TMWA Water Project Design Guidance Manual

A Guide to Assist in the Development of Water Project Design & Approval

Truckee Meadows Water Authority

Quality. Delivered.



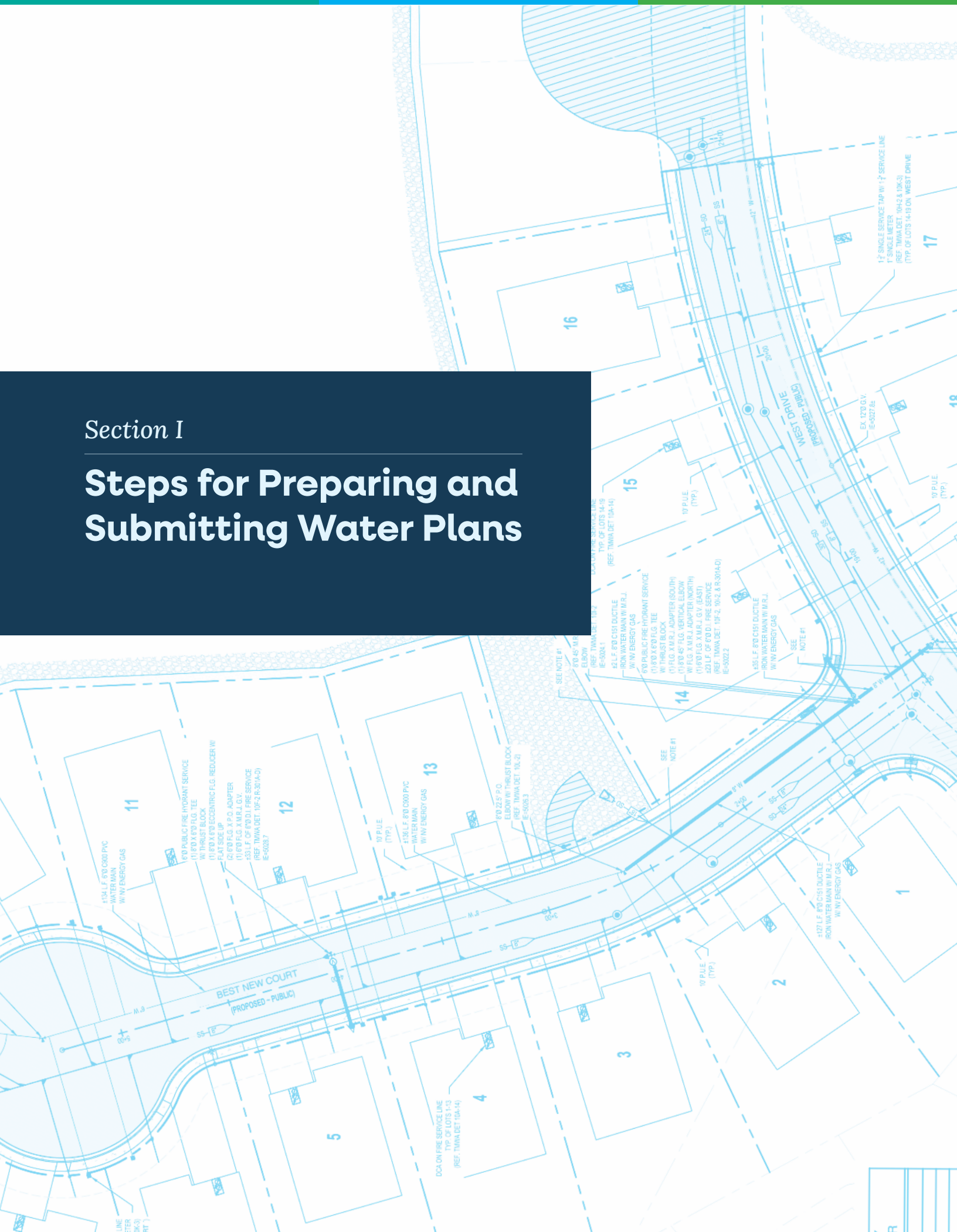
Table of Contents

Section I - Steps for Preparing and Submitting Water Plans . . . 3
Section II - Common Fittings and Callouts for New Business . . . 5
Fitting Joint Types . . . 6
Water Mains . . . 6
Tee . . . 7
Cross . . . 8
Elbows . . . 9
Horizontal Elbows . . . 9
Vertical Elbows at Vertical Offsets . . . 10
Thrust Blocks and Anchor Blocks . . . 12
Reducer . . . 12
Gate Valve . . . 13
Flush Valve Assembly . . . 14
Inline Flush Valve or Inline Blow-off Assembly . . . 14
Air Release Valve . . . 15
Test Station . . . 16
Metered Services . . . 16
Small Diameter Metered Water Services: 2-inch and Smaller . . . 16
Large Diameter Metered Water Services: 4-inch and Larger . . . 18
Backflow Protection . . . 19
Hot Tap . . . 20
Fire Hydrants . . . 20
Fire Services . . . 21
Joint Deflections . . . 22
Water and Sewer Separations . . . 24
Sewer Mains . . . 24
Sewer Laterals . . . 25
Casings . . . 28
Check Valve . . . 30
Section III - Plan Development Quality Control Guidance . . . 31
Helpful Links: . . . 32
General Project Considerations . . . 32
Water Plans . . . 33
Water Mains . . . 34
Water Services . . . 34
Backflow Protection . . . 35
Appendix - Examples of TMWA Water Project Plan Sheets . . . 36

TMWA Quality. Delivered.

Section I

Steps for Preparing and Submitting Water Plans



Steps for Preparing and Submitting Water Plans

- [ ] Review TMWA water project application information including project specific submittal requirements and design resources. Helpful informational links as follows:
  - **New Business Process** (https://tmwa.com/doing-business-with-us/new-construction-beta/)
  - **Document Submittal Requirements** (https://tmwa.com/wp-content/uploads/2025/02/DOCUMENT-SUBMITTAL-REQUIREMENTS-PORTAL-2025JAN29.pdf)
- [ ] Request the water facility AutoCAD files for the project by emailing: **Data Request** (DataRequest@tmwa.com)
- [ ] Download the most current water plan title block, symbols and general notes.
  - **Drawing Templates** (https://tmwa.com/doing-business-with-us/new-construction/drawing-templates/)
- [ ] Download the most current versions to TMWA's Construction and Design Standards. This includes Sections 1-9 and Appendix 10. Appropriate project related details from Appendix 10 shall be included in the water plan set. Visit the New Construction web page and review TMWA Standards for Construction.
  - **Construction and Design Standards** (https://tmwa.com/all-standards/)
- [ ] Design and draft water plans.
  - [ ] Contact TMWA New Business Engineering for design guidance on any pipe design 14-inch diameter and larger.
  - [ ] Ensure water plans meet all requirements of TMWA's Construction and Design Standards, linked above.
  - [ ] Review contents of this guide to assist in project specific call outs.
- [ ] Perform a peer review of the project plans using the sections of this guide and TMWA's Construction and Design Standards, linked above.
- [ ] Submitting a water project to TMWA using the New Business Portal will require you to have a Portal account set up. To create this account visit the New Business Portal Login link below. Allow 24-hours for the login to be activated. Please note that the initial application fee will be required within 24-hours after the application has been successfully submitted. If you have questions about initial fees for your project prior to submittal contact us at **New Construction** (newconstruction@tmwa.com).
  - **New Business Process** (https://tmwa.com/doing-business-with-us/new-construction-beta/)
  - **New Business Portal Login** (https://projectportal.tmwa.com/PublicAccess/template/Login.aspx)

For additional information on the application process after project application submission, please review the **Application Process Outline**

Section II

Common Fittings and Callouts for New Business



Standards and Specifications

Fitting Joint Types

When calling out fittings that are to be connected, it is important to identify the correct joint type of each fitting or appurtenance. For TMWA New Business projects the following will apply unless directed otherwise by TMWA.

Push-on (PO) fittings connect only to pipes.

Mechanical Joint (MJ) and Mechanically Restrained Joint (MRJ) fittings connect only to pipes.

Flange fittings (FL or FLG) are bolted to other flange fittings and do not connect to pipe without an adapter. Adapters will need to be identified by joint type. Typical adapters will be FLG x MRJ or FLG x PO.

Water Mains

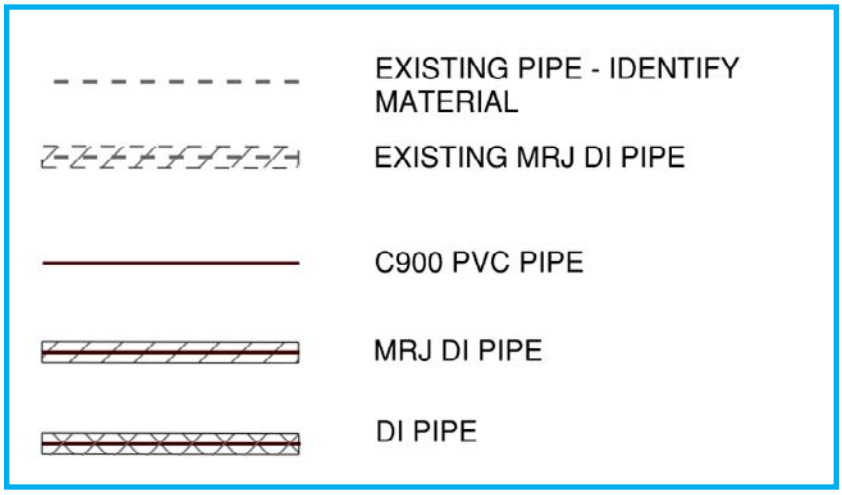
TMWA allows the use of AWWA C900 PVC and AWWA C151 ductile iron for water main installation. For the purposes of this guide and TMWA Construction and Design Standards when referring to these materials it is for water mains between 6-inch and 12-inch. For water mains larger than 12-inch diameter, consult with TMWA's Engineer for design guidance. Water mains shall be called out with the length, diameter, and material extending between fittings or where pipe material changes. Lengths are typically called out using the center of each fitting symbol, rounded to the foot. PVC pipe will be depicted using a single solid line for proposed pipe. Ductile iron will use a hatch. If there is a combination of un-restrained and restrained ductile iron two distinct hatch patterns will need to be used with a legend identifying the difference.

If the water project consists of more than 1,200-feet of main a flushing plan may be required in the plan set. The elevation change of the water main will need to be taken into account during the design. Projects with elevation differences that may over pressurize portions of the project during the system pressure test may require a pressure testing plan as part of the plan set.

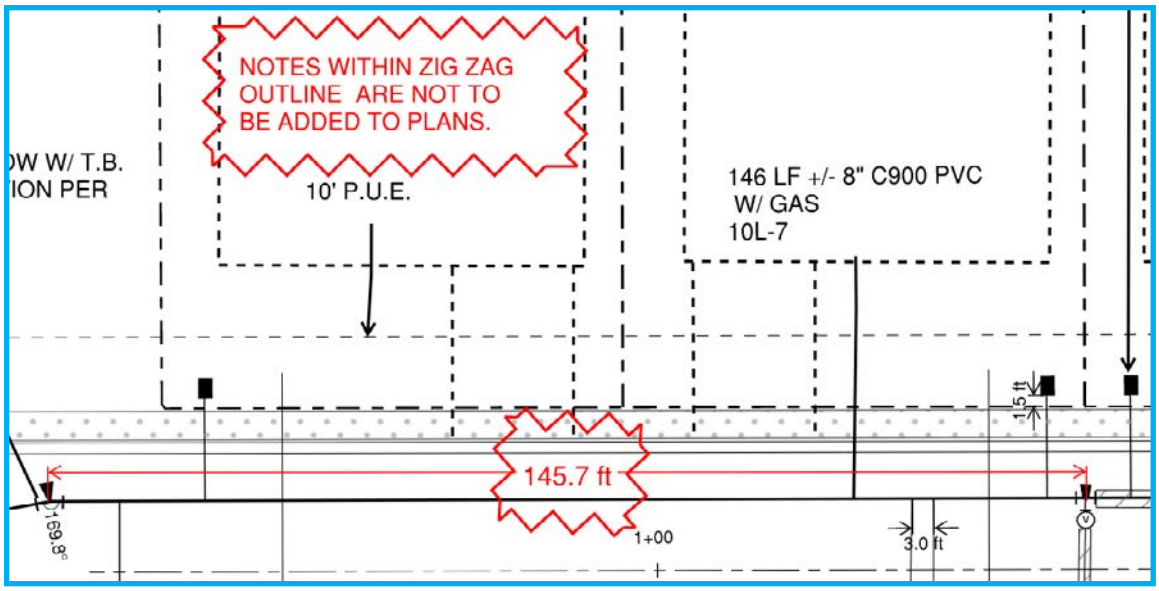
Related Construction and Design Standards Appendix:

- 10L

Examples for different pipe materials and line types.



Example callout for length.



Tee

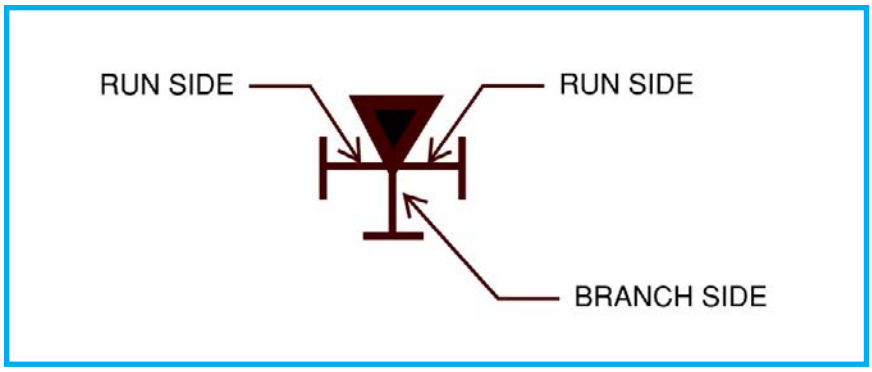
A tee fitting connects three (3) pipes together and shall be manufactured with ductile iron material. The straight through alignment is referred to as the 'run' with an integrated outlet at a right-angle to the pipe known as the 'branch'. Tee fittings shall be specified by diameter and joint type in the RUN x BRANCH direction. Unless otherwise specified by TMWA, tee fittings require a thrust block. Tee fittings are typically connected to reducers and/or gate valves using a flange fitting and adapters. Tees installed in a main-to-main connection will require a minimum of two valves. For tees at services, there is typically only one valve located on the service side of the tee, most often located on the branch side, unless otherwise directed by the Authority. Where there is expected to be deflection of the pipe at the fitting, the degree of deflection shall be called out.

Refer to the following sections for additional callout examples:

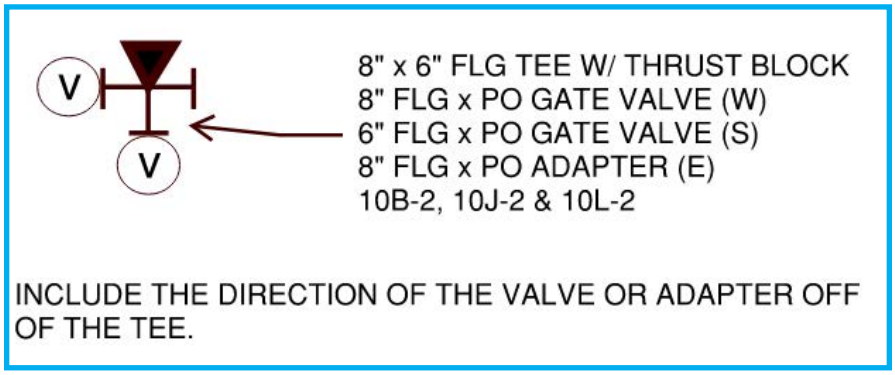
- Thrust Blocks and Anchor Blocks
- Reducers
- Gate Valves
- Larger Diamter Metered Water Services
- Fire Services
- Joint Deflections

Related Construction and Design Standards Appendices:

- 10B
- 10J
- 10L



Example callout.



Cross

Cross fittings connect four (4) pipes together at their point of intersection and shall be manufactured with ductile iron material. Cross fittings are supplied with matching joint types along each run. There are no thrust blocks on cross fittings in most situations. Crosses will require a minimum of three valves, unless otherwise directed by the Authority. Reducing crosses are available, typically through customer orders, however, crosses within TMWA's service territory shall use the same diameter for all outlets unless approved by the Authority in order to maintain consistent and readily available parts for repair and maintenance purposes. In situations where a reduction or increase in diameter at one or more outlets is required reducers will be used after a valve.

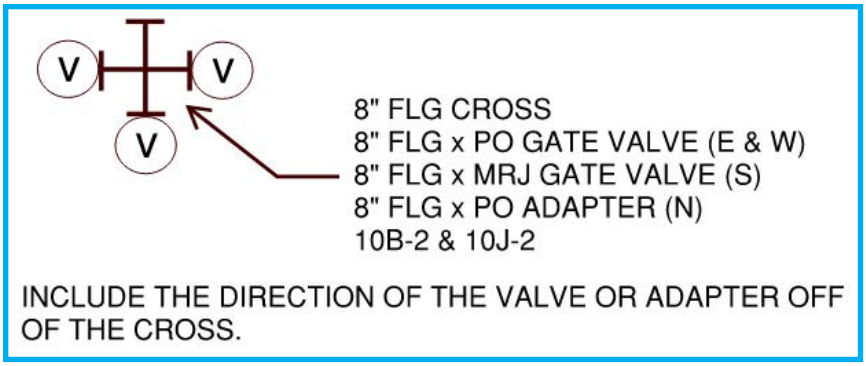
Refer to the following sections for additional callout examples:

- Reducers
- Gate Valves
- Joint Deflections

Related Construction and Design Standards Appendices:

- 10B
- 10J
- 10L

Example callout.



Elbows

Elbow fittings are angular changes in pipe direction and shall be manufactured with ductile iron material. TMWA allowable elbow fittings include the following angles: 11.25^0, 22.5^0, 45^0, and 90^0. Elbow fittings must be specified by diameter and joint type. Elbow fittings must have matching diameters and joint types on each end in order to maintain consistent and readily available parts for repair and maintenance purposes.. Elbow fittings with different joint ends are typically a custom order. Elbows can be used in both horizontal and vertical direction. All vertical elbows will be restrained. Refer to Section 1.1 and Appendix 10I for vertical offset requirements for required restrained length calculations.

Refer to the following sections for additional callout examples:

- Thrust Blocks and Anchor Blocks
- Gate Valves
- Joint Deflections

Related Construction and Design Standards Appendices:

- 10J
- 10L

Horizontal Elbows

Horizontal elbows can be PO, FLG or MRJ. Thrust blocks are used on all horizontal elbows with few exceptions. One such exception would be where existing conditions will not provide adequate space for the installation of thrust blocks. In these situations, the elbow and pipe on each side will be MRJ, with required length of restrained pipe on each end calculated using DIPRA restrained joint calculator found at **www.DIPRA.org**. Elimination of thrust blocks shall be discussed with TMWA Engineering during the review process.

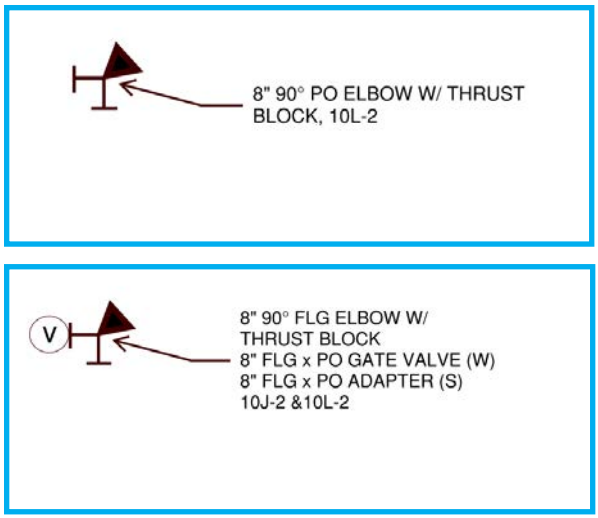
Refer to the following sections for additional callout examples:

- Thrust Blocks and Anchor Blocks
- Gate Valves
- Joint Deflections

Related Construction and Design Standards Appendices:

- 10J
- 10L

Example callouts for horizontal elbows.



Vertical Elbows at Vertical Offsets

Vertical elbows are used to adjust the elevation of a main or service with a diameter of 4-inch or larger in a short horizontal distance. Where a profile is not required, the vertical offset will be identified in the plan view only. For vertical offsets with a profile it will be shown in both plan and profile views. Vertical elbows require restrained pipe on both ends of the outer elbows and between all vertical elbows. The length of pipe between each fitting will need to be called out on the plan. Restrained joint lengths shall be calculated using the DIPRA restrained joint calculator found at **www.DIPRA.org**. The inputs for these calculations are site specific with some standard inputs which can be found in TMWA's Construction and Design Standards, Section 1.1. All project calculations shall be combined in a single PDF, stamped and digitally signed by the project engineer.

