

TOWN OF BENNETT
WATER UTILITY STANDARDS
JANUARY 2021

PREFACE

The primary purpose of these documents is to clearly define the current water engineering and construction standards to be used in the Town of Bennett. The plan numbering structure of this document follows the same basic structure as the American Public Works Association (APWA) Standard Plans, however, there are some differences. Following is an explanation of the structure of this document:

1. Part 5 – Water Systems. Standard Plan divisions for Water system related details are:
 - a. Notes, Abbreviations, and Symbols
 - b. Fire Hydrants
 - c. Water Meters
 - d. Piping
 - e. Thrust Blocks
 - f. Valves
 - g. Trenching
 - h. General
2. Numbering – A plan number having a suffix of “S” identifies that the plan contains index, legend, details specific notes, and acceptable manufacturer and parts numbers related to the standard plan.

This document is intended to be altered periodically to ensure that the most current Town of Bennett Standards are available for public use. This document will be revised and published on the Town’s website annually.

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GENERAL WATER NOTES

1. THE FOLLOWING DOCUMENTS ARE INCORPORATED INTO THESE CONTRACT DOCUMENTS BY REFERENCE:
 - a. AMERICAN WATER WORKS ASSOCIATION STANDARDS (AWWA)
 - b. INTERNATIONAL PLUMBING CODE
2. ALL PIPE, JOINTS FITTINGS, VALVES, AND FIRE HYDRANTS SHALL CONFORM TO ANSI/NSF STANDARD 61 AND APPLICABLE SECTIONS OF AWWA STANDARDS C104-08 THROUGH C550-05 AND C900-07 THROUGH C950-07. ALL BRASS AND BRONZE PIPE, FITTINGS, AND VALVES SHALL MEET LOW LEAD COMPLIANCE REQUIREMENTS IN ACCORDANCE WITH ANSI/ASTM 371.
3. THE TOWN UTILIZES AN ADVANCED METERING INFRASTRUCTURE (AMI) SYSTEM. THE DEVELOPER MAY BE REQUIRED TO CONDUCT A PROPAGATION STUDY AND INSTALL RESULTING RECOMMENDED IMPROVEMENTS TO FACILITATE A CLEAR SIGNAL TO THE PROJECT. REFER TO STANDARD PLAN 520 FOR SPECIFIC METER TRANSMITTER UNIT (MXU) REQUIREMENTS.
4. REFER TO APPLICABLE STANDARD PLANS FOR WATER SYSTEM DETAILS AND REQUIREMENTS.
5. REFER TO STANDARD PLAN 520 FOR GENERAL REQUIREMENTS FOR WATER METERS, METER VAULTS, AND WATER SERVICE LINES.
6. TOWN INSPECTION OF WATER SYSTEM IMPROVEMENTS WILL FOLLOW THE *"PUBLIC WATER SYSTEM FIELD OBSERVATION GUIDELINES"* AND ESTABLISHED TOWN POLICIES. CONTRACTOR SHALL PROVIDE NECESSARY ASSISTANCE TO MEET THE GUIDELINE REQUIREMENTS.
7. NOTIFY PUBLIC WORKS OFFICE AT LEAST 48 HOURS BEFORE PERFORMING ANY WATER RELATED WORK. ARRANGE A PRE-CONSTRUCTION CONFERENCE SPECIFIC TO WATER CONSTRUCTION WITH THE PUBLIC WORKS DEPARTMENT AT LEAST 48 HOURS BEFORE START OF WORK. FOR PROJECTS INVOLVING ONLY SERVICE LINE AND/OR METER VAULT INSTALLATION, AN ON-SITE MEETING WITH THE PUBLIC WORKS DIRECTORS' DESIGNEE 48 HOURS PRIOR TO CONSTRUCTION IS ACCEPTABLE.
8. FOR TEMPORARY USE OF EXISTING WATER SYSTEM AND FIRE HYDRANTS TO OBTAIN CONSTRUCTION WATER, REFER TO STANDARD PLAN 531.
9. ALL CONSTRUCTION OF WATER SYSTEM SHALL BE CLEARLY STAKED BY THE DEVELOPER'S OR CONTRACTOR'S SURVEYOR. STAKING SHALL INCLUDE ALL BENDS, VALVES, HYDRANTS, SERVICES, METER VAULTS, AND SPECIALS. A MINIMUM OF 50-FOOT STATIONING IS REQUIRED FOR PIPELINE.
10. CHANGES TO THE APPROVED WATER PLANS, INCLUDING PIPE ALIGNMENT, SIZE, AND DEPTH AS WELL AS FITTINGS, VALVES, SERVICES, AND METER VAULT LOCATIONS SHALL BE AUTHORIZED BY THE PUBLIC WORKS DIRECTOR PRIOR TO INSTALLATION.

