration for access, maintenance, protection, testing, cleaning, and operations of AW infrastructures. Trees with root zones of 18 inches in depth or greater at maturity may be considered for inclusion provided the drip lines at maturity of the proposed trees are not located within a minimum horizontal separation of 7.5 feet from any water infrastructure. Public art, permanent structures, and other similar amenities may be considered for inclusion provided they are not located within a minimum horizontal separation of 7.5 feet from any water infrastructure. The drip lines at maturity of ornamental trees with root zones at maturity of less than 18 inches in depth, grasses, woody or herbaceous shrubs, and street furniture may be located within a minimum horizontal separation of 7.5 feet from any water infrastructure.
 - c. The need for alternative alignments or the inclusion of protective systems for the proposed water infrastructure beneath these features and their amenities shall be determined on a case-by-case basis by AW.

Source: [Rule No. R161-16.18](#), 11-28-2016.

Source: [Rule No. R161-16.03, 5-25-2016](#); [Rule No. R161-16.18](#), 11-28-2016.

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.
- 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, 8, 12, 16, 24, 30, 36, 42, and 48 inches. A 4 inch pipe size shall be considered for mains less than 200 feet in length.
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-in 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. Mains should be located where maintenance can be accomplished with the least interference with traffic, structures, and other utilities. When mains are located outside of the right-of-way, they shall be within a dedicated utility easement. Main assignments in city streets must be coordinated with the Austin Utility Location and Coordination Committee. Assignments for lines in county roads must also be approved by the county engineer. A minimum horizontal separation distance of five (5) feet, measured from OD of pipe to OD of pipe, shall be maintained between existing or proposed reclaimed water mains and all other non-Austin Water (AW) mains in order to maintain trench integrity. A minimum horizontal separation between reclaimed water service lines and dry utility services shall be three (3) feet OD-OD.
4. The separation between water, reclaimed water and wastewater mains must comply with TCEQ rules.
5. Piping materials and appurtenances shall conform to City of Austin Standard Specifications, Standard Details, and AW Standard Products List (SPL).
6. Minimum depth of cover over the uppermost projection of the pipe and all appurtenances shall comply with City of Austin (COA) Standard Details. ~~M~~maximum depth will be ~~as~~ 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' 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.

7. For mains of 16 inches and larger, drain valves shall be placed at low points.
8. 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 twenty-four (24) inches and larger will include an 18" 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" outlet with blind flange shall be placed every 2500 feet.
9. Dead-end mains shall terminate with a flushing device and flushing devices shall be installed as necessary to facilitate flushing of the system.
10. Mains shall have an approved flushing device located at the high point between main intersections.
11. Joint restraint for pipes larger than 16 inch diameter shall be by use of integral, factory joint restraint systems, or by restraint gaskets.
12. 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.
13. 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.
14. 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. .
15. 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 seven (7) feet from the tree trunk. Utilities shall be placed no closer than two (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 eight (8) feet wide between root barriers. Additional width will be required to allow for multiple utilities to be placed within the "utility gap."

C. Valves

1. All valves twenty-four (24) inches and smaller, shall be resilient seated gate valves.

2. Valves shall be located at the intersection of two or more mains. For lines smaller than twenty-four (24) inches, typical spacing should be 500 feet in high-density areas and 1,200 feet in residential area. Mains twenty-four (24) inches and larger shall be valved at approximate 2,000 foot intervals.
3. At dead ends, gate valves shall be located one (1) pipe length ten (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 (3) valves.
7. The operating nut or extension of any valve shall be between eighteen (18) inches and twenty-four (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. All horizontal gate valves larger than sixteen (16) inches shall have the valve actuator (gearing) located in a vault or manhole.
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.