Refer to the following sections for additional callout examples:

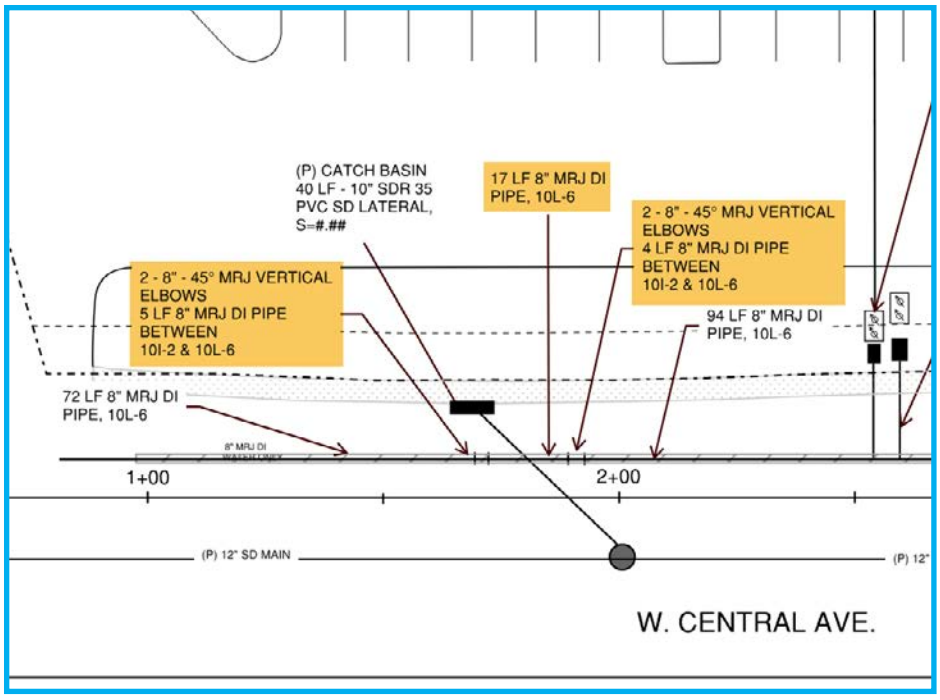
- Inline Flush Valve or Inline Blow-off Assembly,
  please note not all vertical offsets require inline flush or blow-off valves.
- Joint Deflections
- Water and Sewer Separations – at Crossings

Related Construction and Design Standards Appendices:

- 10E
- 10I
- 10L

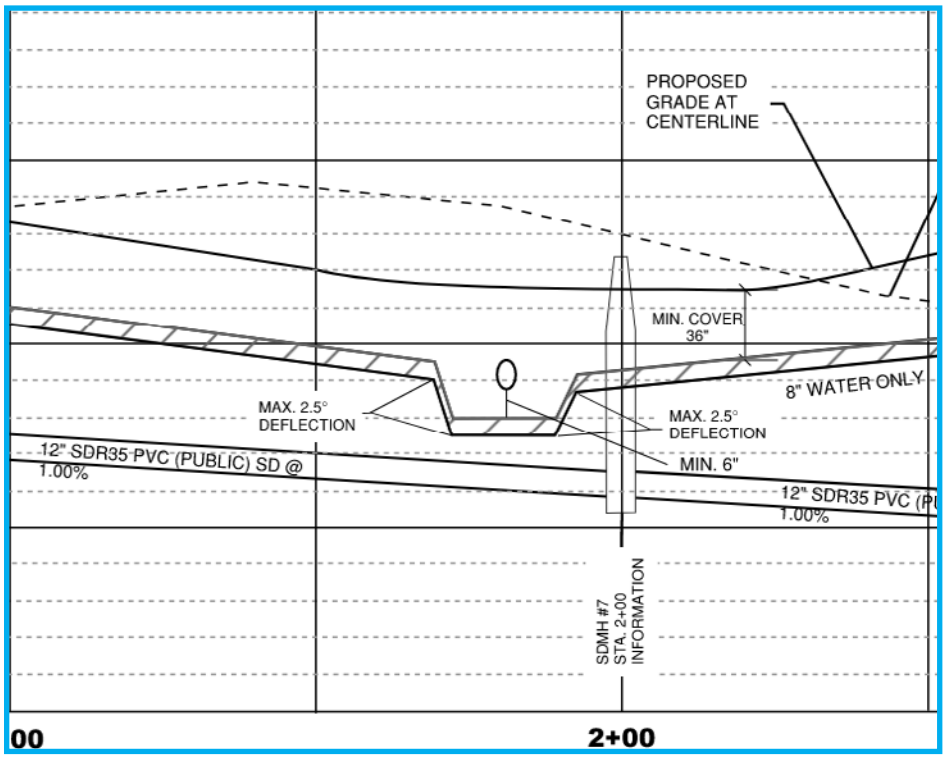
Example callouts for vertical elbows and offsets.

Plan view example.



Typically, there is not a callout for the vertical elbows in the profile, but it is visually depicted.

Profile view example.



Thrust Blocks and Anchor Blocks

A thrust block is a calculated volume of concrete used to prevent movement at a fitting such as tees and horizontal elbows. Anchor blocks are designed for the same purpose, but will be placed under a fitting such as a gate valve or reducer to prevent movement. For standard fittings up to 12-inch diameter refer to TMWA's Construction and Design Standards, Appendix 10L for details using common soil types and test pressures for sizing purposes. In areas where the standard inputs do not match site conditions or if pipe diameters are larger than what is covered in the approved details, it is the engineers responsibility to detail the site-specific thrust or anchor blocks with stamped calculations provided to TMWA.

Thrust blocks can be abbreviated on plans using "TB". Refer to Tees and Elbows sections for example callouts for thrust blocks. Refer to Reducer section for example anchor block callout.

Related Construction and Design Standards Appendices:

- 10L

Reducer

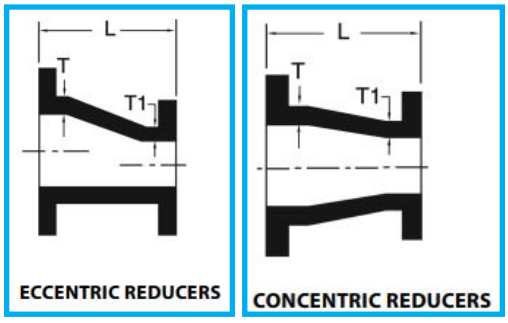
Reducer fittings transition pipe diameters and shall be manufactured with ductile iron. Reducer fittings supplied in TMWA service territory are often flange joints, bolted to a secondary fitting with adapters. Reducers must be specified by size and joint type. The use of concentric and eccentric reducers must be considered in design to avoid high points in the fitting. In some instances, reducers where the reducer is not directly connected to a tee or cross, the fitting will likely be mechanically restrained with pipe on both sides also restrained.

Refer to the following sections for additional callout examples:

- Tee
- Cross
- Thrust Blocks and Anchor Blocks
- Joint Deflections

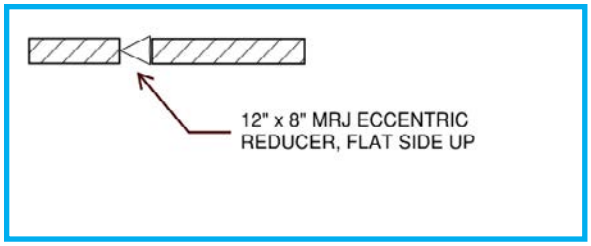
Related Construction and Design Standards Appendices:

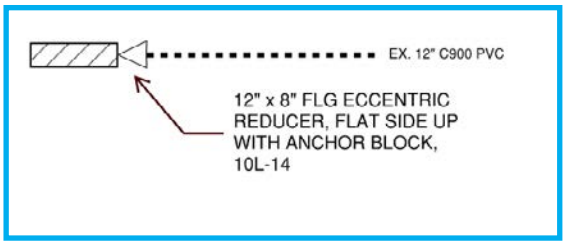
- 10L

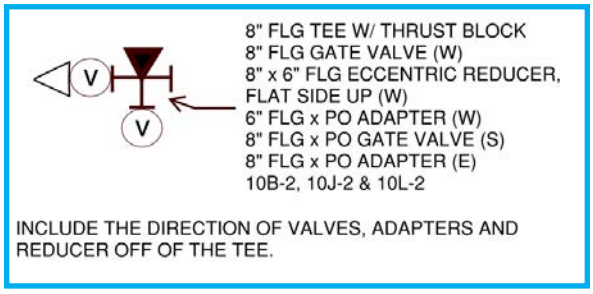


Credit: US Pipe

Example callouts.







Gate Valve

A gate valve is a fitting that is used to stop the flow of water along a main or service line where the service line is 4-inch or larger. Typically gate valves are connected directly to a tee or cross. When an inline gate valve is not directly connected to a tee or cross; rather, it is restrained for a dead-end condition on each side of the gate valve. Gate valves can be ordered with different joint types on each side and must be specified by size and joint type in the plans. In cases where a valve is installed between new and existing mains an anchor block shall be installed. It is important to note that the operating nut needs to be at least 18 inches below finish grade. This is not usually an issue with valves that are 12-inch diameter and smaller, however, in larger diameter valves bevel gearing may be required and will need to be called out specifically at each location.

Gate valves can be abbreviated using “GV” on plan callouts.

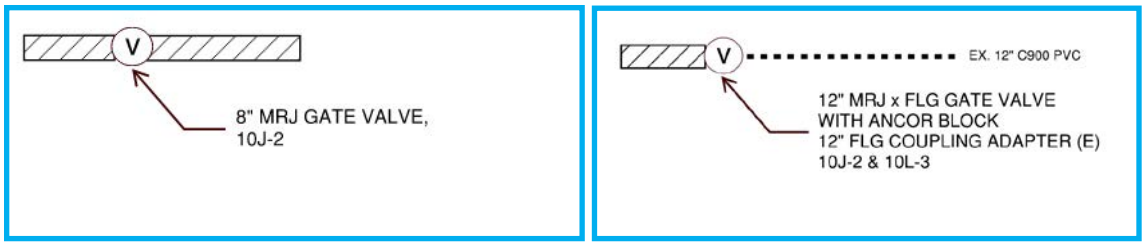
Refer to the following sections for additional callout examples:

- Tee
- Cross
- Flush Valve Assembly
- Inline Flush Valve or Inline Blow-off Assembly
- Large Diameter Metered Water Services
- Hot Tap
- Fire Hydrants
- Fire Services
- Joint Deflections

Related Construction and Design Standards Appendices:

- 10J
- 10L

Example callouts.



Flush Valve Assembly

Flush valve assemblies are a series of fittings located at the end of a main that include a gate valve and a riser assembly that allow for water to be flushed from the main during and after construction or after repairs to the main. A permanent flush valve assembly includes a concrete thrust block at the end of the assembly that supports against the thrust at the dead end. A temporary flush valve assembly incorporates a calculated restrained length of pipe to replace the required thrust block that is included in the permanent flush valve assembly. Restrained joint lengths for temporary flush valve assemblies shall be calculated using the DIPRA restrained joint calculator found at **www.DIPRA.org**. The inputs for these calculations are site specific with some standard inputs which can be found in TMWA's Construction and Design Standards, Section 1.1. All project calculations shall be combined in a single PDF, stamped and digitally signed by the project engineer.

Flush valve assemblies can be abbreviated using "FVA" on plan callouts.

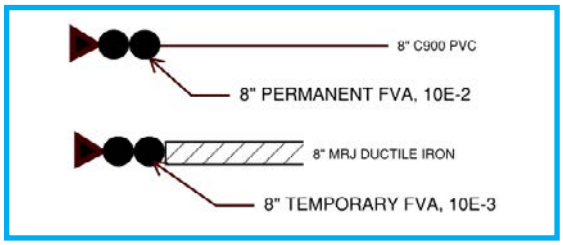
Refer to the following sections for additional callout examples:

- Thrust Blocks and Anchor Blocks
- Gate Valves
- Joint Deflections

Related Construction and Design Standards Appendices:

- 10E
- 10L

Example callouts.



Inline Flush Valve or Inline Blow-off Assembly

Similar to the FVA defined above an inline FVA is typically used at the lower section of a series of vertical elbows or adjacent to a check valve or normally closed gate valve commonly found at pressure regulating stations (PRS). It can also be placed in a long section of water main where there are no other means of flushing a water main. An inline flush assembly consists of two gate valves on either side of a tee along the 'RUN' side of the tee. Another gate valve and flush riser assembly are located on the 'BRANCH' side of the tee.

Inline flush valve assemblies can be abbreviated using “FVA” on plan callouts.

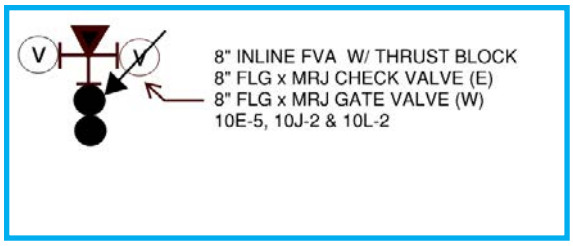
Refer to the following sections for additional callout examples:

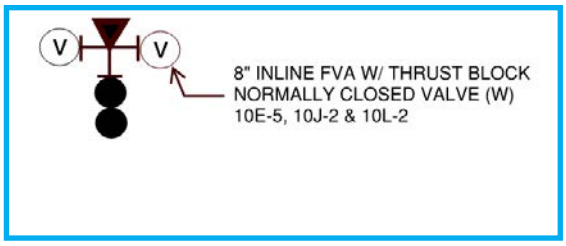
- Thrust Blocks and Anchor Blocks
- Gate Valves
- Joint Deflections

Related Construction and Design Standards Appendices:

- 10E
- 10L

Example callouts.





Air Release Valve

An air release valve assembly consists of a service saddle at the main, C901 CTS HDPE service tubing, a curb valve, a 1-inch air release valve, and associated facilities. An air release valve assembly allows for the removal of air that collects at high points in the water main. They are required at all high points along the main.

Efforts shall be made to place the ARV on the water main side of the street to limit the length of tubing and allow for minimum cover to be maintained. ARV tubing requires a positive slope from the main to the ARV to prevent air from being trapped in the service line. ARV riser tubing is an above grade installation with the protective cover colored green. Every effort shall be made to locate ARV’s away from driveways to limit potential collisions with vehicles. The ARV will need to be placed in a manner that allows for the shut off valve to be located behind curb with the front of the enclosure no closer than 18 inches from back face of curb or sidewalk.

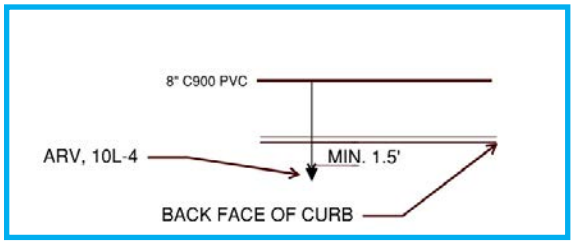
As with all service taps, the ARV tap shall be a minimum of 2 feet from the end of a pipe. If the ARV tubing cannot be installed perpendicular to the main, tracer wire shall be installed.

Air release valves can be abbreviated using “ARV” on plan callouts.

Related Construction and Design Standards Appendix:

- 10L

Example callout.



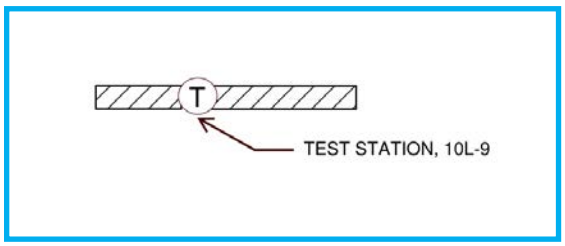
Test Station

A test station is where tracing wire used to locate the water main is brought up to the surface for access. These are typically located within fire hydrant splash pads. Test station shall not be separated by more than 500 feet. Where test stations are not installed in fire hydrant splash pads the locations shall be noted along the water main.

Related Construction and Design Standards Appendices:

- 10F
- 10J
- 10L

Example callouts.



Metered Services

Metered services shall be sized to provide peak hour capacity without excessive pressure losses that take into account anticipated losses through the meter, setter, backflow protection device, and elevation change. Private service line size can be adjusted after the meter to reduce losses and will need to be identified on the civil utility plan. It is the responsibility of the Applicant's engineer to determine the appropriate meter size for a project.

Small Diameter Metered Water Services: 2-inch and Smaller

A water service assembly includes the service saddle at the main, C901 CTS HDPE tubing, a setter, meter, and meter enclosure with lid. Water services must be designated by size and service type (i.e. domestic or irrigation). With the exception of ¾-inch meters, all enclosures will house one single meter. Dual meter enclosures are for ¾-inch meters only. Meters that utilize dual enclosure will still each have a separate service line per meter.

Meter enclosures shall be installed 18-inches behind curb or sidewalk within public utility easement or water facility easement. Meter enclosures shall be shown to scale to ensure there is adequate easement coverage and no conflict with other improvements or structures, items such as fences, walls or footings or other obstructions. Enclosure dimensions should reflect the dimensions at the base, which is the largest footprint. See table below.

Service taps on existing C900 PVC water mains need to call out for a Romac 306 (or 305) stainless steel service saddle. All service callouts will either need to include the diameter and material of the main being tapped or have the water main diameter and material identified in close proximity to the tap.

Every effort shall be made to keep the water service lines perpendicular to the water main to the meter. If this is not practical, tracer wire shall be installed with the service line. With the following note added to the plans.

ADD NOTE: TRACER WIRE TO BE INSTALLED WITH ALL SERVICE LATERALS AND ARV TUBING THAT DO NOT REMAIN PERPENDICULAR TO MAIN OR ARE MORE THAN 50' IN LENGTH. A 3 POUND ANODE IS TO BE INSTALLED AT THE MAIN AND THE TRACER WIRE SHALL BE BROUGHT UP INTO THE METER OR ARV BOX AND SHALL BE LONG ENOUGH TO EXTEND A MINIMUM OF 12 INCHES ABOVE FINISH GRADE.

Metered services shall be designed in a manner that they are not located under parking stalls, accessibility ramps or structures. Meter enclosures shall not be installed in driveways or drive aisles.

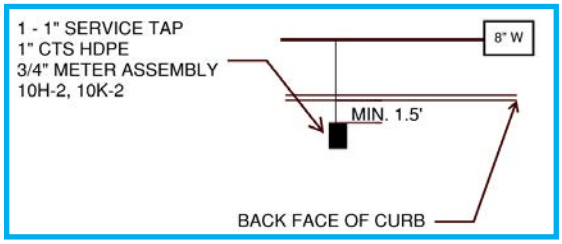
Refer to the following sections for additional callout examples:

- Water and Sewer Separations

Related Construction and Design Standards Appendices:

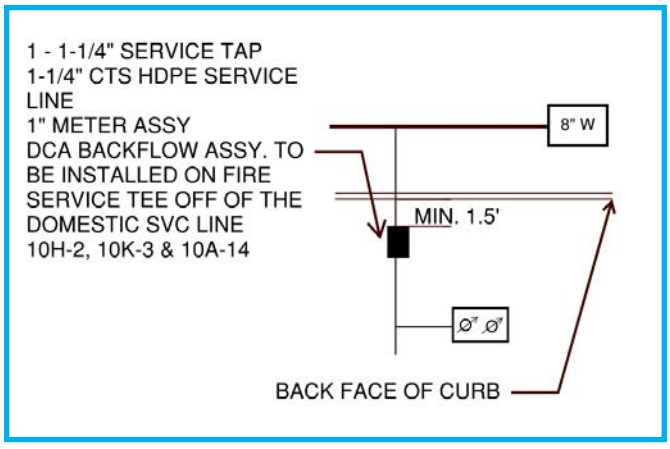
- 10A
- 10H
- 10K

Example callout for residential without backflow protection requirements.

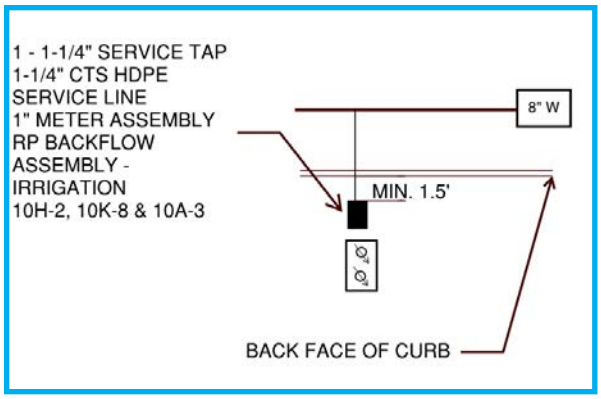


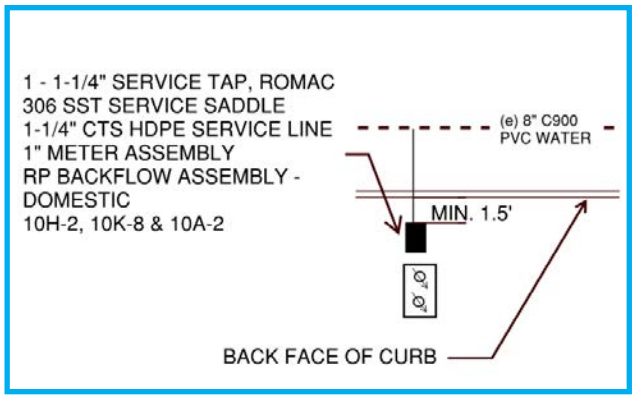
Example callout for residential with backflow protection requirements.

