

New Business Engineering Tips & Tricks Guide

*A Guide to Avoiding Common Design
Mistakes to Help Minimize Revisions*



**Truckee Meadows
Water Authority**

Quality. Delivered.

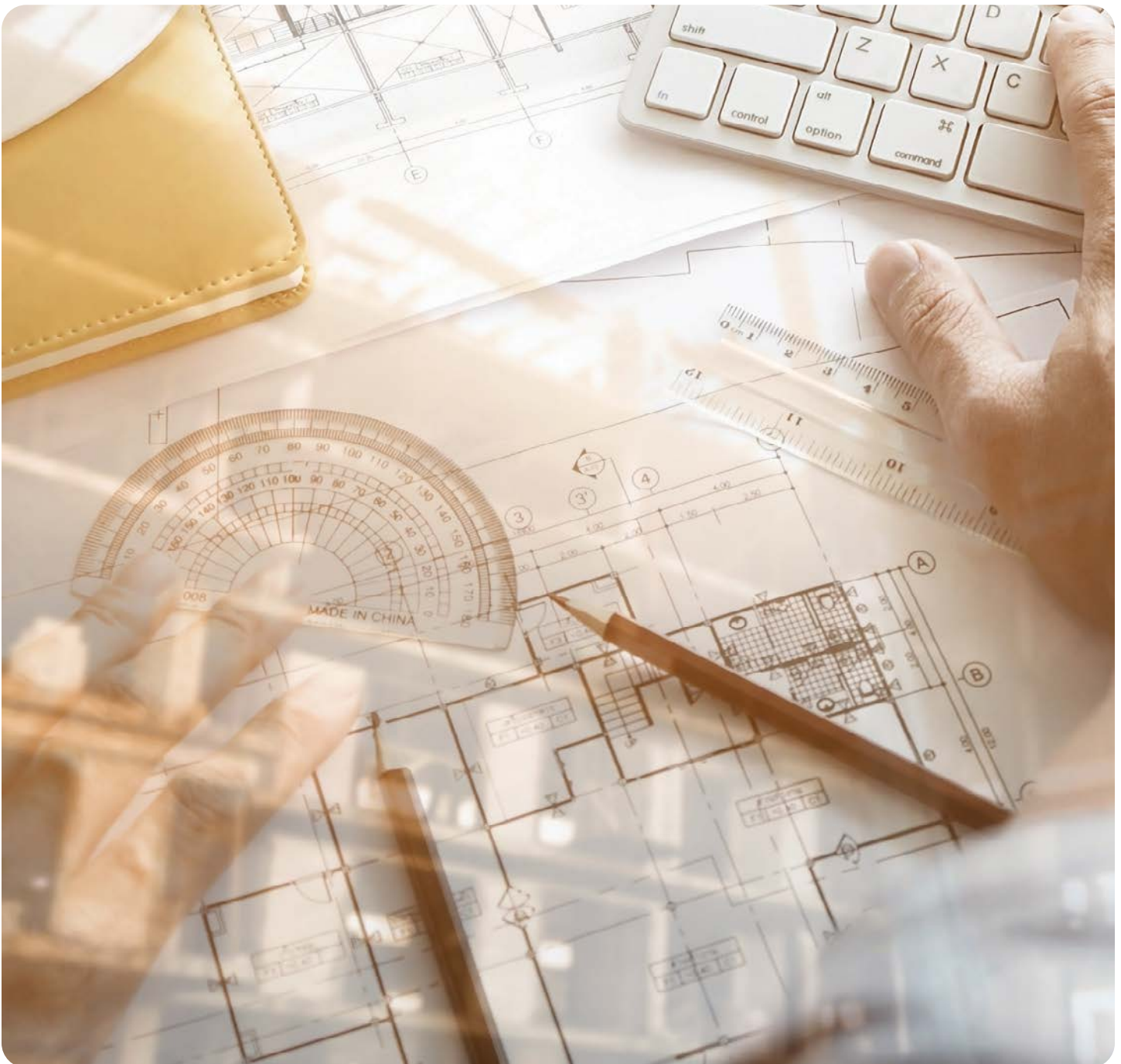


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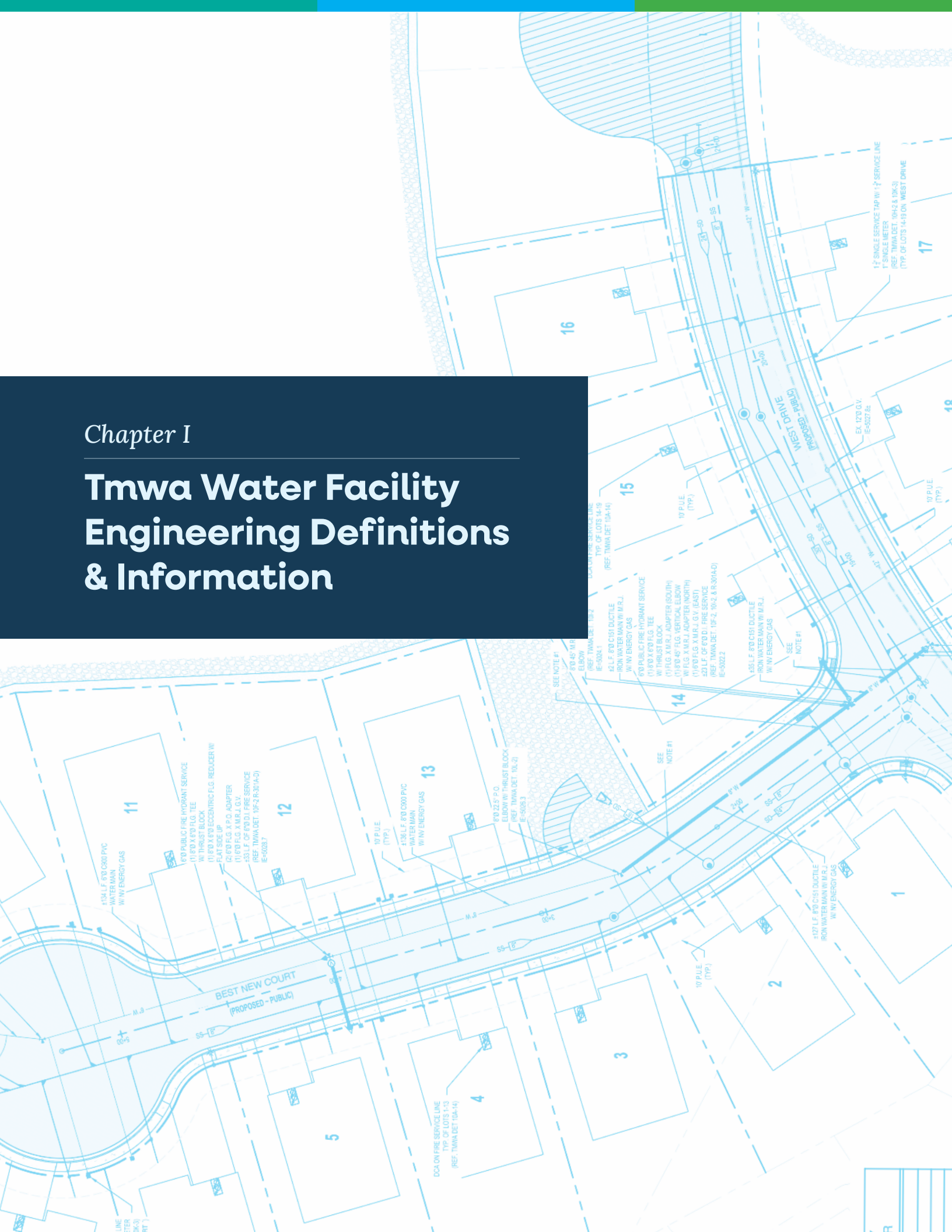
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Tmwa Water Facility Engineering Definitions & Information



Please note that New Business projects primarily involve standards for new construction and generally do not account for modifications or repairs to existing water infrastructure. Other construction standards and practices that apply to large diameter Capital improvements and Street & Highway rehabilitation projects are not included in this document.

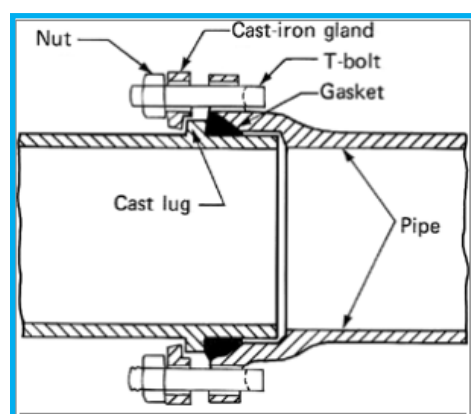
Joint Types & Fitting Connections

Push-on (PO) – a push-on joint consists of a bell and spigot connection between pipe ends with a single rubber gasket placed in the groove socket of the bell. The plain end spigot of one pipe is inserted into the bell end of another pipe to create a continuous watertight joint between pipes and/or fittings.



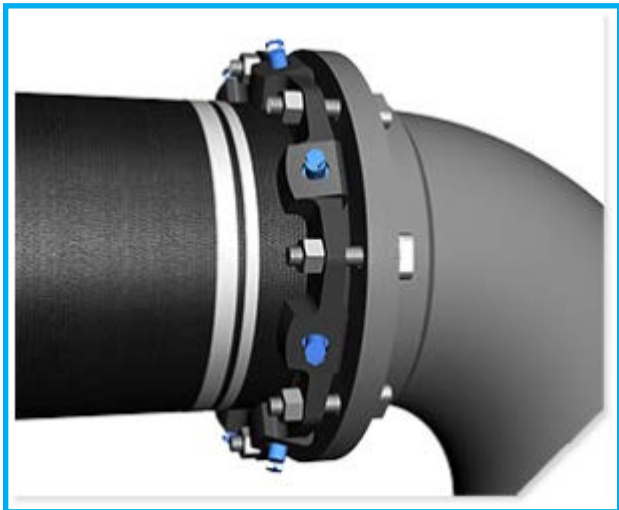
(Westlake Pipe)

Mechanical Joint (MJ) – a mechanical joint consists of a flange cast with the bell end of a pipe or fitting, a rubber gasket that fits into the bell recess, a gland, and nuts and bolts for tightening (Ductile Iron Pipe Research Association).



(Encyclopedia)

Mechanically Restrained Joint (MRJ) – a mechanically restrained joint consists of a flange cast with the bell end of a pipe or fitting, a rubber gasket with stainless steel locking segments vulcanized into the gasket that fits into the bell recess, and a gland with both parallel and perpendicular nuts and bolts for tightening. TMWA does not permit restrained joints on PVC pipe.



(EBAA Iron)

Flange Joint (FLG) – a flange joint consists of external screws parallel to the pipe creating a rigid non-deflecting connection.

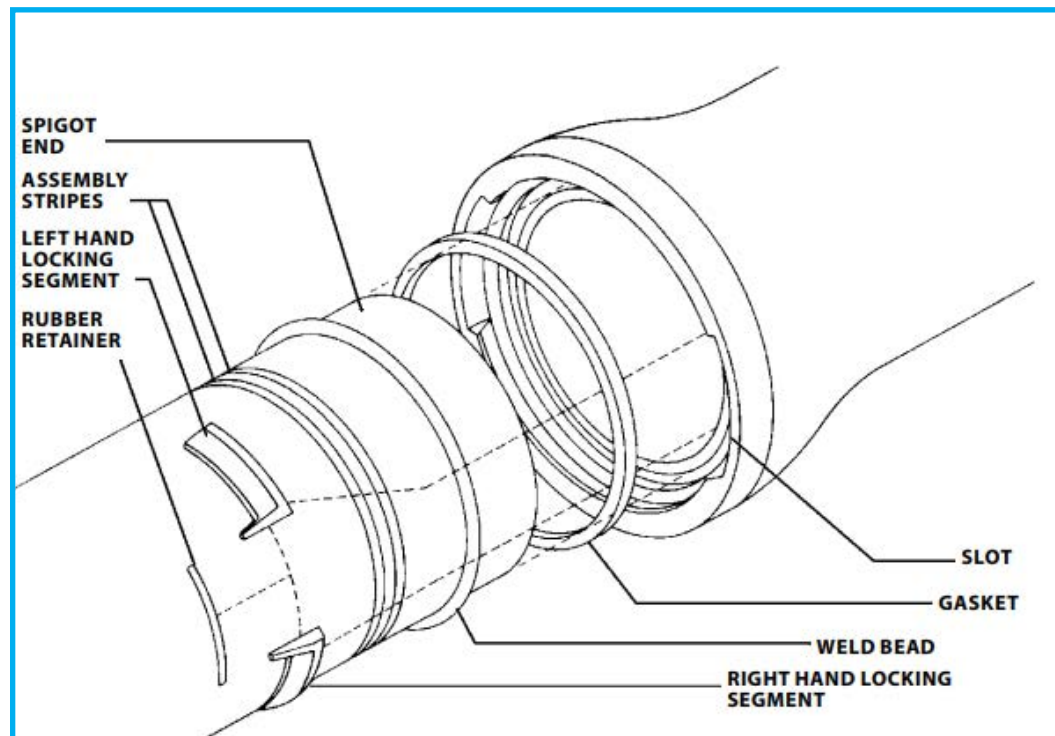


(McWane Ductile)



(US Pipe)

Internally Restrained Flexible Joints – TRFlex and Flex-ring joints are flexible restrained push-on connections that utilize ductile iron locking segments inserted through slot(s) in the bell face providing a positive axial lock between the bell interior surface and a retainer welded bead on the spigot end of the pipe (US Pipe).

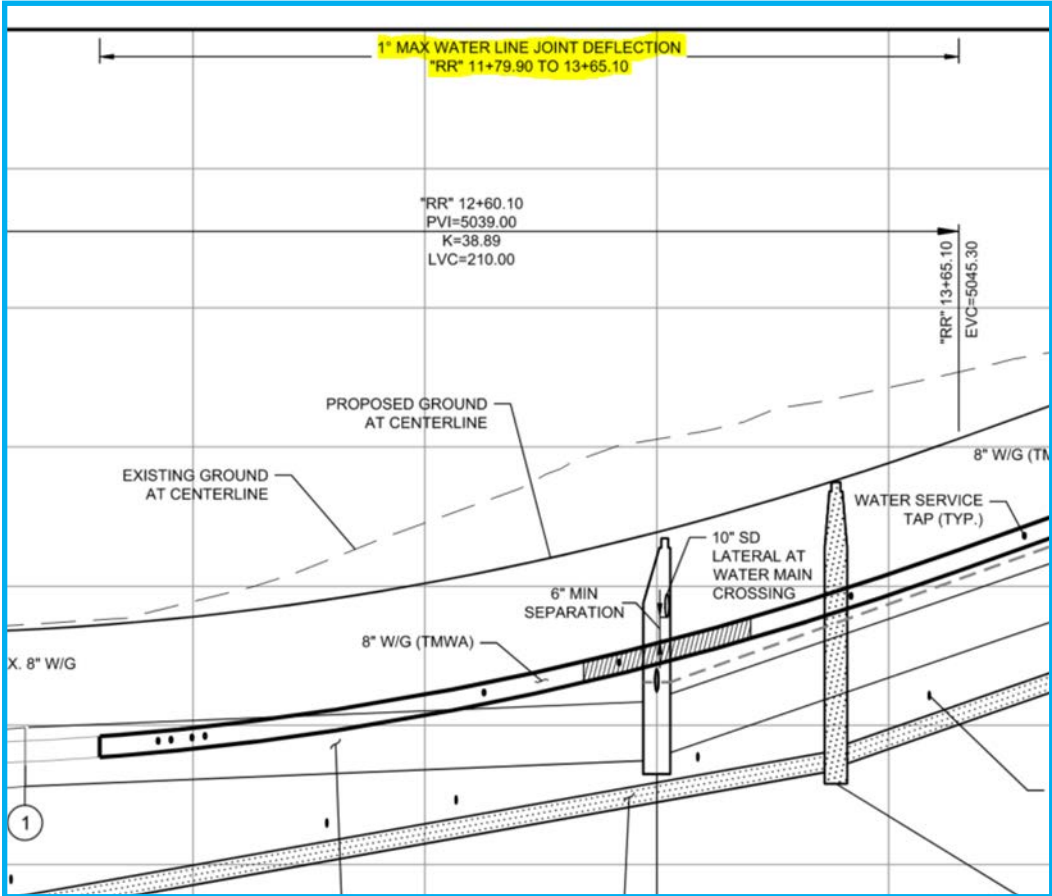


(US Pipe)

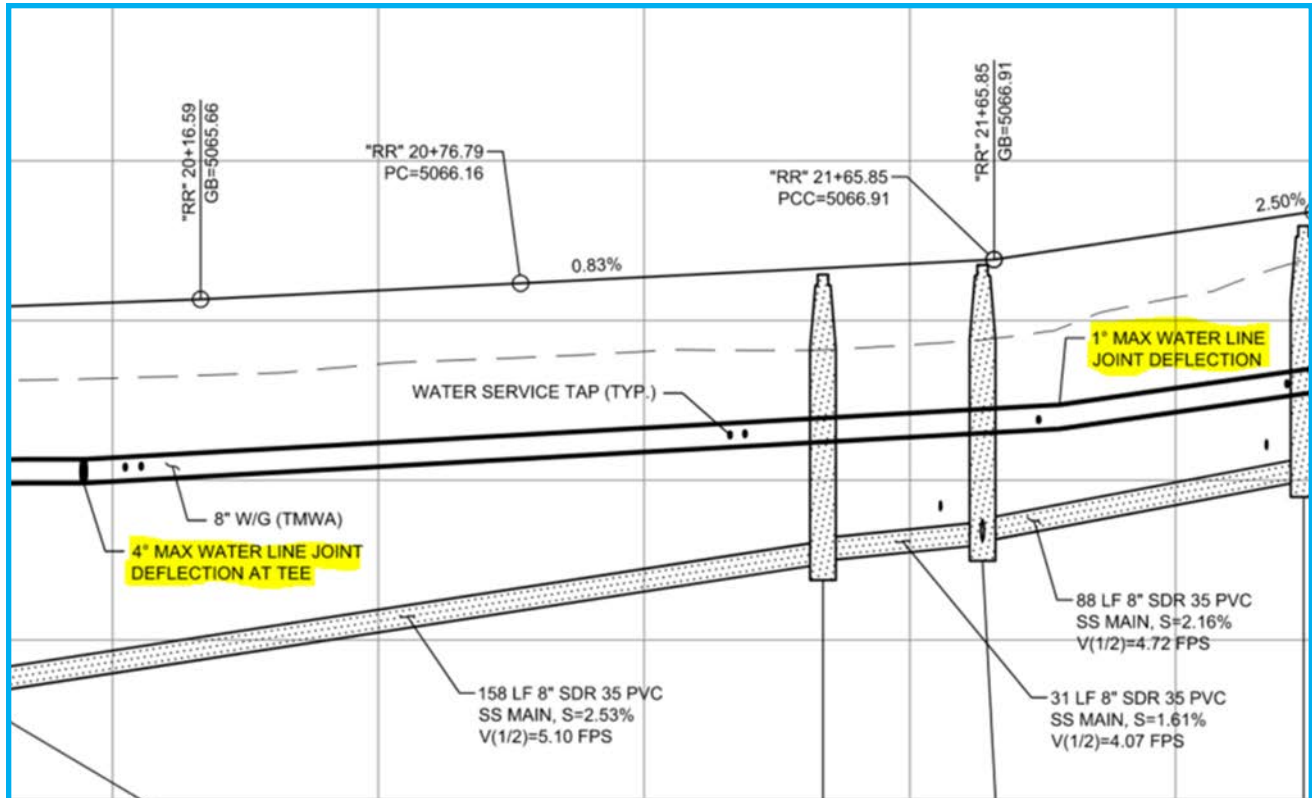
TMWA requires the use of internally restrained flexible joints on large diameter distribution and transmission mains and mains that have high pressure (over 150psi or as directed by the Authority). This is typically required in new construction for mains 14inch diameter and larger. TRFlex joints are not suitable for vertical offsets and require a transition to MRJ fittings for those applications.

Joint Deflection

Joint deflection is measured in total horizontal and vertical deflection per joint. Maximum horizontal pipe deflection shall be specified per joint in plan view where deflection is utilized. Maximum vertical pipe deflection shall be specified per joint in profile view where deflection is utilized. Reference TMWA Section 1.1.07 for total maximum allowable joint deflection. Vertical pipe deflection can be called out with a station to station dimension or drawn at each individual pipe joint.



Example of station to station dimension for pipe deflection in profile

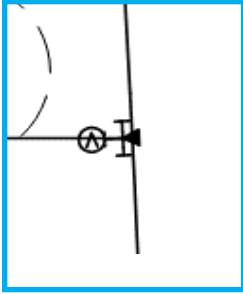


Example of vertical deflection labeled at each joint in profile

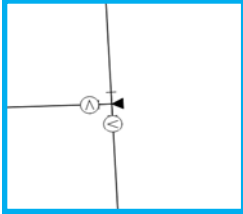
Common Fittings For New Business

Please note that New Business projects primarily involve standards for new construction and generally do not account for modifications or repairs to existing water infrastructure. Other construction standards and practices that apply to large diameter improvements and Street & Highway rehabilitation projects are not included in this document.

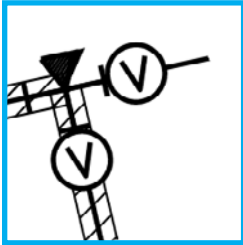
Tee – A tee fitting is a short segment of ductile iron pipe known as the ‘run’ with an integrated outlet at a right-angle to the pipe known as the ‘branch’. Tee fittings shall be specified by size and fitting types and are typically called out RUNxBRANCH. Unless otherwise specified by TMWA, tee fittings require a thrust block on the ‘run’ opposite of the branch. 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. On services there is typically one valve located on the service side of the tee, most often located on the branch side. Unless otherwise directed by the Authority.

**TYPICAL WATER PLAN CALLOUT:**

8"X8" POXFLG TEE WITH THRUST BLOCK
 8" FLG x PO GV
 (TMWA DETAILS 10L-2, 10J-2)

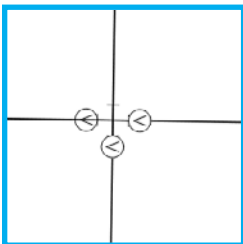
**TYPICAL WATER PLAN CALLOUT:**

8" FLGXFLG TEE WITH THRUST BLOCK
 (2) 8" FLG x PO GV (SOUTH, WEST)
 (1) 8" FLGXPO ADAPTER (NORTH)
 (TMWA DETAILS 10L-2, 10J-2)

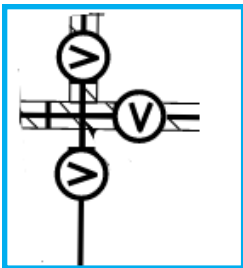
**TYPICAL WATER PLAN CALLOUT:**

8" FLGXFLG TEE WITH THRUST BLOCK
 (1) 8" FLGXPO GV (EAST)
 (1) 8" FLGXMRJ GV (SOUTH)
 8" FLGXMRJ ADAPTER (WEST)
 (TMWA DETAILS 10L-2, 10J-2)

Cross – Cross fittings connect four (4) branches of pipe together at their point of intersection and are manufactured out of 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.

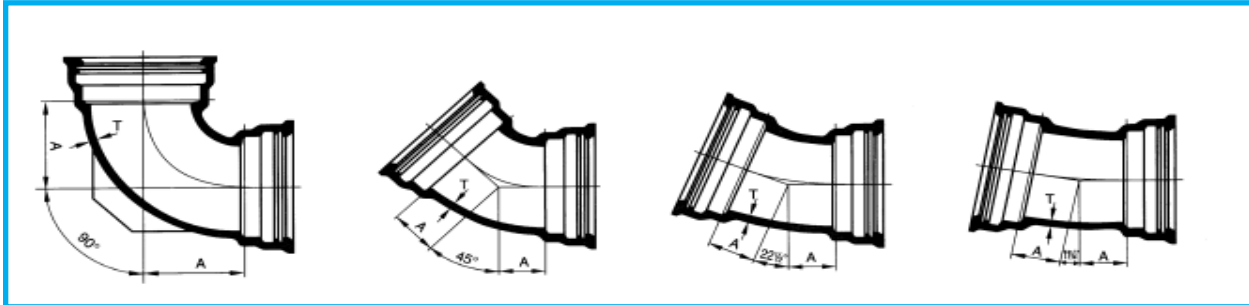
**TYPICAL WATER PLAN CALLOUT:**

8" FLGXFLG CROSS
 (3) 8" FLGXPO GV (EAST, SOUTH, WEST)
 8" FLGXPO ADAPTER (NORTH)
 (TMWA DETAIL 10J-2)

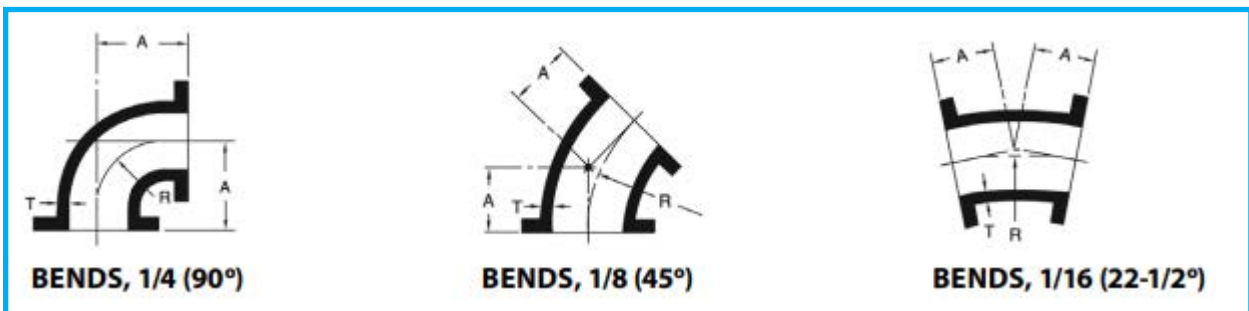
**TYPICAL WATER PLAN CALLOUT:**

8" FLGXFLG CROSS
 (2) 8" FLGXMRJ GV (NORTH, EAST)
 (1) 8" FLGXPO GV (SOUTH)
 8" FLGXMRJ ADAPTER (WEST)
 (TMWA DETAIL 10J-2)

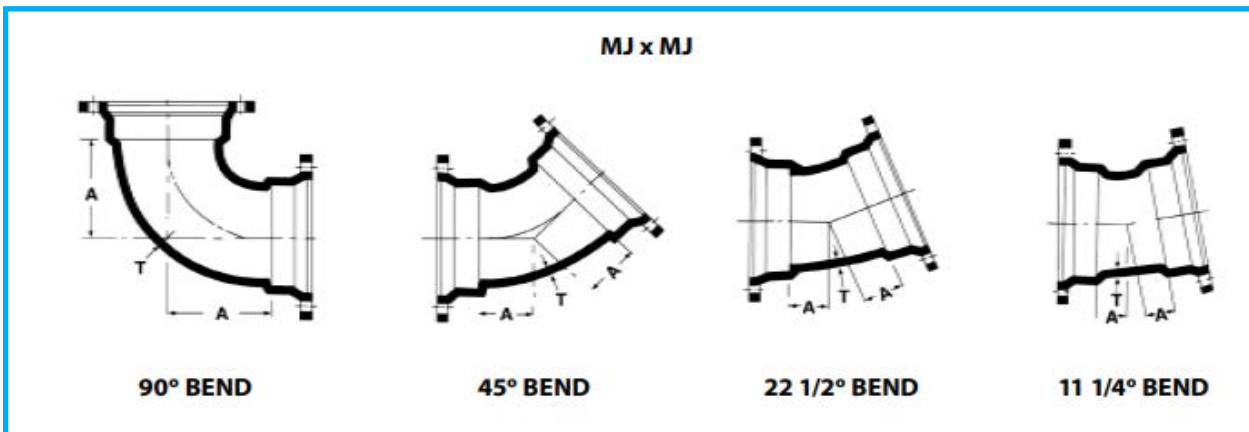
Elbow – Elbow fittings are angular changes in pipe direction and are manufactured out of ductile iron material. Elbow fittings are supplied in 11.25° , 22.5° , 45° , and 90° angles. Elbow fittings must be specified by size and joint type. Elbow fittings in our service territory are largely supplied with matching diameters and joint types on each end. Elbow fittings with different diameters or joint ends are typically a custom order. Most horizontal elbows require thrust blocks per TMWA standards. Where there are parallel mains, elbows that face another main will be restrained with no thrust block. Vertical elbows require restrained joints with no thrust block.



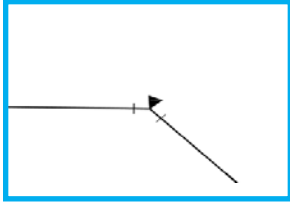
Push-on elbow fittings (US Pipe – Tyton Fittings)



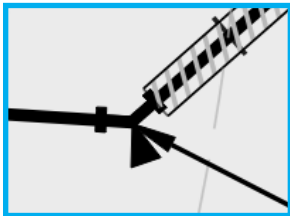
Flange fittings (US Pipe)



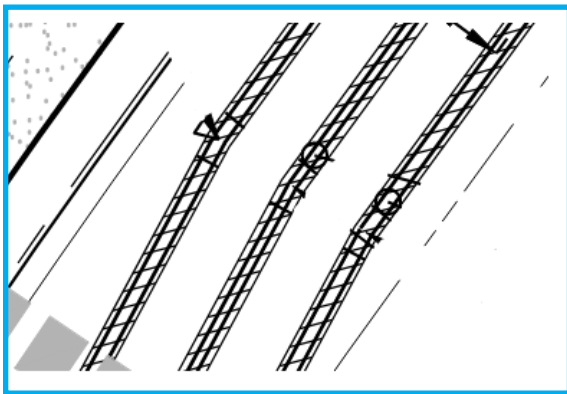
MJ elbow fittings (US Pipe)

**TYPICAL WATER PLAN CALLOUT:**

8" – 22.5° PO ELBOW WITH THRUST BLOCK
(TMWA DETAIL 10L-2)

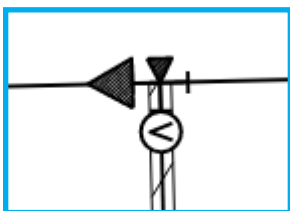
**TYPICAL WATER PLAN CALLOUT:**

8" – 45° MJ ELBOW WITH THRUST BLOCK
RESTRAIN TO DUCTILE PIPE ONLY
(TMWA DETAIL 10L-2)



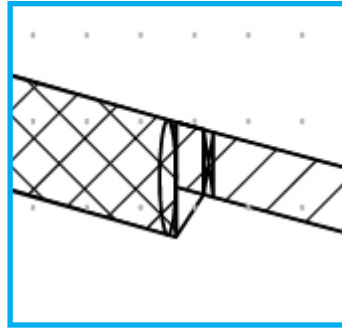
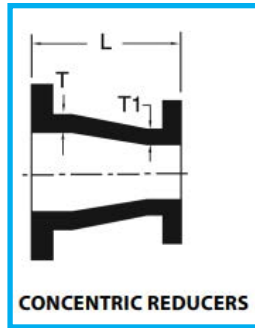
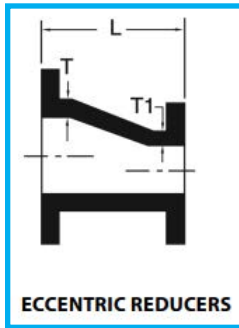
In this example, there are three (3) parallel mains. The outermost MRJ elbow has a thrust block. The 'inside' MRJ elbows do not. Call out inside elbows as not having thrust blocks.