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. Easements

1. Easements for reclaimed water mains shall be a minimum of 15 feet wide, or twice the depth of the main, measured from finished grade to pipe flowline, whichever is greater. Mains shall be centered on the easement. Narrower easements may be considered where

- the Engineer provides evidence, that maintenance activities will not be hindered by the reduced width.
2. Easement documents and the metes and bounds shall be reviewed and approved by AW Pipeline Engineering prior to recordation with the County. Easement recordation at the County is required prior to AW approval of construction plans.
- F. Requirements for Existing and Proposed Reclaimed Water Infrastructure beneath Circular Intersections or Other Geometric Street Features
1. Installation of Circular Intersections or Other Geometric Street Features over existing reclaimed water infrastructure.
 - a. Existing reclaimed water infrastructure may be allowed to exist beneath circular intersections or other geometric street features such as, but not limited to, modern roundabouts, medians, bulb-outs, splitter islands, channelization islands, and other types of physical roadway features. These features may contain hardscaping, landscaping, water quality features, public art, permanent structures, street furniture, or other similar amenities.
 - b. The planning and design of these features and their amenities shall include consideration for access, maintenance, protection, testing, cleaning, and operations of the reclaimed water infrastructure. Where existing reclaimed water facilities are to remain, proposed trees may be considered for inclusion provided the tree is a utility compatible species (as denoted in ECM Appendix F) and is not planted within 5 horizontal feet from any reclaimed water infrastructure. Public art, permanent structures, and other similar amenities may be considered for inclusion provided they are not located within a minimum horizontal separation of 5 feet from any reclaimed water infrastructure.
 - c. The need for relocating, replacing or protecting in place reclaimed existing water infrastructure beneath these features and their amenities shall be determined on a case-by-case basis by AW.
 2. Installation of Circular Intersections or Other Geometric Street Features in new areas of development with no existing reclaimed water infrastructure.
 - a. Proposed reclaimed water infrastructure may be placed beneath proposed circular intersections or other geometric street features such as, but not limited to, modern roundabouts, medians, bulb-outs, splitter islands, channelization islands, and other types of physical roadway features. These features may contain hardscaping, landscaping, water quality features, public art, permanent structures, street furniture, or other similar amenities.
 - b. The planning and design of these features and their amenities shall include consideration for access, maintenance, protection, testing, cleaning, and operations of AW infrastructures. Trees may be considered for inclusion provided the tree is a utility compatible species (as denoted in ECM Appendix F) and is not planted within 5 horizontal feet from any reclaimed water infrastructure. Public art, permanent structures, and other similar amenities may be considered for inclusion provided they are not located within a minimum horizontal separation of 5 feet from any reclaimed water infrastructure.
 - c. The need for alternative alignments or the inclusion of protective systems for the proposed reclaimed water infrastructure beneath these features and their amenities shall be determined on a case-by-case basis by AW.

Source: [Rule No. R161-14.05, 2-20-2014](#).

2.9.4 - Wastewater Systems

A. Determination of Wastewater Flow

1. Residential single-family units shall be assumed to produce an average wastewater flow of 245 gallons/day.
2. Industrial wastewater flows will be evaluated on a case-by-case basis.
3. Inflow/Infiltration.

In sizing sewers, external contributions are accounted for by including 750 gallons per day per acre served for inflow and infiltration. For sewers in the Edwards Aquifer Zone refer to the Texas Commission on Environmental Quality (TCEQ) requirements. Strict attention shall be given to minimizing inflow and infiltration.

4. Peak Dry Weather Flow (PDWF).

The PDWF is derived from the formula:

$$Q_{pd} = [(18 + (0.0206 \times F)^{0.5}) / (4 + (0.0206 \times F)^{0.5})] \times F$$

where: $F = 70 \text{ gal./person/day} \times \text{population}/1440$
= average dry-weather flow in gpm

5. Peak Wet Weather Flow (PWWF).

The PWWF is obtained by adding inflow and infiltration to the peak dry weather flow. In designing for an existing facility, flow measurement shall be used when available for the preexisting developed area if the reference indicates higher peak wet weather flows than the calculated method.

B. Determination of Pipe Size

1. Minimum Size.

The minimum diameter of all gravity sewer mains shall be eight (8) inches. For service line sizes, refer to the City of Austin Standard Details.

2. Design Requirements.

For sewer mains, fifteen (15) inches in diameter or smaller, use the larger size as determined below:

- a. The main shall be designed such that the PDWF shall not exceed 65% of the capacity of the pipe flowing full.
- b. The main shall be designed such that the PWWF shall not exceed 85% of the capacity of the pipe flowing full.
- c. For sewer mains, eighteen (18) inches in diameter or larger, the main shall be designed such that the PWWF shall not exceed 80% of the capacity of the pipe flowing full.