Note for this example the backflow assembly symbol is not shown within the house pad, this was done to limit the footprint of the example. Where internal fire suppression is required in a single-family home, the backflow assembly symbol shall be placed where it is to be installed within the building.

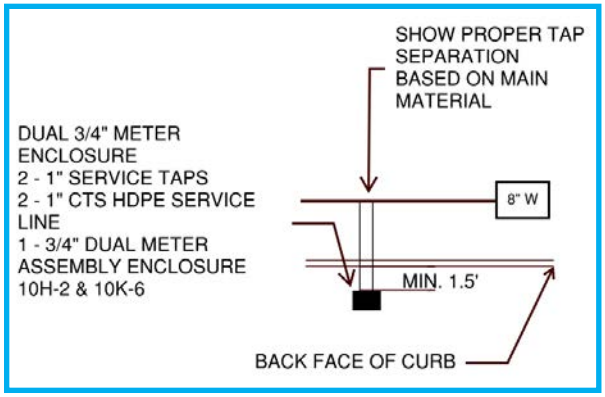


Example callouts for commercial with backflow protection requirements.





Example callout for dual meter enclosure.



Small Diameter Metered Types, Diameters, and Enclosures

Meter Size	Meter Model (Sensus)	Service Tap and Line Size	Enclosure Size	Enclosure Base Dimensions
¾”	iPerl	1”	13”x24”	1.6’ x 2.4’
1”	iPerl	1 – ¼”	13”x24”	1.6’ x 2.4’
1 – ½”	Omni T2	1 – ½”	17”x30”	2’ x 3’
2”	Omni T2	2”	17”x30”	2’ x 3’

Large Diameter Metered Water Services: 4-inch and Larger

Large diameter water services consist of a tee or tap off of the public water main with either C900 PVC pipe or restrained ductile iron service line to the vaulted meter enclosure and a remote reader enclosure. Large diameter metered services are typically a site-specific design, however, the below example callout is a typical installation. Refer to Hot Tap Section for taps off of existing water mains in place of the tee installation. Large diameter meters come in Sensus Omni T2 and Omni C2.

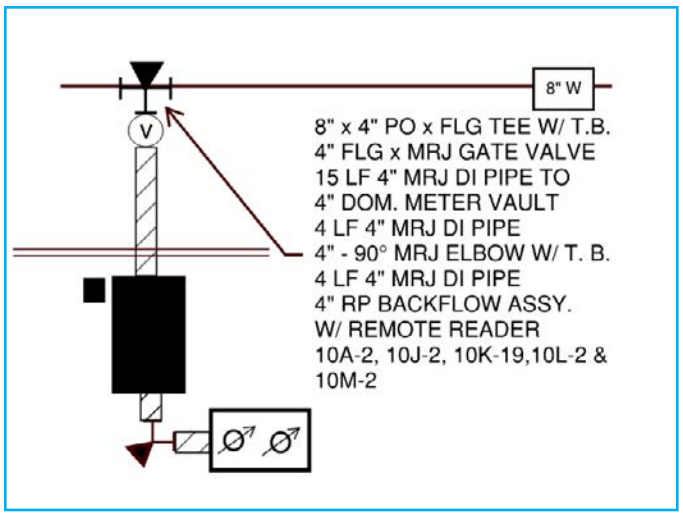
Refer to the following sections for additional callout examples:

- Tee
- Thrust Blocks and Anchor Blocks
- Gate Valve
- Hot Tap
- Joint Deflections
- Water and Sewer Separations

Related Construction and Design Standards Appendices:

- 10A
- 10D
- 10J
- 10L
- 10M

Example callout.



Backflow Protection

For commercial services (non single-family residential) a backflow assembly is required downstream of the meter. Where a single domestic metered service provides domestic water to a single residential building that has more than one dwelling unit backflow protection is required. An example would be a single metered domestic service to a duplex. Each building will be required to have a dedicated domestic service.

Refer to the following sections for additional callout examples:

- Fire Services
- Metered Services

Related Construction and Design Standards Appendices:

- 10A

Hot Tap

A hot tap is a branch connection to an existing main using a tapping sleeve and a flange gate valve and adapter. Hot taps are used to connect a new main to an existing main or a new larger diameter service to an existing main. The diameter of outlet to the tapping sleeve, diameter and joint type of gate valve, adapter diameter and joint type, and thrust block must be specified on the plans along with the diameter and material of the existing main. TMWA will perform all hot taps 4-inch through 12-inch. Any tap larger than 12-inch shall be completed by an Authority approved contractor. In order for a tapping machine to be used there will need to be a minimum of 7-feet of un-obstructed space where the tap is to be located as measured from the face of the existing main. This will allow for the machine to be placed in the trench for the tap.

Taps on existing steel mains will require a deferred backing plate design submittal after approval of the project. Upon first review the generic backing plate detail will be provided to the engineer. Sizing will be determined by the Applicant's engineer after the Applicant's contractor is able to pothole the existing main to obtain the main's wall thickness and outside diameter. All pothole activity shall be arranged with TMWA's Inspector. The sizing of the backing plate shall be in conformance with AWWA Manual M11. All sizing calculations and updated plans shall be stamped and signed by the Applicant's engineer and submitted to TMWA for review and approval prior to welding or further installation.

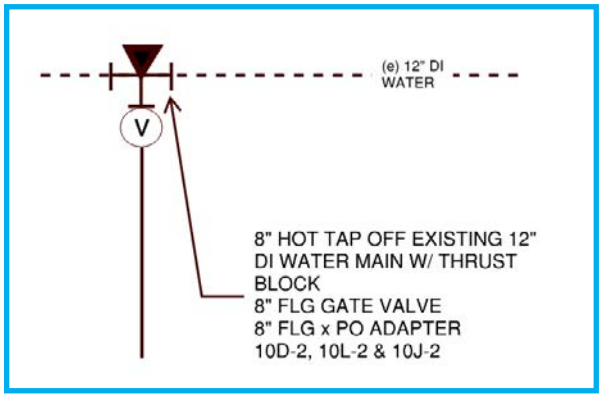
Refer to the following sections for additional callout examples:

- Gate Valve
- Thrust Blocks and Anchor Blocks

Related Construction and Design Standards Appendices:

- 10D
- 10F
- 10J
- 10L

Example callout for hot taps.



Fire Hydrants

A fire hydrant will include the tee or hot tap at the main, the valve, the lateral, and the fire hydrant assembly. Fire hydrants in TMWA service territory are dry barrel with a drain hole incorporated in the design. For fire hydrants that do not include backflow protection, the hydrant barrel must have a minimum of 10 feet horizontal separation from all sewer as defined by NAC445. This separation can be shown with a radius

of separation or a minimum 10 feet dimension. Hydrants must also be specified as public or private in the plans. Any hydrant located on private property or downstream of backflow protection will be defined as private. Regional fire hydrant details as well as the TMWA details for fire hydrants need to be included in any plan that includes fire hydrants upstream of backflow protection. The regional details can be referenced in the call out, but that is not required.

Water plans need to include all related regional fire hydrant details. Fire hydrant locations and quantities shall match the hydrant location approval from the jurisdictional fire agency. This plan is provided to TMWA with the initial application. If, during the review process, there is a change to quantity, location, fire flow, or duration the Developer's representative shall provide TMWA with an updated approval plan.

Fire hydrant assemblies can be abbreviated using "FH" on plan callouts.

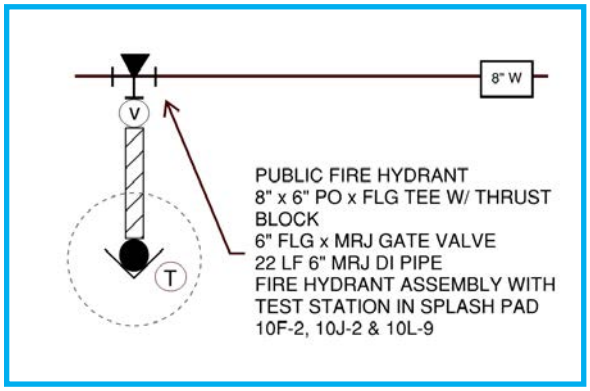
Refer to the following sections for additional callout examples:

- Tee
- Thrust Blocks and Anchor Blocks
- Gate Valve
- Test Station
- Hot Tap
- Joint Deflections

Related Construction and Design Standards Appendices:

- 10D
- 10F
- 10J
- 10L

Example callout.



Fire Services

A fire service will include the tee or hot tap at the main, the valve, the lateral, and backflow protection. Fire services are owned by the property owner starting with the valve at the TMWA main. Backflow protection type and location shall be identified on the plans. The location of the backflow protection assembly needs to be reflected on the plans and needs to be as close as practicable to the point of connection to the TMWA main. Vaulted double check detector assemblies (DCDA) needs to be located in landscape areas and out of drive aisles or parking stalls. Ensure ductile iron pipe is called out at all vault penetrations. For backflow protection assemblies proposed within buildings, all pipe and fittings up to the backflow assembly location

need to be added to the water plans. All pipe and fitting callouts downstream of the backflow assembly are to be noted on the civil utility plan.

TMWA DOES NOT DETERMINE THE SIZE OR CONFIRM ADEQUACY OF THE FIRE SERVICE SIZING.

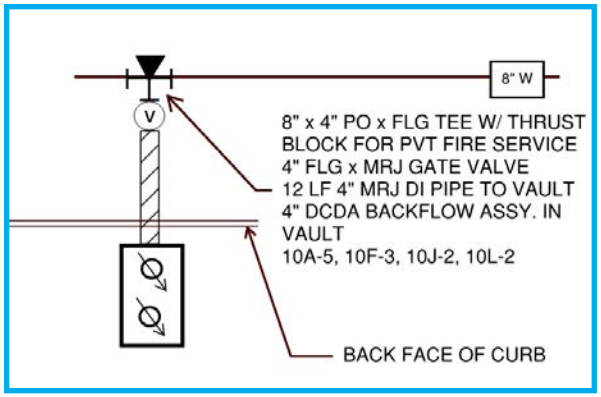
Refer to the following sections for additional callout examples:

- Tee
- Thrust Blocks and Anchor Blocks
- Gate Valve
- Backflow Protection
- Hot Tap
- Joint Deflections

Related Construction and Design Standards Appendices:

- 10A
- 10D
- 10F
- 10J
- 10L

Example callout.



Joint Deflections

Joint deflection is measured in the total horizontal and vertical angle at pipe-to-pipe joints and fittings. Deflection shall not be made by bending pipe. Reference TMWA Construction and Design Standards, Section 1.1 for the maximum allowed joint deflection for fitting joint type and pipe material. The expected joint deflection shall be specified in the plans for fittings where deflection is required. Where profiles are not required for the project, any required vertical deflection shall be called out on the plan view.

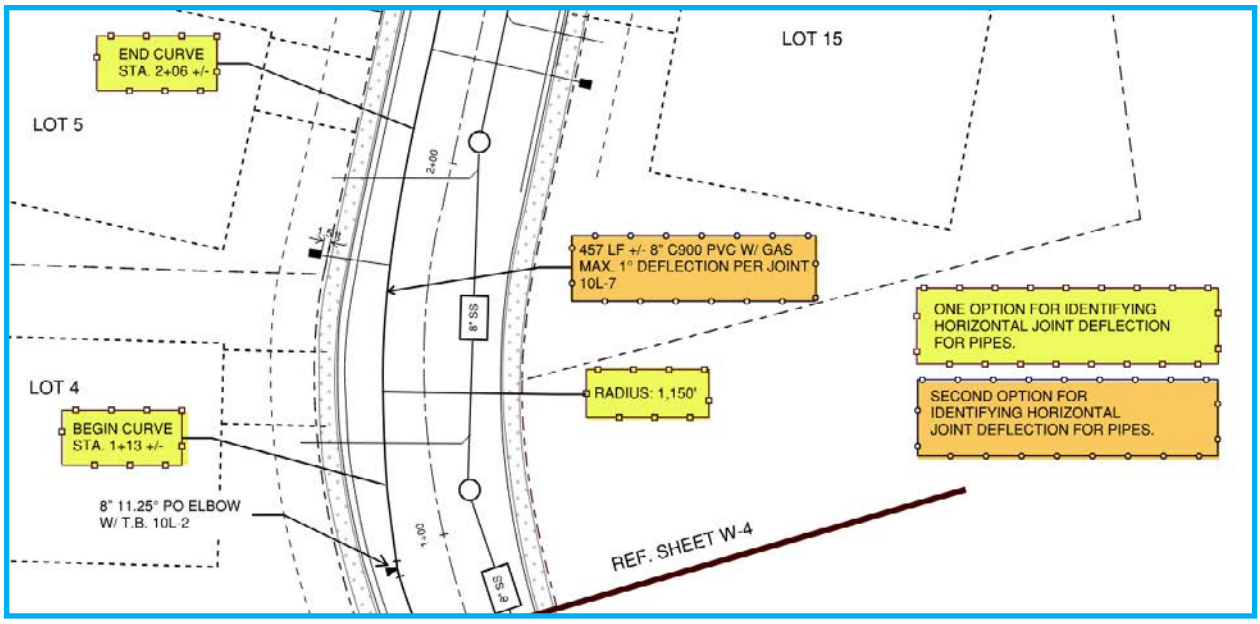
Refer to the following sections for additional callout examples:

- Tee
- Cross
- Elbows

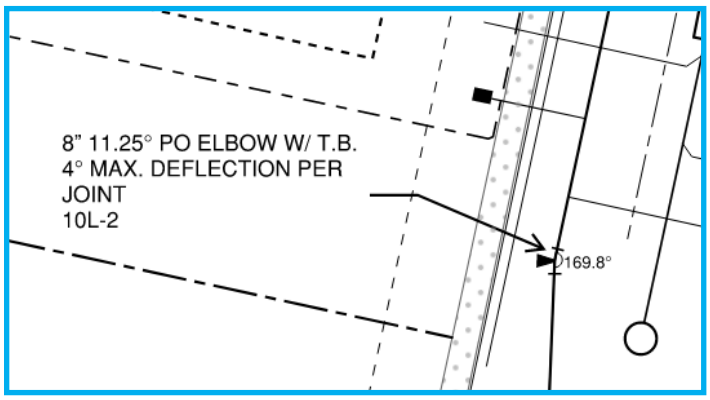
Related Construction and Design Standards, Section 1.1.

Example callout for horizontal pipe deflection through a series of pipe lengths for a plan view.

Note the example below provides two different examples for identifying horizontal pipe deflection. Only one is required on the plans. Efforts should be made to show joint deflection at fittings or obvious pipe joints.

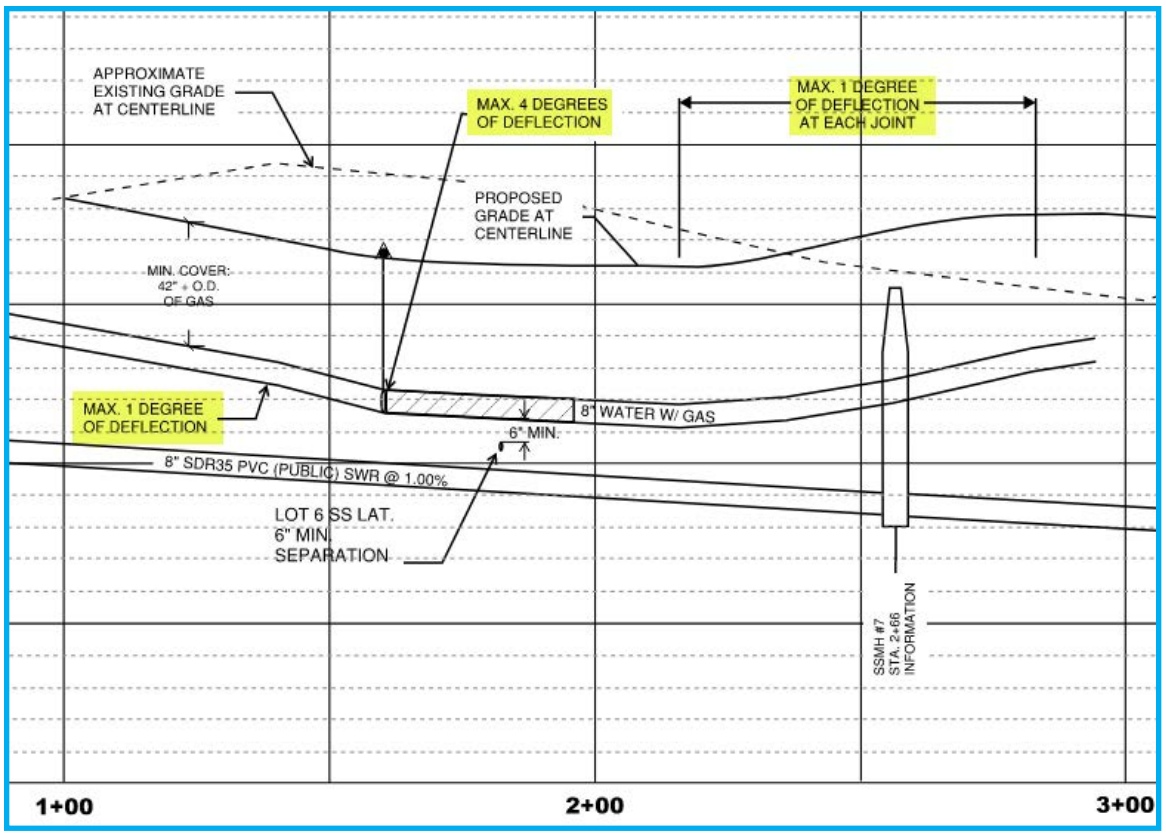


Example callout for joint deflection at a fitting.



Example callout for vertical deflection using both deflection at a fitting and deflection at pipe-to-pipe connections.

Note the example below provides two different examples for identifying vertical pipe-to-pipe joint deflection. Efforts should be made to show joint deflection at fittings or obvious pipe joints.



Water and Sewer Separations

Water mains and service laterals crossing or parallel to sewer mains and sewer laterals are required to maintain minimum separations as defined in NAC 445A. TMWA's Construction and Design Standards further identify these requirements and required mitigation methods in Section 1.1 and Appendix 10L. For the purposes of this section the term "sewer" refers to both sewer laterals and mains, unless otherwise noted.

Sewer Mains

Mitigation is not required on either utility where sewer mains cross under water mains or water service laterals with a minimum of 18-inches of separation.

Mitigation is not required on either utility where the sewer main is located a minimum of 10-feet from the water in the horizontal alignment.

Water mains and laterals shall be located a minimum of 4-feet from manholes.

NAC 445A defines sewer mains as follows:

- Gravity sanitary sewer main with a diameter that is 8-inches or larger.
- Gravity sanitary sewer that is 6-inches and has connections from more than one sewer service lateral.
- Gravity storm drain main with a diameter that is 12-inches or larger.

- Pressurized sewer mains shall include pressurized sanitary sewer lines and non-potable water pipe with a minimum diameter of 2-inches.
- Potable irrigation pipe downstream of a backflow prevention assembly with a diameter larger than 2-inches.
- Any unidentified conduit 6-inch or larger.

Sewer Laterals

Mitigation is not required on either utility where sewer laterals cross under water mains or water services with a minimum of 12-inches.

Mitigation is not required on either utility where the sewer lateral is located a minimum of 4-feet from the water in the horizontal alignment and a minimum of 12-inches below water.

NAC 445A defines sewer laterals as follows:

- Gravity sanitary sewer that is 6-inches or smaller and is connected to only one inlet/building/property.
- Gravity storm drain with a diameter less than 12-inches.
- Any unidentified conduit with a diameter less than 6-inches.

Water facilities shall be installed in a casing when crossing under sewer pipe that is larger than 24-inch diameter. A casing detail will be required on the water plans.