Reducer – Reducer fittings are short ductile iron sections that change a pipe diameter from a larger size to a smaller size. Reducer fittings supplied in TMWA service territory are often flange joints and require 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.

**TYPICAL WATER PLAN CALLOUT:**

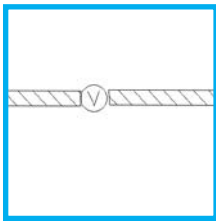
8"X6" FLG TEE WITH THRUST BLOCK
6" FLGXMJRJ GATE VALVE (SOUTH)
8"X6" FLG ECCENTRIC REDUCER FLAT SIDE UP (WEST)
6" FLGXPO ADAPTER (WEST)
8" FLGXPO ADAPTER (EAST)
(TMWA DETAILS 10L-2, 10J-2)

(US Pipe)

**TYPICAL WATER PLAN CALLOUT:**

12"x8" FLANGE ECCENTRIC
REDUCER FLAT SIDE UP
12" MRJ ADAPTER
8" FLG x MRJ GV (10J-2)

Gate Valve (GV) – 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" 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.

**TYPICAL WATER PLAN CALLOUT:**

8" MRJ INLINE GV
RESTRAIN A MINIMUM OF X LF EACH SIDE OF THE GV
(TMWA DETAIL 10J-2)



(FLGXFLG GV)
(Mueller)



(FLGXMJ GV)



(MJXMJ GV)



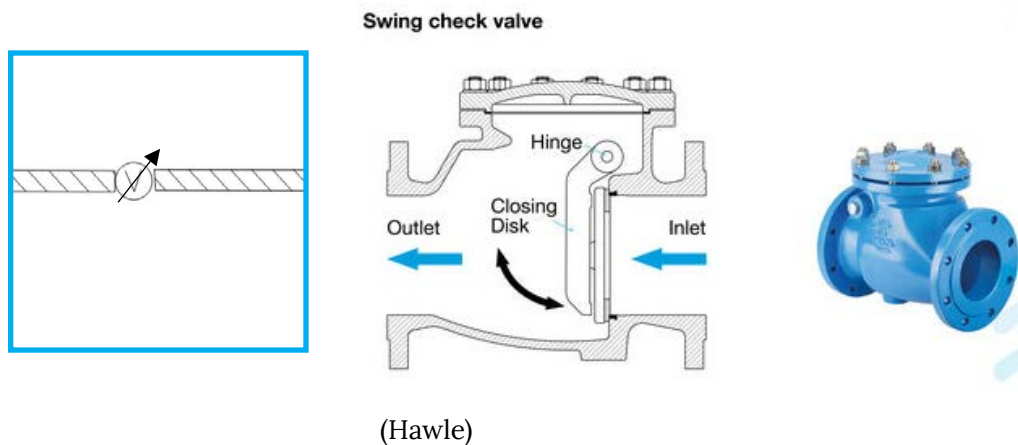
(POXFLG GV)

It is important to note that the operating nut on the gate valve requires a minimum of 18" cover from finish grade to top of nut. If the minimum cover cannot be provided, a gate valve with bevel gear actuator must be specified.



(American Pipe)

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 size 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 will be installed in vaults or manholes.



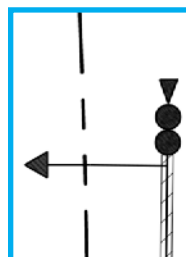
(Hawle)

Flush Valve Assembly (FVA) – 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 temporary flush valve assembly includes a blind flange at the end of the riser and a calculated restrained length of pipe to support the thrust at the dead end. A permanent flush valve assembly includes a concrete thrust block at the end of the riser that supports against the thrust at the dead end. A flush valve assembly is often installed with an air release valve if the dead end of the main is a high point.



TYPICAL WATER PLAN CALLOUT:

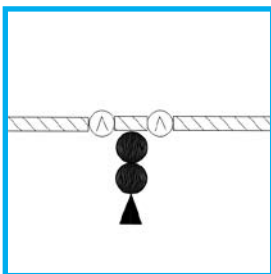
8" PERMANENT FVA
(TMWA DETAIL 10E-2)



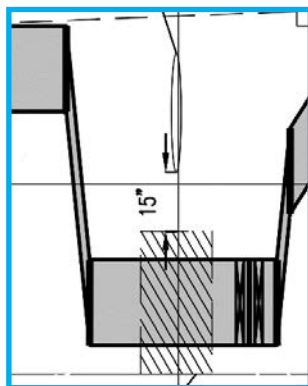
TYPICAL WATER PLAN CALLOUT:

8" TEMPORARY FVA
1" AIR RELEASE VALVE ASSEMBLY
(TMWA DETAILS 10E-3, 10L-4)

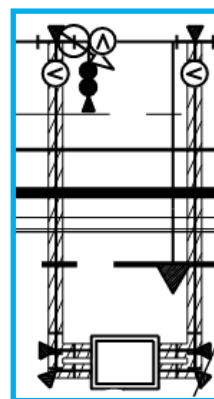
Inline Flush Valve or Inline Blow-off Assembly (FVA) – similar to the FVA defined above an inline FVA is typically used at the lower section of a series of vertical elbows or adjacent to a check valve or normally closed gate valve commonly found at pressure regulating stations (PRS). It can also be placed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



Plan View Example



Profile View Example



PRS Example

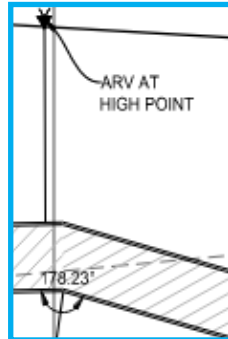
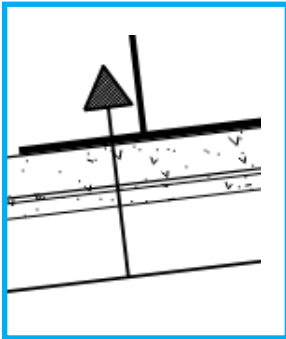
Air Release Valve (ARV) – An air release valve assembly consists of a service saddle at the main, C901 HDPE service tubing, a curb valve, a linch combination air valve single body, linch brass or type k copper pipe that outlets a minimum of 12 inches above finish grade and lid/riser tube to protect the assembly. An air release valve assembly allows for the removal of air that collects at high points in the water main. They can be found at high points along the main and are often located adjacent to temporary FVA's.



(Placer Waterworks)



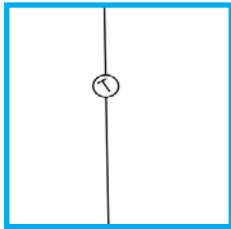
(A.Y. McDonald)



TYPICAL WATER PLAN CALLOUT:
AIR RELEASE VALVE ASSEMBLY AT
HIGH POINT
(TMWA DETAIL 10L-4)

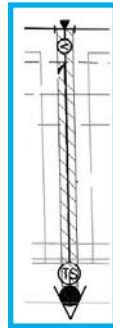
Air release valve assemblies require positive slope in the service line and should be installed perpendicular to the main where possible. It is important to consider the location of air release valves near driveways/property frontages and propose them in locations where they are not at risk of damage or nuisance to the property owner and as close to the main as possible to ensure adequate cover over the line between the main and the ARV.

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 near fire hydrant or if not an option, at a gate valve. Test stations are typically spaced at 500 foot intervals and should be uniquely identified with a symbol on the plans.



TYPICAL WATER PLAN CALLOUT:

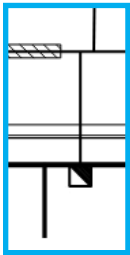
INSTALL TEST
STATION
(TMWA DETAIL 10L-9)



TYPICAL WATER PLAN CALLOUT:

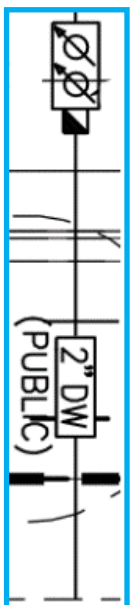
PROPOSED HYDRANT
8"X6" POXFLG TEE WITH THRUST BLOCK
6" FLGXMJR GV
20 LF 6" MRJ DIP FIRE HYDRANT LATERAL
FIRE HYDRANT ASSEMBLY
TEST STATION IN SPLASH PAD
(TMWA DETAILS 10L-2, 10J-2, 10F-2, 10L-9)

Single Water Services – A single water service assembly includes the service saddle at the main, C901 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). Meter enclosures shall be installed 18-inches behind curb or sidewalk within right-of-way or public utility easement. For meters that do not have sufficient easement coverage, a separate TMWA water facility easement shall be dedicated for access to the meter. For commercial services (non single-family residential) a backflow assembly is required downstream of the meter.



TYPICAL WATER PLAN CALLOUT:

SINGLE RESIDENTIAL METER ASSEMBLY:
1" SERVICE TAP
3/4" METER ASSEMBLY
(TMWA DETAILS 10K-2, 10H-2)

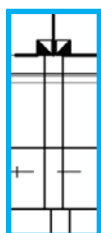


TYPICAL WATER PLAN CALLOUT:

SINGLE COMMERCIAL METER ASSEMBLY:
2" SERVICE TAP
10LF 2" C901 HDPE TUBING
2" METER ASSEMBLY
DOMESTIC RP BACKFLOW
(TMWA DETAILS 10K-10, 10H-2, 10A-2)

Meter Size	Meter Type	Service Line Size	Enclosure Size
¾"	iPerl	1"	13"x24"
1"	iPerl	1 – ¼"	13"x24"
1 – ½"	Omni T2 or Omni R2	1 – ½"	17"x30"
2"	Omni T2 or Omni R2	2"	17"x30"
4" +	Omni T2 or Omni C2	4"+	Vault

Dual Water Services – This assembly consists of two service saddles at the main, two 1" C901 HDPE service lines, two setters & meters, and a single enclosure with lid. That box size is 17" x 30". Dual meter enclosures are only available for ¾" meters – all other service sizes require a single installation.



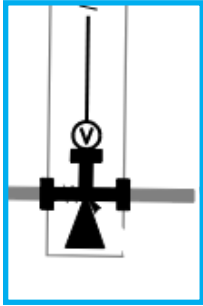
TYPICAL WATER PLAN CALLOUT:

DUAL METER ASSEMBLY:
 2 - 1" SERVICE TAPS
 DUAL ¾" METER ASSEMBLY
 (TMWA DETAILS 10K-6, 10H-2)

TMWA will not allow water service and/or ARV service lines installed under parking stalls or ADA ramps. The maintenance costs involved in replacing ramps and towing vehicles poses a risk to customer rate payers and is not permitted with new construction, unless approved by the Authority.

Water service pipe is continuous jointless tubing that does not require elbow fittings. It can be 'swept' at a radius specified by the manufacturer.

Hot Tap – A hot tap is a branch connection to an existing main using a tapping sleeve and a flange gate valve. A pneumatic drill is bolted to the flange gate valve and is used to remove a portion of the existing main inside the tapping sleeve. Once this is complete, the gate valve is shut, drill and wall section of pipe are removed, and an adapter is placed on the gate valve to connect new main. The size of tapping sleeve, size and joint type of gate valve, and thrust block must be specified in the plans. 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.



TYPICAL WATER PLAN CALLOUT:

8" HOT TAP OFF EXISTING 10" C900 PVC MAIN W/
THRUST BLOCK
10"x8" TAPPING SLEEVE W/ THRUST BLOCK
8" FLG GV
8" FLGXPO ADAPTER
(TMWA DETAILS 10L-2, 10J-2, 10D-2, 10D-3)

Fire hydrants – 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 typically have weep hole drains in the shoe of the assembly that pose as a source for contamination. Because hydrants do not have backflow protection, the hydrant barrel must have a minimum of 10ft horizontal separation from all sewer as defined by NAC445. This separation can be shown with a radius of separation or a minimum 10ft dimension. Hydrants must also be specified as public or private in the plans.



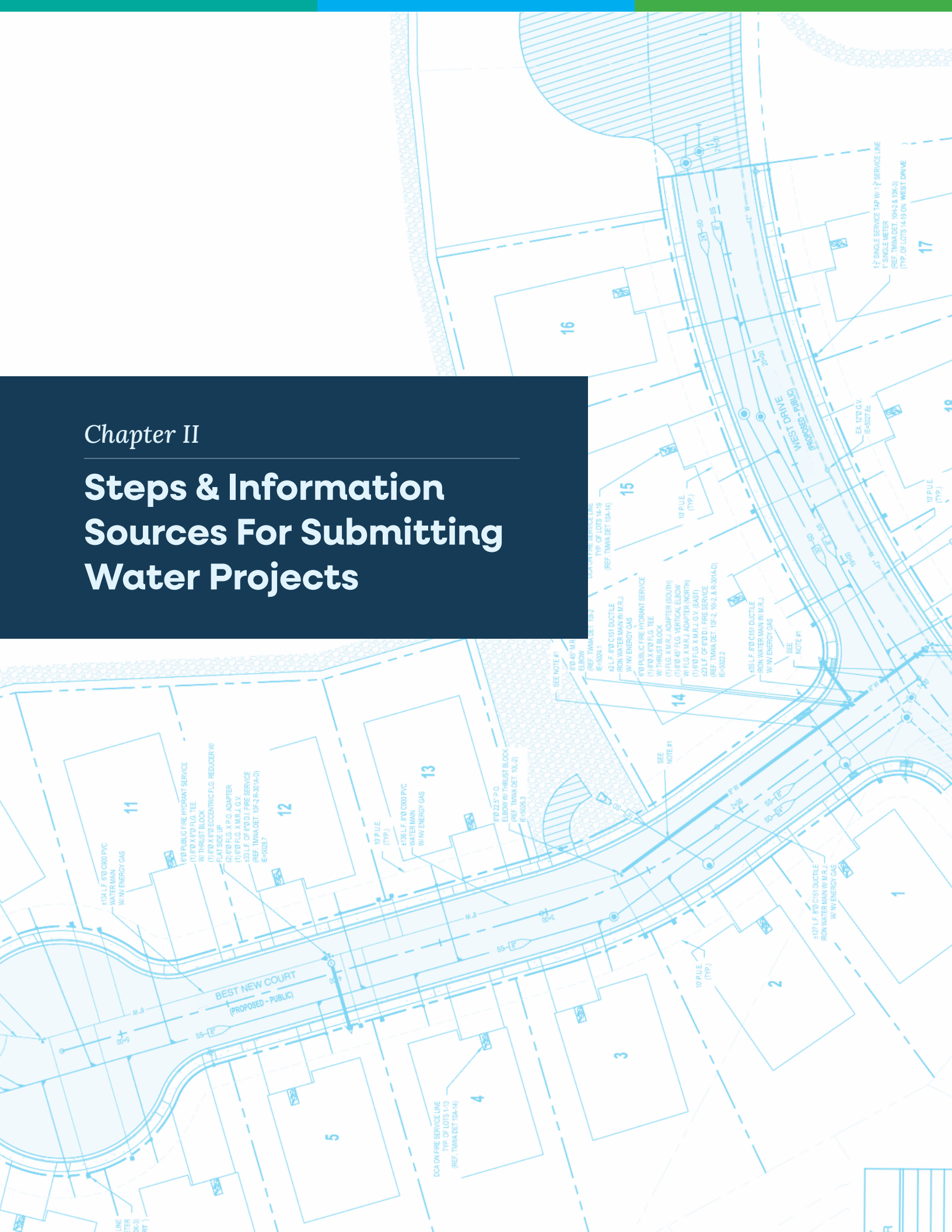
NAC445 Helpful Definitions

Sewer Main – NAC445A.66395 defines sewer main as 1) any gravity pipe with a diameter that exceed 6 inches; or equals 6 inches if the gravity sewer line has connections from more than one service lateral. 2) Pressurized non-potable or sewer line with a minimum diameter of 2 inches; or 3) gravity storm drain with a minimum diameter of 12 inches.

All 'sewer main' including potable irrigation downstream of a backflow assembly with a diameter greater than 2" and reclaim water 2" and larger. These must be shown on TMWA plans for separation and mitigation.

Chapter II

Steps & Information Sources For Submitting Water Projects



Steps for Preparing And Submitting Water Plans

1. Refer to the TMWA New Business Process Webpage for new TMWA water project application processing information and design resources in addition to this Guide.

Web Link: <https://tmwa.com/doing-business-with-us/new-construction/>

2. Contact TMWA CAD Department and request CAD files for available existing TMWA water infrastructure data in the vicinity of the project site.

[Data Request](#) (Email Link)

3. Visit the New Construction web page and download the latest CAD files for water construction plans including the title block and drawing notes.

New Construction Webpage Link: <https://tmwa.com/doing-business-with-us/new-construction/drawing-templates/>

4. Visit the New Construction web page and review TMWA Standards for Construction.

Web Link: <https://tmwa.com/doing-business-with-us/new-construction/all-standards/>

5. Design and draft water plans.

- a. Contact TMWA New Business Engineering for design guidance on any pipe design 14" diameter and larger.

- b. Ensure water plans meet all requirements of TMWA Section 1.1.24

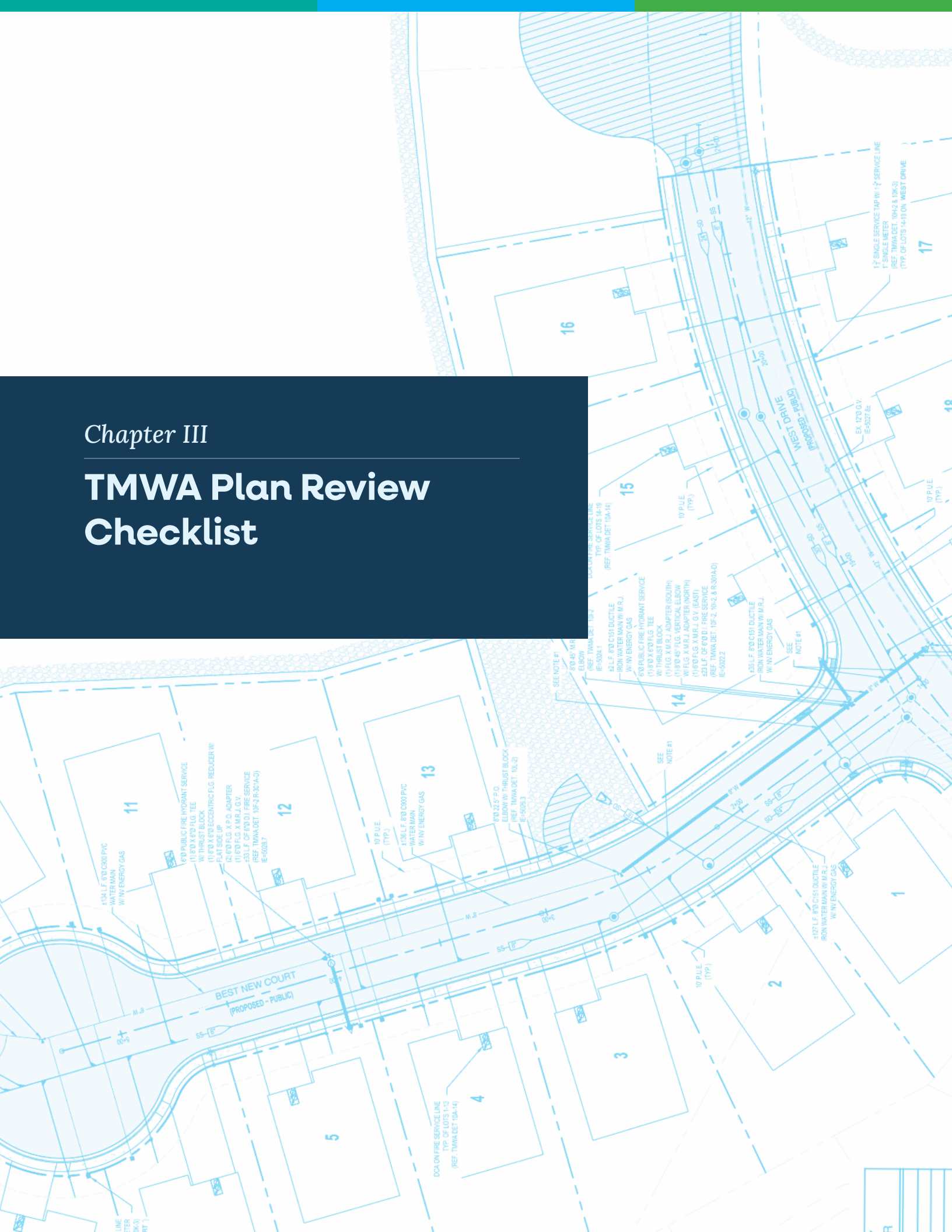
6. Review water design and plans using TMWA Construction and Design Standards.

7. Perform a QA/QC review using the preliminary checklist provided in this guide and TMWA Construction Standards.

8. Submit water project to TMWA following New Business Application Process located at the TMWA New Business Process web page: <https://tmwa.com/doing-business-with-us/new-construction/>.

Chapter III

TMWA Plan Review Checklist



The following checklist is a helpful quality control tool for preparing water plans to submit to TMWA. This checklist does not guarantee plan approval and is designed to help consultants and developers look for common design issues prior to submittal.

Plan Review Checklist

- ☐ Water plan drawings, at a minimum, need to meet all requirements in TMWA Construction and Design Standards Sections 1.1.24 et.al. https://tmwa.com/wp-content/uploads/2024/12/SECTIONS_1-9_MAY2024.pdf
- ☐ Confirm north arrow orientation is correct on plans.
- ☐ Confirm plans are plotted to the scale indicated on the plans.
- ☐ Add the General Notes from the TMWA website to the first sheet of the water plans. Remove backflow, meter or enclosure notes that do not apply to the project.
- ☐ Ensure there is adequate white space on all sheets for the approval stamp.
- ☐ Water plan sheet numbering shall use W-1, W-2, etc. for projects that do not include non-potable/reclaimed water on the property or on an adjacent property.
- ☐ Water plans that involve reclaimed water shall have 'WE-' sheet numbers
- ☐ All proposed water main extensions are required to have a profile view.
- ☐ Length of main is labeled by diameter, material, and length between fittings
- ☐ All fittings are labeled by size and joint type
- ☐ Pipe materials and fittings match the TMWA symbols legend
- ☐ All required separations from the proposed water main must be measured from outer wall of water main to nearest edge of subject item requiring separation.
- ☐ Water mains must be located 10ft from buildings and retaining walls at a minimum, this is measured from footing or any portion of structure, including structure overhangs.
- ☐ Water mains must be located a minimum 5ft from uncovered parking stalls and 7ft from covered parking stalls. Water mains shall be 7 ft from back face of curb. Where this is not feasible, mains must be MRJ DIP.
- ☐ Water mains must have minimum 4ft separation from outer wall of main to outer wall of manholes and catch basins, both shall be watertight.

- ☐ Water mains must have adequate separation and mitigation according to TMWA details 10L-10 and 10L-11 and Section 1.1
 - ☐ Where proposed reinforced concrete pipes (RCP) cross water mains and services, the RCP shall have watertight joints from structure to structure
 - ☐ Where RCP is existing any exposed RCP joints shall be slurry encased
 - ☐ Show mitigated crossings with water in the profile view
- ☐ Specify that hydrants have a minimum of 10ft separation from sewer.
- ☐ Water service lines are perpendicular to the main where possible and have adequate separation and mitigation according to TMWA details 10L-12 and 10L-13 and Section 1.1.
 - ☐ Meters are located 18" behind curb or sidewalk and a minimum 5ft from face of buildings or structures.
 - ☐ Where water services cross under sewer and/or storm drain, a special construction note should be added to the plans showing which lots have mitigated crossings. TMWA requires water services that cross under sewer/storm drain that are lower than the water main elevation to be installed in a HDPE sleeve from main to setter with 3M cold shrink
 - ☐ Ensure water service tap locations have proper separation according to TMWA detail 10H-2
 - ☐ Ensure meters, service lines and ARV's have minimum 5ft separation from street lights
 - ☐ Where service laterals are not perpendicular to the main the full length of the service line the following note shall be added to the plans:

"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."
 - ☐ Water service lines and meters should be immediately in front of the property being served where possible.
- ☐ Ensure DI pipe is installed in full sticks. Where ductile iron pipe is used for restrained joint lengths or mitigation of crossings, TMWA requires the use of full sticks of DI pipe. The standard length of ductile iron pipe is 18-feet.
- ☐ Ensure sanitary sewer laterals can pass under water main with minimum clearance or with mitigation. Show mitigated crossings in the profile view. Where profile views are not required call out the minimum separation of 6", noting which utility is lower with required mitigation noted.
- ☐ Ensure high points in the main have an ARV installed and specified properly.
- ☐ Compare the latest TMWA cover sheet template notes – remove any notes that do not apply to the proposed design.

- ☐ Check that valves are located at each intersection and at minimum intervals as specified in TMWA section 1.1.10.
- ☐ Show PUE and TMWA easements on the water plans.
- ☐ Ensure restrained lengths are shown with accompanying stamped DIPRA calculations. (This can be for vertical offsets, dead ends, inline gate valves, etc.)
- ☐ Maximum horizontal deflection is labeled where designed in plan view.
- ☐ Maximum vertical deflection is labeled where designed in profile view.
- ☐ Specify if fire hydrant and/or fire service laterals need vertical offsets upstream of backflow prevention assemblies on the water plans and on the civil plans for locations downstream of the backflow prevention assembly.
- ☐ Ensure mitigation of fire service pipes is provided from the tee to the backflow prevention assembly
- ☐ Ensure backflow prevention assemblies and their enclosures are shown to-scale on the plans with adequate separation from buildings and structures.
- ☐ Backflow prevention assembly is installed on all commercial services, fire services, and irrigation services. Single family residential that requires internal fire suppression shared with the domestic service shall have a backflow prevention assembly installed on the fire service where it tees off the domestic line.
- ☐ All proposed main extensions are required to include a profile of the proposed water main within the plans that includes all proposed and existing utilities to be shown and identified.
- ☐ Discuss the need for construction water with your client or contractor early in the process. If construction water is going to be needed before the entire water project is completed and accepted by TMWA a separate commercial application will be needed for the construction water. Contact us early to determine availability prior to application.

Partial List Of Common TMWA Redline Comments



Partial List of Common Redline Comments by Section

- Confirm north arrow orientation is correct on plans.
- Confirm plans are plotted to the scale indicated on the plans.
- Add the General Notes from the TMWA website to the first sheet of the water plans. Remove backflow, meter or enclosure notes that do not apply to the project.
- Ensure there is adequate white space on all sheets for the approval stamp.
- Water plan sheet numbering shall use W-1, W-2, etc. for projects that do not include non-potable/ reclaimed water on the property or on an adjacent property.
- Water plan sheet numbering shall use WE-1, WE-2, etc. for projects that include non-potable/ reclaimed water on the property.
- All proposed water main extensions are required to have a profile view.
- Hatch all ductile iron water pipes. If there is a combination of restrained and unrestrained ductile iron pipe, hatch the restrained pipe differently from the unrestrained sections for visual distinction.

Appendix 10A – Backflow Prevention Assemblies

- In plan view, ensure adequate space is provided for the backflow assembly and its associated enclosure/ vault based on the spacing requirements of appendix 10A details. Often, the backflow symbol on the plans does not accurately reflect the true size of the assembly.
- Where backflow assemblies are proposed next to each other, ensure that the assemblies are spaced with enough room for the heated enclosure lids to be opened and for a tester to access the entire assembly.
- Where backflow for fire protection of single-family homes with fire sprinklers is required, ensure that the DCA is called out to be installed on the fire service line on each individual lot that it applies to.
- Backflow assemblies on new construction domestic and irrigation services must be located no more than 1ft behind the TMWA meter.
- For properties with existing services, all services will require backflow protection. Field verify locations of assemblies and show them on the plans. If none exist call for the installation showing the proper callout and detail on the plan.

Appendix 10B – Distribution Branch Installations

- Where mains are proposed at a depth greater than 7ft below finish grade, call out for steel valve stem risers on the plans with centering rings.
- Show gate valve locations in plan view. It is helpful to also show in profile view on the plans.
- In-line gate valves that are not bolted to a tee must be mechanically restrained on each side. Mechanically restrained lengths for in-line gate valves must be calculated using the dead-end condition. Corresponding stamped restrained length calculations must be submitted to TMWA. It is preferred that gate valves are bolted to tees where possible for thrust purposes. Restrained joint calculations can use either the DIPRA calculator found on their website or can be hand calculations using the DIPRA guide. In all cases the calculations shall be stamped and identify the location of the fittings with corresponding station or other identifying feature.
- Where an existing gate valve is un-restrained and requires restraint for new construction purposes, an anchor block must be fitted to the gate valve for thrust restraint.
- Proposed water infrastructure designs must be designed for constructability. This may include cutting-in gate valves to existing water infrastructure to make the proposed design feasible for construction.

Appendix 10C – Distribution Transition Fittings

- Connecting to or replacing sections of existing transite mains require transition fittings at each point of connection.
- Transition fittings shall be used such that ductile iron is not placed into PVC bell ends.