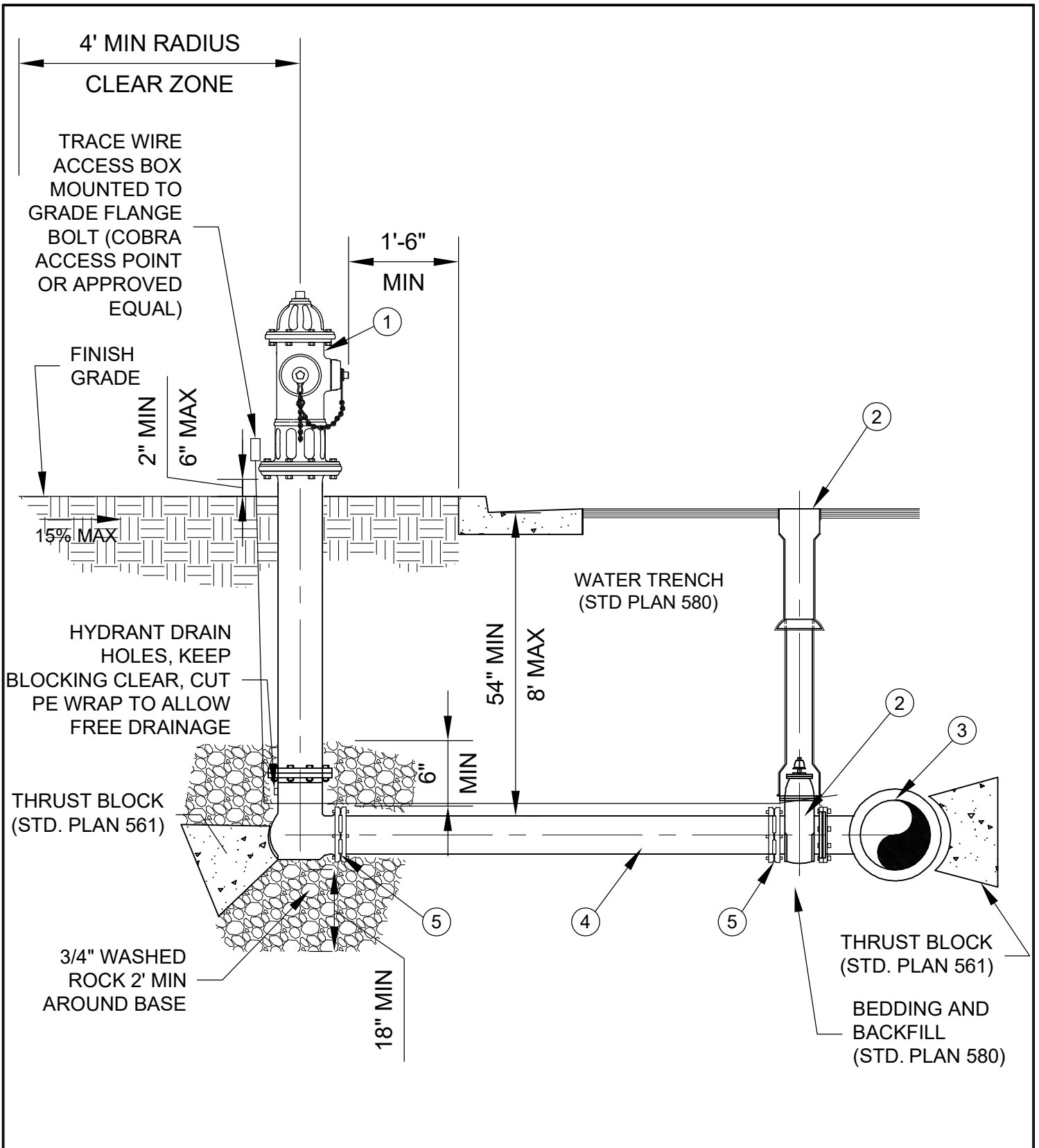
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11. WATER SERVICE INTERRUPTION. THE FOLLOWING SHALL BE MET WITH RESPECT TO THE INTERRUPTION OF SERVICE TO CUSTOMERS INCLUDING THE SHUTDOWN OF THE EXISTING WATER SYSTEM:
 - a. CONTRACTOR SHALL NOT OPERATE EXISTING WATER VALVES
 - b. SCHEDULE SERVICE WORK REQUIRING WATER SERVICE INTERRUPTIONS OR SHUTDOWNS OF THE EXISTING WATER SYSTEM A MINIMUM OF 72 HOURS IN ADVANCE WITH THE PUBLIC WORKS DEPARTMENT.
 - c. LIMIT INTERRUPTIONS TO OCCUR AND BE COMPLETED ON MONDAY THRU THURSDAY, 9:00 AM TO 4:00 PM. NO INTERRUPTION TO OCCUR ON FRIDAYS, WEEKENDS, OR HOLIDAYS.
 - d. CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFICATION TO AFFECTED CUSTOMERS. CONTACT THE PUBLIC WORKS DEPARTMENT FOR NOTIFICATION REQUIREMENTS. BE ADVISED THAT ON OCCASION VALVES IN THE EXISTING WATER SYSTEM MAY BE INOPERABLE AND MAY REQUIRE NOTIFICATION OF A LARGER AREA. IF VALVE MAINTENANCE IS REQUIRED, A SHUTDOWN DELAY OF SEVERAL DAYS SHOULD BE EXPECTED.
 - e. FOR WATER SHUTDOWNS LONGER THAT 4 HOURS, CONTRACTOR SHALL SUBMIT A TEMPORARY WATER PLAN TO KEEP ALL CUSTOMERS IN SERVICE. ALL COSTS ASSOCIATED WITH MAINTAINING SERVICE TO AFFECTED CUSTOMERS SHALL BE BORNE BY THE CONTRACTOR.