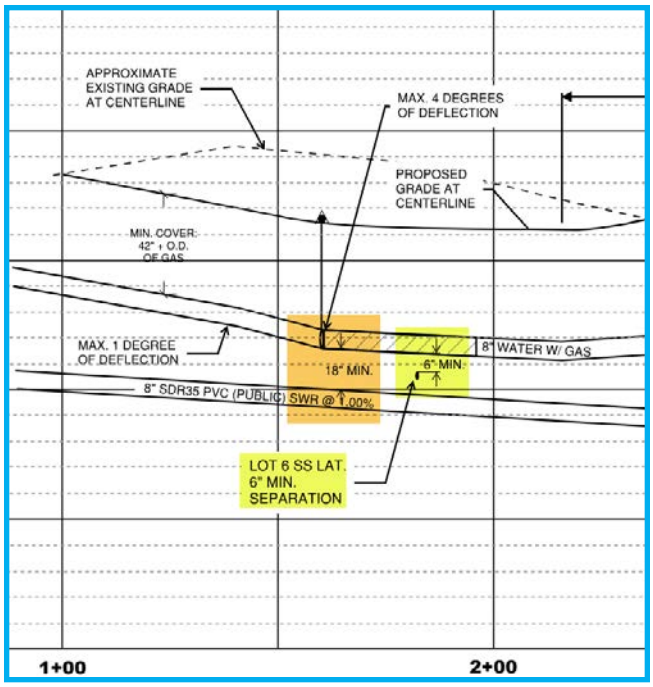
Any conduit used as part of a storm water driveway crossing when part of an open trench roadside drainage is not typically defined as sewer, however separations will need to be determined for the accessibility and maintenance of the water facilities.

Separations between sewer and water need to be identified on the plans. Separations shall be measured from the outside wall of each pipe or manhole wall. Where the plan requires profiles the minimum separations need to be identified in the profile at crossings with the water mains. Mitigation shall be reflected on the plans.

Related Construction and Design Standards Section and Appendix:

- Section 1.1
- 10L

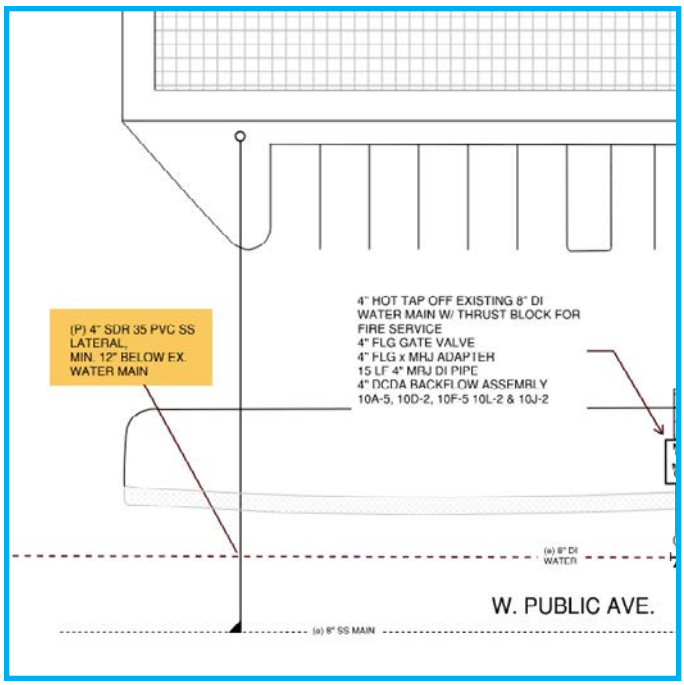
The following example shows sections of a profile view and a plan view with two different separation callouts. *In orange*, there is no required mitigation. The sewer main is crossing a fire hydrant lateral/service. The fire hydrant lateral is crossing over the sewer main with at least 18-inches of separation. The actual separation could be greater than 18-inches, but the minimum separation not requiring mitigation is the only call out required. *In yellow*, the sewer lateral and water main crossing requires mitigation. The sewer lateral is crossing under the water main with less than 12-inch separation, but has the minimum required 6-inches of separation. The callout for the sewer lateral separation of the 6-inch minimum is required along with the required mitigation shown on the plans. *For subdivisions*, in addition to the call out on the profile view there will need to be a note added to the water plans calling out the area of special construction. This note will identify, by lot number, what water services or sewer laterals require mitigation and are crossing sewer with the minimum 6-inch separation while also including if the lateral will pass over or under the respective main. Mitigation typically requires two different things. One being the pipe material of the sewer pipe and the other being the material of the water pipe. The water pipe material is going to be specifically called out on the water plans, but for mechanically restrained joint ductile iron, the pipe in both profile and plan view needs to be hatched.



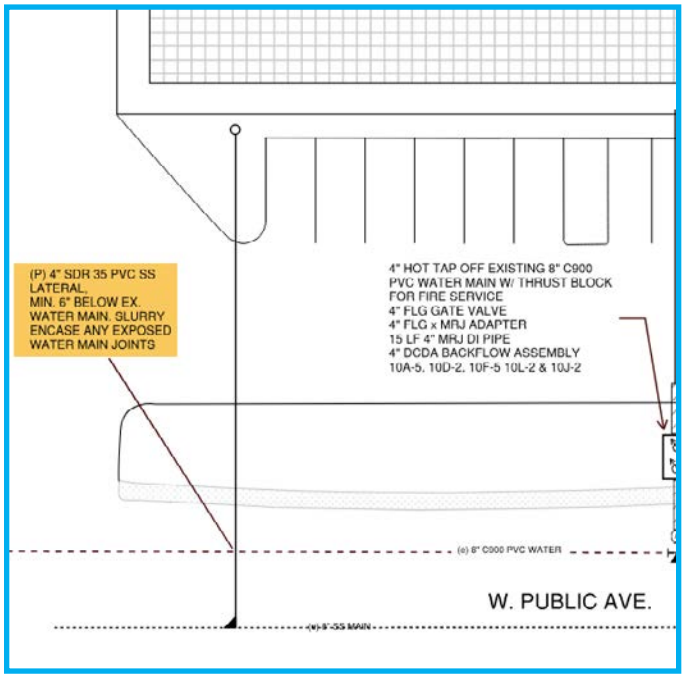
AREA OF SPECIAL CONSTRUCTION:
SEWER LATERAL FOR LOT 6 WILL PASS UNDER THE WATER MAIN WITH A MINIMUM OF 6" SEPARATION, PER 10L-13.



The following example shows a portion of a water plan with the separation called out between a sewer lateral and a water main where no mitigation is required.



The following example shows a portion of a water plan with the separation called out between a sewer lateral and a water main. The required mitigation is also noted at this crossing.



Casings

Casings consist of steel pipe, pipe spacers and end seals to house water mains or service laterals 4-inch and larger where the water crosses under pipes with diameters larger than 24-inch or concrete boxes. The pipe inserted into the casing is referred to as the carrier pipe. The carrier pipe shall be restrained ductile iron through the casing. The selection of the pipe spacer heights should place the carrier pipe as close to centered in the casing. Refer to TMWA's Construction and Design Standards for casing material requirements.

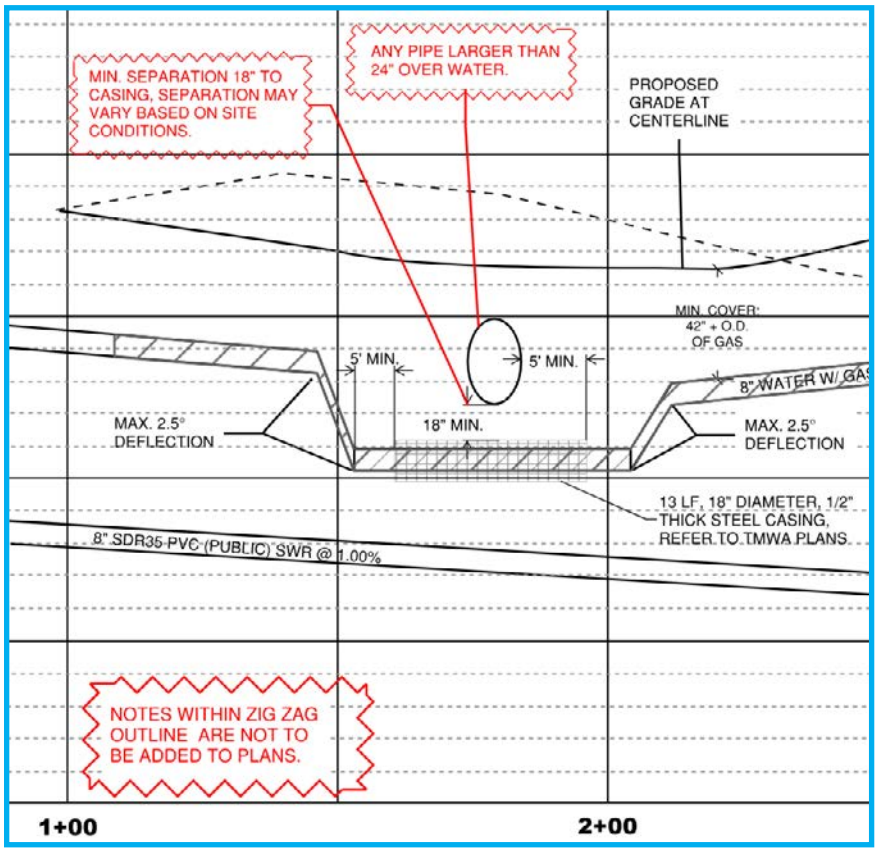
Related Construction and Design Standard Section:

- Section 1.1

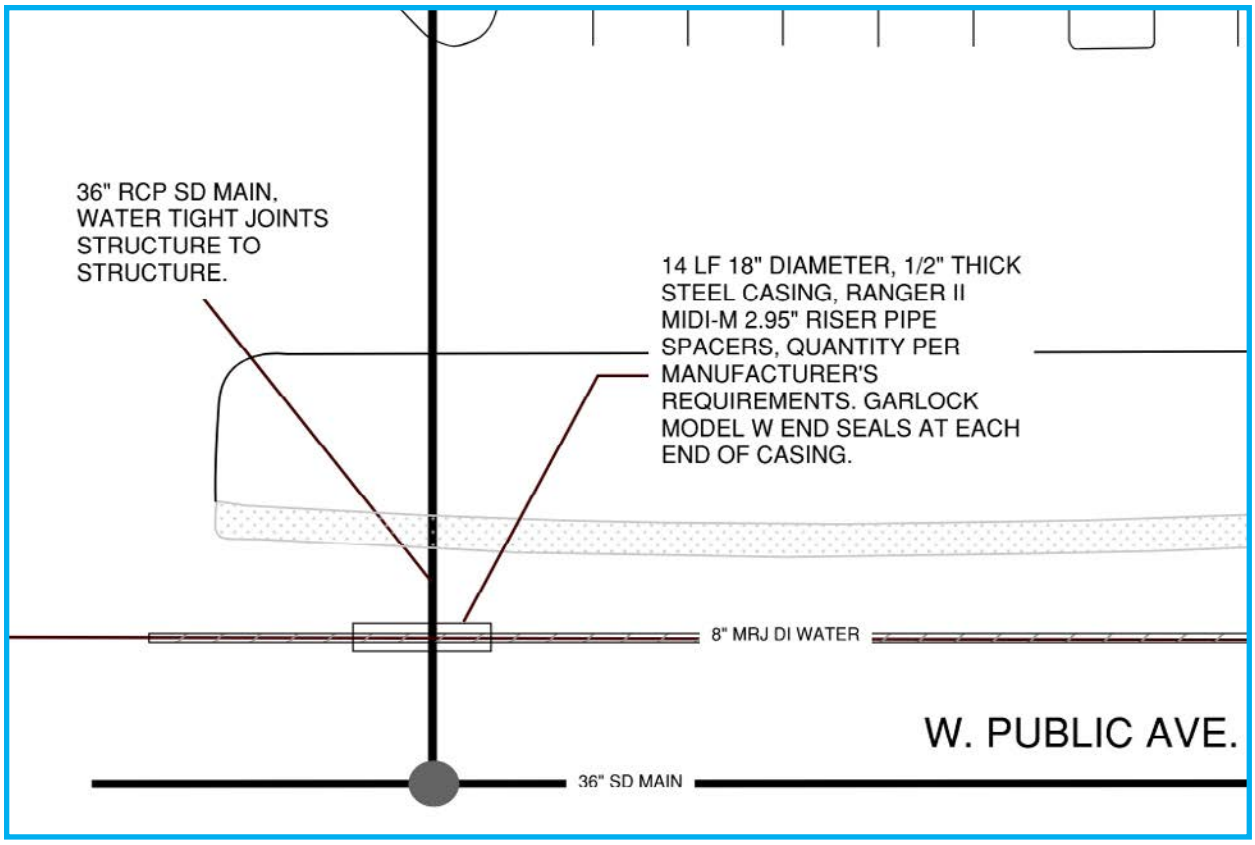
Casing Diameters Based on Carrier Pipe Diameter

Carrier Pipe Diameter	Minimum Casing Diameter
4"	16"
6"	16"
8"	18"
10"	20"
12"	24"

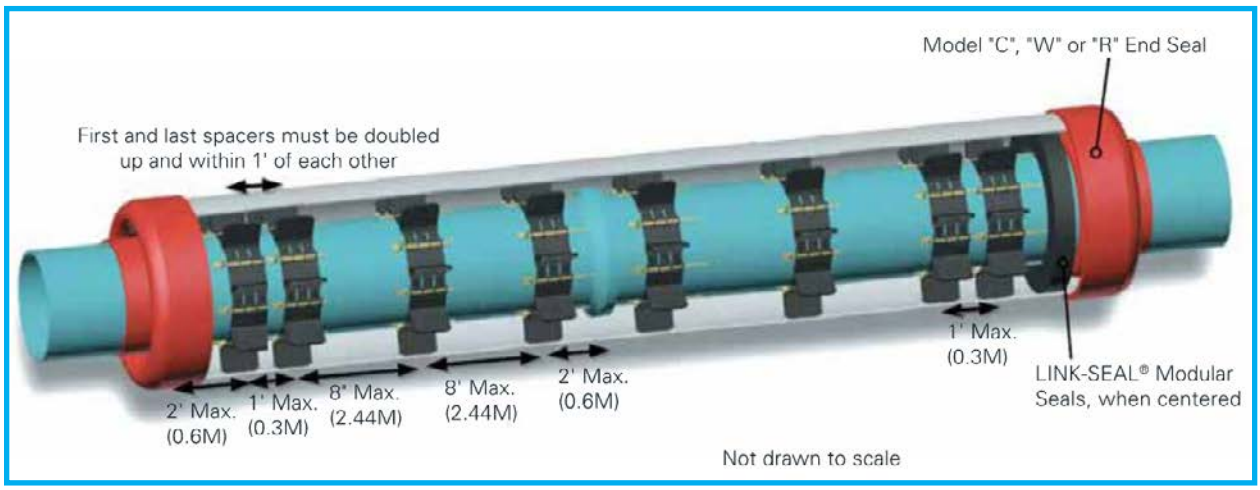
Example profile view of a casing.



Plan view example.



Example installation detail for Ranger II casing spacers.



Credit: Garlock

Check Valve

A check valve is a fitting that is used to allow the flow of water in one direction only. Typically check valves are connected directly to an inline flush valve assembly. Check valves must be specified by diameter and joint type. The check valve symbol shall depict the direction of desired flow in the plans. The symbol's arrow points in the direction of flow. Check valves may require installation within a vault or manhole. Site specific direction will be provided by TMWA.

Refer to the following sections for additional callout examples:

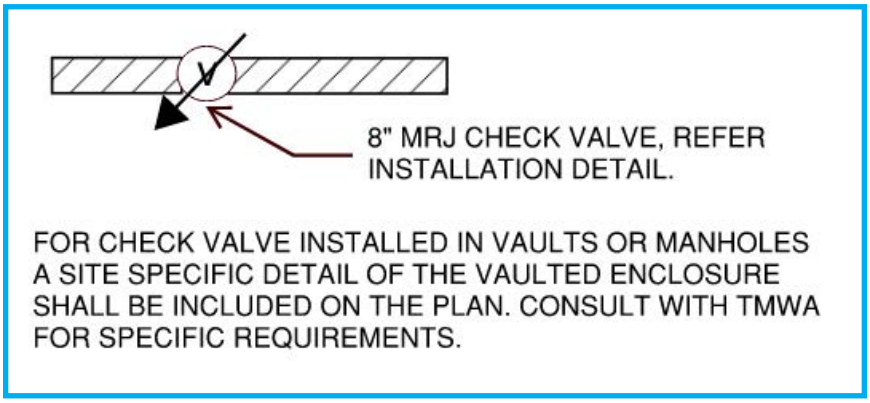
Inline Flush Valve or Inline Blow-off Assembly

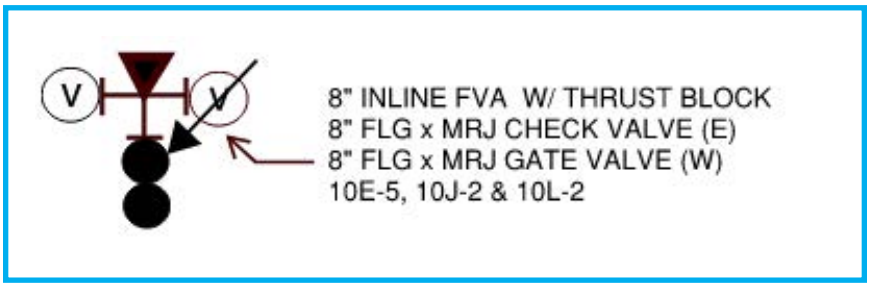
Joint Deflections

Related Construction and Design Standards Appendices:

- 10E
- 10J
- 10L

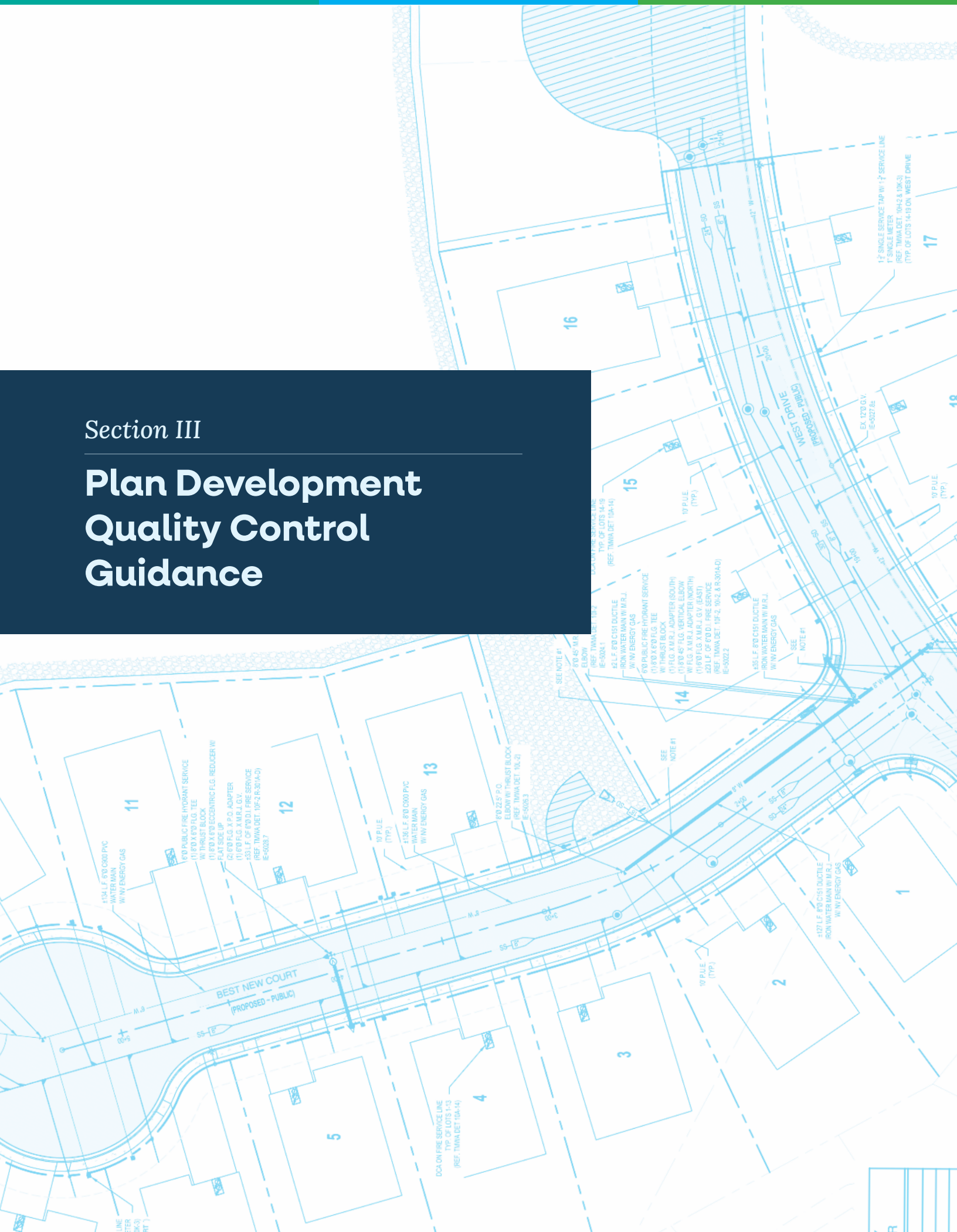
Example callouts.





Section III

Plan Development Quality Control Guidance



This Section is to assist Applicant's engineer in the quality control and project design to help reduce TMWA review comments. It provides some common items to consider prior to project submission and development of plans. This guide does not guarantee plan approval at initial submittal. Please note that excessive non-conformance with the guide, TMWA Construction and Design Standards, and as outlined in the Project Rejection Criteria Section of this document may result in plans being returned without a thorough review.