Appendix 10D – Distribution Tap Assemblies

- Hot taps require a FLGxFLG gate valve. The gate valve is bolted directly to the tapping sleeve on one side and directly to the tapping drill on the other side. Either a flange x push (FLG x PO) or flange by mechanically restrained joint (FLG x MRJ) adapter is required.
- If a parallel utility main is found to be in conflict with a standard distribution hot tap, a reverse hot tap shall be proposed on the plans. A minimum 6ft from outer diameter of water main is required for adequate room to perform a standard hot tap. Based on field conditions, pipe material and diameter it may result in a tee cut in to avoid a reverse tap.
- If a distribution tap is required on a steel main, contact TMWA for welded tap design criteria. Welded taps shall follow the AWWA M11 manual.

Appendix 10E – Flush Assembly Installations

- Existing flush valve assemblies installed prior to 2016 usually require full removal for new main connections to the existing main or the existing main may be hot-tapped. Most existing flush-valve assemblies have a 4-inch valve that would prevent it from remaining in place. Additionally, existing flush valve assemblies need to be analyzed for thrust restraint. If inadequate thrust restraint is provided for new construction purposes, the flush valve assembly will likely need to be replaced with an in-line gate valve and anchor block.
- Flush valve assemblies are required at low points in water mains. If a proposed vertical offset is the true low-point of a water main, please design the offset to include an in-line flush valve assembly.
- Flush valve assemblies at temporary dead-end mains require mechanically restrained joints for thrust purposes. The dead-end restrained length must be calculated and stamped calculations submitted to TMWA. Restrained joint requirements can use either DIPRA on-line calculator or hand calculations can be submitted using the DIPRA guide. Identify the location of each calculation by station label or other identifying feature.
- TMWA mains must be terminated with a flush valve assembly.
- In-line flush valve assemblies may be required where other means of flushing the main are not readily available.

Appendix 10F – Fire Protection Installations

- Where hydrants are in close proximity to sewer, show a dimension in the plans for 10ft minimum separation from o.d. of sewer to hydrant barrel. Fire hydrants in our area contain weep hole drains in the boot of the assembly. The weep hole drain is a possible unprotected location where contamination could occur. Because hydrants do not have backflow, separations must be met to protect the public water system.
- Where fire service laterals must be mitigated for crossings with sewer from the point of connection at the TMWA main to the location of the backflow assembly.
- Fire service laterals must be analyzed for vertical conflicts with other utilities. If a vertical offset is required, the offset must be mechanically restrained, and corresponding restrained length calculations must be submitted to TMWA. In the plans, specify if fire hydrant/fire service laterals need vertical offsets

over or under sewer and storm drain. Stamped restrained joint calculations shall be submitted using either DIPRA on-line calculator or hand calculations using the DIPRA guide. Identify the location of each calculation by station label or other identifying feature.

- Fire services are privately owned by the property owner from the valve at the main to its end location. Fire services do not require TMWA easements. In special circumstances where a private fire service crosses private property not owned by the applicant, TMWA will require documentation of a private easement for the individual fire service.
- Private fire loop systems are reviewed by TMWA from the point of connection at the TMWA main to the backflow assembly. Piping downstream of the backflow assembly shall be proposed on the civil plans and reviewed by the permitting agency for the civil permit.
- Fire hydrant locations are approved by the fire agency. Relocation of a proposed fire hydrant during the plan review process with TMWA will require additional fire agency approval.
- In plan view, label proposed elbows and lengths between elbows on all fire services upstream of the backflow assembly. Identify the diameter, joint type, pipe length and material.
- All regional fire hydrant details shall be included on the TMWA water plans when fire hydrants are required for the project that are fed directly from the TMWA water main.
- Identify if fire hydrants are private or public on the plan view. Private fire hydrants are those located out of public rights of way.

Appendix 10H – Service Tap Installations

- In plan view, ensure that service taps have minimum spacing on same side of the main or opposite sides of the main based on the main material (reference TMWA detail 10H-2).
- In the water plans, ensure that service taps are a minimum of 2ft from fittings, pipe joints, and ends of mains.
- Water service tubing 2-inch diameter and smaller consists of jointless tubing and does not require elbow fittings. Omit elbow fittings on water service lines in the TMWA plans.
- Tracer wire is required on all service lines that are greater than 50 lf in length or do not remain perpendicular to the main between main and meter. Add the following 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.

Appendix 10I – Vertical Elbow Installations

- In profile view, draw vertical elbows at the scaled angle they are proposed (i.e. 22.5 degrees or 45 degrees).
- In profile view, dimension the minimum clearance between the water main and the utility it is crossing over or under.
- In profile view, propose the lower vertical elbows with a minimum 5ft clearance from the trench wall of the crossing utility.
- Provide mechanically restrained joints on the upper and lower portions of proposed vertical offsets based on the restrained length calculations. Submit stamped restrained length calculations to TMWA. Stamped restrained joint calculations shall be submitted using either DIPRA on-line calculator or hand calculations using the DIPRA guide. Identify the location of each calculation by station label or other identifying feature.

- Where vertical elbows are connecting to existing unrestrained pipe, install a gravity block on the upper elbow. Gravity blocks must be designed for thrust restraint and a detail must be provided on the TMWA plans. Stamped gravity block calculations must be submitted to TMWA.
- Where vertical elbows are connected to a tee or gate valve via flanged joints, a FLGXMRJ adapter must be called out on the opposite side of the vertical elbow.
- Vertical offsets crossing under existing box culverts and large diameter utility mains will need to be analyzed for jack & bore construction.
- Vertical offsets under box culverts and in some cases large diameter utility mains will require a steel casing of the water main. In the plans, provide a detail of the steel casing to include thickness of the steel, diameter of the steel casing, manufacturer data of the casing spacers and end seals, and distance between casing spacers.
- There are no thrust blocks on vertical elbows, reference TMWA details in Appendix 10I.

Appendix 10J – Distribution Valve Installations

- In the water plans, specify the size and joint types of all proposed gate valves. Specify if valves need adapters to connect to adjoining fittings or pipes.

Appendix 10K – Water Meter Installations, Small

- On the water plan cover sheet, specify the length of tubing used for water services from main to meter. Water service tubing downstream of the TMWA meter is private and should be reflected on the civil utility plan only.
- On the water plan cover sheet, separate quantities of water service tubing by size and service type (i.e. domestic or irrigation).
- On the water plan cover sheet, ensure that the size of water service tubing quantified matches what is proposed in the water plans.
- Confirm the diameter of the service line corresponds to the meter size as indicated in the 10K details. This applies to the meter enclosure sizing, too.
- On the water plan cover sheet, ensure that the number and size of meters quantified matches the number and size of meters on the water plans.
- In the water plans, show meters installed 18-inches behind curb or sidewalk.
- Water service lines shall not be installed in parking areas or under sidewalk ramps unless approved by TMWA. It is difficult to have cars towed and the cost to replace a ramp is significant enough for rate-payers that we must avoid it. In the water plans, provide a minimum 5ft from back of meter enclosure to face of buildings, footings, fences/walls, or structures. Ensure that the true dimensions at the base of the meter enclosure are used.
- If water meters cannot be located within public right-of-way or public utility easements, provide a TMWA easement on the plans a minimum 7ft each side of the water service line and a minimum of 5ft behind the water meter enclosure.
- Where water services must be relocated, a full retirement of the existing water service must be called out on the water plans and a new service installation provided. If a water service needs to be extended, a full replacement of the water service line will be required on the water plans.

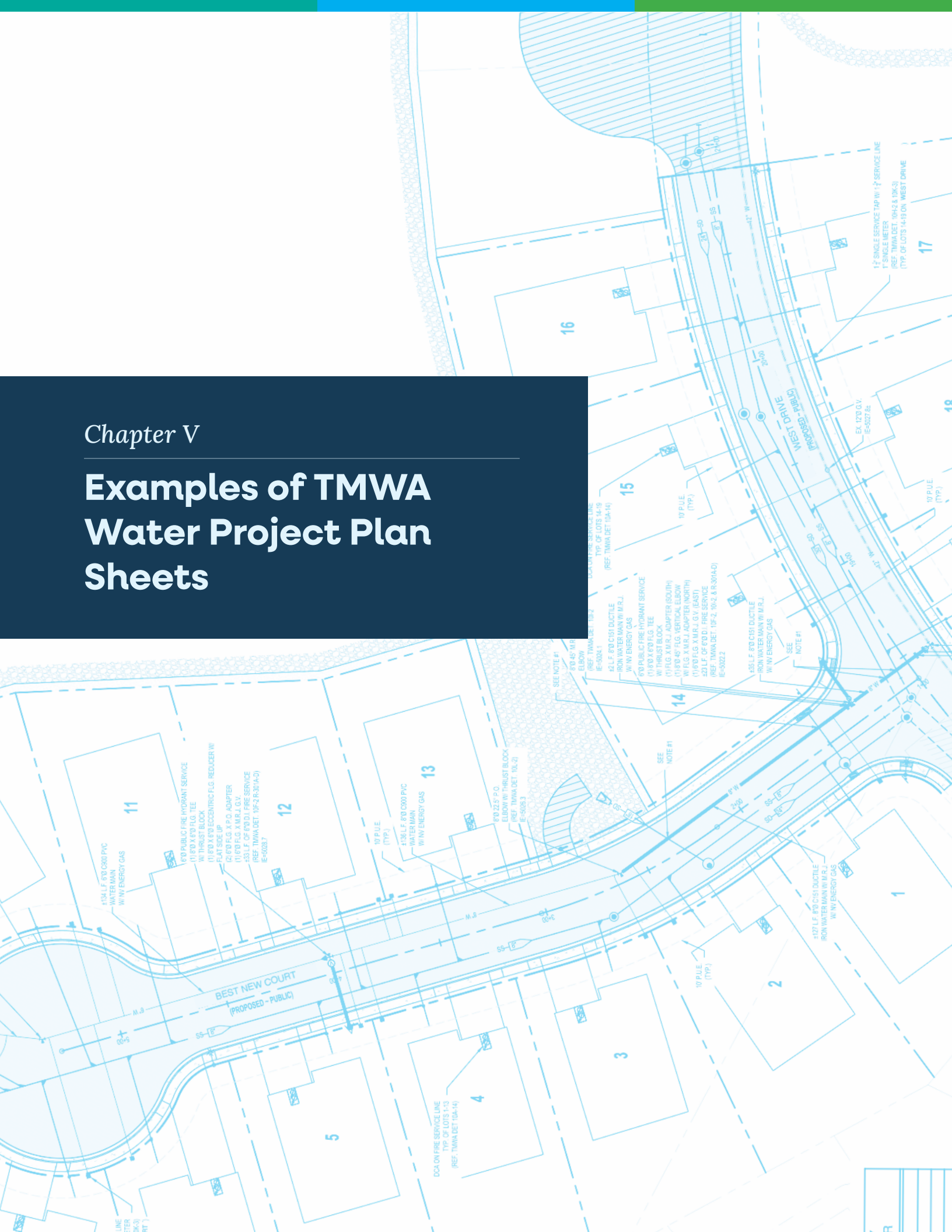
- In profile view, it must be determined if water services can pass over sewer and storm drain with minimum 6-inch vertical clearance and maintain minimum 36-inches of cover. If it is determined that water services must pass under sewer/storm drain, individual lots must be identified on the water plans where this is proposed. Additionally, water services that vertically dip below sewer/storm drain and back up to the setter must be installed in a HDPE sleeve with 3M cold shrink. It is preferred that this is listed under a *Special Construction note on the water plans to call attention to the contractor and the TMWA inspector. The Special Construction note shall identify by lot number which water services will not pass over sewer or storm drain with a minimum of 18" separation.*
- In the water plans, identify the size of service tubing, the size of the water meter, and the associated TMWA standard details. Ensure the correct size service tubing is called out with the proposed water meter, reference TMWA appendix 10K.
- In the water plans, ensure that residential meters are called out with the associated residential TMWA details and the commercial water meters are called out with the associated commercial TMWA details. It is important to note that water meters to individual multi-family buildings are considered commercial water meters, this includes a single meter to a duplex.
- In the water plans, propose no more than one individual meter per building. If a building owner wishes to have multiple tenants, the owner may utilize private sub-meters downstream of the TMWA meter. (Reference TMWA Rule 6).
- Where improvements are being made to a lot and existing water services are not planned for use, the water service(s) must be retired back to a main. Retirement notes must be added to the plan as stated in the TMWA Standards, Section 1.1.
- Traffic rated enclosures, 10K-17 and 10K-18, are only to be used where meters are installed within roadways or areas where heavy traffic is expected. This shall be upon approval of TMWA. TMWA details calling for Tier-22 rated enclosures are adequate for meter enclosures installed within 3-feet of residential driveways. These locations shall be a last resort.

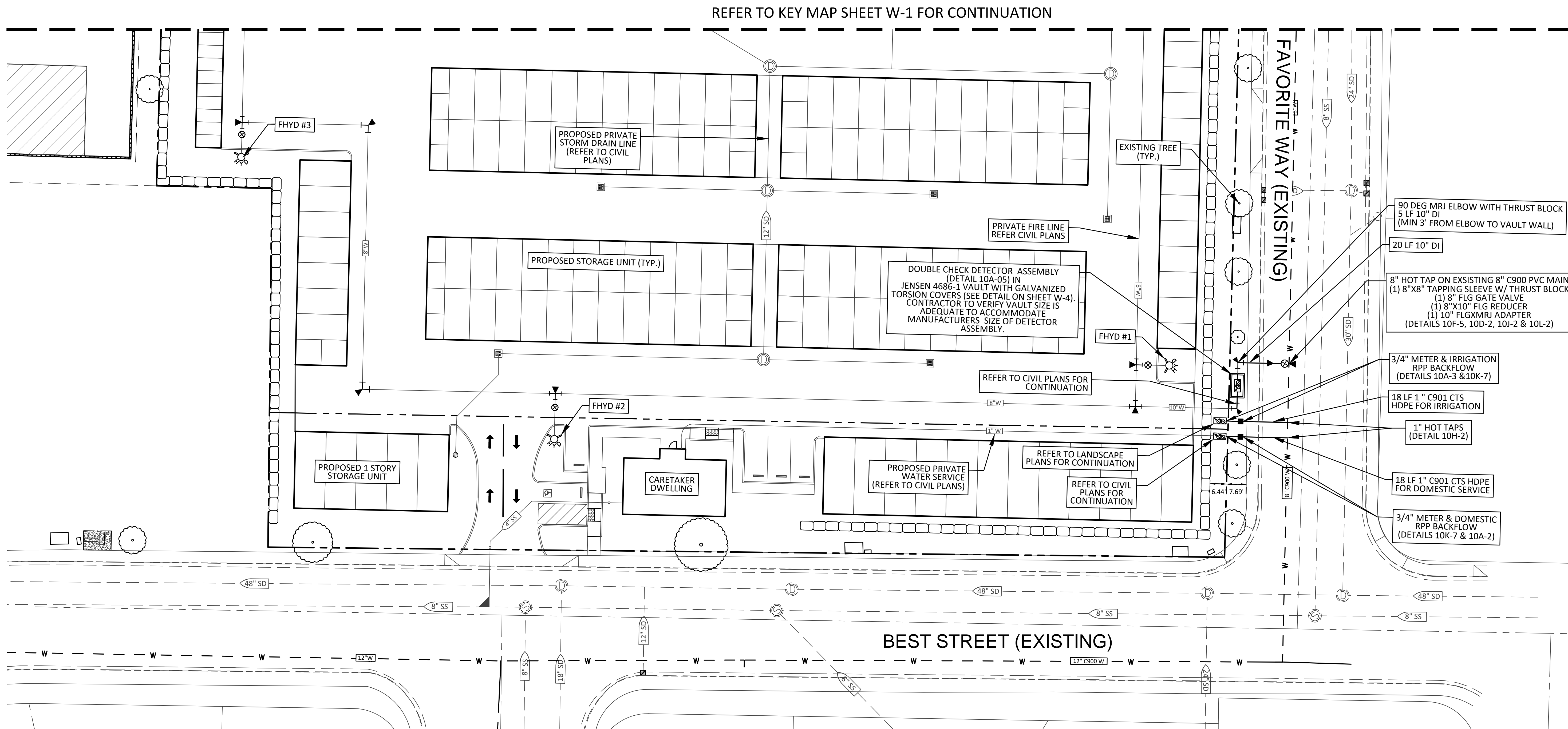
Appendix 10L – Miscellaneous Water Charts

- In the water plans, identify the size, angle, and joint type of all proposed horizontal elbows. Include the associated TMWA standard details for thrust blocks with all individual horizontal elbow labels.
- Air release valve boxes are large and obtrusive – take their location into consideration for both interim and ultimate conditions.
 - » ARV boxes need protection using k-rail or boulders during construction if the project is phased and the box is left exposed for prolonged periods.
 - » Nobody likes an ARV box near their driveway
- If an existing cast-iron or transite water main is proposed to be undermined by another utility pipe, call out for a section replacement of the existing water main and reference TMWA standard detail 10L-8.
- In profile view, label the water main to be in common trench or not in common trench with gas.
- In the water plans, clearly show test station symbols at maximum spacing of 500ft on all water mains. Where possible, locate test stations in the splash pad of fire hydrants.
- In profile view, clearly label mitigated water crossings for each individual instance calling out the minimum separation.
- In the water plans, ensure that water facilities have adequate separation in compliance with TMWA standard details 10L-10 through 10L-13.
- In the water plans, provide a minimum 4ft separation from watertight catch basins and manholes.








- In the plan view, call out horizontal deflection at all fittings using the allowable joint deflection in the Standards.
- In the profile view, call out the vertical joint deflection of pipe and fittings using the allowable joint deflection in the Standards.
 - » AWWA will allow 80% of the manufacturer's deflection tolerance, TMWA Standards identify the allowable joint deflection, refer to the Standards for allowable deflection based on pipe material and diameter and joint type.
- All sewer pipe diameter and material must be called out on profiles and TMWA water plan sheets
- RCP pipe that crosses water within 6" vertical clearance must have watertight joints from structure to structure. Joints can be slurry encased, be applied with external joint sealant, or contain watertight gaskets.
- PUE must be shown on water plan sheets – either physically in the plan view or with a typical lot detail. If there is no PUE on the property or the public water facilities are not adequately covered by the PUE a water facility easement is required to be shown on the plans. If the water facilities are covered with a blanket easement, add a general note to the water plans expressing this.
- TMWA mains with a diameter 14 inches and larger shall be ductile iron and can have push-on joints where possible. FieldLok gaskets or similar are not permitted on mains 14-inch and larger. Restrained ductile iron pipe 14 inches and larger shall have internally restrained joints (TRFlex, HDSS, Flex Ring).
- Water mains must be located 10ft from buildings retaining walls at a minimum, this is measured from footing or structure.
- Water mains must be located a minimum 5-7 ft from parking stalls depending on if the parking is covered and if so by the type of cover. Water mains shall be 7 ft from back face of curb. Where this is not feasible, mains must be MRJ DIP.
- When determining adequate cover over the water main, take into account the cross slope of the roadway section. There must be a minimum of 36-inches when water is alone in the trench and a minimum of 42-inches when water and gas share a common trench.

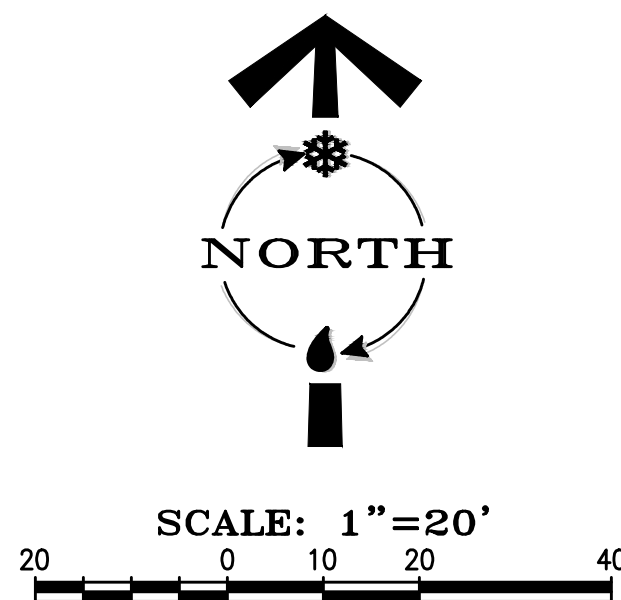
Examples of TMWA Water Project Plan Sheets





LEGEND

- | | |
|---|--|
|  | SANITARY SEWER (DASHED IF EXISTING) |
|  | STORM DRAIN (DASHED IF EXISTING) |
|  | WATER (DASHED IF EXISTING) |
|  | SEWER MANHOLE (DASHED IF EXISTING) |
|  | STORM DRAIN MANHOLE (DASHED IF EXISTING) |
|  | PROPOSED FIRE HYDRANT |
|  | PROPOSED ROCKERY WALL |



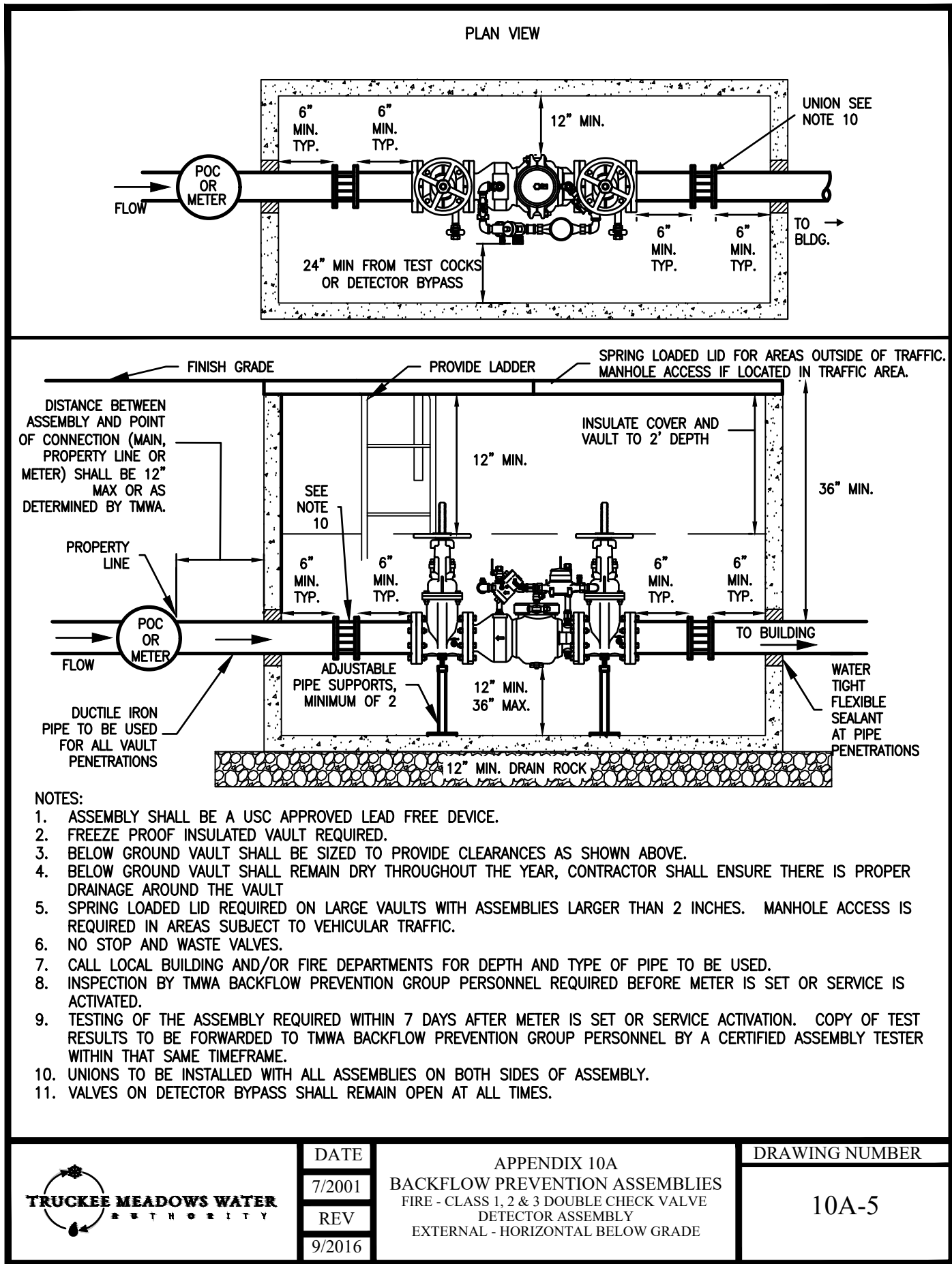
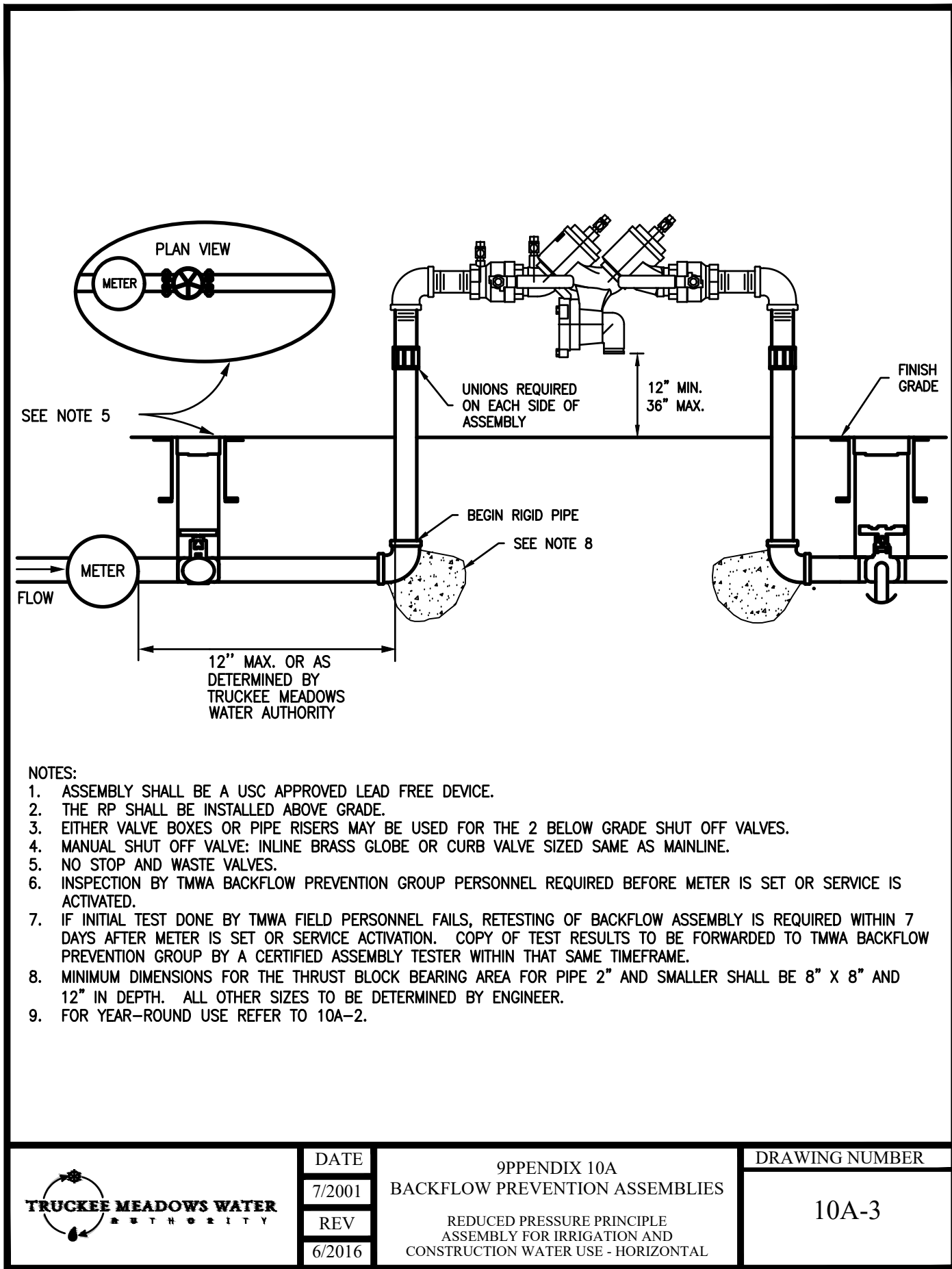
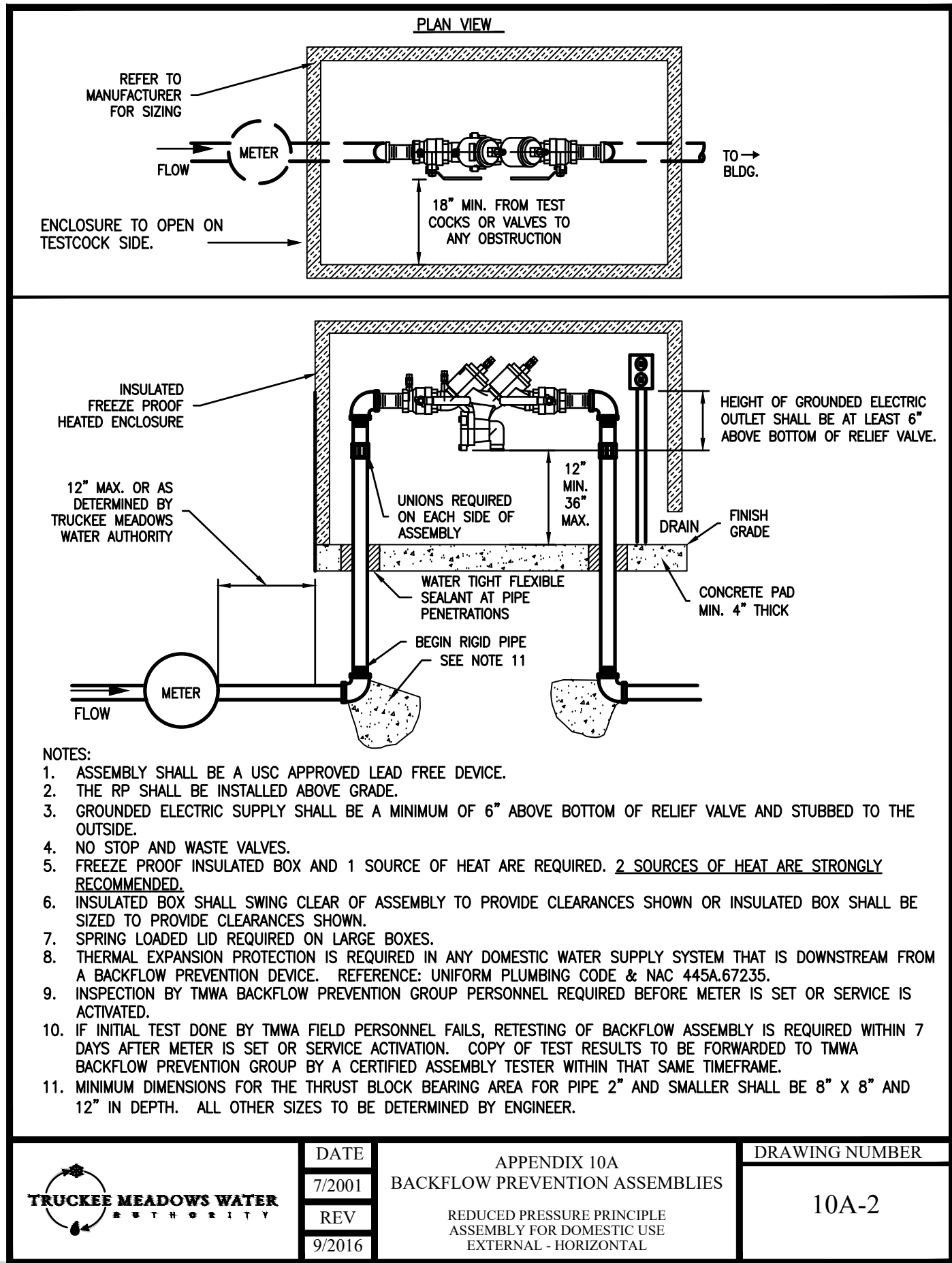
2 working days

Call
before you
Dig.