3. Minimum Design Velocities.

The minimum design velocity calculated using the PDWF must be at least two (2) feet per second (fps). If a minimum velocity of two (2) fps cannot be achieved due to the low projected wastewater flows, velocities lower than two (2) fps at PDWF may be allowed provided that all of the following requirements are met:

- a. The Engineer substantiates in writing and to the satisfaction of Austin Water (AW) that is not possible to meet the two (2) fps velocity at PDWF.

b. A minimum of 0.01 ft./ft. (1.0 percent grade) is provided.

4. Maximum Design Velocities.

The maximum design velocity calculated using the PWWF should not exceed ten (10) fps. Velocities in excess of 10 fps may be considered under special conditions where no other options are available. In such cases, proper consideration shall be given to pipe material, abrasive characteristics of the wastewater flows, turbulence and displacement by erosion or shock.

5. Minimum Slope.

The minimum allowable slope for eight (8) inches mains within the service area of the City of Austin shall be 0.005 ft./ft (0.5 percent grade) unless otherwise required by 3.b of this section.

6. Allowable pipe sizes.

The following sizes will be the only sizes allowed for use in the gravity system: 6" (for services only), 8", 12", 15", 18", 21", 24", 30", 36", 42". Larger sizes may be approved on a case by case basis. These pipe sizes do not apply to force mains.

C. Design Considerations

1. Materials and Standards.

All materials and appurtenances shall conform to the AW Standard Products List.

2. Protecting Public Water Supply.

No physical connection shall be made between a drinking water supply and a sewer or any appurtenance thereof. An air gap of a minimum of two inlet pipe diameters between the potable water supply and the overflow level connected to the sewer shall be provided.

3. Location.

The location of the wastewater main shall be in conformance with the City of Austin Standard Details Manual. Alternative assignments must be approved by AW Utility Development Services (UDS) - Pipeline Engineering. Outside the City Limits, the design engineer shall coordinate utility assignments with both AW and the appropriate county authority.

4. Separation Distance.

The separation between water mains, reclaimed mains and wastewater mains must comply with TCEQ rules. A minimum horizontal separation distance of five (5) feet, measured from OD of pipe to OD of pipe, shall be maintained between existing or proposed AW infrastructure and all other non-AW mains in order to maintain trench integrity. A minimum horizontal separation between wastewater service lines and dry utility services shall be three (3) feet OD-OD.

5. Steep grades.

Where the pipe grade exceeds 12% and the construction is outside of any pavement, concrete retards conforming to the City standards will be required at intervals of no more than twenty-five (25) feet (preferably at joint locations).

6. Depth of Cover.

If fill or embankment placed over existing wastewater mains exceeds four (4) feet or the cut exceeds the minimum depth of cover, AW approval is required. If cuts exceed the minimum depth of cover stated below, AW approval is required. The minimum depth of cover over the upper-most projection of the main shall be as follows:

- a. Wastewater piping installed in natural ground in easements or other undeveloped areas which are not within existing or planned streets, roads or other traffic areas, shall be laid at least 42 inches below ground elevation.
 - b. Wastewater piping installed in proposed streets, existing streets, roads or other traffic areas shall be laid at least 66 inches below proposed ground elevation.
7. Turbulence.
Wastewater lines shall be designed to minimize turbulence to prevent release of sulfide gases and subsequent corrosion.
8. Wastewater lines are prohibited in a critical water quality zone, except for a necessary crossing. (see the Code of the City of Austin, 25-8-261).
9. Curved wastewater mains are prohibited.
10. 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 seven (7) feet from the tree trunk. Utilities shall be placed no closer than two (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 eight (8) feet wide between root barriers. Additional width will be required to allow for multiple utilities to be placed within the “utility gap.”