This Section also combines some more common comments from reviews of past projects and hurdles commonly experienced in the past. Comments may change from time to time based on site specific needs or changes to TMWA's Construction and Design Standards. Updates to this guide may not be completed as timely as TMWA Construction and Design Standards or for minor changes. It should be noted that this Section is not a comprehensive list of review comments.

Helpful Links:

- **New Business Process** – Landing page for New Business Project Submittals and Guide Documents (https://tmwa.com/doing-business-with-us/new-construction-beta/)
- **TMWA Construction and Design Standards** (https://tmwa.com/all-standards/)
- **Drawing Templates** - Includes water plan title blocks, symbols and general notes (https://tmwa.com/doing-business-with-us/new-construction/drawing-templates/)

General Project Considerations

- Discuss construction water needs with your client. Considering construction water needs early in the project will potentially avoid delays after project approval.
- Consider vertical construction timing and fire hydrant coverage needs. Fire hydrant coverage may necessitate project phasing.
- Fire hydrant approval plans will need to reflect any project phasing, clearly identifying phase lines.
- Review potential project phasing. Services, including fire hydrants, are not activated until the entire water project has been constructed and accepted by TMWA. If you have questions about potential project phasing request a pre-application meeting from the New Business Process web page.
- If a Discovery was completed for the project, follow the Discovery findings with respect to facility locations/layout and facility sizing.
- Review the Definitions and Common Callout Example portion of this guide to ensure plans are following these examples.
- Prior to submitting, check Landscape plans and demand calculations for accuracy in counts on plan and calculation. Use TMWA's Water Resource Landscaping Calculation Template found on the New Business Process web page.
- When creating PDF files from CAD please adjust the following to reduce file sizes:
  - » Disable storing SHX as comments. This can be done by typing "PDFSHX" in the command line and setting it to "0".
  - » Disable including layer information. In the Sheet Set PDF Publish Options dialog box, uncheck "Include layer information".
- Prior to submitting check that all plans stamped and signed by a Professional Engineer are flattened before digitally signing. Make sure the plans are not digitally certified.

- Landscape plans stamped by a Landscape Architect need to be submitted as a separate PDF document, not combined with the civil plan set.
- Landscaping needs to consider the location of water facilities including meter enclosures, backflow protection, service lines, mains, water vaults of any kind and air-release valves. A no planting zone shall be added to the landscape plans showing no shrubs within 4-feet and no trees within 10-feet of the water facilities.

Water Plans

- At a minimum water plans need to meet all requirements in TMWA Construction and Design Standards, Section 1.1.
- General notes need to be adjusted to reflect project specifics with the following information:
  - Lengths of main and service lines broken down by diameter and material.
    - Fire Service lengths should reflect the distance from the point of connection to the TMWA main to the backflow assembly.
    - Domestic and irrigation service lengths should reflect the distance from the point of connection to the TMWA main to the meter enclosure.
    - Main lengths should be measured from the center of fittings. Note that service taps and ARV taps would not be defined as fittings in this case.
  - Quantities, type and diameter of all proposed meters including enclosures.
  - Fire hydrant quantity, service line length, material and diameter as well as ownership designation identifying public vs. private.
  - Identification of backflow protection types. Specifically for fire services where there are three different types of assembly options. Remove the options that will not be used for the project.
  - Remove sections of the notes that require quantities from the plan that do not apply to the project, this includes backflow assembly designations when backflow is not required. An example would be a commercial service that includes domestic and fire service with a double check detector assembly. In this case remove the irrigation backflow notes and the fire notes that refer to a double check assembly (DCA) or a reduced pressure detector assembly (RPDA).
- TMWA symbol legend is not only included but used throughout the water plans.
- Use proper sheet numbering dependent on reclaimed/non-potable water use on or adjacent to the project site.
- Confirm north arrow orientation and scale are included and correct on all sheets and all sheet sizes conform to requirements in TMWA Construction and Design Standards, Section 1.1.
- Show the limits of any proposed or existing public utility easement (PUE) or water facility easement. For areas that do not include a PUE for single services the water facility easement will need to extend a minimum of 7-feet each side of the service line and 5-feet behind the back side of the meter enclosure.
- Include all associated details on plan callouts and on the detail sheets. TMWA Appendix 10 details should not be included in the civil plan set.
- Water plans shall not be included as part of the civil plan set.
- Include Engineering firm name and contact information on all sheets.
- Include adequate white space for the TMWA approval stamp on all sheets. This is approximately 2-inches high by 5-inches wide.

Water Mains

- All proposed water main extensions are required to have a profile included in the plan set. For projects that include civil plans with profile sheets incorporating other utilities in the same alignment as the proposed water main, TMWA can use those combined profiles. There typically won't be a need to have duplicate profiles in both sets of plans. However, if there are no profiles in the civil plans, the profile should be included in the water plans. The scales for both the vertical and horizontal scales shall use standard engineering scale as noted in Section 1.1 of TMWA Construction and Design Standards and shall be noted on each sheet. Every effort shall be made to use a consistent scale throughout the plan set.
- Refer to the Common Fittings and Callouts For New Business for standard callouts to be used within the plans.
- Confirm all fitting joint types are compatible with the pipe material called out.
- Mitigation shall be called out and minimum separations identified where required. Only calling referring to the Appendix 10L detail for mitigation will not be sufficient. The means of mitigation is required to be identified. Where reinforced concrete pipe is used at mitigated crossings with water it shall be identified as having water tight joints extending structure to structure.
- Show test station locations.
- Confirm minimum separations from buildings and other structures as identified in Section 1.1.
- Confirm valve spacing meets minimum requirements as identified in Section 1.1.
- Take into account the cross slope of the finish grade above the water main when determining the cover over the water main. Often in roadways the centerline elevation is reflected on the profile sheet with a 2% cross slope with the water main offset from centerline. Use the cross slope and distance from centerline to ensure the minimum allowed cover is met.
- Ductile iron pipe needs to be identified as either MRJ or un-restrained. When ductile iron is used it should extend using full, standard 18-foot lengths, extending fitting to fitting where the next closest fitting is 40-feet or less from the end of the required ductile iron, unless otherwise noted by the Authority.

Water Services

- Confirm service tap spacing is reflected on the plans as identified in Appendix 10, details 10H-2.
- Confirm service taps, include ARV taps, are shown at least 2-feet from any obvious pipe joints.
- Service line 2-inch diameter and smaller does not use fittings. This pipe can be deflected to meet manufacturer's recommendations.
- Show all meter enclosures to scale. For small diameter meters, use the dimensions provided in the Common Fittings and Callouts for New Business section. For large diameter meters use the dimensions shown in Appendix 10M of TMWA's construction and Design Standards.
- Where water services are to be retired as part of the project, include the service retirement notes from Section 1.1 on the plans.
- Individual domestic services shall be tapped for each building on a parcel. Multiple buildings shall not share domestic services.
- Future services or stubs will not be permitted on a project.
- Traffic rated enclosures, identified in details 10K-17 and 10K-18 are only to be used upon approval by the Authority.
- There shall be a no planting zone around meter enclosures and backflow assemblies in addition to ARV's and service lines. The area includes a 4-foot separation from plants and shrubs and 10-feet for trees.

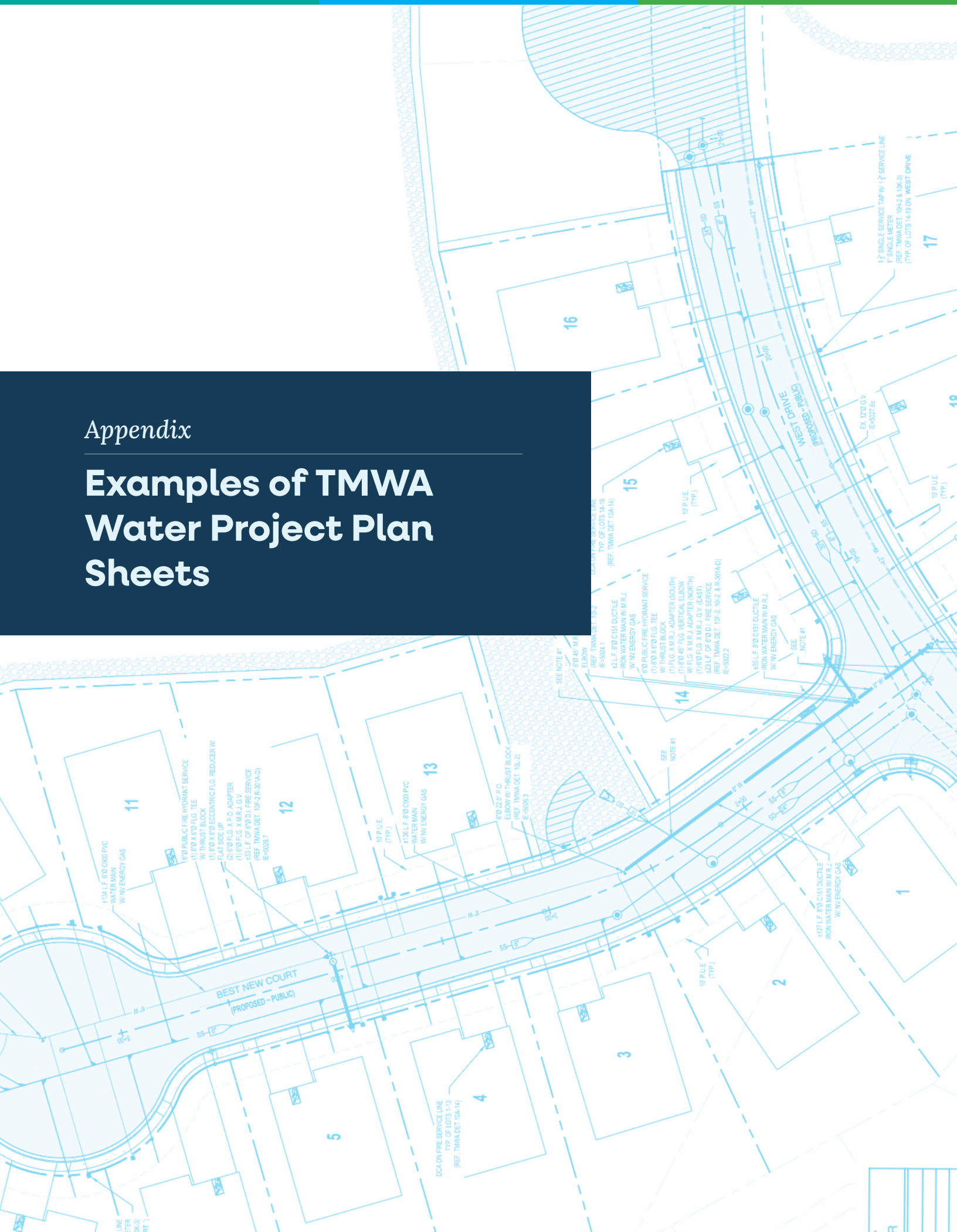
- Meter enclosures shall have appropriate separations from structures of any kind as identified in TMWA's Construction and Design Standards.

Backflow Protection

- Where fire services are to be installed, external protection shall be used where there is adequate space within landscape areas.
- Backflow assemblies shall be placed as close to the meter or connection to the main for un-metered services as practicable.
- Locate backflow assemblies in a manner that allows for future testing and repair.
- For properties with existing services that apply for modifications to the service property, backflow retrofit will be required bringing all services up to date with protection.

Appendix

Examples of TMWA Water Project Plan Sheets



TRUCKEE MEADOWS WATER AUTHORITY:

APPLICANT TO FURNISH AND/OR INSTALL:

ALL TRENCHING AND EXCAVATION PER TMWA ENGINEERING & CONSTRUCTION STANDARDS SECTIONS 4 AND 5.

ALL SURVEY STAKING NECESSARY TO CLARIFY RIGHT-OF-WAY, EASEMENTS, PROPERTY LINES, ELEVATIONS, ETC.

ALL NECESSARY PERMITS, PAVEMENT CUTTING, PAVEMENT REMOVAL, AND PAVEMENT REPLACEMENT.

APPLICANT TO INSTALL WATER METER SETTER AND ENCLOSURE.
WATER METER INSTALLED BY TMWA.

ALL REQUIRED LINE PRESSURE TESTS AND WELDING/FUSION QUALITY TESTS SHALL BE PERFORMED IN ACCORDANCE WITH AWWA C600, C605 AND TMWA ENGINEERING & CONSTRUCTION STANDARDS. MOST STRINGENT STANDARD SHALL APPLY. ALL PRESSURE TESTS SHALL BE PERFORMED BEFORE THE PIPING IS FLUSHED, DISINFECTED OR SAMPLED FOR AN ANALYSIS OF WATER QUALITY.

ADDRESSES OR BUILDING DESIGNATION.

LETTER TO VERIFY THAT ELEVATIONS ARE AT ENGINEERED SUB-GRADES PRIOR TO UTILITY CONSTRUCTION.

ALL PRIVATE DOMESTIC AND IRRIGATION LINES BEYOND THE POINT OF CONNECTION AT TMWA'S METER PROVISION AND ALL NECESSARY WATER PRESSURE REGULATION EQUIPMENT (REFER TO THE MOST CURRENT EDITION OF THE UNIFORM PLUMBING CODE WHICH HAS BEEN ADOPTED BY THE GOVERNMENTAL ENTITY HAVING JURISDICTION OVER THE PROJECT).

WATER MAINS SHALL NOT BE PLACED IN SERVICE UNTIL DISINFECTED PER AWWA STANDARD C651 AND AN ANALYSIS WHICH INDICATES IT MEETS PRIMARY STANDARDS FOR COLIFORM BACTERIA HAS BEEN OBTAINED. FINAL WATER QUALITY TESTS WILL BE FORWARDED TO THE REVIEWING AGENCY UPON COMPLETION OF ANALYSIS.

CONTRACTOR TO COORDINATE WITH TMWA INSPECTOR REGARDING DISCHARGE OF SPENT CHLORINATED WATER.

V-BIO POLYETHYLENE WRAP TO BE USED ON ALL DUCTILE IRON PIPE (DIP) AND FITTINGS PER AWWA STANDARD C105.

RESTRAINED JOINT PIPING 12" DIAMETER AND SMALLER SHALL BE DUTILE IRON PIPE (RJ-DIP). BELL AND SPIGOT PUSH-ON JOINTS SHALL BE RESTRAINED UISNG RUBBER GASKETS WITH STAINLESS STEEL LOCKING SEGMENTS VULCANIZED INTO THE RUBBER GASKET. RESTRAINED JOINT FITTINGS 12" DIAMETER AND SMALLER SHALL BE MECHANICAL JOINT (MJ) DUCTILE IRON RESTRAINED WITH MECHANICAL JOINT WEDGE ACTION RESTRAINT GLANDS.

RESTRAINED JOINT PIPING 14" DIAMETER AND LARGER SHALL BE INTERNALLY RESTRAINED DUCTILE IRON PIPE. INTERNALLY RESTRAINED JOINTS SHALL BE RESTRAINED USING RUBBER GASKETS AND DUCTILE IRON LOCKING SEGMENTS, INSERTED THROUGH A SLOT IN THE BELL FACE AND SECURED TO A WELDED BEAD ON THE SPIGOT END OF PIPE. RESTRAINED JOINT PIPE AND FITTINGS OPTIONS ARE AS FOLLOWS:

INTERNALLY RESTRAINED JOINT PIPE
TRFLEX JOINT PIPE – US PIPE OR MCWANE
HDSS PIPE – US PIPE
FLEX RING JOINT PIPE – AMERICAN

INTERNALLY RESTRAINED JOINT FITTINGS
TRFLEX JOINT PIPE IS COMPATIBLE WITH TRFLEX JOINT FITTINGS
HDSS PIPE IS COMPATIBLE WITH TRFLEX JOINT FITTINGS
FLEX RING JOINT PIPE IS COMPATIBLE WITH FLEX RING JOINT FITTINGS

ADAPTERS FOR FIELD-CUT PIPE
TRFLEX JOINT PIPE – MULTIBEAD PIPE SPOOL (US PIPE)
HDSS PIPE – MULTIBEAD PIPE SPOOL (US PIPE)
FLEX RING JOINT PIPE – FIELD FLEX RING ADAPTERS (AMERICAN)

VERTICAL OFFSETS AND PIPES OF 12" DIAMETER AND SMALLER SHALL USE MJ FITTINGS WITH RESTRAINT GLANDS AND WAX TAPE

ALL CONCRETE FOR THRUST BLOCKS PER TMWA ENGINEERING & CONSTRUCTION STANDARDS AND DRAWING NUMBER 10L-2.

APPROX. 14' OF 1-1/4" AWWA C901 CTS HDPE TUBING WITH ALL FITTINGS AND APPURTENANCES. (INCLUDING ALL HOT TAPS 2" AND UNDER). DOMESTIC

APPROX. 14' OF 2" AWWA C901 CTS HDPE TUBING WITH ALL FITTINGS AND APPURTENANCES. (INCLUDING ALL HOT TAPS 2" AND UNDER). IRRIGATION

SEPARATION BETWEEN WATER SERVICE TAPS:

C900 PVC PIPE, TRANSITE (AC) PIPE – SERVICE TAPS ON THE SAME SIDE OF PIPE SHALL HAVE A MINIMUM 36" SEPARATION. SERVICES STAGGERED SIDE TO SIDE OF PIPE SHALL HAVE A MINIMUM 18" SEPARATION. NO SERVICES ALLOWED WITHIN 24" OF CUT END OR PIPE TO BELL TRANSITION.

DUCTILE IRON PIPE, CAST IRON PIPE, STEEL PIPE – SERVICE TAPS ON THE SAME SIDE OF PIPE SHALL HAVE A MINIMUM 18" SEPARATION. SERVICES STAGGERED SIDE TO SIDE OF PIPE SHALL HAVE A MINIMUM 9" SEPARATION. NO SERVICES ALLOWED WITHIN 24" OF CUT END OR PIPE TO BELL TRANSITION.

1 – 13" x 24" SINGLE WATER METER PROVISION ASSEMBLY(IES).

1 – 17" x 30" SINGLE WATER METER PROVISION ASSEMBLY(IES).

APPROX. 13' OF 4" AWWA C151 DUCTILE IRON PIPE FOR FIRE SERVICE(S).

PRESSURE REGULATOR VALVE (PRV) – PRV'S ARE REQUIRED WITHIN THIS DEVELOPMENT TO REDUCE WATER PRESSURE IN DOMESTIC LINES AND IRRIGATION SYSTEMS. WATER PRESSURE MAY BE GREATER THAN 80 PSI WHEN THE SERVICE IS INITIALLY CONNECTED OR IN THE FUTURE AS A RESULT OF PRESSURE INCREASES PLANNED WITHIN THE AREA. THE APPLICANT IS RESPONSIBLE FOR THE INITIAL INSTALLATION AND MAINTENANCE OF THE ASSEMBLY(IES). WHEN A CHANGE IN OWNERSHIP OCCURS, FUTURE MAINTENANCE OF THE ASSEMBLY(IES) BECOMES THE RESPONSIBILITY OF THE NEW OWNER.

TMWA TO FURNISH AND/OR INSTALL:

FIELD INSPECTOR TO INSPECT MAINS AND SERVICES

HOT TAP LABOR (GREATER THAN 2" ONLY)

1 – 1" iPERL – SENSUS WATER METER(S) FOR DOMESTIC.

1 – 2" OMNI T2 – SENSUS WATER METER(S)

GENERAL COMMENTS:

CONTRACTOR TO CALL PROJECT COORDINATOR AT (775) 834-8269 48-HOURS PRIOR TO START OF CONSTRUCTION TO SCHEDULE ON-SITE INSPECTION.
(INCLUDE WORK ORDER NUMBER 26-1105)

APPLICANT TO NOTIFY TMWA OF ANY DESIGN AND/OR ADDRESS CHANGES.

ALL MATERIALS, INCLUDING BACKFILL, SHALL BE AT THE JOB SITE PRIOR TO START OF CONSTRUCTION AND SHALL COMPLY WITH TMWA ENGINEERING & CONSTRUCTION STANDARDS.

MAINTAIN POTABLE WATER AND SS/SD/NON-POTABLE HORIZONTAL AND VERTICAL CLEARANCES AS SPECIFIED IN NEVADA ADMINISTRATIVE CODE (NAC) SECTION 445A AND TMWA ENGINEERING & CONSTRUCTION STANDARDS.

AT ALL CROSSINGS, UNDERGROUND ELECTRIC FACILITIES SHALL BE LOCATED BELOW WATER MAINS AND/OR WATER SERVICES WITH A MINIMUM OF 2-FEET VERTICAL CLEARANCE.