1-800-227-2600

<div style="text-align: center;">FOR TMWA USE ONLY NEW BUSINESS WATER</div>					
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:					


EXAMPLE PLAN SET

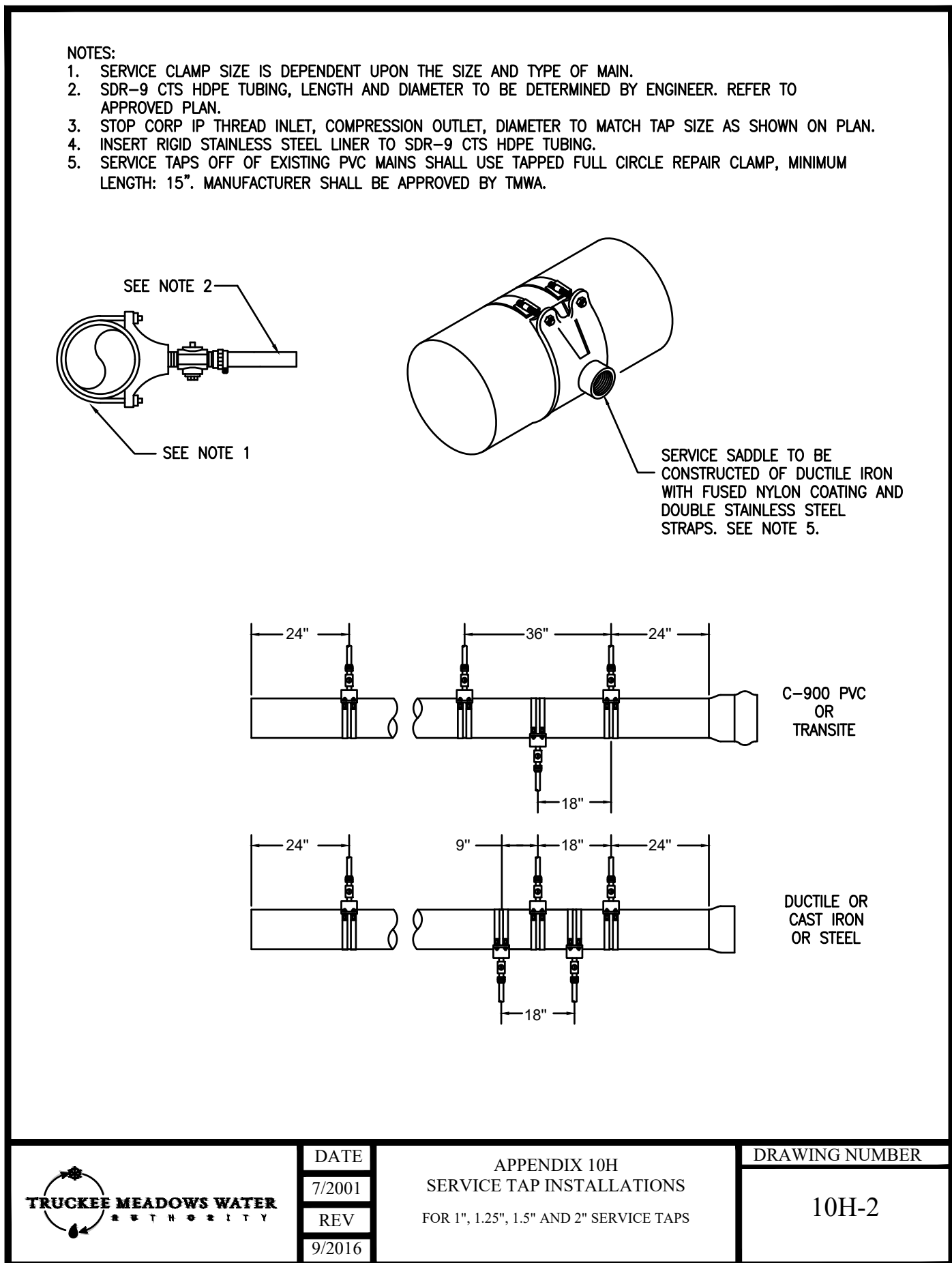
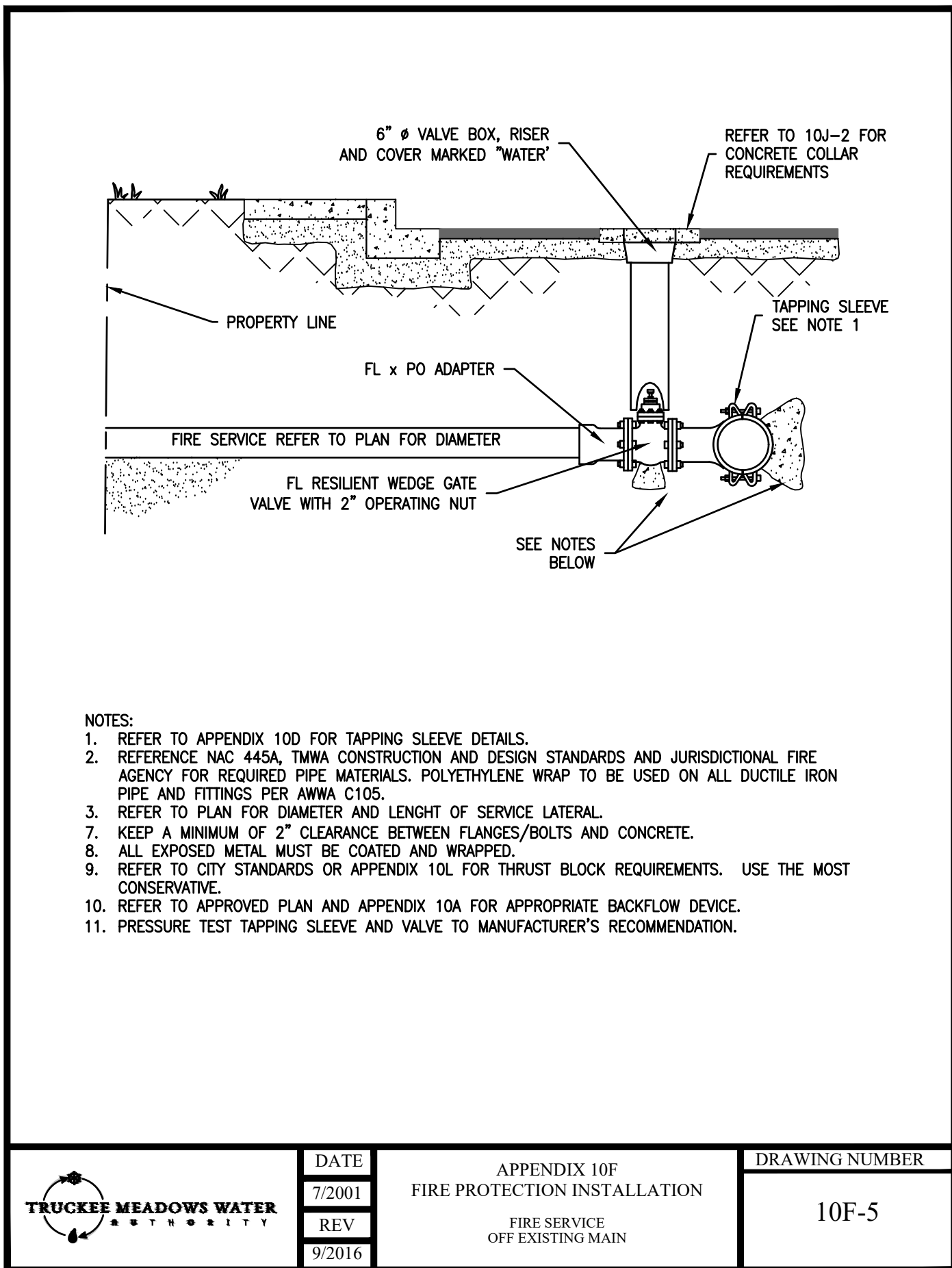
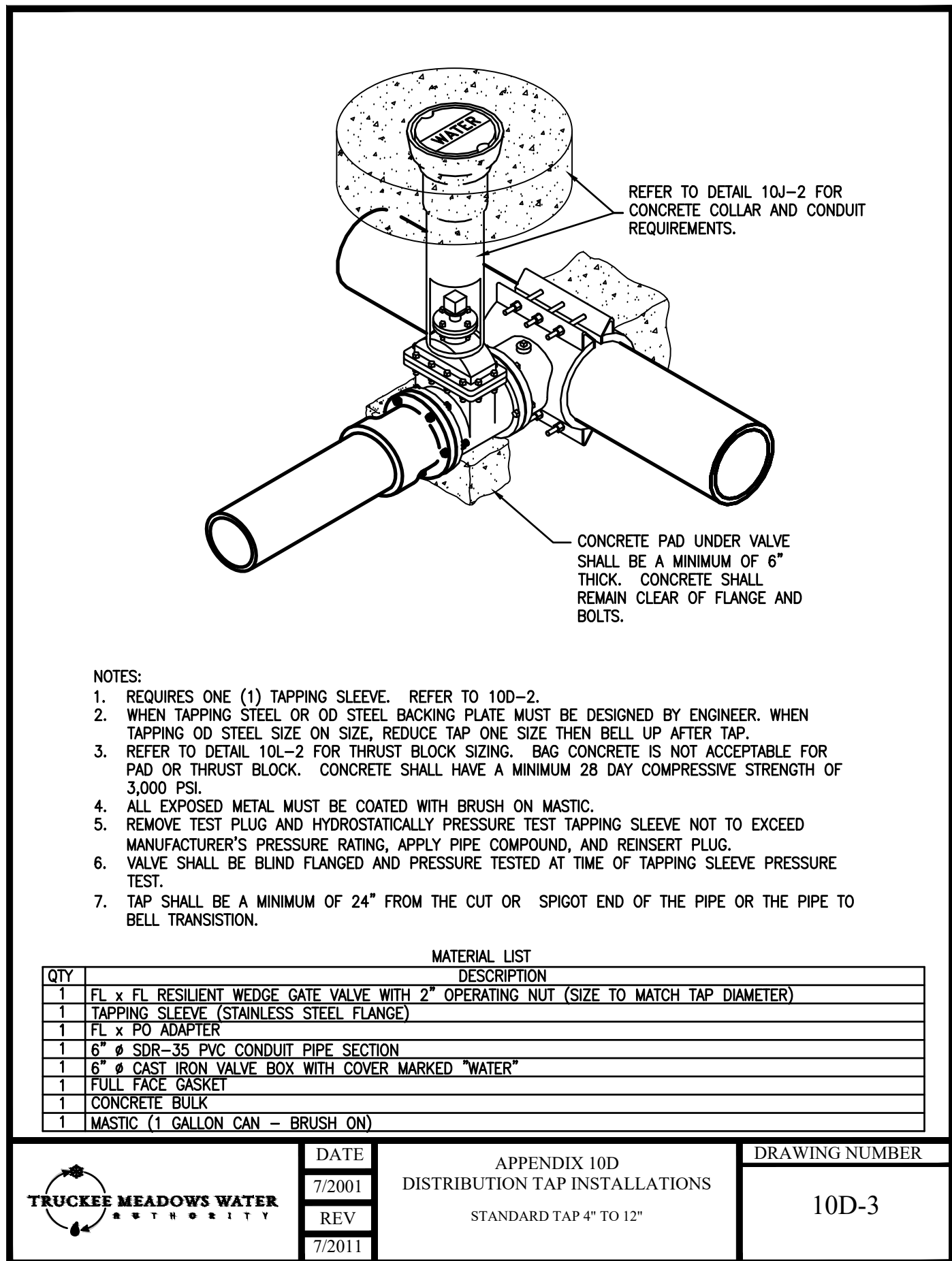


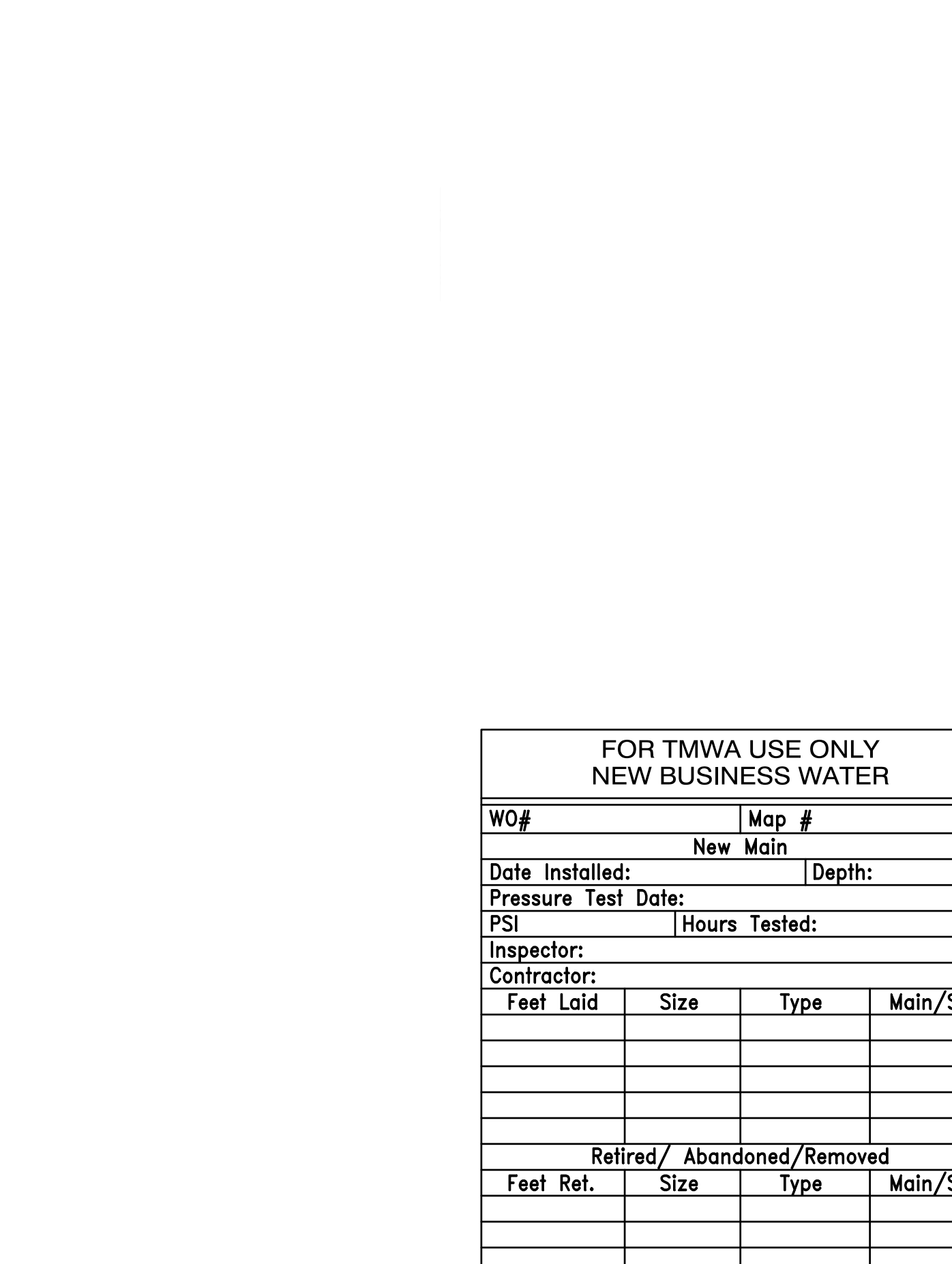
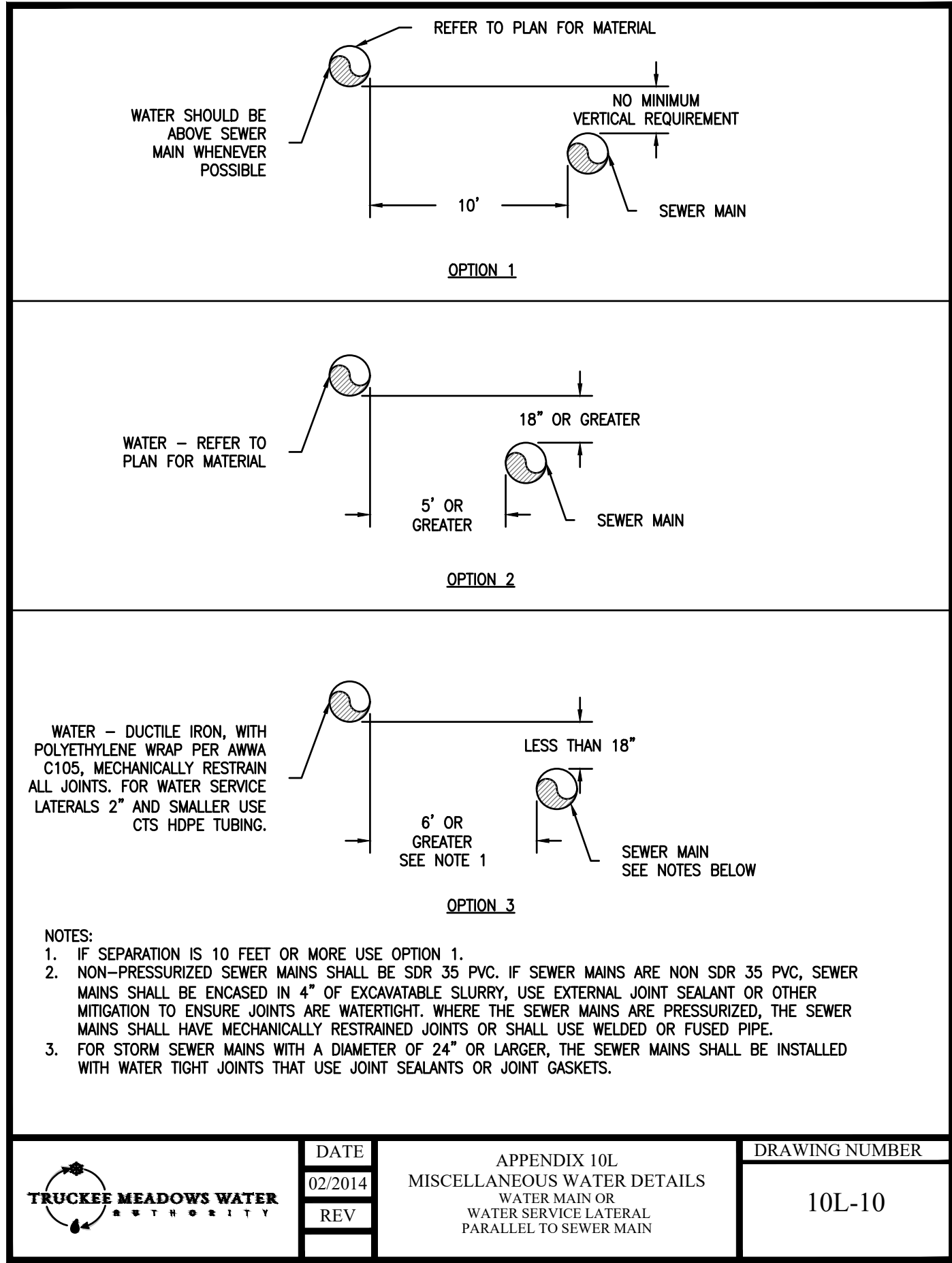
TAP SIZE - FLANGED BRANCH							
MAIN SIZE	VENDOR	MAIN TYPE	4"	6"	8"	10"	12"
4"	SM ROM	DI/CI PVC	663-04800400-200 SST-4.90 x 4" FL				
6"	SM ROM	DI/CI PVC	663-06630400-000 SST-7.00 x 4" FL	663*06630600-200 SST-7.00 x 6" FL			
	SM ROM	TR	663-(00)400-000 SST-(00) x 4" FL	663-(00)0600-200 SST-(00) x 6" FL			
8"	SM ROM	DI/CI PVC	663-09050400-000 SST-9.06 x 4" FL	663-09050600-000 SST-9.06 x 6" FL	663-09050800-200 SST-9.06 x 8" FL		
	SM ROM	TR	663-(00)0400-000 SST-(00) x 4" FL	663-(00)0600-000 SST-(00) x 6" FL	663-(00)0800-200 SST-(00) x 8" FL		
	SM ROM	SC40 STEEL	663-08630400-000 SST-8.63 x 4" FL	663-08630600-000 SST-8.63 x 6" FL	663-08630800-200 SST-8.63 x 8" FL		
10"	SM ROM	DI/CI PVC	663-11100400-000 SST-11.45 x 4" FL	663-11100600-000 SST-11.45 x 6" FL	663-11100800-000 SST-11.45 x 8" FL	663-11101000-200 SST-11.45 x 10" FL	
	SM ROM	TR	663-(00)0400-000 SST-(00) x 4" FL	663-(00)0600-000 SST-(00) x 6" FL	663-(00)0800-000 SST-(00) x 8" FL	663-(00)1000-200 SST-(00) x 10" FL	
	SM ROM	SC40 STEEL	663-10750400-000 SST-11.13 x 4" FL	663-10750600-000 SST-11.13 x 6" FL	663-10750800-000 SST-11.13 x 8" FL	663-10751000-200 SST-11.13 x 10" FL	
12"	SM ROM	DI/CI PVC	663-10750400-000 SST-13.30 x 4" FL	663-13200600-000 SST-13.30 x 6" FL	663-13200800-000 SST-13.30 x 8" FL	663-13201000-000 SST-13.30 x 10" FL	663-13201200-200 SST-13.30 x 12" FL
	SM ROM	TR	663-(00)0400-000 SST-(00) x 4" FL	663-(00)0600-000 SST-(00) x 6" FL	663-(00)0800-00004 SST-(00) x 8" FL	663-(00)1000-000 SST-(00) x 10" FL	663-(00)1200-200 SST-(00) x 12" FL
	SM ROM	SC40 STEEL	663-12750400-000 SST-12.85 x 4" FL	663-12750600-000 SST-12.85 x 6" FL	663-12750800-000 SST-12.85 x 8" FL	663-12751000-000 SST-12.85 x 10" FL	663-12751200-200 SST-12.85 x 12" FL

NOTES:

1. MAXIMUM TEST PRESSURE IS 300 PSI FOR LISTED MANUFACTURERS.
2. FLANGES (FL) SHALL BE STAINLESS STEEL ASTM A 240, TYPE 304.
3. VENDOR (MANUFACTURER): SM = SMITH-BLAIR, ROM = ROMAC INDUSTRIES
4. (OD) = PIPE OUTSIDE DIAMETER. CHECK WITH MANUFACTURER FOR CATALOG NUMBER FOR OTHER SIZES.
5. FOR TAPS ON TRANSITE MAINS OD MUST BE FIELD MEASURED PRIOR TO ORDERING PARTS.

	DATE	APPENDIX 10D DISTRIBUTION TAP INSTALLATION	DRAWING NUMBER
	7/2011		10D-2
	REV	WATER TAPPING SLEEVES	





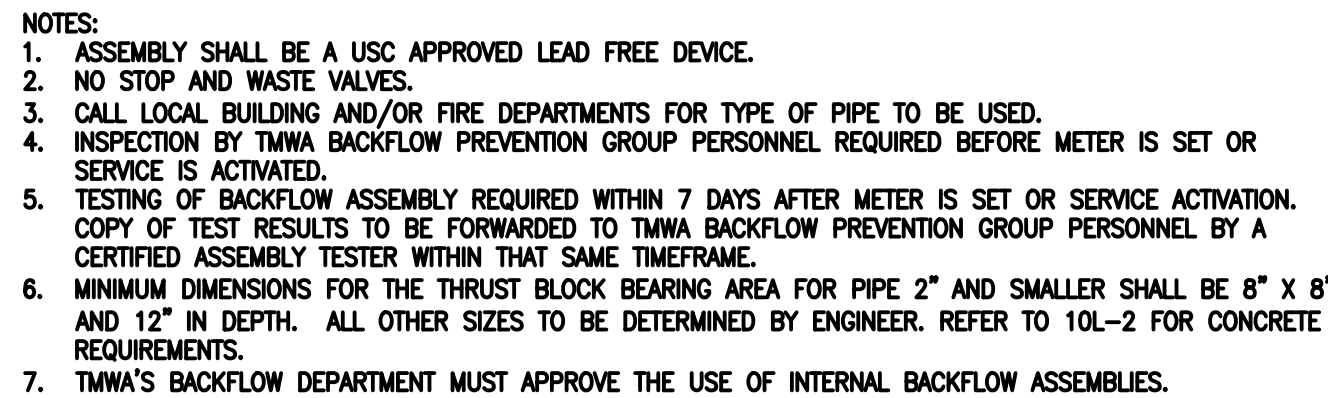
TRUCKEE MEADOWS WATER


A U T H O R I T Y

1365 CAPITAL BLVD., PO BOX 30013
 RENO, NEVADA 89502-3013
 PH 775-854-8000 / FX 775-854-8003

BEST NEW VILLAGE PHASE 1B SUB SPARKS, NEVADA


3 OF 5

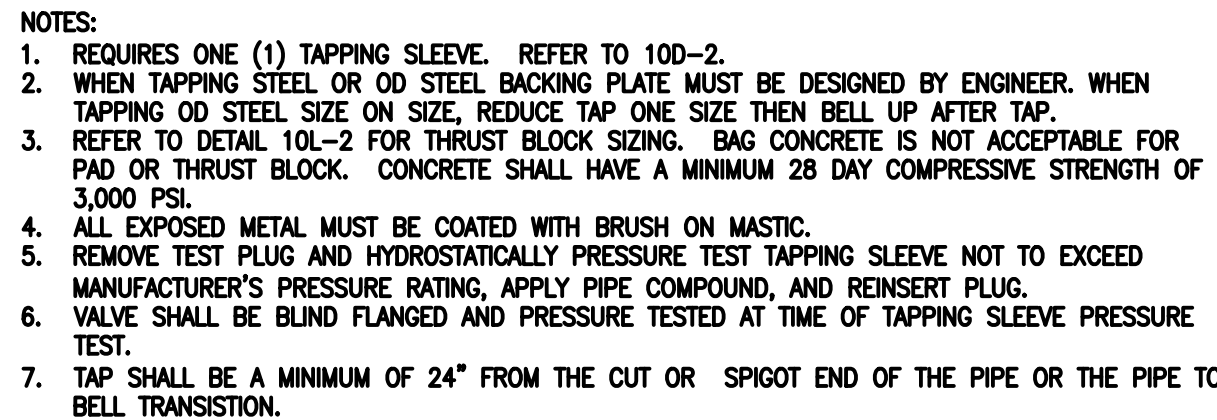



 TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10F FIRE PROTECTION INSTALLATIONS	DRAWING NUMBER
	7/2001		10F-2
	REV	6" FIRE HYDRANT SERVICE OFF NEW MAINS	
	9/2016		

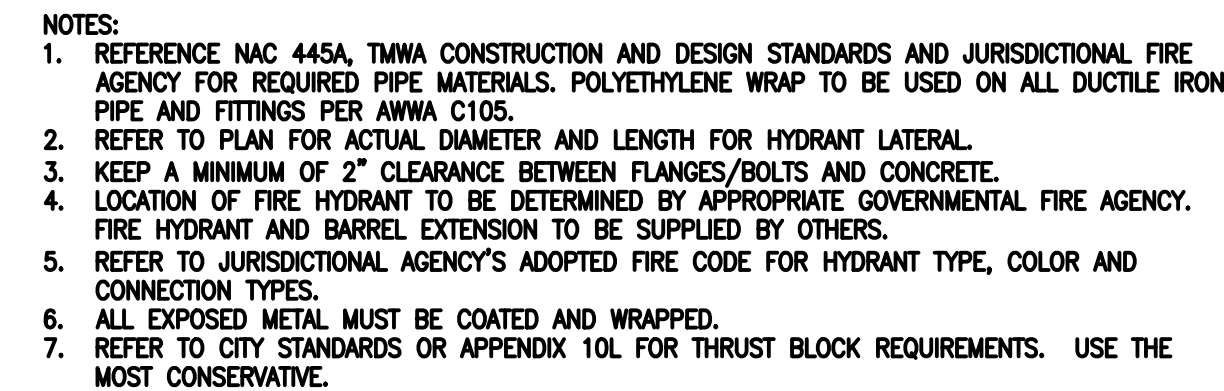
NOTES:

1. MAXIMUM TEST PRESSURE IS 300 PSI FOR LISTED MANUFACTURERS.
2. FLANGES (FL) SHALL BE STAINLESS STEEL ASTM A 240, TYPE 304.
3. VENDOR (MANUFACTURER): SM = SMITH-BLAIR, ROM = ROMAC INDUSTRIES
4. (OD) = PIPE OUTSIDE DIAMETER. CHECK WITH MANUFACTURER FOR CATALOG NUMBER FOR OTHER SIZES.
5. FOR TAPS ON TRANSITE MAINS OD MUST BE FIELD MEASURED PRIOR TO ORDERING PARTS.