 - f. CONTRACTOR SHALL HAVE ALL PERTINENT PARTS AND MATERIALS ON SITE PRIOR TO SHUTDOWN OF THE WATER SYSTEM BY THE PUBLIC WORKS DEPARTMENT.
 - g. CONSTRUCTION EXCAVATION MUST BE PREPARED AND THE WATER MAIN EXPOSED PRIOR TO SHUTDOWN OF THE WATER SYSTEM.
12. EXPOSE EXISTING WATER PIPES AND VERIFY HORIZONTAL AND VERTICAL LOCATION PRIOR TO INSTALLING NEW IMPROVEMENTS.
13. THE HORIZONTAL DISTANCE BETWEEN WATER LINES AND SANITARY SEWER LINES SHALL BE AT LEAST 10 FEET. WHERE A WATER MAIN AND SEWER MUST CROSS, THE WATER MAIN SHALL BE AT LEAST 18 INCHES ABOVE THE SEWER LINE. SEPARATION DISTANCES SHALL BE MEASURED EDGE-TO-EDGE (I.E. FROM THE NEAREST EDGES OF THE FACILITIES).
14. IF THE BASIC SEPARATION CANNOT BE MET, AN EXCEPTION TO THE RULE CAN BE APPLIED WITH ADDITIONAL MITIGATION MEASURES TO PROTECT PUBLIC HEALTH.
15. THE OPEN ENDS OF ALL PIPELINES UNDER CONSTRUCTION SHALL BE COVERED AND EFFECTIVELY SEALED AT THE END OF THE DAY'S WORK.
16. PROVIDE ACCESS TO EXISTING MAIN LINE VALVES THROUGHOUT CONSTRUCTION.
17. UNDER NO CIRCUMSTANCE SHALL THE PIPE OR ACCESSORIES BE DROPPED INTO THE TRENCH.
18. WHERE JOINING EXISTING ASBESTOS CEMENT PIPE, CUT IN ACCORDANCE WITH OSHA REQUIREMENTS AND DISPOSE OF IN ACCORDANCE WITH APPLICABLE ENVIRONMENTAL REGULATIONS.