ALL WORK SHALL BE ACCOMPLISHED IN STRICT ACCORDANCE WITH THE SPECIFICATIONS SET FORTH IN THE TMWA ENGINEERING & CONSTRUCTION STANDARDS. THE CONTRACTOR SHALL SECURE COPIES OF THE AFOREMENTIONED CONSTRUCTION SPECIFICATIONS ON HIS/HER OWN BEHALF. THE ENGINEERING & CONSTRUCTION STANDARDS MAY BE DOWNLOADED FROM:
www.tmwa.com/standards

SYMBOLS ARE NOT TO SCALE AND DO NOT NECESSARILY REPRESENT ACTUAL LOCATIONS OF FACILITIES.

THESE DRAWINGS ARE BASED ON CIVIL PLANS DATED: NOVEMBER, 2026

THIS MAP ILLUSTRATES DATA COLLECTED FROM VARIOUS SOURCES AND MAY NOT REPRESENT A SURVEY OF THE PREMISES. NO RESPONSIBILITY IS ASSUMED AS TO THE SUFFICIENCY OR ACCURACY OF THE DATA DISPLAYED HEREON.

CAUTION: CONTRACTOR IS RESPONSIBLE FOR LOCATING AND COORDINATING WORK AROUND ALL EXISTING UTILITIES. PRIOR TO EXCAVATION, CHECK TO ENSURE ADDITIONAL DEPTH IS NOT REQUIRED TO ACCOMMODATE INSTALLATION OF GAS FACILITIES.

SOILS RETENTION MAY BE REQUIRED AROUND WATER METER BOXES, FIRE HYDRANTS, AND OTHER FACILITIES IF SLOPES EXCEED 15%.

WATER METERS SHALL BE LOCATED WITHIN A PUBLIC UTILITY EASEMENT (PUE).

TOP OF WATER METER ENCLOSURE SHALL BE SET 0.2 FEET ABOVE HIGHEST FINISHED GRADE SURROUNDING ENCLOSURE WITHIN LANDSCAPED AREAS. FOR INSTALLATIONS IN CONCRETE OR OTHER PAVED AREAS, SET TOP OF LID FLUSH WITH SURROUNDING SURFACE.

APPLICANT TO ADVISE PLUMBING CONTRACTOR OF HIS/HER RESPONSIBILITY TO VERIFY WATER PRESSURE DURING STATIC CONDITIONS AT ALL SERVICE LOCATIONS. THE PLUMBING CONTRACTOR IS REQUIRED TO CONFORM TO THE MOST CURRENT EDITION OF THE UNIFORM PLUMBING CODE WHICH HAS BEEN ADOPTED BY THE GOVERNMENTAL ENTITY HAVING JURISDICTION OVER THE PROJECT. SPECIAL ATTENTION SHOULD BE GIVEN TO THE SECTION OF THE CODE CONCERNING STATIC WATER PRESSURE IN EXCESS OF 80 PSI.

UNUSED SERVICE LATERALS SHALL BE RETIRED BACK TO TMWA'S WATER MAIN.

WATER MAINS TO EXTEND A MINIMUM OF 10-FEET BEYOND END OF PAVING. MAINS ARE NOT TO BE INSTALLED UNDER SIDEWALK AND/OR CURB & GUTTER.

DURING CONSTRUCTION ALL OPEN ENDS OF PIPES OR FITTINGS SHALL BE SEALED AT THE END OF EACH WORKING DAY TO PREVENT THE ENTRY OF FOREIGN OBJECTS.

ALL PIPE AND APPURTENANCES SHALL BE NSF 61 CERTIFIED.

BACKFLOW PREVENTION:

BACKFLOW PREVENTION IS REQUIRED BY NEVADA ADMINISTRATIVE CODE (NAC) SECTION 445A.67185.
1. DOMESTIC AND IRRIGATION BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED IMMEDIATELY DOWNSTREAM OF THE METER.
2. FOR FIRE SERVICE BACKFLOW ASSEMBLY(IES): CONTACT BACKFLOW PREVENTION GROUP FOR TYPE AND REQUIRED LOCATION.

BACKFLOW PREVENTION GROUP WILL APPROVE WATER METER SET AND PERMANENT WATER SERVICE AFTER:
1. THE ASSEMBLY IS INSTALLED PER TMWA INSTALLATION STANDARDS AND INSPECTED BY THE BACKFLOW PREVENTION GROUP.
2. OPEN TRENCH, DITCH, AND/OR SLURRY INSPECTIONS COMPLETED BY THE BACKFLOW PREVENTION GROUP.
3. FINAL INSTALLATION AND FREEZE PROTECTION INSPECTED BY THE BACKFLOW PREVENTION GROUP.
4. CALL (775) 834-8288 FOR INSPECTIONS OR QUESTIONS.

THE OWNER/DEVELOPER IS RESPONSIBLE TO CONTACT TMWA BACKFLOW PREVENTION GROUP FOR CURRENT BACKFLOW INSTALLATION STANDARDS.

FIRE SERVICES

DCDA USC APPROVED DCDA (DOUBLE CHECK DETECTOR ASSEMBLY)

TESTING OF BACKFLOW PREVENTION ASSEMBLY IS REQUIRED WITHIN 7-10 DAYS AFTER METER IS SET OR SERVICE ACTIVATION. A COPY OF TEST RESULTS ARE TO BE FORWARDED TO TMWA WATER QUALITY/BACKFLOW PREVENTION PERSONNEL BY A CERTIFIED ASSEMBLY TESTER.

DOMESTIC SERVICES

RP USC APPROVED RP (REDUCED PRESSURE PRINCIPLE ASSEMBLY)

IF INITIAL TEST DONE BY TMWA FIELD PERSONNEL FAILS, RE-TESTING OF BACKFLOW PREVENTION ASSEMBLY IS REQUIRED WITHIN 7-10 DAYS AFTER METER IS SET OR SERVICE ACTIVATION. A COPY OF TEST RESULTS ARE TO BE FORWARDED TO TMWA WATER QUALITY/BACKFLOW PREVENTION PERSONNEL BY A CERTIFIED ASSEMBLY TESTER.

IRRIGATION SERVICES

RP USC APPROVED RP (REDUCED PRESSURE PRINCIPLE ASSEMBLY)

IF INITIAL TEST DONE BY TMWA FIELD PERSONNEL FAILS, RE-TESTING OF BACKFLOW PREVENTION ASSEMBLY IS REQUIRED WITHIN 7-10 DAYS AFTER METER IS SET OR SERVICE ACTIVATION. A COPY OF TEST RESULTS ARE TO BE FORWARDED TO TMWA WATER QUALITY/BACKFLOW PREVENTION PERSONNEL BY A CERTIFIED ASSEMBLY TESTER.

2 working days Call before you Dig. 1-800-227-2600

ABBREVIATIONS

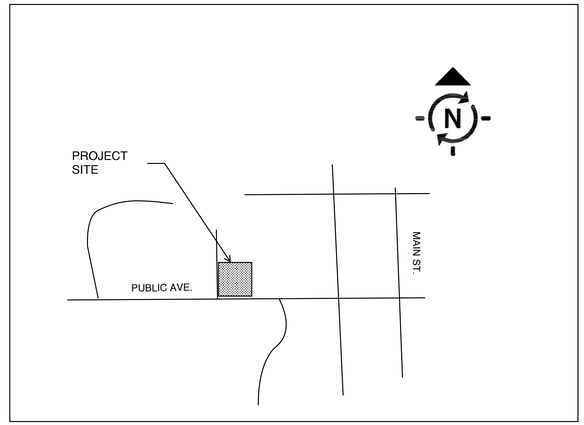
ARV	AIR RELEASE VALVE
ASSY	ASSEMBLY
BOT	BOTTOM (OF PIPE)
BOV	BLOW-OFF VALVE
CL	CENTERLINE
CONST	CONSTRUCT
CTS	COPPER TUBE SIZE
DI OR DIP	DUCTILE IRON PIPE
DIA	DIAMETER
DCDA	DOUBLE CHECK DETECTOR ASSEMBLY
EX.	EXISTING
FCA	FLANGE COUPLING ADAPTER
FH	FIRE HYDRANT
FLG OR FL	FLANGE
FVA	FLUSH VALVE ASSEMBLY
GV	GATE VALVE
HDPE	HIGH DENSITY POLYETHYLENE
HP	HIGH POINT
IE	INVERT ELEVATION
MJ	MECHANICAL JOINT
MRJ	MECHANICALLY RESTRAINED JOINT
OD	OUTSIDE DIAMETER
PL OR P/L	PROPERTY LINE
PO	PUSH ON
PUE	PUBLIC UTILITY EASEMENT
PVC	POLYVINYL CHLORIDE PIPE
R	RADIUS
RFCA	RESTRAINED FLANGE COUPLING ADAPTER
ROW OR R/W	RIGHT OF WAY
RPBA	REDUCED PRESSURE BACKFLOW ASSEMBLY
STL	STEEL
TB	THRUST BLOCK
TS	TEST STATION
TYP	TYPICAL
W	WATER
W/	WITH
XING	CROSSING

11" ELBOW
22" ELBOW
45" ELBOW
90" ELBOW
AIR RELEASE VALVE
BACKFLOW PREVENTOR
CHECK VALVE
FIRE HYDRANT
FLUSH VALVE
METER-DUAL
METER-SINGLE
REDUCER
SERVICE-DUAL
SERVICE-SINGLE
TEE
VALVE

CHLORINE DOSAGE

NUMBER OF 5 gram CALCIUM HYPOCHLORITE TABLETS REQUIRED FOR DOSE OF 25mg/L

PIPE DIAMETER INCHES	LENGTH OF PIPE SECTION FEET		
	13 OR LESS	18	20
6	1	1	1
8	1	2	2
10	2	3	3
12	3	4	4



VICINITY MAP
NTS

A NOTE FOR THE READER:
THIS PLAN IS FICTITIOUS AND CONTAINS A GENERIC ENGINEER'S SEAL AND SIGNATURE. EACH PLAN SET SHALL COMPLY WITH NRS, NAC AND NEVADA BOARD OF PROFESSIONAL ENGINEERS AND LAND SURVEYORS STAMPING, SEALING AND SIGNATURE REQUIREMENTS.
WHAT IS SHOWN HERE IS A VISUAL EXAMPLE OF THE SEAL, SIGNATURE AND DATE REQUIREMENTS ALONG WITH INFORMATION REQUIRED ON THE FIRST SHEET AND ALL OTHER SHEETS WITHIN THE PLAN SET.

PROFESSIONAL ENGINEER - STATE OF NEVADA
JANE D. SMITH
Exp: 06 / 30 / 27
Jane D. Smith
CIVIL
NO. 000000

Date Signed: 11/1/2026

REQUIRED ON THE FIRST SHEET OF EACH PLAN SET:
DIGITAL SIGNATURE INFORMATION FOR THE STAMPING ENGINEER INCLUDED HERE.

REQUIRED ON ALL SHEETS:
ENGINEERING FIRM NAME
ENGINEER'S NAME
CONTACT EMAIL
CONTACT PHONE NUMBER

FOR TMWA USE ONLY
NEW BUSINESS WATER

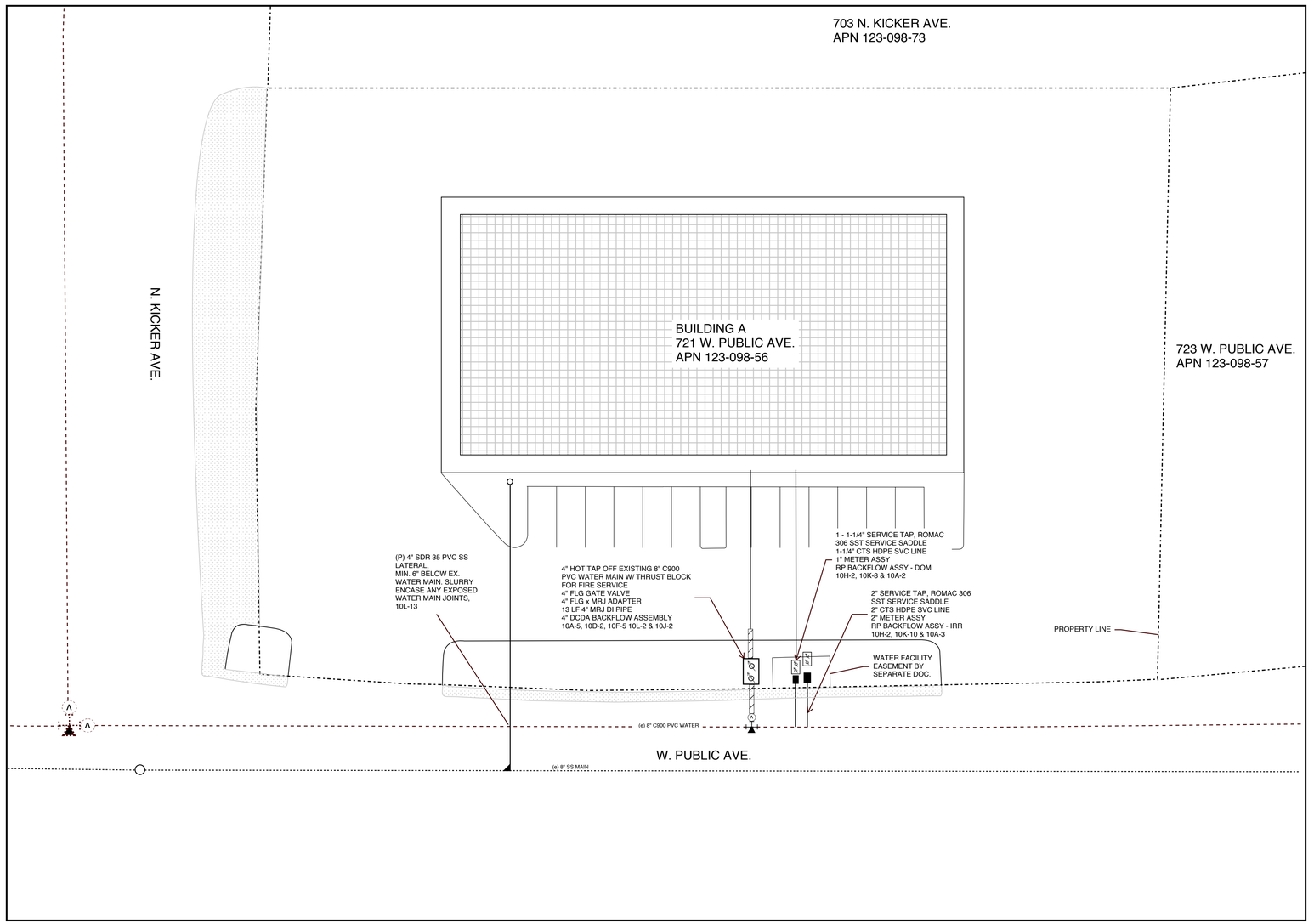
WO#		Map #	
New Main			
Date Installed:		Depth:	
Pressure Test Date:			
PSI	Hours Tested:		
Inspector:			
Contractor:			
Feet Laid	Size	Type	Main/Svc
Retired/ Abandoned/Removed			
Feet Ret.	Size	Type	Main/Svc
# of Meter boxes Inst./Size:			
# of Setters Inst./Size:			

WORK ORDER NO. 26-1105
DESIGNED ENGINEERING FIRM NAME
DRAWN
DATE NOV-2026
CHECKED
SUBMITTED NOV-2026
RECOMMENDED
APPROVED

Truckee Meadows Water Authority
Quality. Delivered.
1355 CAPITAL BLVD. / PO BOX 30013
RENO, NEVADA 89502-3013
PH 775-834-8000 / FX 775-834-8003

721 W PUBLIC AVE.COM SVC
WATER PLANS
RENO, NV

SHEET NUMBER
W-1
1 OF ____



SCALE: 1"=20'

20 0 10 20 40

NOTE: ALL SERVICES ARE REQUIRED TO HAVE PRIVATE PRESSURE REGULATING VALVES.

PROFESSIONAL ENGINEER - STATE OF NEVADA
JANE D. SMITH
Exp: 06 / 30 / 27
CIVIL
No. 000000

Jane D. Smith

Date Signed: 11/1/2026

REQUIRED ON ALL SHEETS:
ENGINEERING FIRM NAME
ENGINEER'S NAME
CONTACT EMAIL
CONTACT PHONE NUMBER

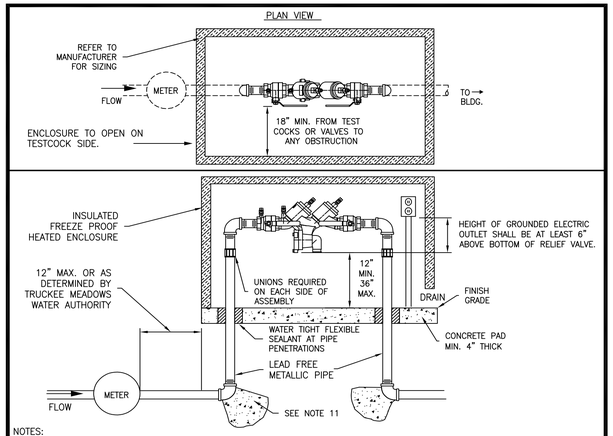
WORK ORDER NO. 26-1105
DESIGNED ENGINEERING FIRM NAME
DRAWN
DATE NOV-2026
CHECKED
SUBMITTED NOV-2026
RECOMMENDED
APPROVED

Truckee Meadows Water Authority
Quality. Delivered.
1355 CAPITAL BLVD. / PO BOX 30013
RENO, NEVADA 89502-3013
PH 775-834-8000 / FX 775-834-8003

721 W PUBLIC AVE COM SVC WATER PLANS

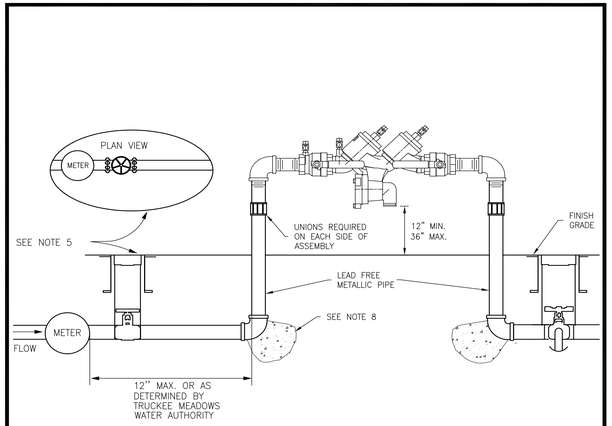
RENO, NV

SHEET NUMBER
W-2
2 OF 5



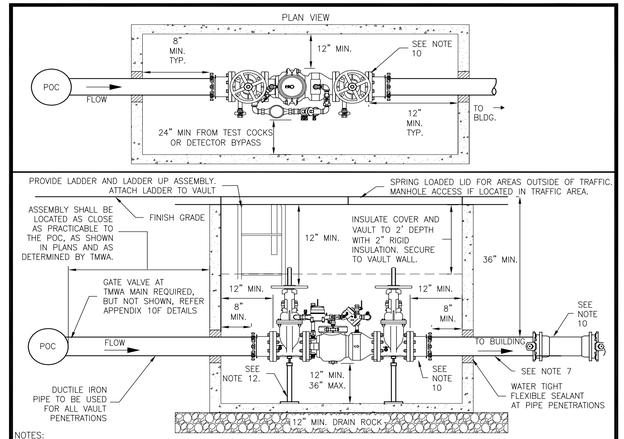
NOTES:
1. ASSEMBLY SHALL BE A USC APPROVED AND NSF-61 CERTIFIED LEAD FREE DEVICE.
2. THE RP SHALL BE INSTALLED ABOVE GRADE.
3. GROUNDED ELECTRIC SUPPLY SHALL BE A MINIMUM OF 6" ABOVE BOTTOM OF RELIEF VALVE AND STUBBED TO THE OUTSIDE.
4. NO TYPE OF OUTLET, TEE, TAP, TAKE-OFF OR CONNECTION BETWEEN THE SERVICE CONNECTION AND THE BACKFLOW PREVENTION DEVICE.
5. FREEZE PROOF INSULATED BOX AND 1 SOURCE OF HEAT ARE REQUIRED. 2 SOURCES OF HEAT ARE STRONGLY RECOMMENDED.
6. INSULATED BOX SHALL SWING CLEAR OF ASSEMBLY TO PROVIDE CLEARANCES SHOWN OR INSULATED BOX SHALL BE SIZED TO PROVIDE CLEARANCES SHOWN.
7. SPRING LOADED LID REQUIRED ON LARGE BOXES.
8. THERMAL EXPANSION PROTECTION IS REQUIRED IN ANY DOMESTIC WATER SUPPLY SYSTEM THAT IS DOWNSTREAM FROM A BACKFLOW PREVENTION DEVICE. REFERENCE: UNIFORM PLUMBING CODE & NAC 445A.67235.
9. INSPECTION BY TMWA BACKFLOW PREVENTION GROUP PERSONNEL REQUIRED BEFORE METER IS SET OR SERVICE IS ACTIVATED.
10. IF INITIAL TEST DONE BY TMWA FIELD PERSONNEL FAILS, RETESTING OF BACKFLOW ASSEMBLY IS REQUIRED WITHIN 7 DAYS AFTER METER IS SET OR SERVICE ACTIVATION. COPY OF TEST RESULTS TO BE FORWARDED TO TMWA BACKFLOW PREVENTION GROUP BY A CERTIFIED ASSEMBLY TESTER WITHIN THAT SAME TIMEFRAME.
11. MINIMUM DIMENSIONS FOR THE THRUST BLOCK BEARING AREA FOR PIPE 2" AND SMALLER SHALL BE 8" X 8" AND 12" IN DEPTH. ALL OTHER SIZES TO BE DETERMINED BY ENGINEER. OPTIONAL: PLACE CONCRETE COMPLETELY BETWEEN THE TWO ELBOWS WITH A MINIMUM OF 8" HIGH X 8" WIDE. SEE 10L-2 FOR CONCRETE REQUIREMENTS.