D. Manholes

1. Location.

Manholes shall be located and spaced so as to facilitate inspection and maintenance of the wastewater main. All manholes must be accessible to maintenance equipment, including 2½ ton straight trucks, dump trucks, vacuum trucks, and standard (not compact) sizes of backhoes and loaders. In isolated cases, construction of all-weather access roads may be necessary for manhole and/or wastewater line access if required, design guidance is provided in Section 2.9.4.D.12. Manholes shall be placed at the following locations:

- a. Intersections of mains.
- b. Horizontal alignment changes.
- c. Vertical grade changes.
- d. Change of pipe size.
- e. Change of pipe material.
- f. The point of discharge of a force main into a gravity wastewater main.
- g. For multi-family projects exceeding fifteen (15) dwelling units and for commercial developments containing more than 4,000 square feet of air conditioned space and requiring a water meter greater than 2", a manhole is required on the main at the point of connection to the wastewater service.
- h. At the upstream end of mains.
- i. At other locations as required by Chapter 15-10 (Wastewater Regulations) of the Austin City Code.

2. Spacing.

Manhole spacing for lines smaller than 24 inches should not exceed 500 ft.; for larger mains, spacing may be increased, subject to approval by the Utility.

3. Covers.

- a. All manholes located in unpaved areas or in the TCEQ Edwards Aquifer Recharge Zone (EARZ) shall have bolted, watertight covers.
- b. When existing manholes are adjusted in height to match finished surface elevations, the most current manhole ring and cover size shall be utilized. This may require removal and replacement of the existing manhole cone section to facilitate the above work.

4. Corrosion Prevention.

Manholes shall be constructed of or lined with a corrosion resistant material. Where new construction ties into an existing manhole, the existing manholes must be lined, coated, or replaced with a corrosion resistant material. The Design Engineer shall provide an AW Manhole Inspection report for Wastewater Manhole replacement or rehabilitation for both CIP and non-CIP projects.

5. All lines into manholes, including drop connections, shall match crown-to-crown where feasible. Any deviation must be approved in advance by AW UDS - Pipeline Engineering.

6. Drop manholes are not allowed where the size of the incoming main requiring the drop exceeds 15 inches diameter. External drops will be limited to a depth of 15 feet from the lid of the manhole to the base. Drop manholes in excess of 15 feet deep must be designed with an internal drop and must be a minimum size of five (5) foot diameter.

7. Minimum inside manhole diameters shall be as indicated in the following table:

Main Size	Depth		
	Less than 20'	20'—30'	Greater than 30'
Up to 15"	48"	60"	72"
18"—24"	60"	60"	72"
30" & 36"	72"	72"	72"

Note 1: In the event a structure is utilized inside a manhole, the clear space between the structure and the manhole wall shall be a minimum of 48".

Note 2: If more than two mains connect to a manhole, or if two mains connect to a manhole at an angle other than 180 degrees from each other, a larger diameter manhole may be required in order to accommodate mandrel insertion and hydraulically efficient flow. **A straight section of invert that is 4" to 6" in length is required to transition between the curved portion of the invert channel and the connecting pipes in order to accommodate the mandrel apparatus for up to 15" diameter pipes.**

Note 3: New pipe connections to existing manholes shall provide a minimum of 12" clearance between the existing pipe ID and the new core hole ID measured on the inside surface of the manhole, regardless of the orientation of the pipes with respect to one another. New precast manholes and manholes with cast-in-place bases shall have holes for pipe penetrations in the manhole wall separated by a minimum of seven (7) inches, designed by the manhole manufacturer and as measured from the inside diameter of the cored holes on the inside wall of the manhole to ensure the structural integrity of the manhole wall.

Note 4: The vertical distance between the highest point of the invert shelf and the bottom of any horizontal or near-horizontal surface protruding into a manhole or junction box, shall be at least six (6) feet, when the depth of the main is sufficient.