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19. PROVIDE EXTENSIONS ON VALVE STEM TOPS HAVING OVER 5 FEET BURY. REFER TO STANDARD PLAN 570.
20. ALL BURIED METALLIC FITTINGS SHALL BE FULLY ENCASED IN POLYETHYLENE WRAP (CHRISTYS OR APPROVED EQUAL), 8 MILS MINIMUM, INSTALLED PER MANUFACTURER RECOMMENDATIONS.
21. INSTALL AIR AND VACUUM VALVES PER STANDARD PLANS 574 AND 575 AT HIGH POINTS (8" DIAMETER PIPE OR LARGER) AS DEEMED NECESSARY BY THE DESIGN ENGINEER AND TOWN.
22. THRUST BLOCKING IS REQUIRED ON ALL WATER MAIN AND FIRE LINES. REFER TO STANDARD PLANS 561 AND 562.
23. REMOVE AND CORRECT DEFECTIVE WORK WITHIN 24 HOURS FOLLOWING WRITTEN NOTIFICATION BY THE PUBLIC WORKS DIRECTOR OR THEIR DESIGNEE.
24. CONSTRUCT TEMPORARY FLUSHING VALVES/BLOW-OFF PIPING ON THE END OF NEW WATER MAINS AS REQUIRED TO MEET FLUSHING REQUIREMENTS. CONSULT WITH THE TOWN INSPECTOR TO DETERMINE ACCEPTABLE LOCATIONS AND SIZING REQUIREMENTS. MINIMUM ACCEPTABLE FLUSHING VELOCITY FOR INITIAL FLUSH IS 6 FEET PER SECOND.
25. ALL TYPES OF INSTALLED PIPE SHALL BE PRESSURE TESTED AND LEAKAGE TESTING IN ACCORDANCE WITH AWWA STANDARD C600-10.
26. ALL NEW WATER MAINS OR APPURTENANCES SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA STANDARD C651-05 OR A METHOD APPROVED BY THE PUBLIC WORKS DIRECTOR. THE SPECIFICATIONS SHALL INCLUDE DETAILED PROCEDURES FOR THE ADEQUATE FLUSHING, DISINFECTION AND MICROBIOLOGICAL TESTING OF ALL WATER MAINS. ON ALL NEW AND EXTENSIVE DISTRIBUTION SYSTEM CONSTRUCTION, EVIDENCE OF SATISFACTORY DISINFECTION SHALL BE PROVIDED TO THE PUBLIC WORKS DIRECTOR OR THEIR DESIGNEE. SAMPLES FOR COLIFORM ANALYSES SHALL BE COLLECTED AFTER DISINFECTION IS COMPLETE AND THE SYSTEM IS REFILLED WITH DRINKING WATER. THE USE OF WATER FOR PUBLIC DRINKING WATER PURPOSES SHALL NOT COMMENCE UNTIL THE BACTERIOLOGICAL TESTS INDICATE THE WATER IS FREE FROM CONTAMINATION.
27. DISINFECTING, FLUSHING, AND HYDROSTATIC TESTING PLANS SHALL BE SUBMITTED TO THE PUBLIC WORKS DIRECTOR OR THEIR DESIGNEE A MINIMUM OF 5 WORKING DAYS PRIOR TO COMMENCEMENT OF ACTIVITY. CONTRACTOR SHALL NOT OPERATE EXISTING WATER VALVES.
28. BACKFLOW PREVENTION DEVICES MAY BE REQUIRED. IF REQUIRED, THE TOWN MAY SET UP A WATER METER UNTIL AN APPROVED AND TESTED BACKFLOW DEVICE IS INSTALLED AND INSPECTED.
29. ALL BACKFLOW PREVENTION DEVICES HAVE TO BE TESTED PERIODICALLY TO ENSURE THAT THEY ARE FUNCTIONING PROPERLY. A VISUAL CHECK OF AIR GAPS IS SUFFICIENT, BUT MECHANICAL BACKFLOW PREVENTERS HAVE TO BE TESTED BY A STATE CERTIFIED BACKFLOW SPECIALIST, WITH PROPERLY CALIBRATED GAUGE EQUIPMENT. TO OBTAIN A LIST OF STATE CERTIFIED TESTERS, CONTACT THE PUBLIC WORKS DEPARTMENT.