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10A BACKFLOW PREVENTION ASSEMBLIES	DRAWING NUMBER
	7/2001	REDUCED PRESSURE PRINCIPLE ASSEMBLY FOR DOMESTIC USE EXTERNAL - HORIZONTAL	10A-2
	REV 5/2024		



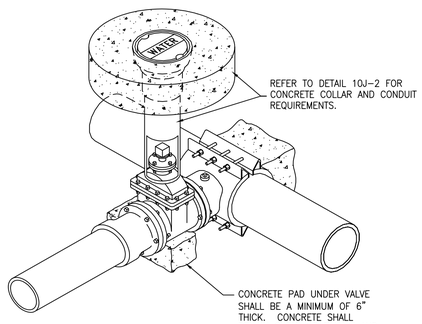
NOTES:
1. ASSEMBLY SHALL BE A USC APPROVED AND NSF-61 CERTIFIED LEAD FREE DEVICE.
2. THE RP SHALL BE INSTALLED ABOVE GRADE.
3. EITHER VALVE BOXES OR PIPE RISERS MAY BE USED FOR THE 2 BELOW GRADE SHUT OFF VALVES.
4. MANUAL SHUT OFF VALVE: INLINE BRASS GLOBE OR CURB VALVE SIZED SAME AS MAINLINE.
5. NO TYPE OF OUTLET, TEE, TAP, TAKE-OFF OR CONNECTION BETWEEN THE SERVICE CONNECTION AND THE BACKFLOW PREVENTION DEVICE.
6. INSPECTION BY TMWA BACKFLOW PREVENTION GROUP PERSONNEL REQUIRED BEFORE METER IS SET OR SERVICE IS ACTIVATED.
7. IF INITIAL TEST DONE BY TMWA FIELD PERSONNEL FAILS, RETESTING OF BACKFLOW ASSEMBLY IS REQUIRED WITHIN 7 DAYS AFTER METER IS SET OR SERVICE ACTIVATION. COPY OF TEST RESULTS TO BE FORWARDED TO TMWA BACKFLOW PREVENTION GROUP BY A CERTIFIED ASSEMBLY TESTER WITHIN THAT SAME TIMEFRAME.
8. MINIMUM DIMENSIONS FOR THE THRUST BLOCK BEARING AREA FOR PIPE 2" AND SMALLER SHALL BE 8" X 8" AND 12" IN DEPTH. ALL OTHER SIZES TO BE DETERMINED BY ENGINEER. OPTIONAL: PLACE CONCRETE COMPLETELY BETWEEN THE TWO ELBOWS WITH A MINIMUM OF 8" HIGH X 8" WIDE. REFER TO 10L-2 FOR CONCRETE REQUIREMENTS.
9. FOR YEAR-ROUND USE REFER TO 10A-2.

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10A BACKFLOW PREVENTION ASSEMBLIES	DRAWING NUMBER
	7/2001	REDUCED PRESSURE PRINCIPLE ASSEMBLY FOR IRRIGATION AND CONSTRUCTION WATER USE - HORIZONTAL	10A-3
	REV 5/2024		



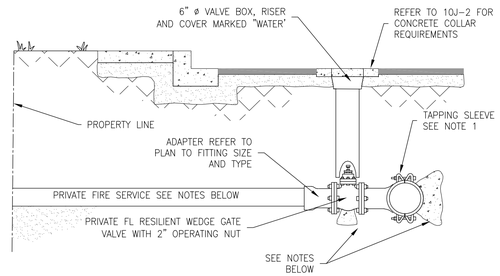
NOTES:
1. ASSEMBLY SHALL BE USC APPROVED. IF USED FOR DOMESTIC PURPOSES, ASSEMBLY SHALL BE NSF-61 CERTIFIED AND LEAD FREE.
2. FREEZE PROOF INSULATED VAULT REQUIRED.
3. BELOW GROUND VAULT SHALL BE SIZED TO PROVIDE CLEARANCES AS SHOWN ABOVE.
4. BELOW GROUND VAULT SHALL REMAIN DRY THROUGHOUT THE YEAR, CONTRACTOR SHALL ENSURE THERE IS PROPER DRAINAGE AROUND THE VAULT
5. SPRING LOADED LID REQUIRED ON LARGE VAULTS WITH ASSEMBLIES LARGER THAN 2 INCHES. MANHOLE ACCESS IS REQUIRED IN AREAS SUBJECT TO VEHICULAR TRAFFIC.
6. NO TYPE OF OUTLET, TEE, TAP, TAKE-OFF OR CONNECTION BETWEEN THE SERVICE CONNECTION AND THE BACKFLOW PREVENTION DEVICE.
7. CALL LOCAL BUILDING AND/OR FIRE DEPARTMENTS FOR TYPE OF PIPE TO BE USED.
8. INSPECTION BY TMWA BACKFLOW PREVENTION GROUP PERSONNEL REQUIRED BEFORE METER IS SET OR SERVICE IS ACTIVATED.
9. TESTING OF THE ASSEMBLY REQUIRED WITHIN 7 DAYS AFTER METER IS SET OR SERVICE ACTIVATION. COPY OF TEST RESULTS TO BE FORWARDED TO TMWA BACKFLOW PREVENTION GROUP PERSONNEL BY A CERTIFIED ASSEMBLY TESTER WITHIN THAT SAME TIMEFRAME.
10. RESTRAINED FLANGE COUPLING ADAPTERS (RFCA) TO BE INSTALLED WITH ALL ASSEMBLIES ON BOTH SIDES OF ASSEMBLY. UPON APPROVAL ONE RFCA CAN BE REPLACE WITH A FLANGE X PLAIN END SPOOL WITH AN MRJ X MRJ DUCTILE IRON SOLID SLEEVE CONNECTING THE PLAIN END TO THE ADJACENT PIPE MINIMUM OF 20" FROM VAULT WALL ON THE BUILDING SIDE OF THE ASSEMBLY.
11. VALVES ON DETECTOR BYPASS SHALL REMAIN OPEN AT ALL TIMES.
12. ADJUSTABLE PIPE SUPPORTS, MINIMUM OF 2.

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10A BACKFLOW PREVENTION ASSEMBLIES FIRE - CLASS 1, 2 & 3 DOUBLE CHECK VALVE DETECTOR ASSEMBLY EXTERNAL - HORIZONTAL BELOW GRADE	DRAWING NUMBER
	7/2001		10A-5
	REV 5/2024		



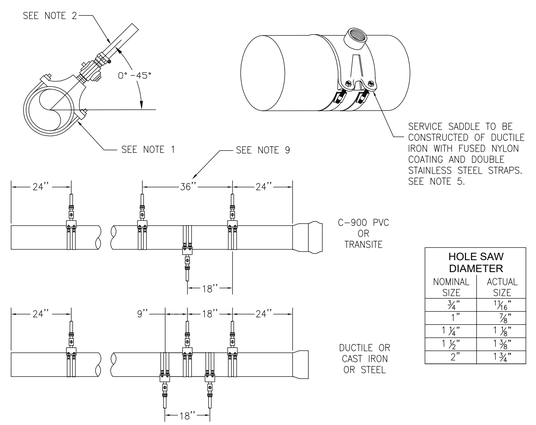
NOTES:
1. TAPPING SLEEVE SHALL BE ROMAC MODEL SST, SMITH-BLAIR MODEL 663, OR JCM 432HP AND HAVE:
   A MAXIMUM TEST PRESSURE OF 300 PSI AND
   STAINLESS STEEL ASTM A 240, TYPE 304 FLANGE
2. WHEN TAPPING STEEL OR OD STEEL BACKING PLATE MUST BE DESIGNED BY ENGINEER. WHEN TAPPING OD STEEL SIZE ON SIZE, REDUCE TAP ONE SIZE THEN BELL UP AFTER TAP. MAIN THICKNESS AND OUTSIDE DIAMETER SHALL BE FIELD VERIFIED.
3. REFER TO DETAIL 10L-2 FOR THRUST BLOCK SIZING AND CONCRETE REQUIREMENTS. BAG CONCRETE IS NOT ACCEPTABLE FOR PAD OR THRUST BLOCK.
4. ALL EXPOSED METAL MUST BE COATED WITH BRUSH ON MASTIC. WAX TAPE COATING SYSTEMS MAY BE REQUIRED, REFER TO PLANS FOR LOCATIONS.
5. REMOVE TEST PLUG AND HYDROSTATICALLY PRESSURE TEST TAPPING SLEEVE NOT TO EXCEED MANUFACTURER'S PRESSURE RATING, APPLY PIPE COMPOUND, AND REINSERT PLUG.
6. VALVE SHALL BE BLIND FLANGED AND PRESSURE TESTED AT TIME OF TAPPING SLEEVE PRESSURE TEST.
7. EDGE OF CUTTER SHALL BE A MINIMUM OF 24" FROM THE CUT OR SPIGOT END OF THE PIPE OR THE PIPE TO BELL TRANSITION.
8. FOR TAPS ON TRANSITE, THE OUTSIDE DIAMETER OF THE MAIN MUST BE FIELD MEASURED PRIOR TO ORDERING PARTS.
9. ALL BOLTS, WASHERS AND ASSOCIATED HARDWARE SHALL BE FLUOROPOLYMER COATED. USE WASHERS BETWEEN ALL HEX HEAD CONNECTIONS.

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10D DISTRIBUTION TAP INSTALLATIONS STANDARD TAP 4" TO 12"	DRAWING NUMBER
	7/2001		10D-2
	REV 5/2024		



NOTES:
1. REFER TO APPENDIX 10D FOR TAPPING SLEEVE DETAILS.
2. REFERENCE NAC 445A, TMWA CONSTRUCTION AND DESIGN STANDARDS AND FIRE AGENCY HAVING JURISDICTION FOR REQUIRED PIPE MATERIALS. POLYETHYLENE WRAP TO BE USED ON ALL DUCTILE IRON PIPE AND FITTINGS PER AWWA C105.
3. REFER TO PLAN FOR SERVICE LATERAL DIAMETER AND LENGTH. MATERIAL TO BE AWWA C900 UNLESS OTHERWISE NOTED ON THE PLAN.
4. KEEP A MINIMUM OF 2" CLEARANCE BETWEEN FLANGES/BOLTS AND CONCRETE.
5. ALL EXPOSED BOLTS AND EXPOSED METAL SHALL BE COATED WITH BRUSHED-ON MASTIC AND WRAPPED WITH POLYETHYLENE. WAX TAPE COATING MAY BE REQUIRED, REFER TO PLANS FOR LOCATIONS AND REQUIREMENTS.
6. REFER TO AGENCY HAVING JURISDICTION, CITY STANDARDS OR APPENDIX 10L FOR THRUST BLOCK REQUIREMENTS. USE THE MOST CONSERVATIVE.
7. REFER TO APPROVED PLAN AND APPENDIX 10A FOR APPROPRIATE BACKFLOW DEVICE.
8. PRESSURE TEST TAPPING SLEEVE AND VALVE TO MANUFACTURER'S RECOMMENDATION.

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10F FIRE PROTECTION INSTALLATION FIRE SERVICE OFF EXISTING MAIN	DRAWING NUMBER
	7/2001		10F-5
	REV 5/2024		



NOTES:
1. SERVICE SADDLE SIZE IS DEPENDENT UPON THE SIZE AND TYPE OF MAIN.
2. SDR-9 CTS HDPE TUBING, LENGTH AND DIAMETER TO BE DETERMINED BY ENGINEER. REFER TO APPROVED PLAN.
3. CORPORATION STOP IP THREAD INLET, COMPRESSION OUTLET, DIAMETER TO MATCH TAP SIZE AS SHOWN ON PLAN.
4. INSERT RIGID STAINLESS STEEL LINER TO SDR-9 CTS HDPE TUBING.
5. SERVICE TAPS OFF OF EXISTING PVC MAINS SHALL USE FULL CIRCLE STAINLESS STEEL SERVICE SADDLE, ROMAC 305 OR 306. OTHER MANUFACTURER SHALL BE APPROVED BY TMWA PRIOR TO INSTALLATION.
6. TRACER WIRE TO BE INSTALLED ON SERVICE LINES THAT DO NOT REMAIN AT A 90-DEGREE ANGLE TO THE MAIN BETWEEN THE MAIN AND THE METER. A 3-POUND ANODE IS TO BE PLACED AT THE MAIN. TRACER WIRE SHALL BE BROUGHT UP INTO THE METER ENCLOSURE WITH ENOUGH TO EXTEND AT LEAST 12-INCHES ABOVE GRADE.
7. WAX TAPE COATING MAY BE REQUIRED ON SADDLE AND CORPORATION STOP, REFER TO PLANS FOR LOCATIONS AND REQUIREMENTS.
8. COMBINATION AIR VALVE TAPPING SADDLE MUST BE AT 90° ANGLE (TOP OF PIPE).
9. SUCCESIVE TAPS ON C-900 SHALL BE OFFSET VERTICALLY SO THEY ARE NOT TAPPED ON THE SAME PLANE. COORDINATE TAP LOCATIONS WITH TMWA INSPECTOR.

HOLE SAW DIAMETER	
NOMINAL SIZE	ACTUAL SIZE
¾"	1 1/16"
1"	1 3/8"
1 ¼"	1 5/8"
1 ½"	1 7/8"
2"	2 1/4"

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10H SERVICE TAP INSTALLATIONS FOR 1", 1.25", 1.5" AND 2" SERVICE TAPS	DRAWING NUMBER
	7/2001		10H-2
	REV 5/2024		

WORK ORDER NO. 26-1105
DESIGNED ENGINEERING FIRM NAME
DRAWN
DATE NOV-2026
CHECKED
SUBMITTED NOV-2026
RECOMMENDED
APPROVED

Truckee Meadows Water Authority
Quality. Delivered.
1355 CAPITAL BLVD. / PO BOX 30013
RENO, NEVADA 89502-3013
PH 775-834-8000 / FX 775-834-8003

721 W PUBLIC AVE_COM SVC WATER PLANS

RENO, NV

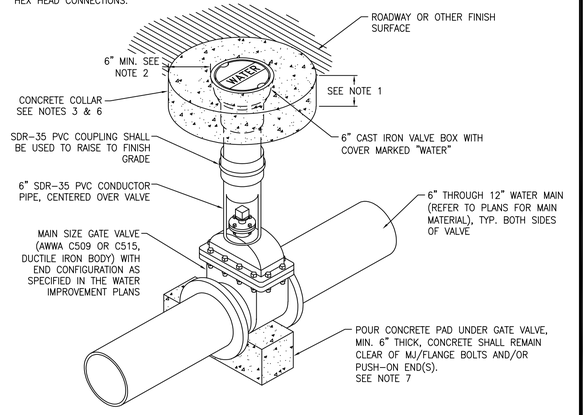
PROFESSIONAL ENGINEER - STATE OF NEVADA
JANE D. SMITH
Exp: 06 / 30 / 27
CIVIL
No. 000000
Jane D. Smith

Date Signed: 11/1/2026

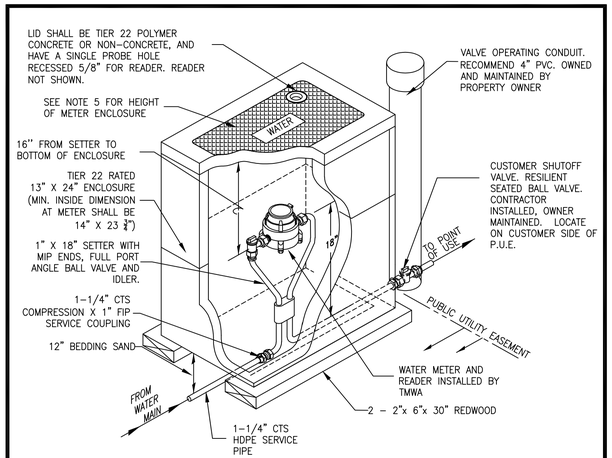
REQUIRED ON ALL SHEETS:
ENGINEERING FIRM NAME
ENGINEER'S NAME
CONTACT EMAIL
CONTACT PHONE NUMBER

SHEET NUMBER
W-3
3 OF 5

NOTES:
1. CONCRETE COLLAR SHALL BE MINIMUM 6–INCHES THICK OR MATCH PAVEMENT THICKNESS, WHICHEVER IS GREATER, UNLESS OTHERWISE SPECIFIED BY THE JURISDICTIONAL AGENCY RESPONSIBLE FOR THE ROADWAY.
2. FOR MULTIPLE VALVE/RISER BOXES IN CLOSE PROXIMITY, A MONOLITHIC CONCRETE COLLAR MAY BE POURED.
3. CONTRACTOR AND/OR DESIGN ENGINEER SHALL CONSULT WITH THE JURISDICTIONAL AGENCY RESPONSIBLE FOR THE ROADWAY FOR REQUIREMENTS THAT MAY VARY FROM THIS STANDARD PRIOR TO CONSTRUCTION.
4. ALL BOLTS AND EXPOSED METAL SHALL BE COATED WITH BRUSHED–ON MASTIC. WAX TAPE COATING MAY BE REQUIRED, REFER TO PLANS FOR LOCATIONS AND REQUIREMENTS.
5. GATE VALVE, DUCTILE IRON PIPE, AND OTHER METAL PARTS SHALL BE ENCASED WITH V–BIO POLYETHYLENE WRAP PER AWWA C105.
6. UNLESS OTHERWISE SPECIFIED BY THE JURISDICTIONAL AGENCY RESPONSIBLE FOR THE ROADWAY, PORTLAND CEMENT CONCRETE (P.C.C.) FOR CONCRETE COLLAR SHALL HAVE THE FOLLOWING CHARACTERISTICS: 4,000 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS, MINIMUM 6 SACKS OF CEMENT PER CUBIC YARD WITH A MAXIMUM WATER/CEMENT RATIO OF 0.45, AIR ENTRAINMENT 6% ±1.5%, SLUMP AT 1 TO 4 INCHES. BAG CONCRETE MIX IS NOT ACCEPTABLE.
7. CONCRETE FOR PAD SHALL HAVE A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI AFTER 28 DAYS. BAG CONCRETE MIX IS NOT ACCEPTABLE.
8. NORMALLY CLOSED VALVES SHALL HAVE A DEBRIS CAP INSTALLED WITH A TAG NOTING "NORMALLY CLOSED VALVE". TAG TO BE SUPPLIED BY TMWA INSPECTOR.
9. STAINLESS STEEL VALVE STEM RISERS WITH CENTERING RINGS SHALL BE INSTALLED ON VALVES IF THE TOP OF OPERATING NUT IS GREATER THAN 8'.
10. ALL BOLTS, WASHERS AND ASSOCIATED HARDWARE SHALL BE FLUOROPOLYMER COATED. USE WASHERS BETWEEN ALL HEX HEAD CONNECTIONS.