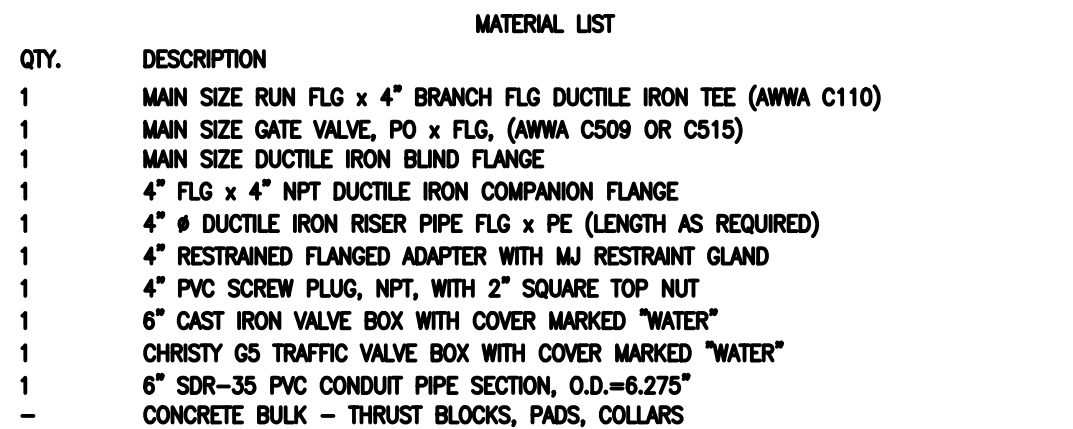
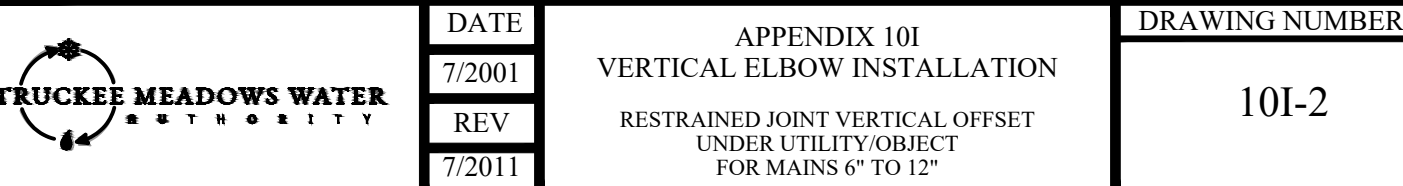
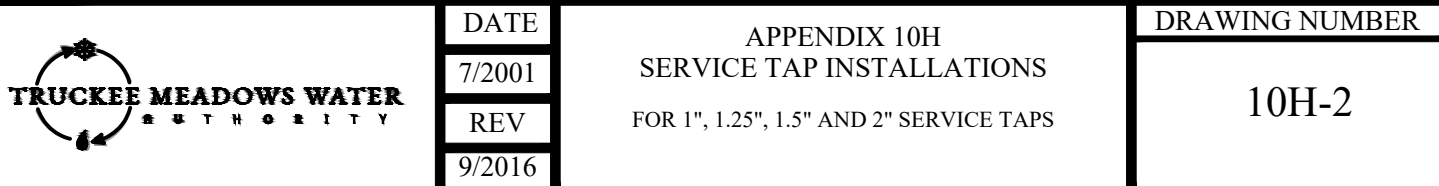
 TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10H SERVICE TAP INSTALLATIONS	DRAWING NUMBER
	7/2001	FOR 1", 1.25", 1.5" AND 2" SERVICE TAPS	10H-2
	REV		
	9/2016		



 TRUCKEE MEADOWS WATER AUTHORITY	DATE	APPENDIX 10D DISTRIBUTION TAP INSTALLATIONS	DRAWING NUMBER
	7/2001		10D-3
	REV	STANDARD TAP 4" to 12"	
	7/2011		



TRUCKEE MEADOWS WATER
AUTHORITY

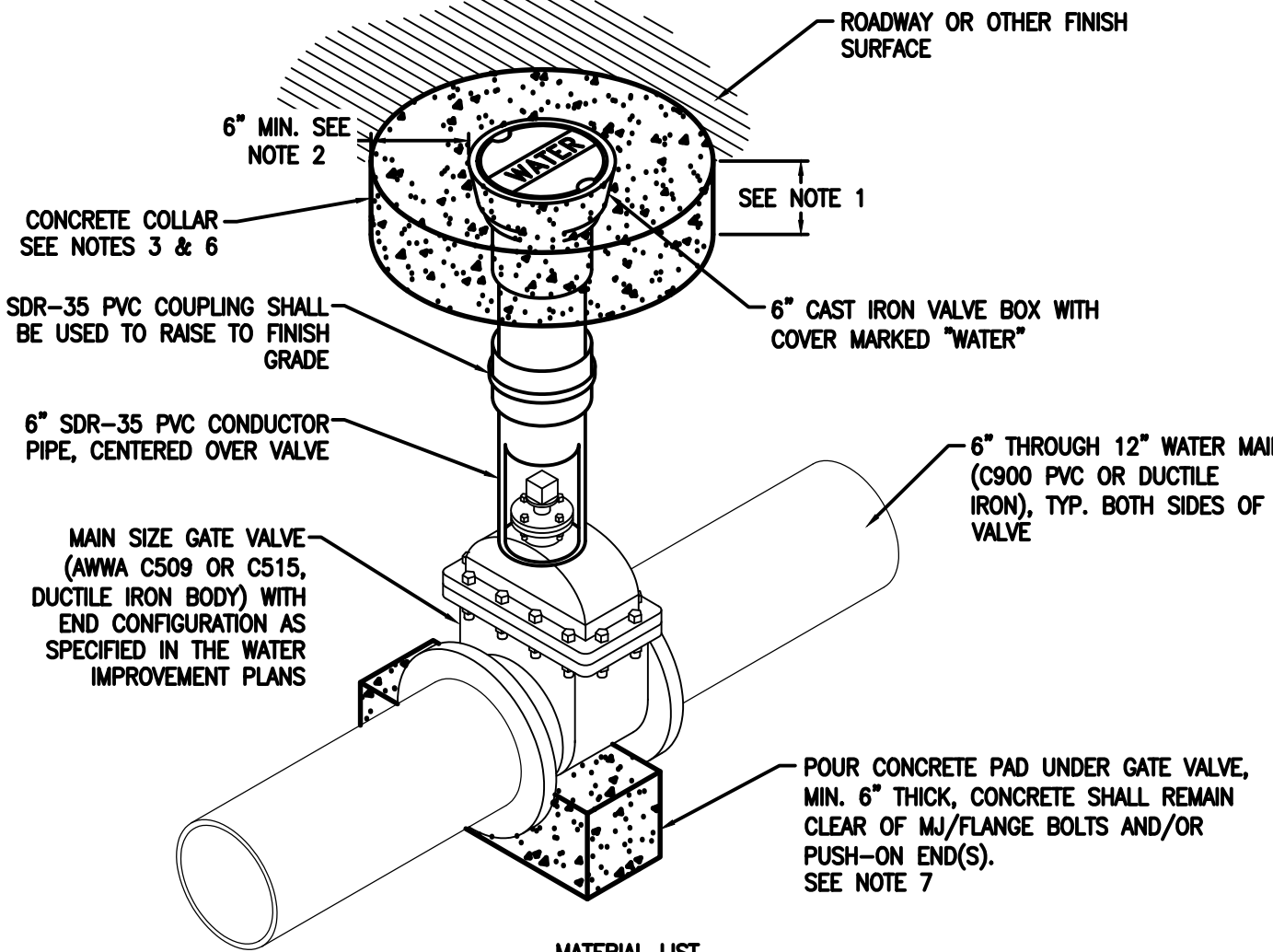


TRUCKEE MEADOWS WATER
AUTHORITY



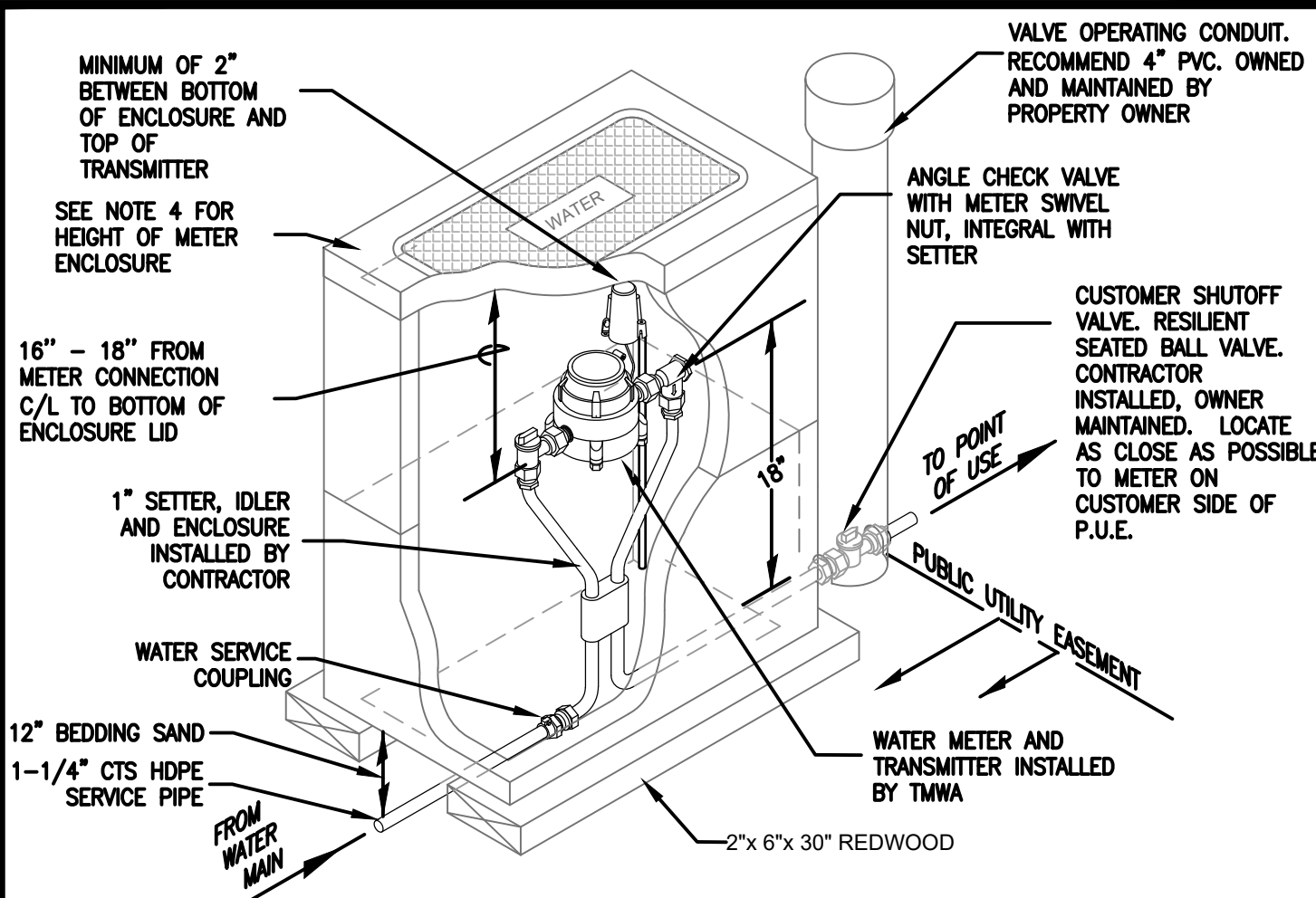
WO#						Map #					
New Main											
Date Installed:								Depth:			
Pressure Test Date:											
PSI						Hours Tested:					
Inspector:											
Contractor:											
Feet Laid				Size		Type		Main/Svc			
Retired/ Abandoned/Removed											
Feet Ref.				Size		Type		Main/Svc			

- NOTES:
- 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.
 - FOR MULTIPLE VALVE/RISER BOXES IN CLOSE PROXIMITY, A MONOLITHIC CONCRETE COLLAR MAY BE POURED.
 - 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.
 - ALL BOLTS AND EXPOSED METAL SHALL BE COATED WITH BRUSHED-ON MASTIC.
 - GATE VALVE, DUCTILE IRON PIPE, AND OTHER METAL PARTS SHALL BE ENCASED WITH POLYETHYLENE WRAP PER AWWA C105.
 - 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% \pm 1.5%, SLUMP AT 1 TO 4 INCHES. BAG CONCRETE MIX IS NOT ACCEPTABLE.
 - CONCRETE FOR PAD SHALL HAVE A COMPRESSIVE STRENGTH OF NOT LESS THAN 3,000 PSI AFTER 28 DAYS. BAG CONCRETE MIX IS NOT ACCEPTABLE.



QTY	DESCRIPTION
1	MAIN SIZE GATE VALVE (AWWA C509 OR C515, DUCTILE IRON BODY) WITH END CONFIGURATION AS SPECIFIED IN THE WATER IMPROVEMENT PLANS.
1	MASTIC (1 GALLON CAN - BRUSH ON)
1	6\" SDR-35 PVC CONDUCTOR PIPE SECTION
1	6\" CAST IRON VALVE BOX WITH COVER MARKED \"WATER\"
1	FULL FACE GASKET
1	CONCRETE BULK - PAD AND COLLAR

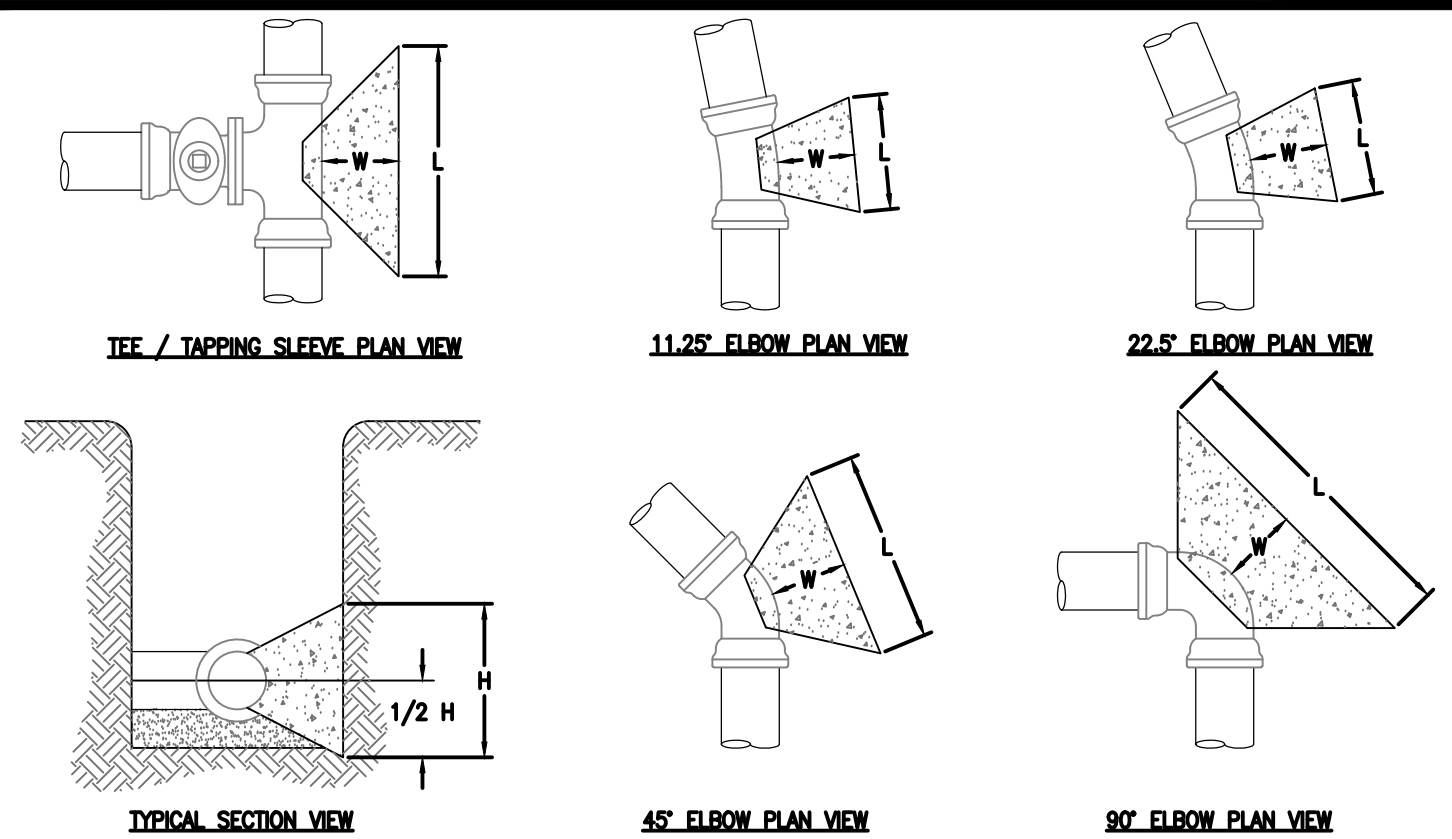
DATE	APPENDIX 10J DISTRIBUTION VALVE INSTALLATION	DRAWING NUMBER
1/2002		10J-2
REV	IN-LINE GATE VALVE WITH CONCRETE COLLAR	
7/2011		



- NOTES:
- THERMAL EXPANSION PROTECTION IS REQUIRED IN ANY DOMESTIC WATER SUPPLY SYSTEM THAT IS DOWNSTREAM FROM A BACKFLOW PREVENTION DEVICE. REFERENCE: UNIFORM PLUMBING CODE.
 - METER AND TRANSMITTER SUPPLIED AND INSTALLED BY TMWA.
 - FOR DRIVEWAY OR TRAFFIC AREAS USE 13x24 ENCLOSURE APPROVED FOR TRAFFIC RATED H/20 LOADING. SEE DETAIL 10K-17.
 - 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 TRAFFIC AREAS.
 - ENCLOSURE TO BE BACKFILLED WITH WATER PIPE BEDDING SAND ONLY, SEE SECTION 5, TRENCH BEDDING & BACKFILL.
 - BLANKET TO BE INSTALLED ABOVE METER AND BELOW TRANSMITTER.

ITEM ID	QTY	DESCRIPTION
MS-CHK-1.00	1.0	SETTER WATER METER, WITH ANGLE CHECK VALVE, NEW 1\" MIP ENDS
WSC-1.25x1.00-CTSxFIP	1.0	COUPLING SERVICE 1-1/4\" CTS COMPRESSION X 1\" FIP
SSL-1.25	1.0	LINER RIGID STAINLESS STEEL FOR 1-1/4\" CTS HOPE TUBING
GSKT-1.00	2.0	GASKET-1\" FOR WATER METER
WM-DISC-1.00	1.0	1\" WATER METER - SUPPLIED AND INSTALLED BY TMWA
ENCL-13x24-NIT	1.0	ENCLOSURE NON-TRAFFIC 13 X 24 WATER METERS, SEE NOTE 3
ENCL-13x24-LID-NIT	1.0	COVER NON-TRAFFIC 13 X 24, SEE NOTE 3
ENCL-13x24-EXT-NIT	1.0	EXTENSION BOX NON-TRAFFIC 13 X 24, SEE NOTE 3
INSL-BLKT-4x4	1.0	BLANKET INSULATION 4\" X 4\" FOR WATER METERS
RWDW-BRD-2x6x30	2.0	BOARD - REDWOOD 2\" X 6\" X 30\"
IDLR-1.00	1.0	IDLER WATER METER 1\" SETTER
ERT	1.0	REMOTE TRANSMITTER - SUPPLIED AND INSTALLED BY TMWA

DATE	APPENDIX 10K WATER METERS - SMALL NEW RESIDENTIAL INSTALLATION 1-1/4\" SINGLE SERVICE FOR 1\" SETTER WITH ANGLE CHECK, METER AND TRANSMITTER	DRAWING NUMBER
6/2004		10K-3
REV		
7/2011		



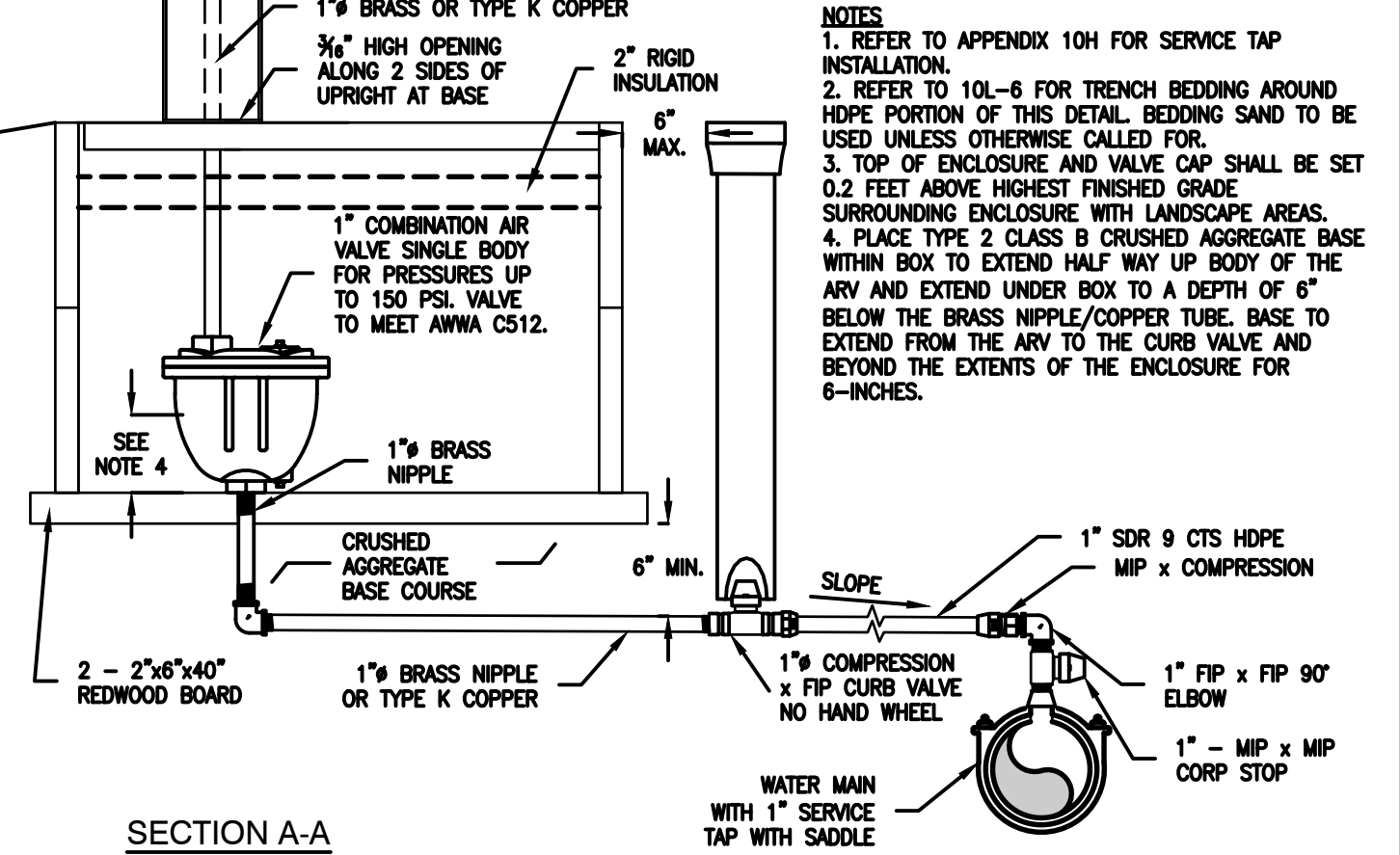
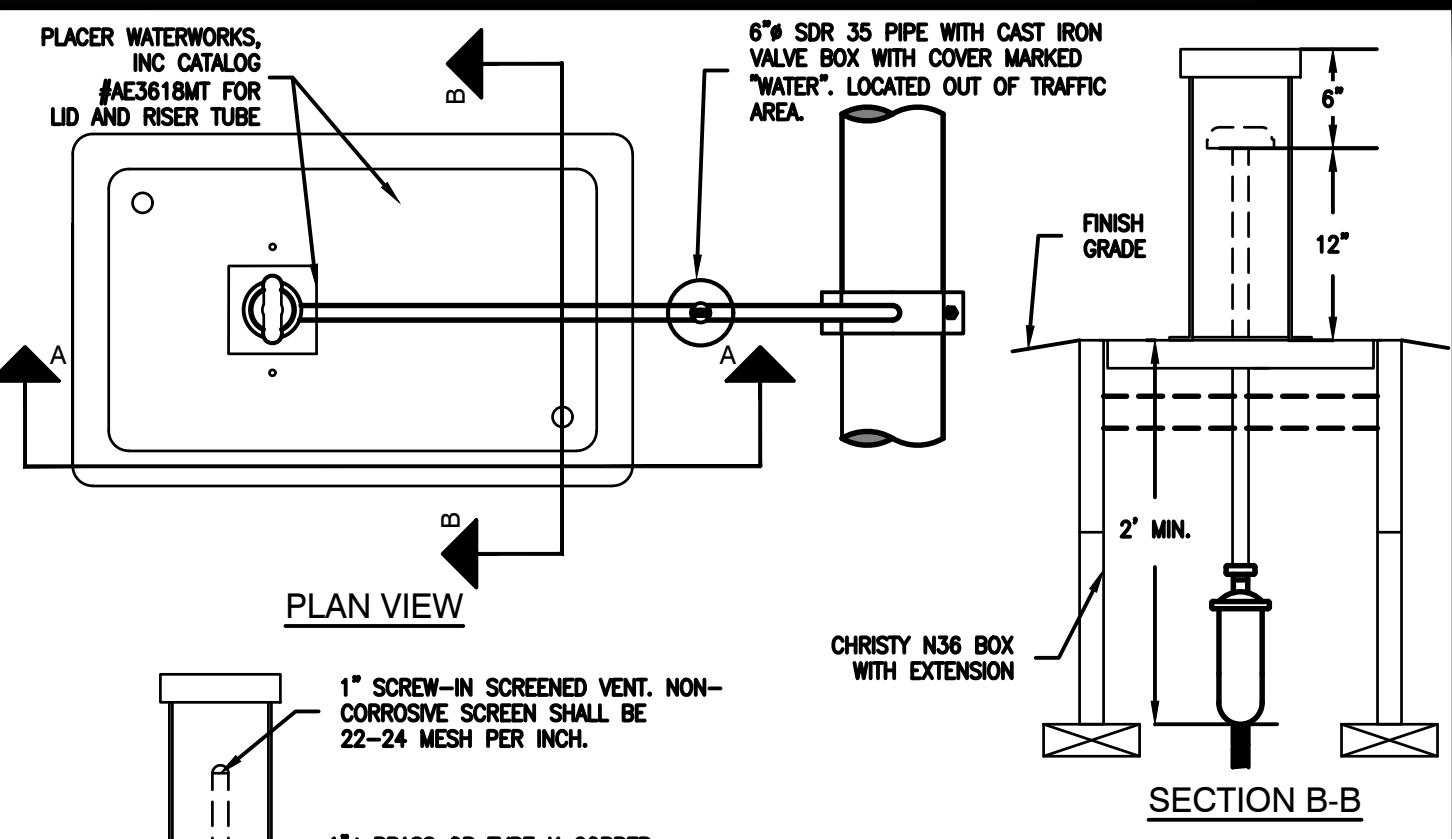
THRUST BLOCK DIMENSIONS														
TEE, TAP, OR DEAD END			11.25" ELBOW				22.5" ELBOW			45° ELBOW		90° ELBOW		
BRANCH SIZE (INCHES)	L (FEET)	H (FEET)	W MIN. (FEET)	ELBOW SIZE (INCHES)	L (FEET)	H (FEET)	W MIN. (FEET)	L (FEET)	H (FEET)	W MIN. (FEET)	L (FEET)	H (FEET)	W MIN. (FEET)	
4	1.5	1	4	1	1	1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

THRUST BLOCK DESIGN CRITERIA:

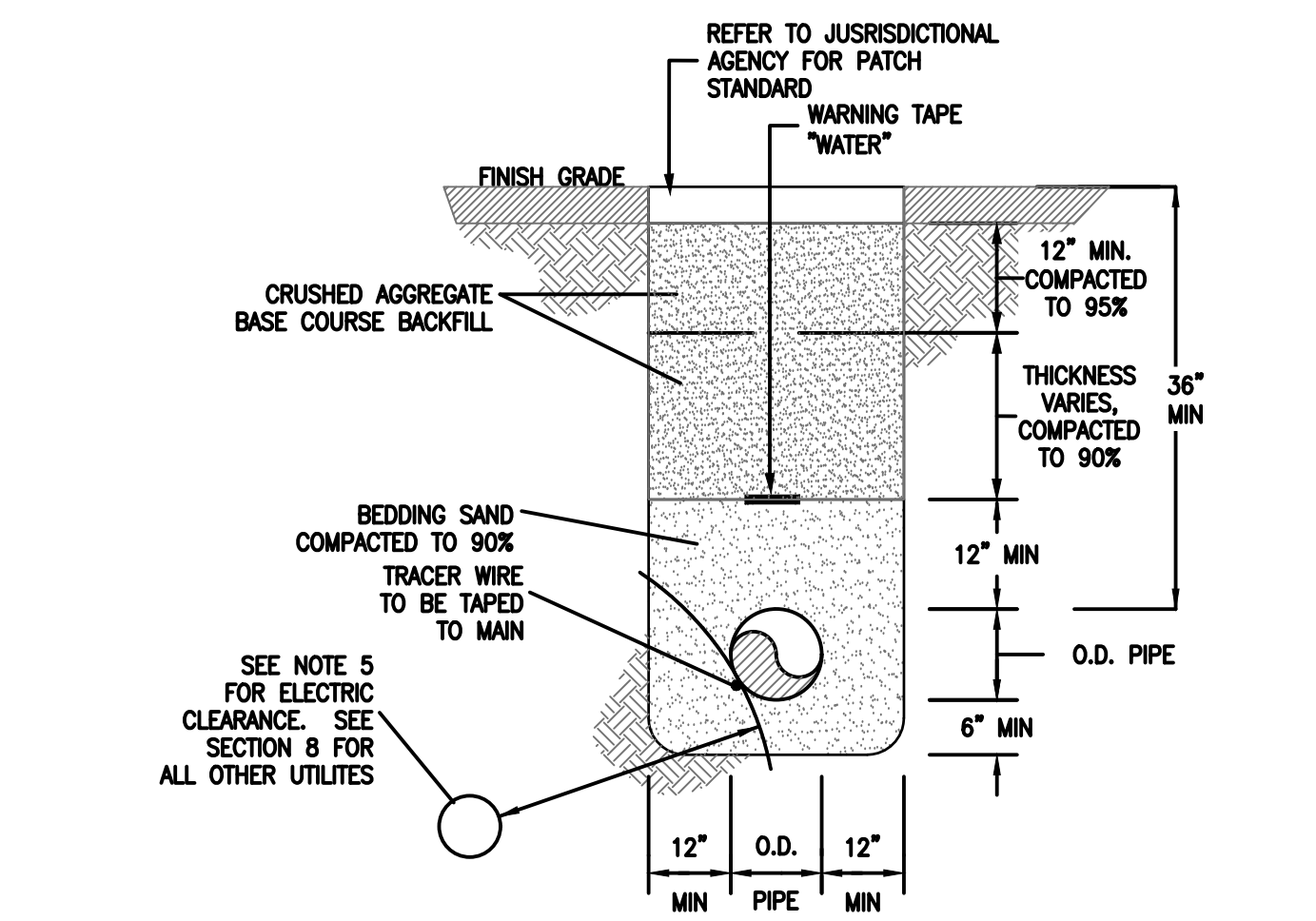
THRUST BLOCK SIZES HAVE BEEN CALCULATED USING THE METHOD AND EQUATIONS PUBLISHED IN THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE, SIXTH EDITION 2006 BY THE DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA) UTILIZING THE FOLLOWING DESIGN PARAMETERS: DESIGN PRESSURE = 150 PSI (SEE NOTE #4 BELOW), SOIL BEARING CAPACITY = 2,000 PSF (SEE NOTE #4 BELOW), SAFETY FACTOR = 1.5, AND NOMINAL PIPE DIAMETER

- THRUST BLOCK NOTES:
- CONCRETE FOR THRUST BLOCKS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3,000 PSI. REFERENCE SECTION 1.1.13 OF THE TRUCKEE MEADOWS WATER AUTHORITY ENGINEERING & CONSTRUCTION STANDARDS FOR ADDITIONAL REQUIREMENTS. BAG CONCRETE MIX IS NOT ACCEPTABLE.
 - ALL FITTINGS SHALL BE WRAPPED WITH POLYETHYLENE WRAP PER AWWA C105. MASTIC (BRUSH-ON) SHALL BE APPLIED TO ALL BOLTS, ETC.
 - 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.
 - FOR SOIL BEARING CAPACITY LESS THAN 2,000 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.