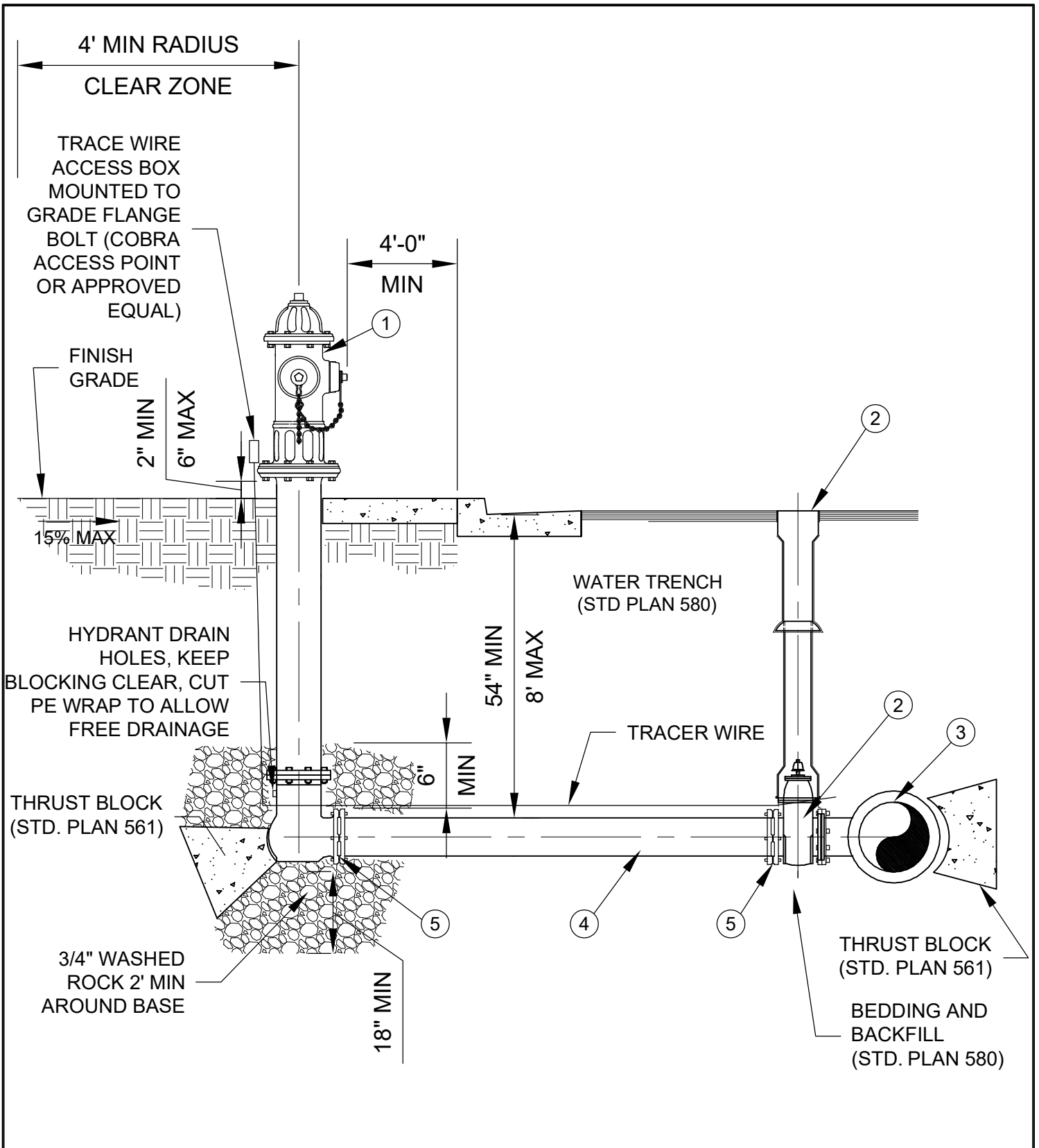
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NOTES:


1. REFER TO STD. PLAN 511-S FOR LEGEND ITEMS, APPROVED PARTS LIST, AND DETAIL NOTES.

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NOTES:

- REFER TO STD. PLAN 511-S FOR LEGEND ITEMS, APPROVED PARTS LIST, AND DETAIL NOTES.

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ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	FIRE HYDRANT, DRY BARREL, AWWA C502	MUELLER	SUPER CENTURION 250, MODEL NO. 423-501147, 5-14" MAIN VALVE OPENING 3-WAY (2 HOSE NOZZLE/1 PUMPER NOZZLE). YELLOW COLOR.
2	BURIED VALVE AND VALVE BOX (STD. PLAN 570), 6" GATE VALVE, NRS, FLG X MJ, 2" SQ. OPERATING NUT, AWWA C509	MUELLER	SERIES 2360, SST BONNET BOLTS
3	6" DUCTILE IRON FLANGE TEE, AWWA C110	-	-
4	HYDRANT SERVICE LINE, 6" DIAMETER DUCTILE IRON PIPE, RESTRAINED JOINTS (STD. PLAN 540)	-	-
5	MECHANICAL JOINT RESTRAINT OR SST TIE ROD/NUT RESTRAINT	EBBA IRON	MEGALUG SERIES 1100, STD T-BOLTS AND NUTS

511 S FIRE HYDRANT

DETAIL NOTES

1. LOCATE HYDRANT AS SHOWN ON THE APPROVED PLANS
2. SET HYDRANT PLUMB WITH PUMPER NOZZLE FACING STREET
3. ADJUST TO GRADE WITH MAXIMUM OF ONE (1) HYDRANT BARREL EXTENSION (AWWA C502)
4. PROVIDE 316 STAINLESS STEEL BOLTS AND NUTS WITH ANTI-SIEZE LUBRICATION ON ALL FLANGED CONNECTIONS
5. RECOAT DAMAGED OR MARRED HYDRANT COATING AFTER INSTALLATION (UV RESISTANT, HIGH GLOSS, POLYURETHANE ENAMEL COATING, TOWN OF BENNETT YELLOW, PAINT COLOR PER NFPA REQUIREMENTS)
6. HYDRANT DRAINS SHALL NOT BE CONNECTED TO OR LOCATED WITHIN 10 FEET OF SANITARY SEWERS. WHERE POSSIBLE, HYDRANT DRAINS SHALL NOT BE LOCATED WITHIN 10 FEET OF STORM DRAINS.
7. ALL BURIED METALLIC FITTINGS SHALL BE FULLY ENCASED IN POLYETHYLENE WRAP (CHRISTY'S VISQUEEN OR APPROVED EQUAL), 8 MILS MINIMUM THICKNESS, INSTALLED PER MANUFACTURER RECOMMENDATIONS


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GENERAL REQUIREMENTS - WATER METER, METER VAULT, AND SERVICE LINE

REFER TO SPECIFICATIONS AND STANDARD PLANS FOR DETAILED WATER METER, METER VAULT, AND SERVICE LINE REQUIREMENTS

WATER METER & METER VAULT:

1. WATER METER AND RADIOREAD METER TRANSCIEVER UNIT (MXU) WILL BE PROVIDED BY THE TOWN. ALL OTHER COMPONENTS SHALL BE PROVIDED AND INSTALLED BY THE DEVELOPER/BUILDING. PROVIDE 2 WEEKS ADVANCE NOTICE TO THE PUBLIC WORKS DEPARTMENT FOR METER SET REQUESTS. APPROPRIATE METER APPLICATION AND PAYMENT OF FEES APPLY BEFORE THE TOWN WILL SET A METER.
2. WATER METER SIZE SHALL BE APPROVED BY THE PUBLIC WORKS DIRECTOR PRIOR TO INSTALLATION OF ANY SERVICE LINE, METER VAULT, OR WATER MAIN TAP.
3. INSTALLATION OF A WATER METER EXCEEDING 1-INCH WILL REQUIRE PUBLIC WORKS DIRECTOR APPROVAL. THE METER AND VAULT WILL REQUIRE A FLOW RATE AND DEMAND ANALYSIS BY THE DEVELOPER/BUILDER AND A SITE-SPECIFIC DESIGN.
4. USE OF AN INSIDE WATER METER WILL REQUIRE PUBLIC WORKS DIRECTOR APPROVAL. INSIDE METERS SHALL BE USED ONLY FOR COMMERCIAL OR MULTI-UNIT BUILDINGS SUBJECT TO THE FOLLOWING CONDITIONS:
 - a. UNRESTRICTED ACCESS IS AVAILABLE TO PUBLIC WORKS DEPARTMENT PERSONNEL.
 - b. THE METER SHALL BE LOCATED IN A SEPARATE MECHANICAL ROOM.
 - c. THE METER SHALL BE ASSOCIATED WITH FIRE PROTECTION SYSTEM (FIRE STACK) PLUMBING.
 - d. THE METER REQUIRES A SITE SPECIFIC DESIGN APPROVED BY THE FIRE MARSHAL, THE TOWN OF BENNETT BUILDING DEPARTMENT, AND THE PUBLIC WORKS DEPARTMENT. LAYOUT SHALL BE CONSISTENT WITH WATER STANDARD PLANS 523, 526, AND 528.
5. METER VAULT LOCATION SHALL BE APPROVED BY THE PUBLIC WORKS DIRECTOR PRIOR TO INSTALLATION OF ANY SERVICE LINE OR WATER MAIN TAP.
6. LOCATE METER VAULT, WHENEVER POSSIBLE, IN LANDSCAPE AREAS. PLACEMENT WITHIN A PAVED SURFACE, DRIVEWAY OR WALKWAY, REQUIRES WRITTEN APPROVAL PRIOR TO THE INSTALLATION OF THE SERVICE LINE OR WATER MAIN TAP. THE METER VAULT SHALL BE PLACED AT THE PUBLIC RIGHT OF WAY LINE. IN THE ABSENCE OF A PUBLIC R-O-W LINE, THE METER VAULT SHALL BE LOCATED WITHIN A DEDICATED EASEMENT AND A MAXIMUM OF FIVE FEET BEHIND THE CURB AND GUTTER OR SIDEWALK AS APPLICABLE.
7. EXTEND THE SERVICE LINE STUB ON THE CUSTOMER SIDE TO 10 FEET BEYOND THE METER VAULT WITH METER VAULT CONSTRUCTION. INSTALL END CAP AND MARKER ON SERVICE LINE TERMINATION.