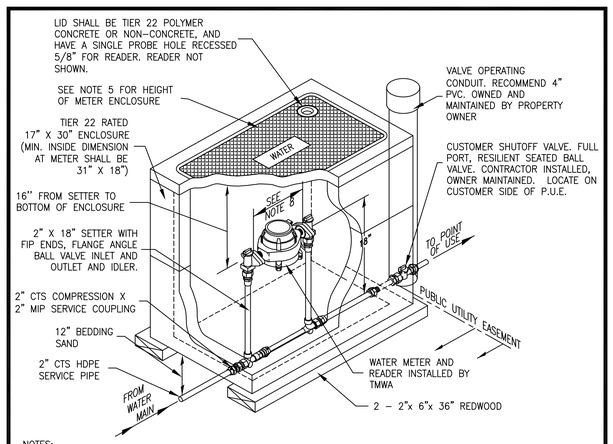


TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10J DISTRIBUTION VLAVE INSTALLATION IN-LINE GATE VALVE WITH CONCRETE COLLAR	DRAWING NUMBER
	1/2002		10J-2
	REV		
	5/2024		



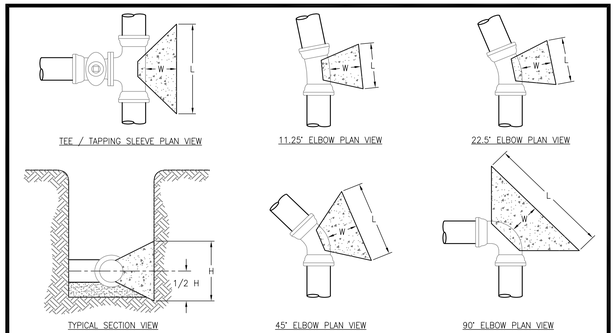
NOTES:
1. COVER SHALL BE HUBBELL, JENSEN PRECAST, OLDCASTLE, OR CHANNELL AND HAVE:
   ANSI/SCTE 77 TIER 22 RATING (SEE NOTE 4) AND
   PROBE HOLE RECESSED 5/8" TO ALLOW FOR FLUSH MOUNT OF READER
2. THERMAL EXPANSION PROTECTION IS REQUIRED IN ANY DOMESTIC WATER SUPPLY SYSTEM. REFERENCE: UNIFORM PLUMBING CODE.
3. METER AND READER SUPPLIED AND INSTALLED BY TMWA.
4. FOR NON–DELIBERATE TRAFFIC AREAS USE 13" X 24" ANSI/SCTE 77 TIER 22 BOX AND COVER. FOR DELIBERATE TRAFFIC AREAS USE 13" X 24" ENCLOSURE APPROVED FOR TRAFFIC RATED H/20 LOADING AND REMOTE READER ENCLOSURE. SEE DETAIL 10K–17 AND 10K–19.
5. TOP OF METER ENCLOSURE SHALL BE SET 0.2 FEET ABOVE HIGHEST FINISHED GRADE SURROUNDING ENCLOSURE WITHIN LANDSCAPED AREAS, AND SHALL BE SET FLUSH WITH SURROUNDING FINISH GRADE IN PAVED AREAS. ENCLOSURE MAY BE ONE PIECE 24" IN HEIGHT OR BE 12" ENCLOSURE WITH A 12" RISER.
6. ENCLOSURE TO BE BACKFILLED WITH WATER PIPE BEDDING SAND ONLY, SEE SECTION 5, TRENCH BEDDING & BACKFILL.
7. 4' X 4' INSULATING BLANKET TO BE INSTALLED ABOVE METER AND BELOW READER.
8. UPON AUTHORITY APPROVAL 18" SETTER MAY BE REPLACED WITH TALLER SETTERS.
9. CONTRACTOR TO INSTALL IDLER WITH ALL SETTERS.
10. CONTRACTOR TO INSTALL SOLID PLUG IN PROBE HOLE OF LID.
11. ALL COMPONENTS IN CONTACT WITH WATER SHALL BE NSF–61 CERTIFIED.

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10K WATER METERS - SMALL NEW COMMERCIAL INSTALLATION 1-1/4" SINGLE SERVICE LINE FOR 1" SETTER, METER AND READER	DRAWING NUMBER
	6/2004		10K-8
	REV		
	5/2024		



NOTES:
1. COVER SHALL BE HUBBELL, JENSEN PRECAST, OLDCASTLE, OR CHANNELL AND HAVE:
   ANSI/SCTE 77 TIER 22 RATING (SEE NOTE 4);
   WEIGHT OF LESS THAN 50 POUNDS (UNLESS APPROVED BY THE AUTHORITY); AND
   PROBE HOLE RECESSED 5/8" TO ALLOW FOR FLUSH MOUNT OF READER
2. THERMAL EXPANSION PROTECTION IS REQUIRED IN ANY DOMESTIC WATER SUPPLY SYSTEM. REFERENCE: UNIFORM PLUMBING CODE.
3. METER AND READER SUPPLIED AND INSTALLED BY TMWA.
4. FOR NON–DELIBERATE TRAFFIC AREAS USE 17" X 30" ANSI/SCTE 77 TIER 22 BOX AND COVER. FOR DELIBERATE TRAFFIC AREAS USE 17" X 30" ENCLOSURE APPROVED FOR TRAFFIC RATED H/20 LOADING AND REMOTE READER ENCLOSURE. SEE DETAIL 10K–18 AND 10K–19.
5. TOP OF METER ENCLOSURE SHALL BE SET 0.2 FEET ABOVE HIGHEST FINISHED GRADE SURROUNDING ENCLOSURE WITHIN LANDSCAPED AREAS, AND SHALL BE SET FLUSH WITH SURROUNDING FINISH GRADE IN PAVED AREAS. ENCLOSURE MAY BE ONE PIECE 24" IN HEIGHT OR BE 12" ENCLOSURE WITH A 12" RISER.
6. ENCLOSURE TO BE BACKFILLED WITH WATER PIPE BEDDING SAND ONLY, SEE SECTION 5, TRENCH BEDDING & BACKFILL.
7. 4' X 4' INSULATING BLANKET TO BE INSTALLED ABOVE METER AND BELOW READER.
8. DISTANCE BETWEEN FLANGES SHALL BE 17.25".
9. UPON AUTHORITY APPROVAL 18" SETTER MAY BE REPLACED WITH TALLER SETTERS.
10. CONTRACTOR TO INSTALL IDLER WITH ALL SETTERS.
11. CONTRACTOR TO INSTALL SOLID PLUG IN PROBE HOLE OF LID.
12. ALL COMPONENTS IN CONTACT WITH WATER SHALL BE NSF–61 CERTIFIED.

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10K WATER METERS - SMALL NEW COMMERCIAL INSTALLATION 2" SINGLE SERVICE LINE FOR 2" SETTER, METER AND READER	DRAWING NUMBER
	6/2004		10K-10
	REV		
	5/2024		



THRUST BLOCK DIMENSIONS

TEE, TAP, OR DEAD END					11.25° ELBOW			22.5° ELBOW			45° ELBOW			90° ELBOW		
BRANCH SIZE (INCHES)	L (FEET)	H (FEET)	W MIN. (FEET)	ELBOW SIZE (INCHES)	L (FEET)	H (FEET)	W MIN. (FEET)	L (FEET)	H (FEET)	W MIN. (FEET)	L (FEET)	H (FEET)	W MIN. (FEET)	L (FEET)	H (FEET)	W MIN. (FEET)
4	2	1.5	1	4	1	1	1	1.5	1	1	1.5	1.5	1	2	2	1
6	3	2	1	6	1.5	1	1	1.5	1.5	1	3	1.5	1	4	2	1
8	3.5	3	1	8	2	1	1	2	2	1	3	2.5	1	5.5	2.5	1
10	5	3	1	10	2	1.5	1	3	2	1	4.5	2.5	1	6	3.5	1
12	6	3.5	1	12	2	2	1	4	2	1	5.5	3	1	7.5	4	1

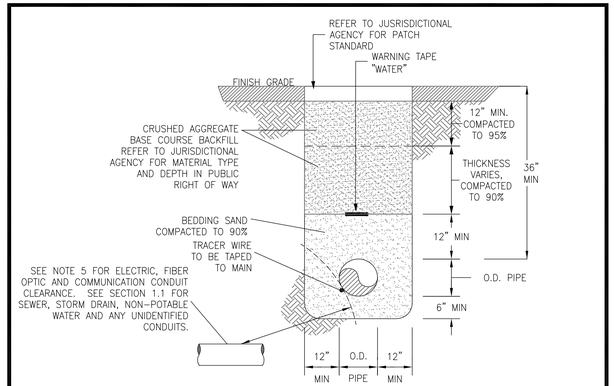
THRUST BLOCK DESIGN CRITERIA:

THRUST BLOCK SIZES HAVE BEEN CALCULATED USING THE METHOD AND EQUATIONS PUBLISHED IN ***THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE, SEVENTH EDITION 2016*** BY THE DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA) UTILIZING THE FOLLOWING DESIGN PARAMETERS: DESIGN PRESSURE = 150 PSI (SEE NOTE #4 BELOW), SOIL BEARING CAPACITY = 1,500 PSF (SEE NOTE #4 BELOW), SAFETY FACTOR = 1.5, AND OUTSIDE PIPE DIAMETER

THRUST BLOCK NOTES:

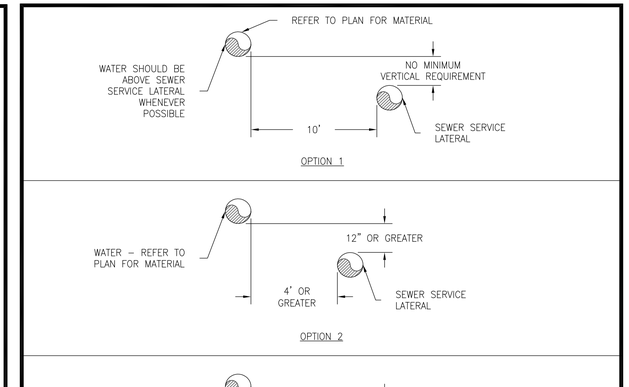
1. CONCRETE FOR THRUST BLOCKS SHALL HAVE A MINIMUM 28–DAY COMPRESSIVE STRENGTH OF 4,000 PSI. REFERENCE SECTION 1.1.12 OF THE TRUCKEE MEADOWS WATER AUTHORITY ENGINEERING & CONSTRUCTION STANDARDS FOR ADDITIONAL REQUIREMENTS. BAG CONCRETE MIX IS NOT ACCEPTABLE.
2. ALL FITTINGS SHALL BE WRAPPED WITH V–BIO POLYETHYLENE WRAP PER AWWA C105. MASTIC (BRUSH–ON) SHALL BE APPLIED TO ALL BOLTS AND EXPOSED METAL. WAX TAPE COATING SYSTEMS MAY BE REQUIRED, REFER TO PLANS FOR LOCATIONS.
3. THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED SOIL. IN CASES WHERE THIS IS NOT PRACTICAL, BACKFILL AREA BEHIND WHERE THRUST BLOCK WILL BE POURED WITH TYPE 2, CLASS B AGGREGATE BASE (PER SECTION 200.01.03 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION – ORANGE BOOK) COMPACTED TO 95% MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT AS DETERMINED BY PROCEDURES SET FORTH IN ASTM D 1557. CUT–BACK COMPACTED AGGREGATE BASE TO EXPOSE A FIRM SURFACE, THEN POUR THRUST BLOCK.
4. FOR SOIL BEARING CAPACITY LESS THAN 1,500 PSF AND/OR DESIGN PRESSURE IN EXCESS OF 150 PSI, INCREASE THRUST BLOCK BEARING AREAS ACCORDINGLY. REVISED THRUST BLOCK SCHEDULE FOR SPECIFIC CONDITIONS SHALL BE SUBMITTED BY THE DESIGN ENGINEER.

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10L THRUST BLOCKS TEES, TAPPING SLEEVES, DEAD ENDS 11.25, 22.5, 45 AND 90 DEGREE ELBOWS 4" TO 12"	DRAWING NUMBER
	7/2011		10L-2
	REV		
	5/2024		



NOTES:
1. ALL TRENCHES MUST CONFORM TO APPLICABLE TMWA, CITY, STATE, COUNTY, AND OSHA SPECIFICATIONS AND REQUIREMENTS. IN THE CASE OF CONFLICT, THE MORE RIGID SPECIFICATION OR STANDARD SHALL APPLY.
2. BEDDING SAND SHALL BE COMPACTED TO 90% MAXIMUM DENSITY PER SECTION 5.05.03 AND SHALL BE A MINIMUM OF 12" ABOVE AND 6" BELOW THE MAIN. PER SECTION 5 OF TMWA STANDARDS.
3. CRUSHED AGGREGATE BASE COURSE BACKFILL SHALL BE PLACED IN 12" MAXIMUM LOOSE LIFTS. THE TOP 12" SHALL BE COMPACTED TO 95% MAXIMUM DENSITY. THE AREA ABOVE THE BEDDING SAND & BELOW 12" FROM FINISH GRADE SHALL BE COMPACTED TO 90% MAXIMUM DENSITY. PER SECTION 5 OF TMWA STANDARDS.
4. NON–METALLIC BLUE WARNING TAPE SHALL BE PLACED IN ALL TRENCHES AT LEAST 12" ABOVE THE WATER MAIN.
5. ELECTRIC UTILITIES MUST BE LOCATED BELOW WATER & MAINTAIN 2' MINIMUM RADIAL CLEARANCE FROM TMWA WATER FACILITIES WHEN CROSSING, 5' MINIMUM WHEN PARALLEL. IF 2' RADIAL CLEARANCE CAN NOT BE MET ELECTRIC CONDUIT MUST BE CONCRETE ENCASED AT LEAST 18" EACH SIDE OF WATER CROSSING. FIBER OPTIC AND/OR COMMUNICATION CONDUITS SHALL NOT BE PLACED IN THE SAME TRENCH AS WATER. FIBER OPTIC AND/OR COMMUNICATION CONDUITS CROSSING WATER SHALL BE PLACED A MINIMUM OF 12" BELOW WATER.
6. ALL CHANGES MUST BE APPROVED BY THE TMWA INSPECTOR AND/OR THE TMWA ENGINEER.
7. IF GAS IS ROLLED OUT OF COMMON TRENCH WITH WATER, HORIZONTAL SEPARATION OF 4' SHALL BE MAINTAINED BETWEEN GAS AND WATER MAINS.
8. TRACER WIRE SHALL BE #12 COPPER CLAD STEEL CORE WITH 30 MILS BLUE HDPE INSULATION. ALL WIRE SPLICES SHALL BE MADE USING A SPLIT BOLT CONNECTOR WRAPPED WITH AQUASEAL AND ELECTRIC TAPE. THE CONTRACTOR SHALL INSTALL A 3 POUND ANODE AT EVERY TEST STATION. TEST STATIONS SHALL BE LOCATED ALONG THE MAIN NO MORE THAN 500 FEET APART. REFER TO 10L–9.

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10L MISCELLANEOUS WATER DETAILS TRENCH DETAIL WATER ONLY	DRAWING NUMBER
	7/2011		10L-6
	REV		
	5/2024		



NOTES:
1. SEWER LATERAL DEFINITIONS: GRAVITY SANITARY SEWER LATERAL 6" OR SMALLER IN DIAMETER (GRAVITY SANITARY SEWER LATERAL 6" IN DIAMETER AND HAS CONNECTIONS FROM MORE THAN ONE SEWER SERVICE LATERAL IS CONSIDERED A MAIN); GRAVITY STORM DRAIN LATERAL 10" AND SMALLER IN DIAMETER; OR PRESSURIZED SEWER LATERALS 1.5" AND SMALLER IN DIAMETER.
2. IF SEPARATION IS 10 FEET OR MORE USE OPTION 1.
3. IF NON–PRESSURIZED SEWER LATERALS ARE JOINTLESS, AWWA WATER QUALITY PIPE (EXTENDED STRUCTURE TO STRUCTURE) OR D3212 JOINTED PIPE, MITIGATION IS NOT REQUIRED ON THE WATER MAIN OR LATERAL. IF SEWER LATERALS DON'T HAVE WATERTIGHT JOINTS, SEWER MAINS SHALL BE ENCASED IN 4" OF EXCAVATABLE SLURRY (FOR EXISTING PIPE ONLY), INSTALLED WITH EXTERNAL JOINT SEALANT OR OTHER MITIGATION TO ENSURE JOINTS ARE WATERTIGHT. WHERE THE SEWER LATERALS ARE PRESSURIZED, THE SEWER LATERALS SHALL BE AWWA WATER QUALITY PIPE WITH MECHANICALLY RESTRAINED JOINTS OR SHALL BE JOINTLESS PIPE. FOR NON–POTABLE IRRIGATION, USE GLUED PVC WITHIN A SLEEVE OR JOINTLESS HDPE.
4. CTS HDPE TUBING 2" AND SMALLER SHALL NOT HAVE JOINTS OR FITTINGS BETWEEN THE WATER MAIN AND THE CURB VALVE OR SETTER.

TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10L MISCELLANEOUS WATER DETAILS WATER MAIN OR WATER SERVICE LATERAL PARALLEL TO SEWER SERVICE LATERAL	DRAWING NUMBER
	02/2014		10L-11
	REV		
	5/2024		

Truckee Meadows Water Authority
Quality. Delivered.
1355 CAPITAL BLVD. / PO BOX 30013
RENO, NEVADA 89502-3013
PH 775-834-8000 / FX 775-834-8003

WORK ORDER NO. 26–1105
DESIGNED ENGINEERING FIRM NAME
DRAWN
DATE NOV–2026
CHECKED
SUBMITTED NOV–2026
RECOMMENDED
APPROVED

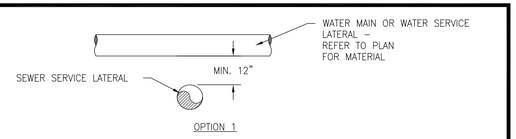
721 W PUBLIC AVE_COM SVC
WATER PLANS
RENO, NV

JANE D. SMITH
Exp: 06 / 30 / 27
CIVIL
PROFESSIONAL ENGINEER – STATE OF NEVADA
No. 000000
Jane D. Smith

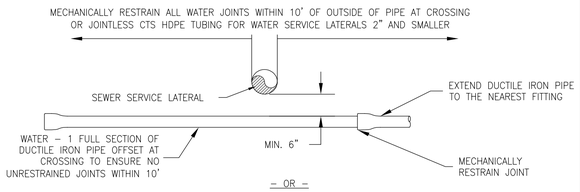
Date Signed: 11/1/2026

REQUIRED ON ALL SHEETS:
ENGINEERING FIRM NAME
ENGINEER'S NAME
CONTACT EMAIL
CONTACT PHONE NUMBER

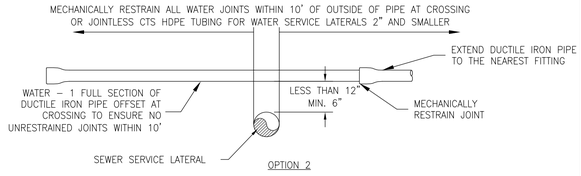
SHEET NUMBER
W-4
4 OF 5



OPTION 1



– OR –



OPTION 2

NOTES:

1. SEWER LATERAL DEFINITIONS: GRAVITY SANITARY SEWER LATERAL 6" OR SMALLER IN DIAMETER (GRAVITY SANITARY SEWER LATERAL 6" IN DIAMETER AND HAS CONNECTIONS FROM MORE THAN ONE SEWER SERVICE LATERAL IS CONSIDERED A MAIN); GRAVITY STORM DRAIN LATERAL 10" AND SMALLER IN DIAMETER; OR PRESSURIZED SEWER LATERALS 1.5" AND SMALLER IN DIAMETER.
2. IF NON–PRESSURIZED SEWER LATERALS ARE JOINTLESS OR AWWA WATER QUALITY (EXTENDED STRUCTURE TO STRUCTURE) PIPE MITIGATION IS NOT REQUIRED ON THE WATER MAIN OR LATERAL. IN ALL OTHER CASES, WATER SHALL BE MITIGATED AND NON–PRESSURIZED SEWER LATERALS SHALL BE D3212 JOINTED PIPE, ENCASED IN 4" OF EXCAVATABLE SLURRY (FOR EXISTING PIPE ONLY), INSTALLED WITH EXTERNAL JOINT SEALANT OR OTHER MITIGATION TO ENSURE JOINTS ARE WATERTIGHT. WHERE THE SEWER LATERALS ARE PRESSURIZED, THE SEWER LATERALS SHALL BE AWWA WATER QUALITY PIPE WITH MECHANICALLY RESTRAINED JOINTS OR SHALL BE JOINTLESS PIPE. FOR IRRIGATION, USE GLUED PVC WITHIN A SLEEVE OR JOINTLESS HDPE.
3. ALL MECHANICALLY RESTRAINED WATER PIPES SHALL BE DUCTILE IRON WITH POLYETHYLENE WRAP PER AWWA C105.
4. CTS HDPE TUBING 2" AND SMALLER SHALL NOT HAVE JOINTS OR FITTINGS BETWEEN THE WATER MAIN AND THE CURB VALVE OR SETTER.

TRUCKEE MEADOWS WATER AUTHORITY	DATE 2/2014 REV 5/2024	APPENDIX 10L MISCELLANEOUS WATER DETAILS WATER MAIN OR WATER SERVICE LATERAL CROSSING SEWER SERVICE LATERAL	DRAWING NUMBER 10L-13

WORK ORDER NO. 26-1105
DESIGNED ENGINEERING FIRM NAME
DRAWN
DATE NOV-2026
CHECKED
SUBMITTED NOV-2026
RECOMMENDED
APPROVED

Truckee Meadows Water Authority
Quality. Delivered.
1355 CAPITAL BLVD. / PO BOX 30013
RENO, NEVADA 89502-3013
PH 775-834-8000 / FX 775-834-8003

721 W PUBLIC AVE_COM SVC WATER PLANS

RENO, NV

JANE D. SMITH
Exp: 06 / 30 / 27
CIVIL
No. 000000
PROFESSIONAL ENGINEER · STATE OF NEVADA

Date Signed: 11/1/2026

REQUIRED ON ALL SHEETS:
ENGINEERING FIRM NAME
ENGINEER'S NAME
CONTACT EMAIL
CONTACT PHONE NUMBER

SHEET NUMBER
W-5
5 OF 5