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		

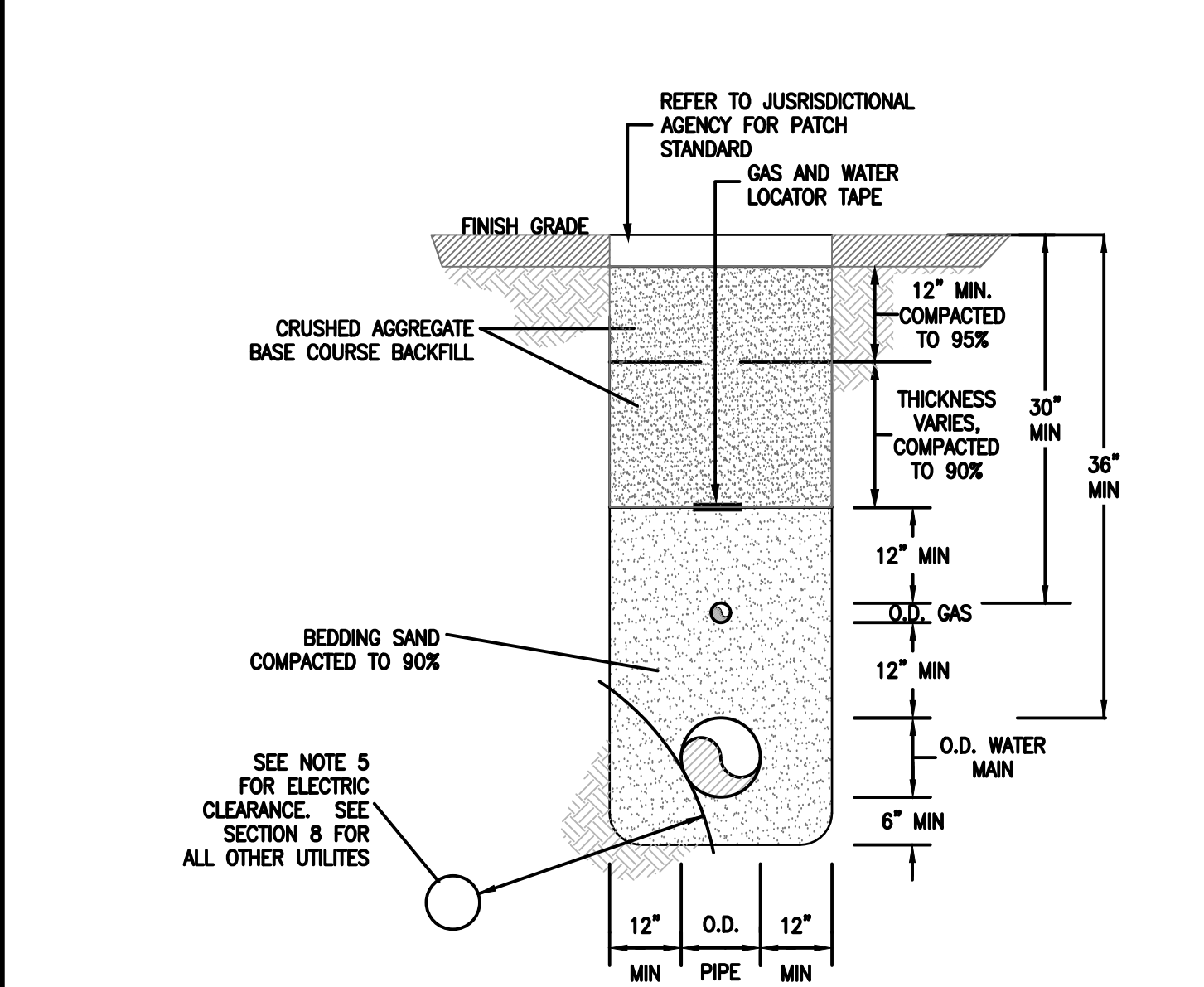


DATE	APPENDIX 10L COMBINATION AIR RELEASE VALVE	DRAWING NUMBER
7/2005		10L-4
REV		
9/2016		



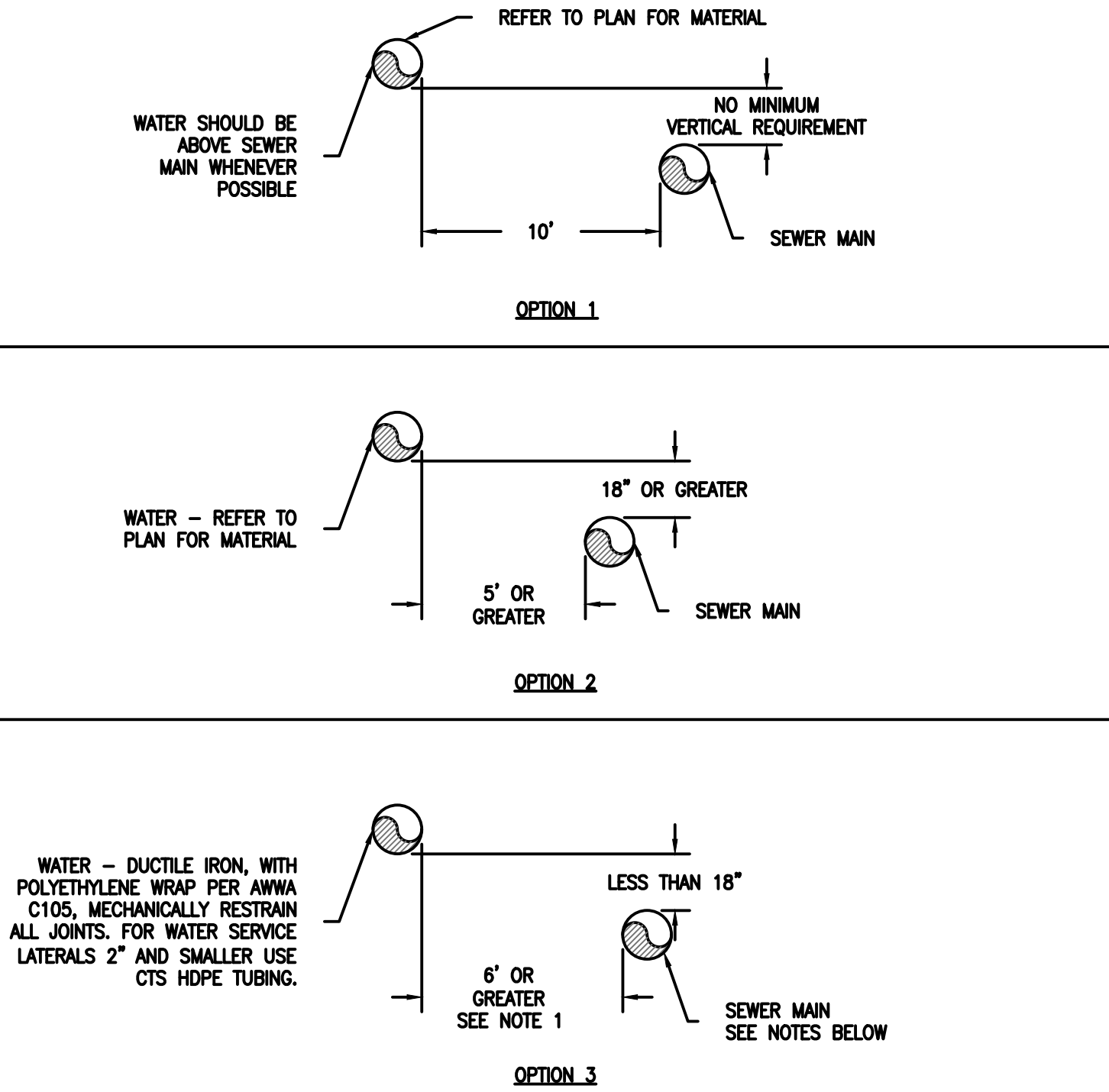
- NOTES:
- ALL TRENCHES MUST CONFORM TO APPLICABLE TMWA, CITY, STATE, COUNTY, AND OSHA SPECIFICATIONS AND REQUIREMENTS. IN THE CASE OF CONFLICT, THE MORE RIGID SPECIFICATION OR STANDARD SHALL APPLY.
 - BEDDING SAND SHALL BE COMPACTED TO 90% MAXIMUM DENSITY PER SECTION 5.05.03 AND SHALL BE A MINIMUM OF 12\" ABOVE AND 6\" BELOW THE MAIN. PER SECTION 5 OF TMWA STANDARDS.
 - 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.
 - NON-METALLIC BLUE WARNING TAPE SHALL BE PLACED IN ALL TRENCHES AT LEAST 12\" ABOVE THE WATER MAIN.
 - ELECTRIC UTILITIES MUST BE LOCATED BELOW WATER & MAINTAIN 2\" MINIMUM RADIAL CLEARANCE FROM TMWA WATER FACILITIES. IF 2\" RADIAL CLEARANCE CANNOT 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.
 - ALL CHANGES MUST BE APPROVED BY THE TMWA INSPECTOR AND/OR THE TMWA ENGINEER.
 - SEPARATION FOR PIPES IN A JOINT TRENCH SHALL BE A MINIMUM OF 12\".
 - TRACER WIRE SHALL BE #14 COPPER CLAD STAINLESS STEEL CORE WITH 30 MILS BLUE HOPE 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.

DATE	APPENDIX 10L MISCELLANEOUS WATER DETAILS	DRAWING NUMBER
7/2011		10L-6
REV	TRENCH DETAIL WATER ONLY	
02/2014		



- NOTES:
- 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.
 - 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.
 - 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.
 - METALLIC WATER AND GAS LOCATOR TAPE SHALL BE PLACED IN ALL TRENCHES AT LEAST 12\" ABOVE THE GAS.
 - ELECTRIC UTILITIES MUST BE LOCATED BELOW WATER & MAINTAIN 2\" MINIMUM RADIAL CLEARANCE FROM TMWA WATER FACILITIES. IF 2\" RADIAL CLEARANCE CANNOT 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.
 - ALL CHANGES MUST BE APPROVED BY THE TMWA INSPECTOR AND/OR THE TMWA ENGINEER.
 - SEPARATION FOR PIPES IN A JOINT TRENCH SHALL BE A MINIMUM OF 12\".

DATE	APPENDIX 10L MISCELLANEOUS WATER DETAILS	DRAWING NUMBER
7/2011		10L-7
REV	TRENCH DETAIL GAS AND WATER	
02/2014		



- NOTES:
- IF SEPARATION IS 10 FEET OR MORE USE OPTION 1.
 - NON-PRESSURIZED SEWER MAINS SHALL BE SDR 35 PVC. IF SEWER MAINS ARE NON SDR 35 PVC, SEWER MAINS SHALL BE ENCASED IN 4\" OF EXCAVATABLE SLURRY, USE EXTERNAL JOINT SEALANT OR OTHER MITIGATION TO ENSURE JOINTS ARE WATERTIGHT. WHERE THE SEWER MAINS ARE PRESSURIZED, THE SEWER MAINS SHALL HAVE MECHANICALLY RESTRAINED JOINTS OR SHALL USE WELDED OR FUSED PIPE.
 - FOR STORM SEWER MAINS WITH A DIAMETER OF 24\" OR LARGER, THE SEWER MAINS SHALL BE INSTALLED WITH WATER TIGHT JOINTS THAT USE JOINT SEALANTS OR JOINT GASKETS.

DATE	APPENDIX 10L MISCELLANEOUS WATER DETAILS WATER MAIN OR WATER SERVICE LATERAL PARALLEL TO SEWER MAIN	DRAWING NUMBER
02/2014		10L-10
REV		

WORK ORDER NO. 23-0000
DESIGNED: XYZ
DRAWN: XYZ
DATE: 11/27/2023
CHECKED: XYZ
SUBMITTED: 11/27/2023
RECOMMENDED:
APPROVED:

TRUCKEE MEADOWS WATER
AUTHORITY
1365 CAPITAL BLVD., PO BOX 50013
SPARKS, NEVADA 89415
TEL: 775-834-8000 / FAX: 775-834-8003