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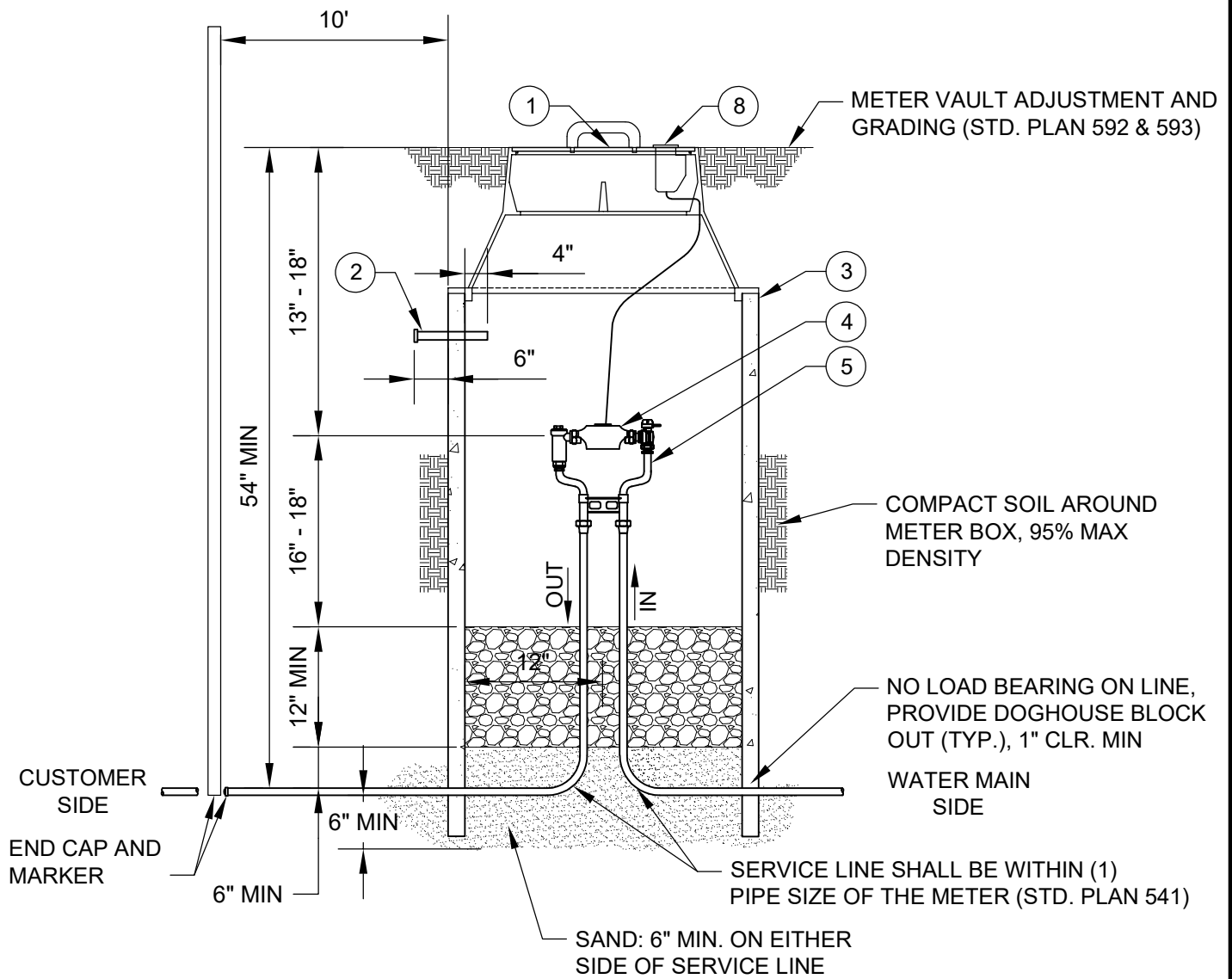
8. LOCATE METER VAULT TO PROVIDE CONVENIENT, SAFE, AND UNINHIBITED ACCESS FROM A PUBLIC ROW OR PUBLIC UTILITY EASEMENT. NO FENCES SHALL BE LOCATED BETWEEN THE ROW/EASEMENT LINE AND THE METER VAULT. NO OBSTRUCTIONS OR UTILITIES SHALL BE LOCATED WITHIN 3 FEET OF THE OUTSIDE WALL OF THE METER VAULT. NO BUSHES, SHRUBS, OR PLANTS SHALL BE WITHIN 2 FEET OF THE METER LID AND NO TREES SHALL BE PLANTED SUCH THAT THE DRIP LINE AT MATURITY WILL BE WITHIN 3 FEET OF THE METER LID.
9. SET METER VAULT SET FLUSH WITH THE FINAL LANDSCAPE OR PAVEMENT GRADE. IF THE GROUND IS NOT TO FINAL GRADE AT THE TIME OF THE METER INSTALLATION OR INSPECTION, ADJUST METER VAULT WHEN FINAL GRADE IS ESTABLISHED AND ADJUST THE METER SETTER TO MEET REQUIRED VAULT DIMENSIONS. REFERENCE STANDARD PLANS 592 AND 593 FOR METER VAULT GRADING REQUIREMENTS.
10. IN MOST CASES THE METER TRANSCIEVER UNIT (MXU) DEVICE WILL MOUNT THROUGH THE METER VAULT LID. IF METER LOCATION DOES NOT PERMIT A CLEAR RELIABLE MXU DEVICE RADIO SIGNAL TO TOWN FACILITIES, A REMOTE MXU DEVICE WILL BE REQUIRED. THE