8. Where a separation of nine (9) feet between an existing water main and a new manhole cannot be achieved during construction of a new wastewater main the joints in the wastewater manhole shall be made watertight using externally applied joint wraps. Where a separation of nine (9) feet between a water main and an existing manhole cannot be achieved during construction of a new water main, then the manhole shall be assessed as per Section 2.9.4.D.4 to determine if the manhole is watertight and if not, shall require the manhole to be made watertight.
9. Manholes constructed on existing wastewater mains may have a cast-in-place base. All other manholes shall have a precast base.
10. Manhole and junction box inverts shall have a minimum slope of 2.5% between the inlet and outlet pipe inverts.
11. Manholes and junction boxes located below ground water
 - a. When the interior surface of a concrete manhole or junction box is coated with a urethane, polyurethane, or epoxy liner, the exterior surface of that portion of a manhole or junction box located below ground water level shall be water proofed using a flexible system applied to the exterior surface. The drawings shall indicate which structures must be water proofed and the elevation to which water proofing must be applied (2 feet above ground water level).
 - b. Manhole joints below the ground water level and/or located in the 100 year floodplain shall be sealed by installing a joint wrap material over the joint on the manhole exterior.
 - c. Construction joints in cast-in-place junction boxes shall be water proofed using water stops.
12. All-weather access roads should be at least 12 feet wide, placed within a 20-foot wide (minimum) access easement, intended for emergency use by maintenance equipment. If the wastewater easement is wide enough to accommodate the access road, it may be used in lieu of an access easement. This 12 foot maintenance access road should be outside the toe of any fill slope and the top of any cut slope and shall not have a post construction longitudinal slope greater than 15% nor a post construction transverse slope greater than 5%, shall not have a vertical grade break of greater than 12%, should have an inside turning radius of no less than 28.3 feet, an outside turning radius of no less than 42 feet, shall be cleared of all vegetation and graded, and should maintain a horizontal and vertical clearance from existing and proposed vegetation and all other objects of no less than 14 feet.

The access road shall include a means for equipment to turn around when located more than 200 feet from a paved public roadway. Turn around shall meet the above listed design criteria. Access roads shall be cleared, graded and stabilized with stones in accordance with Standard Detail 662S-2, Pond Maintenance Road Typical Cross Section. Other materials and geometrics may be approved on a case by case basis by AW.
13. If a proposed development intends to connect to an existing brick manhole, the manhole will need to be removed and replaced.

E. Ventilation

Ventilation shall be provided as required by TCEQ Rules and Regulations.

F. Inverted Siphons

The use of siphons is discouraged. When no other feasible option exists, the following criteria apply. Siphons shall have a minimum of two barrels. The minimum pipe size shall be six (6) inches with a minimum flow velocity of 3.0 fps at peak dry weather flow. The minimum dry weather flow shall be used to size the smallest barrel. Three-barrel siphons shall be designed to carry the capacity of the incoming gravity wastewater mains(s) with one barrel out of service.

An additional corrosion resistant pipe shall be designed to allow for the free flow of air between the inlet and outlet siphon boxes. The diameter of this air jumper shall not be smaller than one-half the diameter of the upstream sewer. Air jumper pipe design shall provide for removal of condensate water that will collect in the pipe.

Siphons shall be designed to allow draining, cleaning, and diversion of flow from individual barrels and inspection. Siphon inlet and outlet structures shall be manufactured with polymer concrete.

G. Service Lines

1. Wastewater service lines, between the main and property line, shall have an inside diameter not less than six (6) inches. The minimum grade allowed for service lines is one (1) percent. In all new systems, grade breaks exceeding allowable joint deflection must be made with approved fittings and shall not exceed a cumulative total of 45 degrees.
2. No service connections shall be made to mains larger than 15 inches in diameter.
3. Service connections to force mains that are two (2) inches in diameter and smaller may be allowed on a case by case basis. Service connections to force mains that are larger than two (2) inches in diameter shall not be allowed.
4. New double wastewater services shall be placed along the common property line between two lots on the opposite property line from water services. Single wastewater services shall be a minimum of nine feet from a water service per TCEQ rules. Services to lots without a water/wastewater easement will terminate at the property line with a cleanout; service to lots having a five (5) foot by five (5) foot water/wastewater easement will terminate within the easement. For details, see the City of Austin Standard Details.
5. Wastewater clean-outs are not allowed in sidewalks, paved areas, load bearing pavement, or driveways. If the clean-out must be located in a sidewalk or paved area (as allowed by a variance issued by AW only), then AW approved locking lids will be required for the clean-out.
6. Sample and inspection ports are required for service lines when industrial waste monitoring is required. They shall be located at the property line within the public right-of-way (ROW) or utility easement line to indicate the line of responsibility of the utility. They shall not be located in traffic areas, paved parking areas or sidewalks.

H. Easements

1. Easements for wastewater mains shall be a minimum of 15 feet wide, or twice the depth of the main, measured from finished grade to pipe flowline, whichever is greater. Mains 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.
2. Easement documents and the metes and bounds shall be reviewed and approved by AW
UDS - 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.