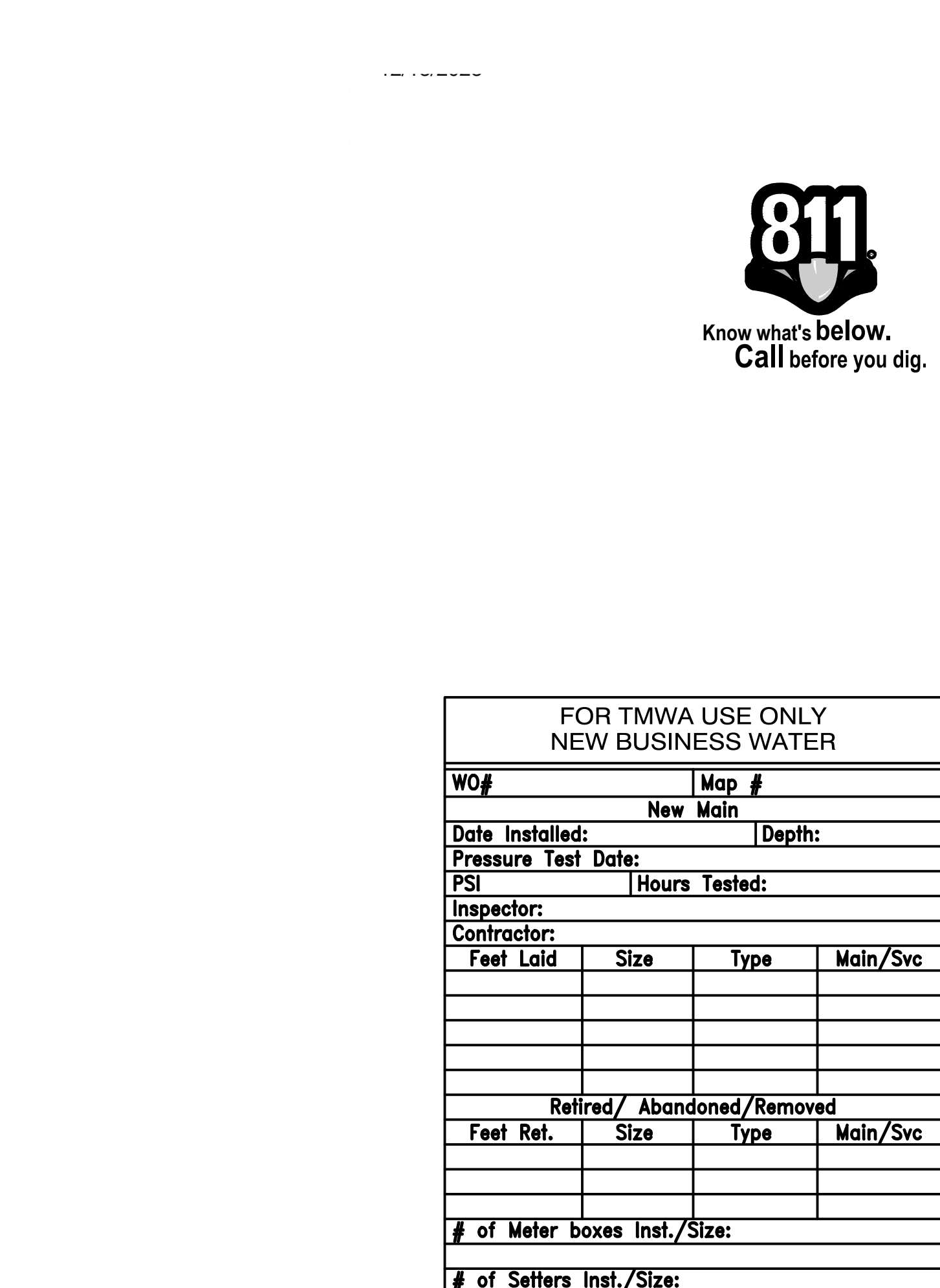
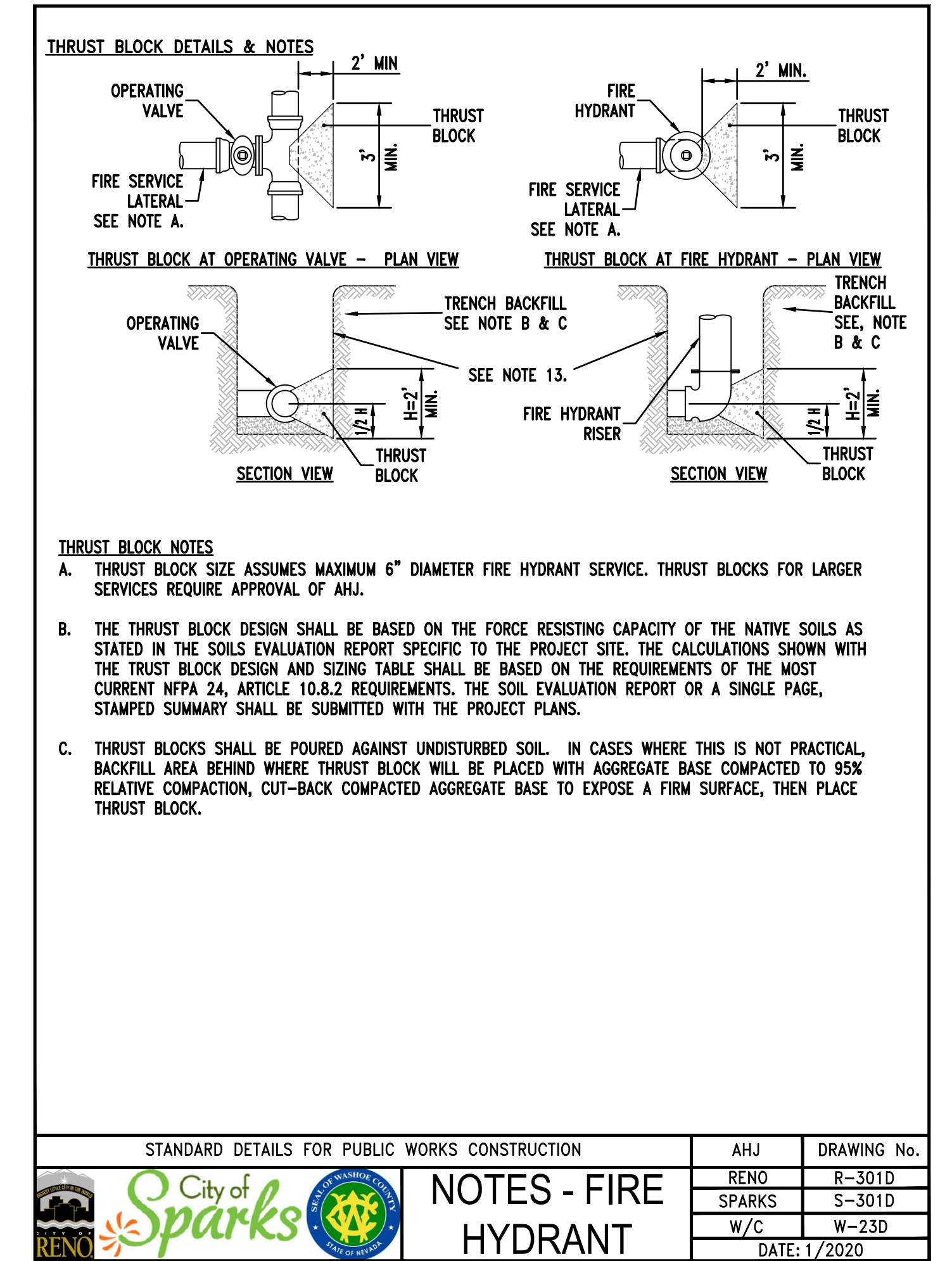
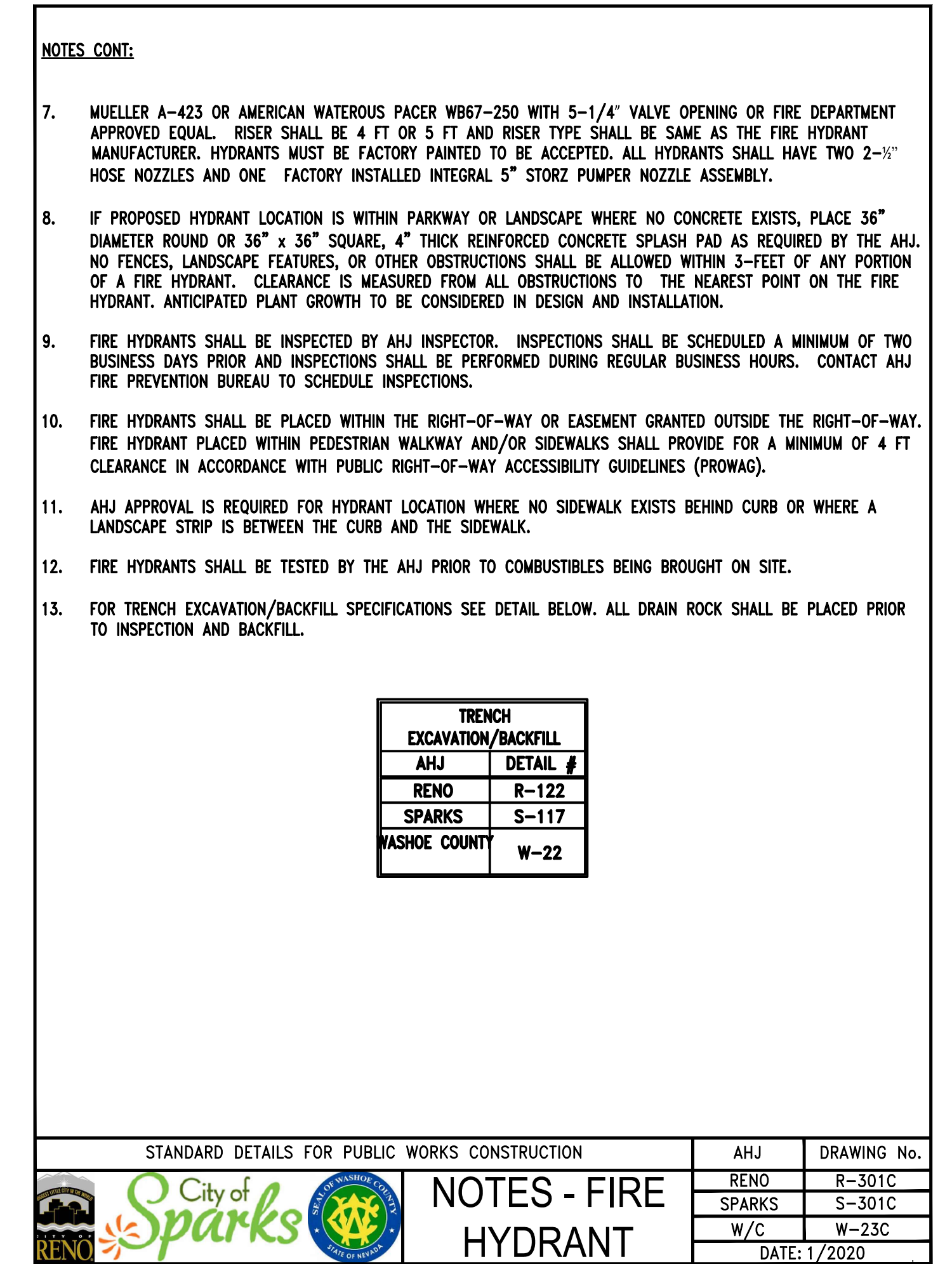
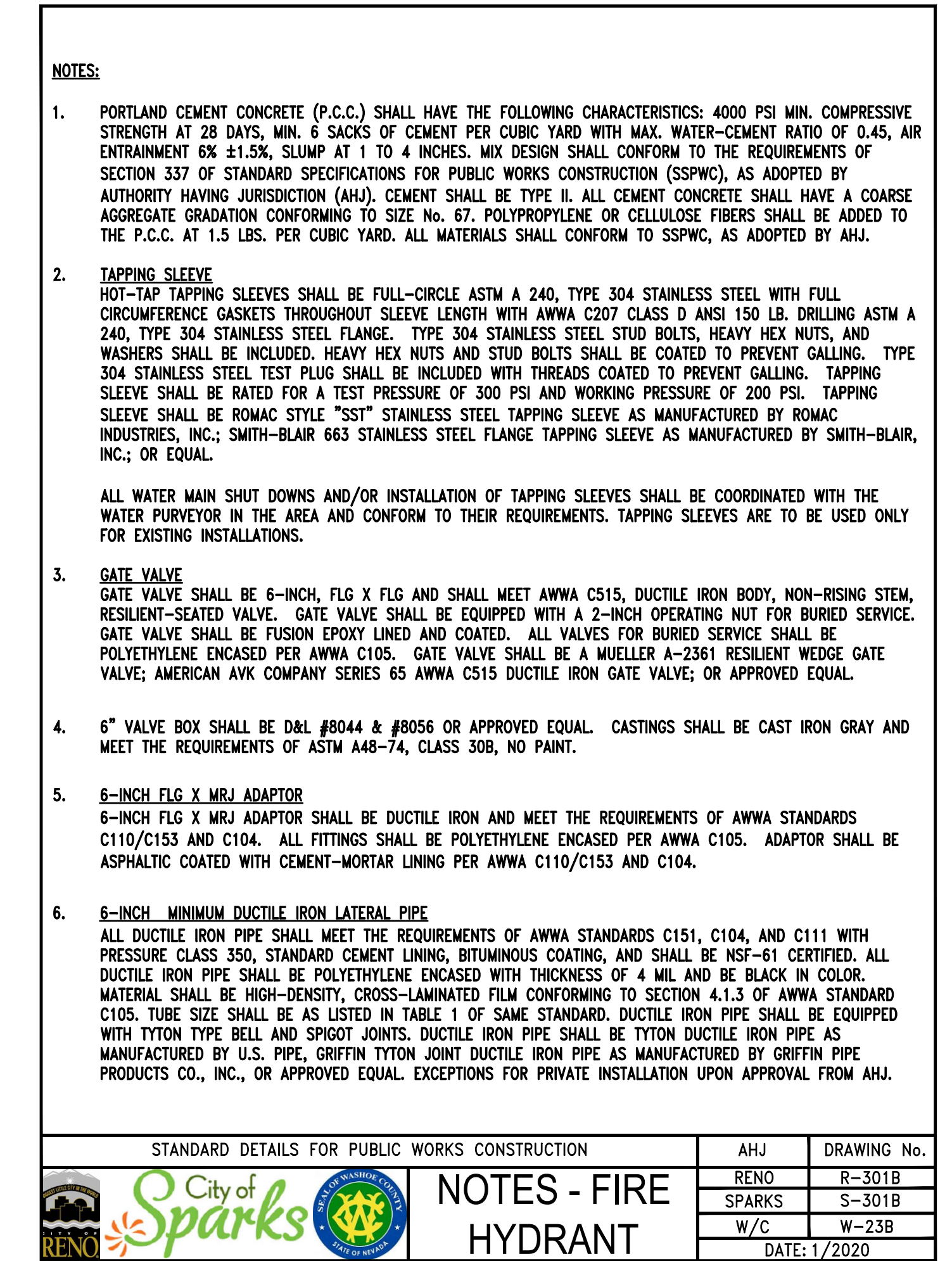
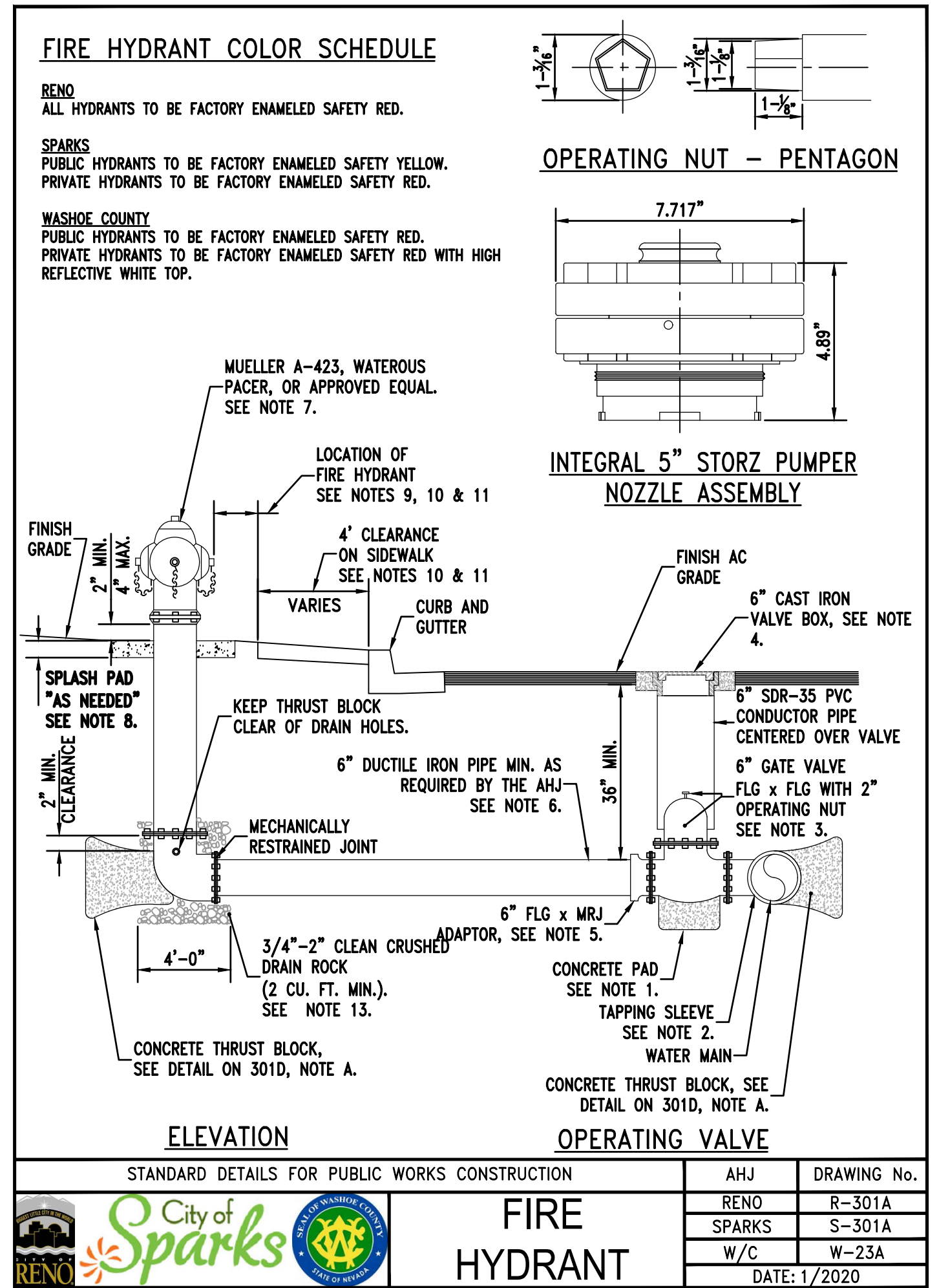
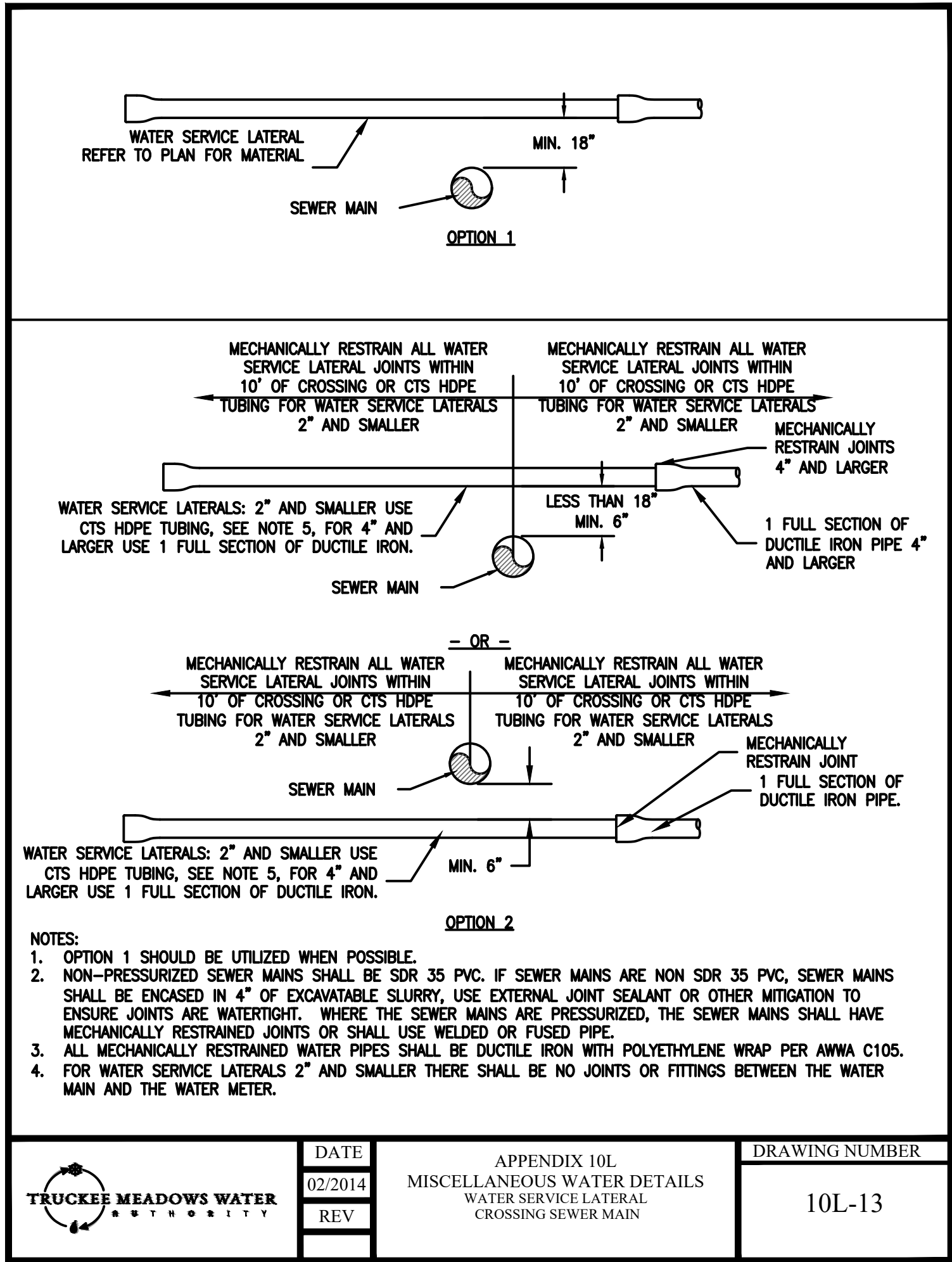
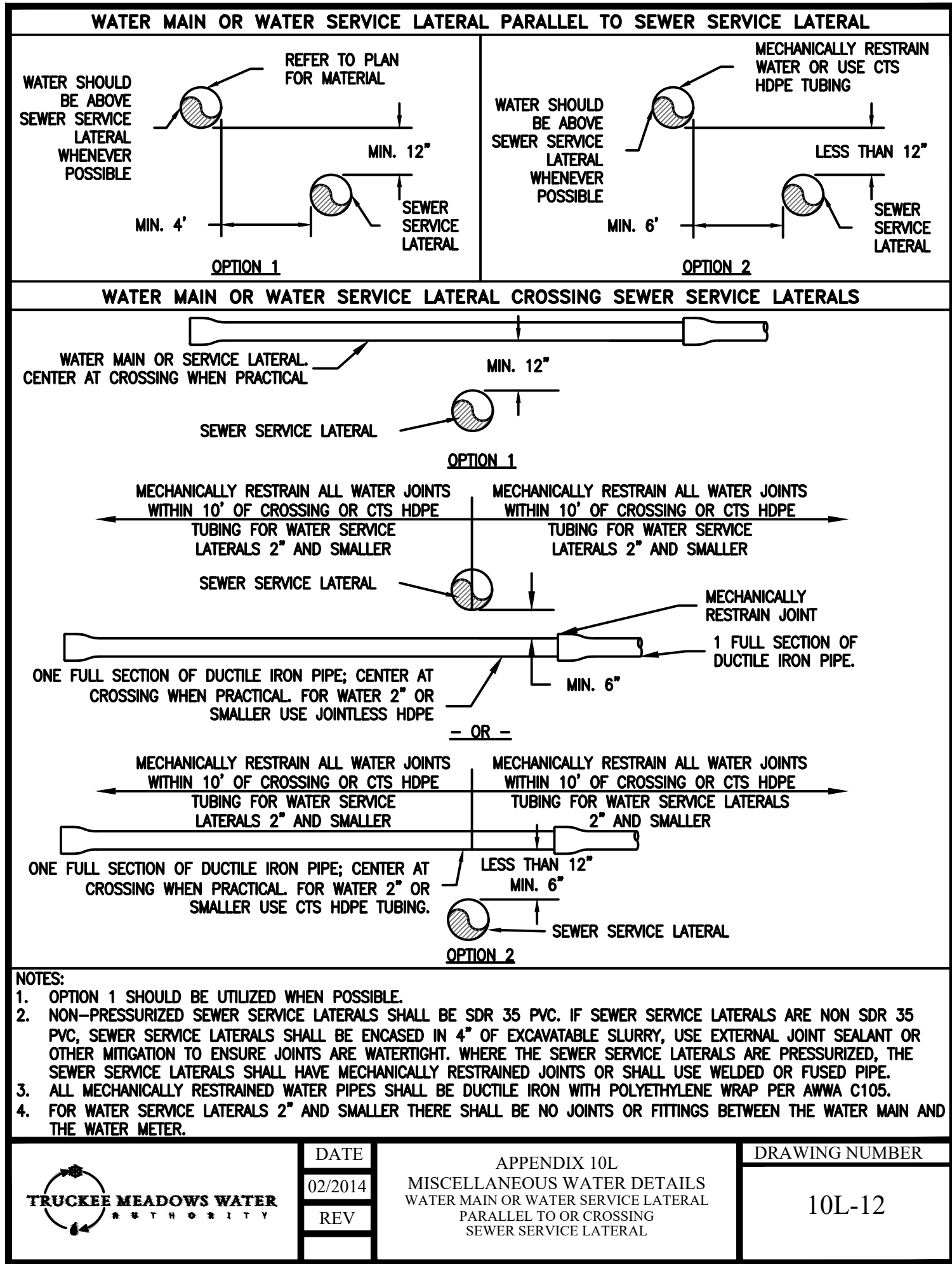
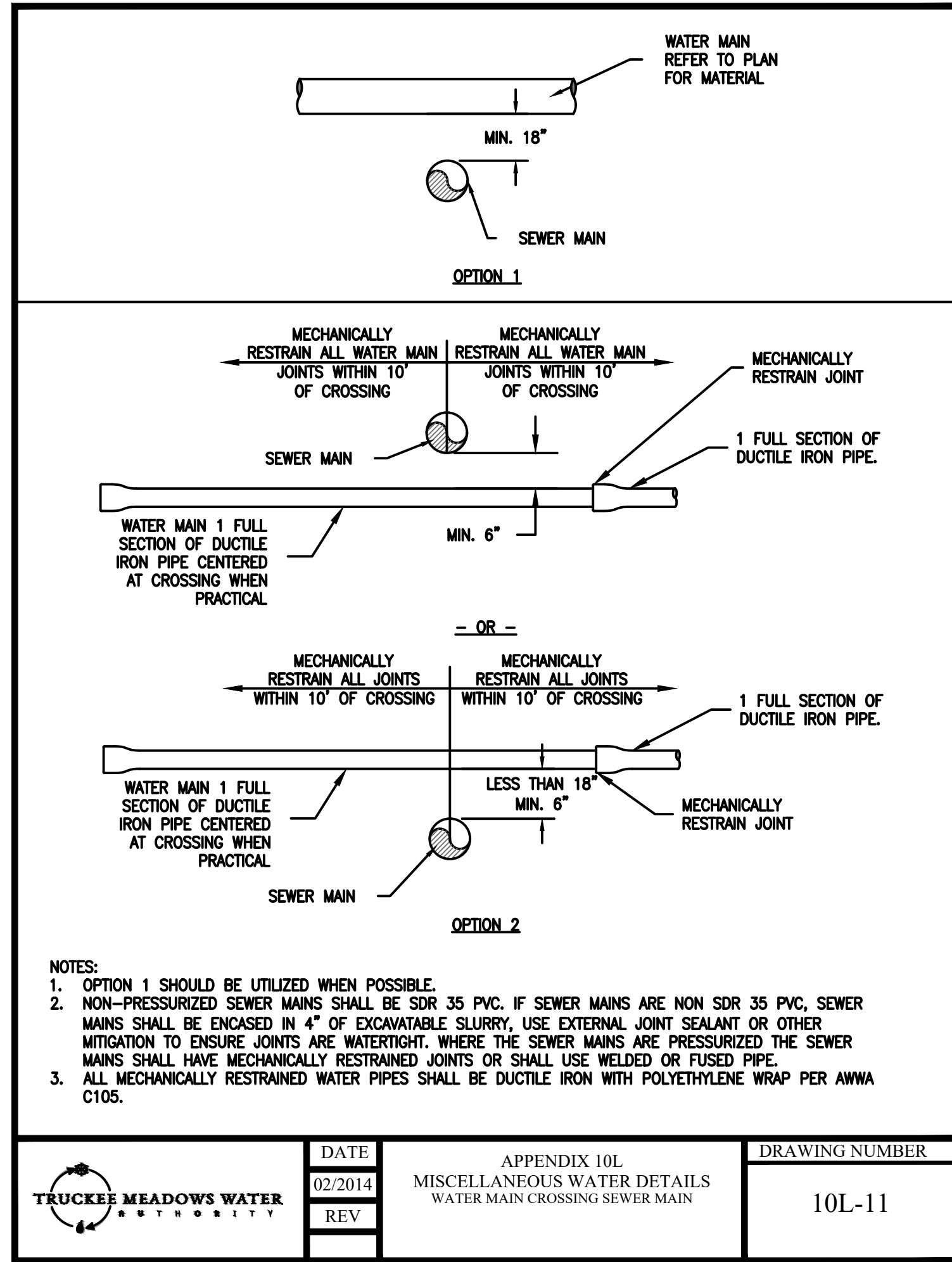
BEST NEW VILLAGE PHASE 1B_SUB
SPARKS, NEVADA
WATER DETAILS



FOR TMWA USE ONLY NEW BUSINESS WATER				
WO#	Map #			
Date Installed:		New Main		
Pressure Test Date:	PSI	Depth:	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:				

SHEET NUMBER
W-4
4 OF 5

EXAMPLE PLAN SET

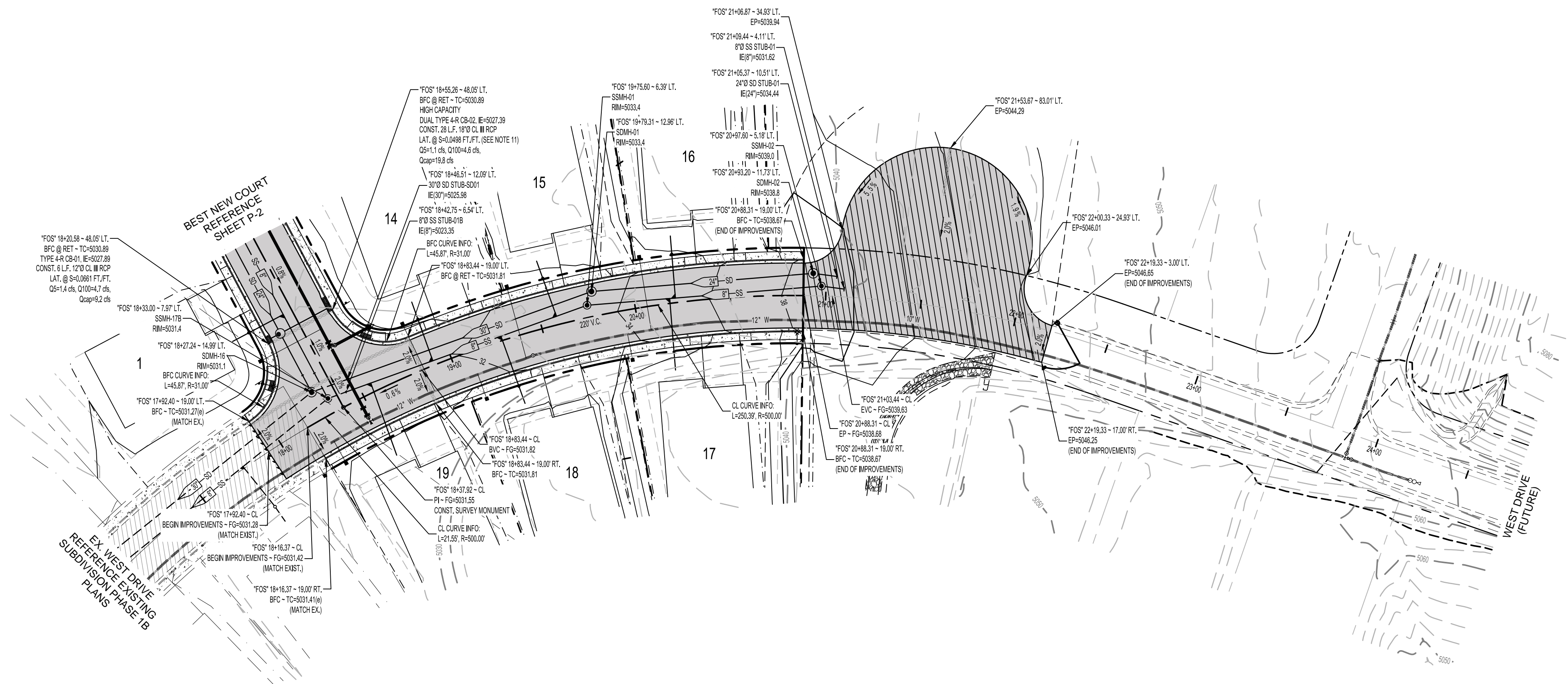
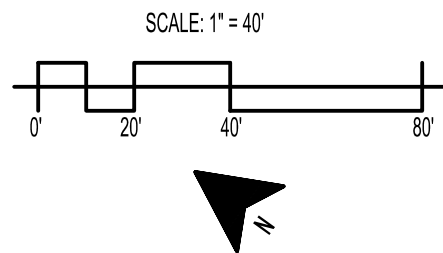


WORK ORDER NO. 23-0000
DESIGNED BY
DRAWN BY
DATE 11/27/2023
CHECKED BY
SUBMITTED 11/27/2023
RECOMMENDED BY
APPROVED BY

TRUCKEE MEADOWS WATER
R U T H O R I T Y
1365 CAPITAL BLVD., PO BOX 30013
RENO, NV 89506-0013
TEL: 775-854-8000 / FAX: 775-854-8003

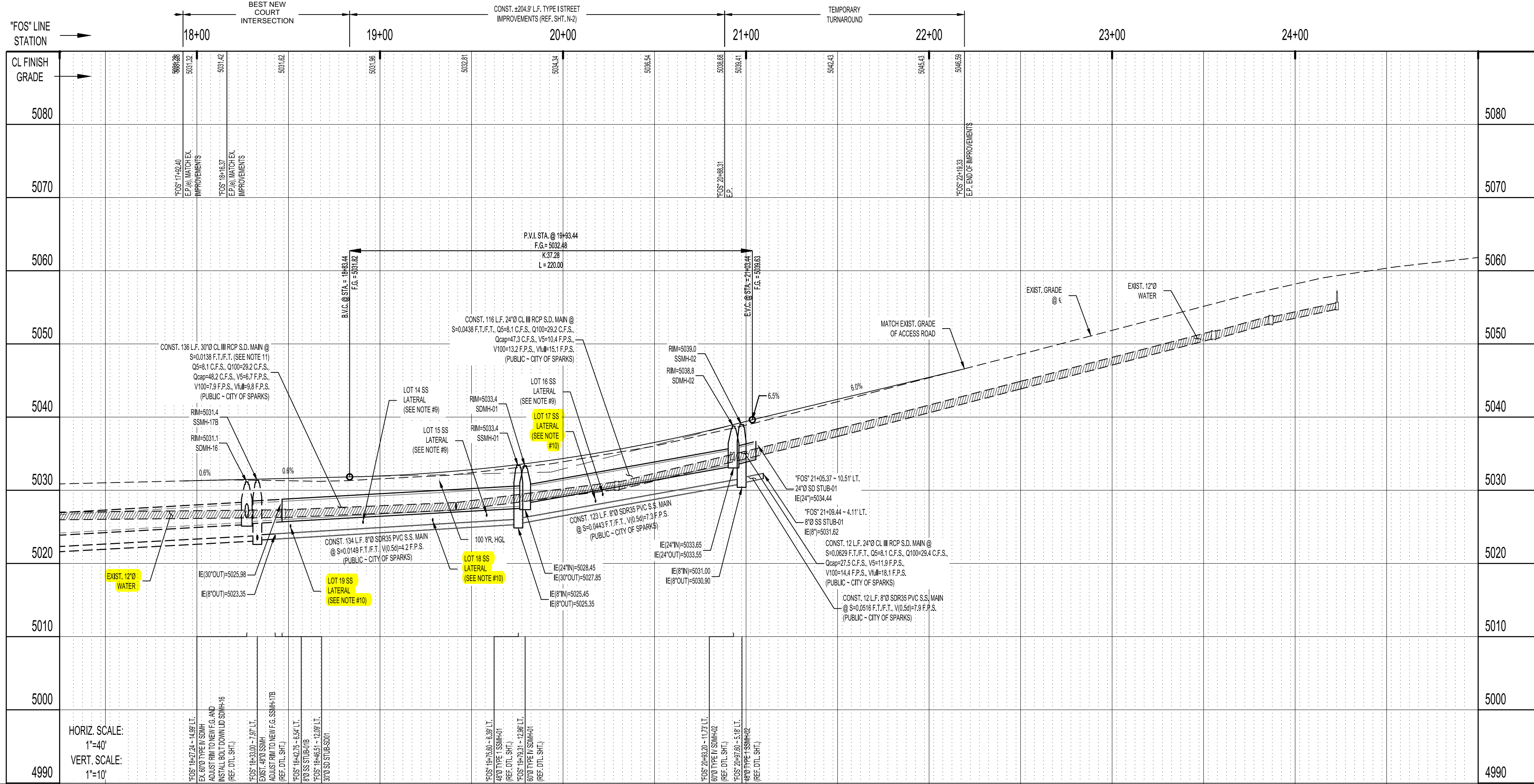
BEST NEW VILLAGE PHASE 1B SUB
SPARKS, NEVADA
WATER DETAILS

SHEET NUMBER
W-5
5 OF 5



WEST DRIVE
STA. "FOS" 17+92.40 TO 20+88.31

- LEGEND
- 4.00' --- EXIST. CONTOUR MAJOR
 - 2.00' --- EXIST. CONTOUR MINOR
 - 0.00' --- PROPOSED CONTOUR MAJOR (TRUNCATED)
 - 0.00' --- PROPOSED CONTOUR MINOR
 - 0.00' --- PROPERTY LINE
 - 0.00' --- EX. AC PAVEMENT
 - 0.00' --- NEW AC PAVEMENT
 - 0.00' --- EX. CONCRETE
 - 0.00' --- NEW CONCRETE
 - 0.00' --- R/P-RAP
 - 0.00' --- ROCKERY WALL (BY SEPARATE PERMIT)
 - 0.00' --- SAWCUT LINE
 - 0.00' --- CURB AND GUTTER (DASHED IF EXIST.)
 - 0.00' --- ROLLED CURB AND GUTTER (DASHED IF EXIST.)
 - 0.00' --- MANHOLE (DASHED IF EXIST.)
 - 0.00' --- CATCH BASIN (DASHED IF EXIST.)
 - 0.00' --- STORM DRAIN (DASHED IF EXIST.)
 - 0.00' --- SANITARY SEWER (DASHED IF EXIST.)
 - 0.00' --- WATER (DASHED IF EXIST.)
 - 0.00' --- DUCTILE IRON WATER MAIN (DASHED IF EXIST.)
 - 0.00' --- GRADE BREAK
 - 0.00' --- SLOPE IN PERCENT
 - 0.00' --- STREET LIGHT
 - 0.00' --- FIRE HYDRANT



EXAMPLE PLAN SET

- NOTES:
1. REF. GRADING AND DRAINAGE PLAN FOR ADDITIONAL INFORMATION.
 2. ALL PROPOSED ROADWAYS SHALL BE PUBLIC.
 3. ALL STORM DRAIN FACILITIES SHALL BE PUBLIC UNLESS OTHERWISE NOTED.
 4. ALL SANITARY SEWER FACILITIES SHALL BE PUBLIC.
 5. SANITARY SEWER LATERALS SHALL NOT BE CONSTRUCTED WITHIN 5' OF A MANHOLE.
 6. ALL COMMON AREAS INCLUDING DRAINAGE CHANNELS SHOWN SHALL BE OWNED AND MAINTAINED BY THE MIRAMONTE HOMEOWNERS ASSOCIATION.
 7. REF. TMAA PLANS FOR WATER INFO AND DETAILS.
 8. CONTRACTOR TO VERIFY EXACT LOCATION OF EXISTING UTILITIES PRIOR TO INSTALLATION.
 9. SDR 35 PVC SANITARY SEWER LATERALS FOR LOTS 14-21 SHALL CROSS UNDER THE PROPOSED STORM DRAIN MAIN. CONTRACTOR SHALL MAINTAIN A MIN. VERTICAL SEPARATION OF 9'.
 10. SDR 35 PVC SANITARY SEWER LATERALS FOR LOTS 17-19 SHALL CROSS UNDER THE EXISTING DUCTILE IRON AND PROPOSED PVC WATER MAIN. CONTRACTOR SHALL MAINTAIN A MIN. VERTICAL SEPARATION OF 9'.
 11. WATER TO PASS ABOVE ALL SEWER AND STORM DRAIN. WHEREVER POSSIBLE, WHEN WATER MAINS AND/OR SERVICES MUST PASS UNDER SEWER OR STORM DRAIN OR WHEN THEY CROSS ABOVE WITH LESS THAN 18" BUT AT LEAST 6" VERTICAL SEPARATION, THE WATER AND SEWER/STORM MUST BE MITIGATED PER TMAA 10L-11 OR 10L-13, RESPECTIVELY. ALL RCP MAINS MUST HAVE WATERTIGHT JOINTS FROM STRUCTURE TO STRUCTURE WHERE WATER MAIN CROSSINGS EXIST.



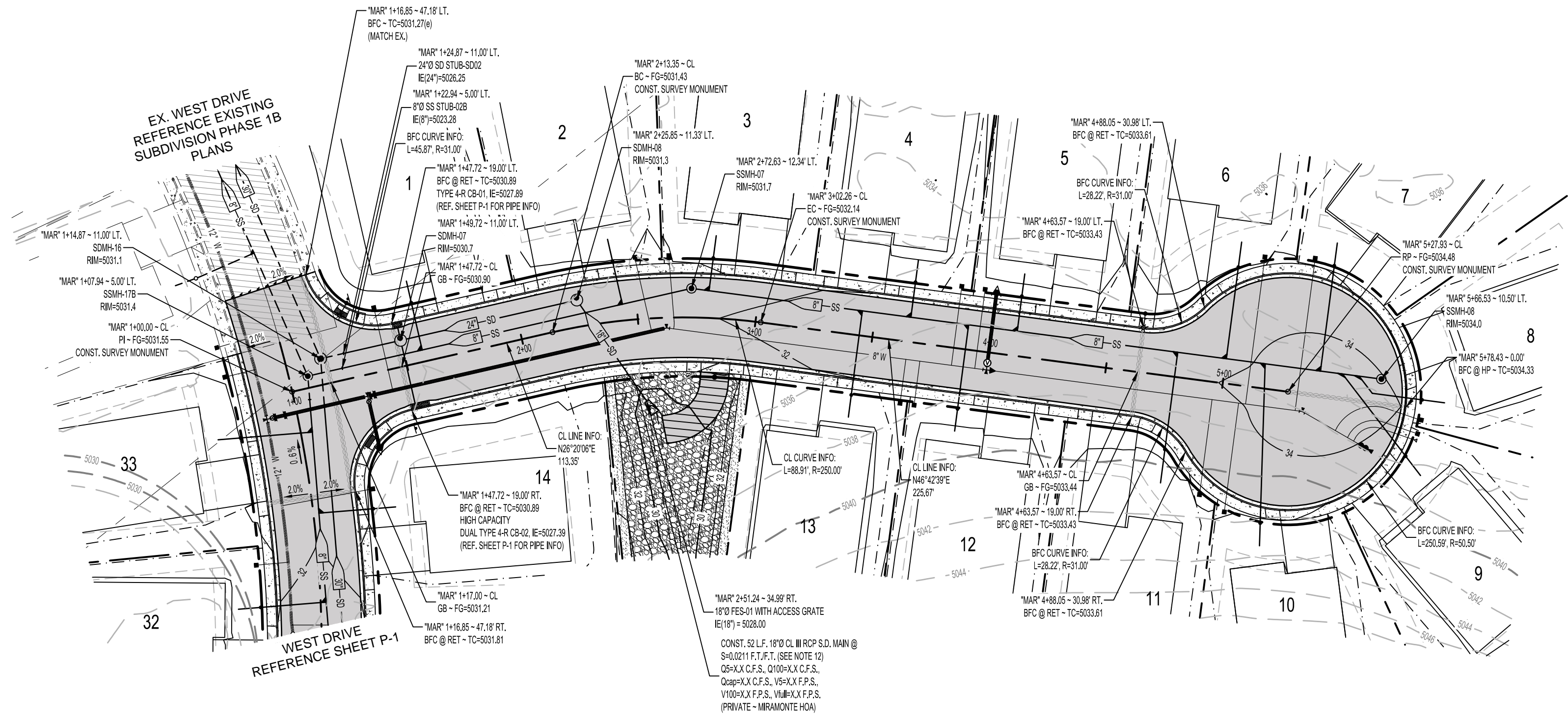
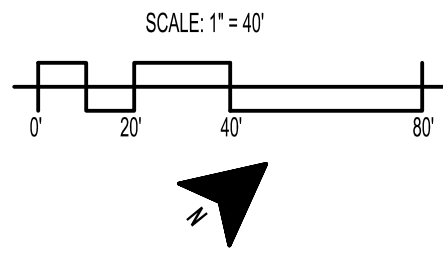
BEST
ENGINEERING
FIRM

Drawn By	
Checked By	
Project No.	
Date	11.22.2023
NO.	DATE
ISSUE	

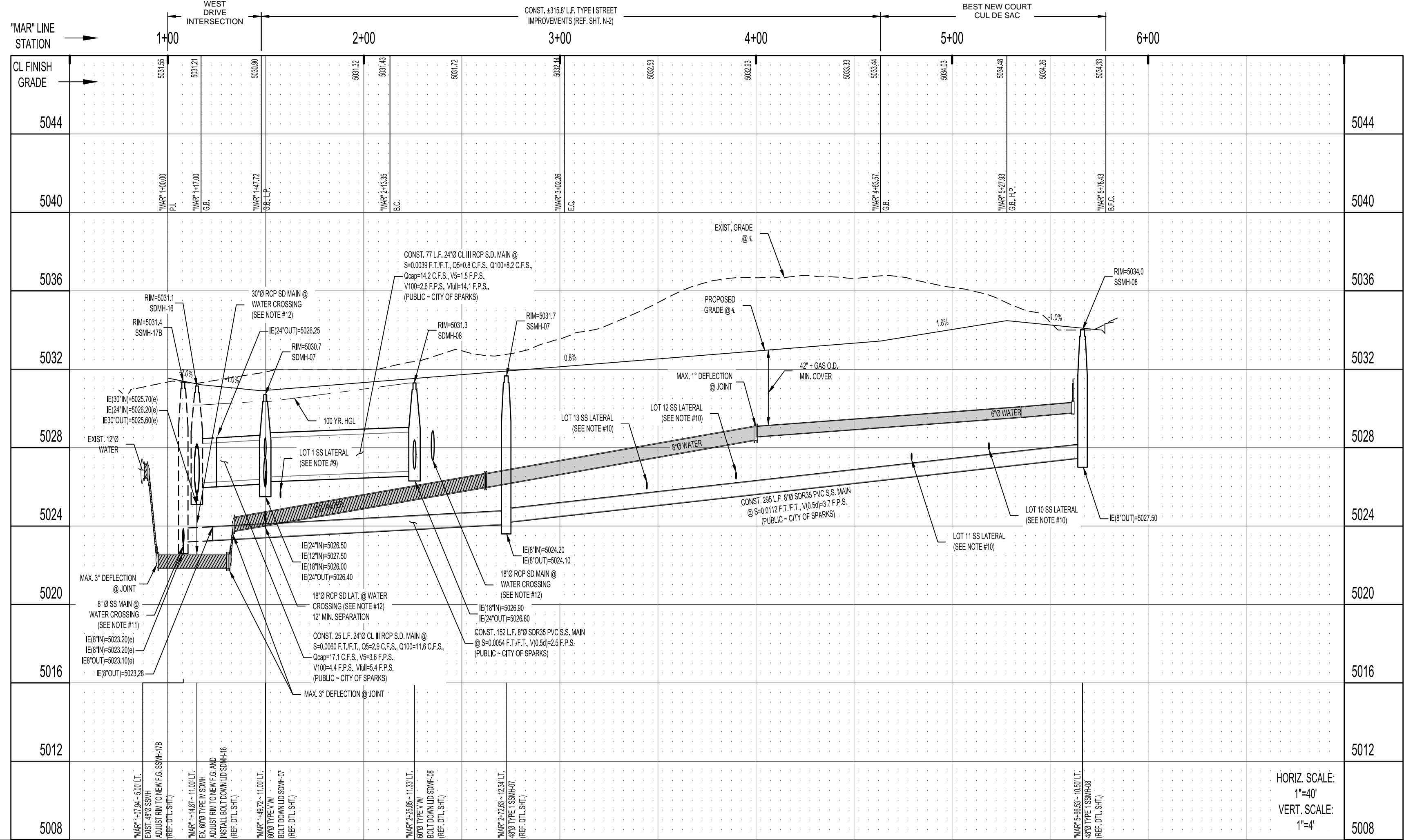
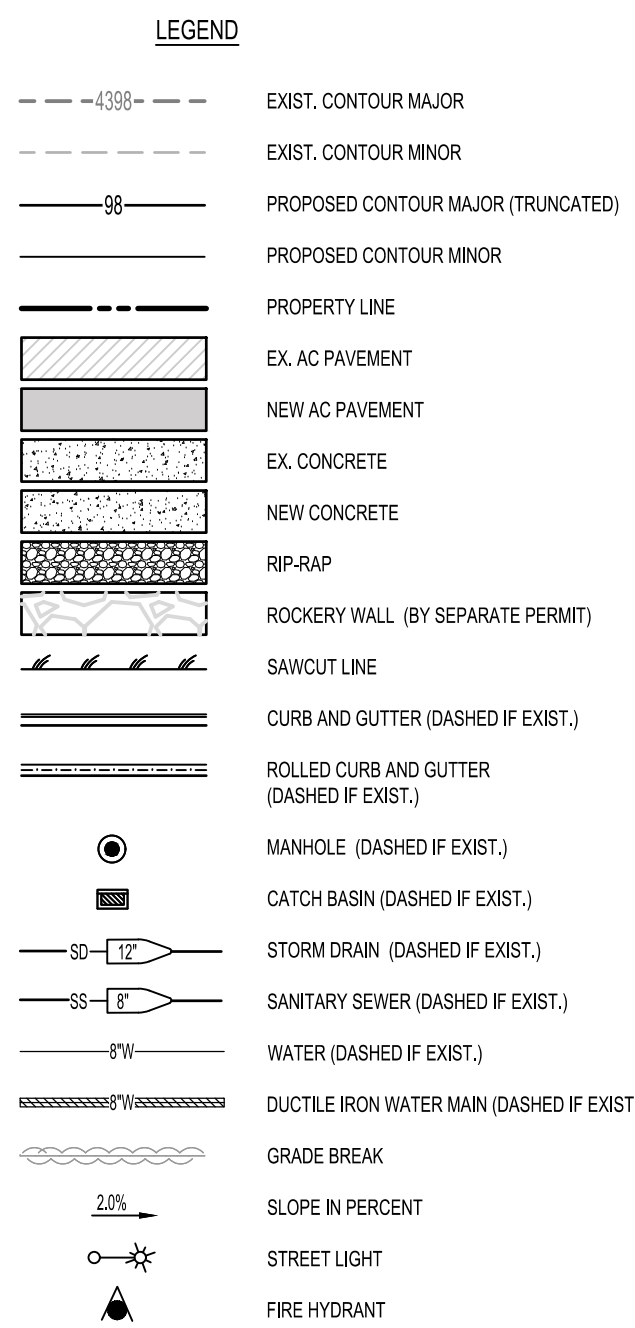
Drawing Title
WEST
DRIVE
PLAN & PROFILE

Project
CIVIL IMPROVEMENT PLANS
BEST NEW VILLAGE
PHASE 1B
SPARKS, NEVADA

P-1
OF
17



BEST NEW COURT
STA. "MAR" 1+00.00 TO 5+27.93



- NOTES:
- REF. GRADING AND DRAINAGE PLAN FOR ADDITIONAL INFORMATION.
 - ALL PROPOSED ROADWAYS SHALL BE PUBLIC.
 - ALL STORM DRAIN FACILITIES SHALL BE PUBLIC UNLESS OTHERWISE NOTED.
 - ALL SANITARY SEWER FACILITIES SHALL BE PUBLIC.
 - SANITARY SEWER LATERALS SHALL NOT BE CONSTRUCTED WITHIN 5' OF A MANHOLE.
 - ALL COMMON AREAS INCLUDING DRAINAGE CHANNELS SHOWN SHALL BE OWNED AND MAINTAINED BY THE MIRAMONTE HOMEOWNERS ASSOCIATION.
 - REF. TWINA PLANS FOR WATER INFO AND DETAILS.
 - CONTRACTOR TO VERIFY EXACT LOCATION OF EXISTING UTILITIES PRIOR TO INSTALLATION.
 - SDR 35 PVC SANITARY SEWER LATERALS FOR LOT 1 SHALL CROSS UNDER THE PROPOSED STORM DRAIN MAIN. CONTRACTOR SHALL MAINTAIN A MIN. VERTICAL SEPARATION OF 6\"/>

EXAMPLE PLAN SET



Project
CIVIL IMPROVEMENT PLANS
BEST NEW VILLAGE
PHASE 1B
SPARKS, NEVADA

BEST
ENGINEERING
FIRM

Drawn By	
Checked By	
Project No.	
Date	11.22.2023
NO.	
DATE	
ISSUE	

Drawing Title
BEST NEW COURT
PLAN & PROFILE

P-2
OF
17

NVBPELS Best Practices Guide



Best Practices Guide

for Quality Plan Submittals

Nevada Quality of Plan Submittals Task Force

October 2022

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Introduction

About This Guide

In July 2021 the **Quality of Plan Submittals Task Force (QPSTF)** was formed to address concerns surrounding the submittal process for obtaining permits. The submittal process can vary amongst public agencies, and this guide strives to assist with the process by offering best practices to make the submittal process more efficient and effective.

Nevada enjoys a reputation of being friendly to development and building. The best practices in the Guide are intended to illustrate ways that public agencies can better serve their constituents and ways that professionals can serve their clients.

The best practices in this Guide are organized around **improving communication** and **standardizing the submittal process**.

Each best practice details the benefits and challenges and includes recommendations for implementing them. The best practices seek to improve predictability, efficiency, timeliness, and quality.

Conventions Used in This Guide

After the need for a widely adopted and accepted best practices guide became clear, the task force identified four primary participants in the submittal process:

1. **Clients** – The terms “Owner”, “Builder”, or “Developer” may also be used
2. **Professionals** – May include Licensed Engineers, Land Surveyors, Architects, and Contractors
3. **Public Agencies** – State, county, or municipal agencies
4. **Utility Companies** – may be publicly owned, privately owned, or cooperatives (private organizations created by the government)

Roles and Responsibilities

Identifying and understanding the roles and responsibilities of the four participants listed above is an important first step in ensuring the submittal process runs smoothly. This guide will be most effective if each participant adopts policies/practices that supports their roles and responsibilities.

Objective

Where all three participants to the submittal process make use of these guidelines, **a reasonable goal is that 90% of the projects should be completed in three or less plan-check cycles.**

Communication

Improving Communication

The task force identified communication as one of the most important areas of concern in the submittal process. It was noted that smaller public agencies are sometimes more effective communicators than large public agencies, primarily because smaller agencies often speak with a single voice whereas large agencies often speak with multiple voices. Multiple voices often result in inconsistent feedback from review staff. Having multiple reviewers is perfectly ok as long as the reviewers apply or interpret codes uniformly.

The following Best Practices can be used to improve communication between stakeholders in the submittal process:

1. Designate a single point of contact or an electronic portal for managing submittal communications
2. Develop a user guide, separate and distinct from a checklist, for submittals
3. Establish procedures for concurrent submittals
4. For complex projects, consider scheduling a pre-submittal meeting, a meeting after first review, and a mandatory meeting if reviews exceed three
5. For non-complex projects consider a meeting after first review and a mandatory meeting if reviews exceed three
6. Designate project technical review team
7. Hold regularly scheduled inter-departmental meetings
8. Establish workarounds for proximity of professional staff

1. Designate a Single Point of Contact

Public Agencies

If staffing levels allow, agencies should designate one person or one department as a single point of contact to work with submittal applicants. Typically, this would be an individual from either the engineering or planning department. Similarly, each project should have a single point of contact throughout the review and approval process. An example of this would be the planning manager receiving an application for a land development plan, coordinating its review by other individuals and agencies, ensuring the plan is placed on appropriate agendas, and communicating outstanding issues with the applicant. This also requires the single point of contact to actively communicate with any of the necessary reviewers to ensure there is clarity around expectations and communications. Further consideration should be given to making the department that accepts development applications the one-stop-shop for all other agency submittal approvals regarding development (i.e., zoning permits, driveway permits, etc.). The duties of such a position within the department would generally include:

- Responsibility for intake of submittals, including a completeness review of the submittal prior to acceptance into the review queue. Agencies should not allow any files or sheets within a file to be swapped or added after a document is submitted for review.
- Agencies should require the professional to submit a response to all the comments made by the agency in the previous review.
- Coordinating the review of the land development/subdivision application among the different reviewers, including reviews done by third party consultants, such as traffic, and reviews done by outside agencies such as NV Energy, Southwest Gas, Southern Nevada Water Authority, TMWA.

- Tracking the project through the review process, including clearly communicating to the applicant which meetings they are scheduled for and what the applicant needs to provide for such meetings.

In lieu of a person serving as a single point of contact, an electronic portal could serve a similar role. All communications would occur via the portal and all participants in the submittal process would have access to communications. The electronic portal would serve as a single source of information for the submittal participants.

Professionals and Clients

Similarly, professionals and clients should also designate a single point of contact for each submittal. Professionals and clients may designate others to reach out to agency staff when appropriate to aid in growth and development of staff. However, every effort must be made by the professional to ensure there is adequate internal coordination to avoid different people contacting agency staff members asking the same question.

In the absence of an agency electronic portal that provides for a single source of communication, professionals and clients can consider using electronic tools, such as Bluebeam, that may be helpful in providing a single source of communication for managing their submittal process.

When submitting documents to an agency for review, professional and clients must submit a complete document for review. Submitting incomplete documents to get a “holding spot” in the review queue wastes resources and creates significant inefficiencies in the submittal review process. After submitting a complete set of documents for review and receiving the agencies review comments, professionals should submit written responses to all the comments made by the reviewer/s. If there are more than three reviews, professionals and the clients should request/attend a meeting with the agency to get clarification on the agency’s submittal concerns for the project.

2. Develop a User Guide for Submittals

Public Agencies

Each agency should create a brief reference guide to help applicants navigate the submittal process. The reference guide should contain all applicable information regarding the submittal process, including who reviews the submittal with contact information (including outside agencies) and which boards and commissions make decisions and/or recommendations. The reference guides should include step-by-step directions for the submittal review process, as well as any applicable forms and fees. The guide is not intended to specify submittal requirements or the plan requirements but is to describe what is required for the applicant to navigate the submittal process. The guide should be written in plain English so that non-professionals can understand the agency’s submittal process.

Agencies should review the guide at least annually to keep it up to date. The guide should be clear and concise and contain information that is as complete as possible. The agency should implement proper document control processes. Changes and updates to the guide must have an effective date and provide for a grace period to allow stakeholders time to understand and implement the changes.

The guide should include:

- Explanation of activities required, and permits issued by each authority
- Description of each agency, department, authority, board and commission involved
- Meeting times and schedules
- Contact information for relevant people and/or agencies
- Online instructions on how to obtain the appropriate information

Professionals and Clients

Professionals and clients should thoroughly familiarize themselves with, and abide by, the guidelines provided by the agency. When a submittal varies from the guidelines provided by the agency, professionals should include a brief explanation of any deviations from the guideline requirements.

3. Establish Procedures for Concurrent Submittals

Public Agencies

For projects which require permits from more than one agency, the option to submit concurrent applications can save review time and encourage greater collaboration among agency officials and regulators. There are numerous outside agencies or third-party consultants that also review and/or approve submittals. In some instances, this is worked into the agency review process, and for others it is a separate review. In any case, these reviews should happen concurrently where possible. Outside agencies may already have, or could develop, specific policies on how concurrent reviews are addressed and any related limitations to their review. Reviews that can happen concurrently with a submittal include:

- **Water** – Any submittal which will include a hookup to a public water system should have its lateral and/or main line extensions reviewed at the same time the applicant's project is going through the agency submittal process.
- **Sewer** – Any sewer laterals, proposed main lines, or septic systems should be reviewed by the appropriate authority at the same time as the project is being reviewed by the permitting agency.
- **Transportation** – Larger land development/subdivision applications will also require a review by the Nevada Department of Transportation (NDOT) and/or the Regional Transportation Commission. This can include the completion of a Traffic Impact Study, which the applicant would complete, but NDOT/RTC/Public Agency would review. The review of this aspect of an application can be time consuming, and both the applicant and the agency need to be aware of the timing of this review and its impact on the submittal review schedule.
- **Stormwater** – Depending upon the amount of impervious coverage proposed in a development, the preparation of a stormwater management plan as part of the submittal process may be required.

Submittals that include dry utilities such as NV Energy, SW Gas, Cox, etc must be submitted to a utility company prior to making a submittal to an agency. Agencies require dry utility improvements to be signed by the utility company prior to submittal approval by an agency. If the plans are not submitted sufficiently in advance for the utility to review/approve/sign, it can cause substantial delays to the submittal review process.

Professionals and Clients

In terms of processing applications concurrently, the responsibility for submitting necessary applications to the appropriate agencies must be clear to the applicant and the agency.

4. Conduct Pre-submittal Meetings

Public Agencies

An agency should set requirements for a pre-submittal meeting. A pre-submittal meeting can occur during the design phase or any time prior to or after a professional has complete documents for a submittal. A pre-submittal meeting provides an agency the opportunity to explain the review and approval process to the professional or client and to discuss the documentation required for a complete submittal. Checklists and timelines, as well as a list of minimum standards that submittals must contain to be reviewed, can be provided. A pre-submittal meeting also allows for the informal discussion of a project and can bring to light any potential issues with the submittal process.

A pre-submittal meeting should occur well in advance of any project deadlines for bringing the project to fruition. At a minimum, a pre-submittal meeting should include the presentation of a sketch plan or conceptual plan for review by all those attending. Other pre-submittal documents such as point of connection for sewer and hydraulic analysis for water, should be available at the pre-submittal meeting to facilitate efficient feedback from the agencies attending the meeting.

In addition to a pre-submittal meeting, the client may also wish to discuss a sketch plan during a regularly scheduled project coordination meeting, or possibly during a public hearing or neighborhood meeting, depending on the scope and nature of the project.

In addition to the client, professional and agency staff, the pre-submittal meeting could include representatives from each of the following:

- Community Development or Planning
- Public Works
- Building Department
- Regional Flood Control
- Regional Transportation Commission
- Water and Sewer Authority
- Fire Department
- Nevada Department of Transportation
- Third Party Consultants/Professionals
- Utility Companies (when appropriate for a specific project)
- Due to the number of agencies involved in the review process, each reviewing agency should commit to being present for a pre-submittal meeting.

If multiple agencies/reviewers are present at a pre-submittal meeting, someone should be designated to document the discussion, comments, and suggestions. Otherwise, the content of important matters discussed may be lost in the absence of a well-organized process.

If a sketch plan is presented, the issues discussed will be relevant only to the information provided at that time. Any change to the plan not discussed during the pre-submittal meeting may render previous comments and suggestions irrelevant. Every effort must be made by an agency to provide clear and correct direction to the professional/client. When an agency is circuitous in its wants/desires/requirements for a project, it results in costly re-designs for the client and inserts unnecessary delays in delivering community project benefits.

If an agency adopts a pre-submittal meeting process, it should be formally adopted and be incorporated into an agency's standard process as a means of informing professionals and clients of this option for initiating a project that will be subject to an agency's submittal process.

Professionals and Clients

Professionals and clients should participate in all pre-design/submittal meetings as they provide a forum for informal review to discuss a proposal and the associated requirements well in advance of the required submittal process. The process can save time and money for all parties. It also allows the parties to develop a good working relationship and build communication channels that can prevent confusion later in the submittal process.

5. Designate Project Technical Review Team

Public Agencies

When a submittal is made to a public agency, the agency may choose to conduct a coordinated review of the submittal. This process differs from the pre-submittal meeting in that, at this stage, an application has been formally submitted for consideration of approval.

A project technical review team should consist of the public agency staff and representatives from other agencies that will be reviewing the submittal. Typically, the applicant is not present during the technical review.

In addition to providing a forum for a coordinated review, the comments, suggestions, and questions that arise from each of the reviewing parties can be consolidated into a single review letter/report to be provided to the applicant. This review letter or report can be emailed to the applicant once completed. The technical review team should consist of representatives from the agencies that will ultimately review and approve the submittal.

A meeting, if needed, should be held with the applicant to review the comments in the coordinated review report. A technical plan review will typically consist of at least some of the following, and may include other topics:

- Water and Sewer services
- Traffic and access permitting
- NPDES approvals
- Environmental issues
- Transit, bicycle, and pedestrian facilities
- Erosion and sedimentation control
- Fire protection
- Code requirements
- Area, bulk, and density requirements
- Landscaping, lighting, open space
- Parking

6. Hold Regularly Scheduled Inter-Departmental Meetings

Public Agencies

Interdepartmental meetings provide an opportunity for sharing information and updates between departments within a public agency. All public agency departments may have input in the submittal process, and a regularly scheduled meeting would help each department understand the processes specific to the other departments. This meeting is not intended for specific submittal reviews but is intended to provide improved coordination including updates on current practices and any anticipated changes in those practices. When inter-departmental meetings result in changes to the submittal process, industry notices should be published to make stakeholders aware of the changes.

The goal of regularly scheduled inter-departmental meetings within an agency should be to establish predictable processes for submittals/permitting.

7. Establish Workarounds for Proximity of Professional Staff

Public Agencies

Physical proximity of agency staff is not always possible due to the geographic locations of individual buildings. In addition to agency staff there are also other departments, project inspectors, and others involved in the submittal process that may have offices in other locations, making them less available for in-person joint reviews and discussions. While a lack of physical proximity can inhibit the ability to conduct simultaneous reviews of plans, technology can be used to bridge this gap and allow for easier interaction among staff. The use of internet resources, including but not limited to email, shared document editing, and multi-user document viewing, as well as teleconferencing, would allow for simultaneous review of plans and better interagency coordination.

Agencies should consider a virtual review/comment meeting with the professional and client after the first submittal review to ensure the professional and client understand the review comments and any requirements that need to be met prior to a subsequent submittal. For agencies that cannot accommodate a virtual review/comment meeting after the first review, the meeting should be considered mandatory if the submittal is not approved by a pre-determined point, such as after a third review. The meeting should also include the client to ensure no miscommunication between the project stakeholders.

Implementation

- Digital copies of plans could be received with all applications and then distributed to all reviewers so that simultaneous review can take place.
- If needed, teleconferencing is a method of allowing all reviewers to discuss a plan simultaneously.
- Municipalities could assign one individual to be the “project coordinator” responsible for collecting and forwarding comments from all reviewers. The project coordinator could also initiate a teleconference so that plans could be discussed by all reviewers simultaneously as needed.
- Plan reviewers could hold meetings on a regular basis, either in person or via teleconference, to allow all reviewers to discuss potential issues with the plans. This would allow everyone involved to be aware of general concerns that should be considered when making comments.

Professionals and Clients

Physical proximity of professionals and clients should not preclude in-person reviews and discussions. Technology can be used to bridge this gap and allow for easier interaction among all parties. Video conferencing and sharing of computer screens can be an effective means of collaborating during the submittal process.

Standardizing the Process

Predictability and consistency of the submittal process within an agency advances the goal of more efficient submittal process. Professionals and clients should know what to expect from agencies and staff when they interact through the process. This includes submittal requirements, plan requirements, public meeting schedules, and review timeframes.

One of the most common frustrations voiced by private-sector participants was preparing similar information many ways. For example, the forms used for, and information required by a public agency could be coordinated and standardized so that the same information is required for similar processes in different agencies. For the most part, information required to apply for a variance could be consistent regionally. An agency should consider only requiring what is necessary per code/statute in lieu of what is solely an agency preference. If there is a regional design manual, an agency should align its requirements rather than inserting its preferences into the submittal requirements.

This best practice promotes efficient permitting because it employs a standard across agencies. Public agencies have a great deal of autonomy, and boards and commissions exercise varying degrees of discretion. Many participants believe there could be consistency among the agencies to improve predictability and efficiency while maintaining individual authority within an agency.

The following best practices, described in more detail on the following pages, can be used to standardize an agency submittal/permitting process:

1. Develop checklists and flow charts
2. Establish predictable processes

1. Develop Checklists and Flow Charts

Public Agencies

As part of the planning or permitting process, providing a checklist to the applicant can provide valuable information which can help both the applicant and the agency. A checklist should include, but may not be limited to, a timeline for the review and approval process, clear submittal requirements, information on fees, and information pertaining to other agencies from which approvals may be required. The checklist should provide detail on all relevant processes in a concise and easily understandable format. In addition to a checklist, it is recommended that a flowchart(s) along with a general timeline be created to assist the applicant.

Similar to the agency submittal guideline document, the agency should implement proper document control processes for checklists and flow charts. Changes and updates must have an effective date and provide for a grace period to allow stakeholders time to understand and implement any changes.

When developing checklists, agencies must be sensitive to implementing standards that avoid duplication of information that is requested. Duplicated information often leads to contradictions and reduces clarity for reviewers. A checklist can introduce duplication of information when items are added to the checklist without attention to items that are already included on the checklist.

The links below are checklists and flowcharts used by agencies that participated in drafting this document. Appendix A provides a template that agencies can use to build their own checklists.

Sample Checklists

Clark County Water Reclamation District

- [Plan Intake Checklist](#)
- [Plan Review Checklist](#)

City of Henderson

- [Civil Improvements Submittal Checklist](#)

City of North Las Vegas Public Works

- [Civil Improvement Plan Checklist](#)

Sample Flowcharts

City of Henderson

- [Development Guidelines](#)

Professionals and Clients

Professionals and clients should abide by the checklists and flowcharts provided by an agency. The applicant must be aware that information contained in checklists and flowcharts will not be exhaustive. An agency will likely include a disclaimer that a checklist does not constitute the professional's full legal obligations in the submittal process.

2. Establish Predictable Processes

Public Agencies

To aid professionals/clients in the submittal process, the agency should establish a consistent predictable process for submittal reviews. The process should be clearly communicated and easy to understand. Agencies should also be aware that professionals that submit incomplete documents are violating Nevada Administrative Code chapter 625 and the agency is within their purview to file a complaint against the professional with the state Board.

Where possible, agencies can provide options for expedited submittal reviews.

Professionals and Clients

Professionals and clients should abide by an agency's submittal process and make every effort to provide complete submittals at the first time of submission. On occasion professionals have made incomplete submittals to be placed in the waiting queue, despite only having preliminary documents. At a minimum, this slows the review process for all submittals and creates extreme inefficiencies in the entire submittal process for all involved stakeholders. More importantly, submitting incomplete submittals to an agency is a violation of Nevada Administrative Code chapter 625. Incomplete submittals are a violation of NAC 625.610 (6) and/or (7) and could also be a violation of other NAC chapter 625 regulations depending on the specifics of the submittal. An agency can refer the violation to the state Board for investigation and it could result in disciplinary action against the professional.

Professionals in "responsible charge of the work" must thoroughly review all submittals before stamping and signing to ensure submittals are complete and prepared in a proper and professional manner. If possible, the submittal should undergo an in-house quality control review to ensure the submittal is project specific and meets agency requirements. Professionals that use internal checklists and quality control measures not only provide a better service to their clients but also significantly reduce the submittal review cycle.

Appendix A – Sample Checklist

The following example is intended to be a reference for agencies to use when creating their own checklists. Whether the final checklist is electronic or paper, each agency will have its own specific requirements. The following example includes the basics, such as project name, date, project type, reviewer, department/discipline, which should be applicable to all agencies.

(Name of Agency) Plan Review Checklist			
Date Received	(Today's Date)		
Project Name	(Project Name)		
Project Number	(XXXX-1234)		
Project Description	(Include enough information to describe what type of work is being done – ie. engineering and discipline or surveying and job type)		
Submitted by	(Name of individual submitting – include company name, address, phone, email, etc.)		
Review Type	(ie. 1 st , 2 nd , 3 rd , 4 th , 5 th , Final, Rev)		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	Pre-submittal Checklist
			Paper or electronic submittal?
			If electronic, verify all agency electronic submittal requirements are met
			Page size (specify if applicable)
			Number of pages in TOC matches number of pages in submittal
			Project name matches name on plans
			All sheets reference the correct project/revision number
			Review project scope to determine if this is the correct checklist
			This checklist applies to new construction
			This checklist does not apply to existing or revisions (use XXX checklist instead)
			Professional(s)
			Electronic stamp with signature and date on cover/title/first sheet of each discipline
			Digital signature applied to cover/title/first sheet for their discipline (refer to agency requirements)
			Professional license is from Nevada?
			Verify contact (POC) is correct
			Verify that client/developer and each professional is correctly entered into agency contact list
First Submittal			

Date	Agency Disc.	Status	Details	Attached to	Created by	Updated by	Changes Y/N	✓	✕
			Insert heading type (ie. COMMENT, CORRECTION, RESPONSE) then enter narrative text						
Second Submittal									
			Insert heading type (ie. COMMENT, CORRECTION, RESPONSE) then enter narrative text						
Third Submittal									
			Insert heading type (ie. COMMENT, CORRECTION, RESPONSE) then enter narrative text						

Credits

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UNLV

CM Works

Westwood

Las Vegas Valley Water District

Southern Nevada Water Authority

Wright Engineers

GCW Engineering

City of Henderson

NV Energy

Lumos & Associates

Atlas

Wood Rodgers

Kleinfelder

WMK Surveying

Clark County Water Reclamation District

Atkins

NCE

HDR

The LandWell Company

Nevada Department of Transportation

CFA

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