REMOTE MXU DEVICE WILL BE INSTALLED BY THE TOWN, AT A LOCATION DETERMINED BY THE TOWN, AT THE TIME OF THE METER INSPECTION. IN MOST CASES THE REMOTE MXU DEVICE WILL BE INSTALLED ON THE OUTSIDE OF THE BUILDING FACING A PULIC STREET. PROVIDE CONDUIT AND SIGNAL WIRE FROM METER VAULT TO REMOTE MXU DEVICE LOCATION, REFERENCE STANDARD PLAN 530. FOR DEVELOPMENT PROJECTS, A SIGNAL PROPOGATION STUDY AND INSTALLATION OF A NEW REPEATER STATION AT THE DEVELOPER'S EXPENSE MAY BE REQUIRED.
11. IF REPLACING METER VAULT, PROTECT EXISTING METER AND MXU DEVICE, TAG OR LEAVE IN VAULT. CONTACT BENNETT PUBLIC WORKS DEPARTMENT PRIOR TO REMOVING OR REPLACING METER.
12. PROTECT METER VAULT AND MXU DEVICE THROUGHOUT CONSTRUCTION.
13. A WATER METER WILL NOT BE SET BY THE TOWN UNTIL THE METER VAULT AND SERVICE LINE ARE IN COMPLIANCE WITH THE MOST CURRENT VERSION OF THE ENGINEERING STANDARDS, STANDARD DRAWINGS, AND APPROVED PROJECT DRAWINGS, A METER INSPECTION HAS BEEN PERFORMED AND DEFICIENCIES CORRECTED, AND ALL APPLICABLE FEES PAID.
14. ALL BRASS AND BRONZE PIPE, FITTINGS, AND VALVES SHALL MEET LOW LEAD COMPLIANCE REQUIREMENTS IN ACCORDANCE WITH ANSI/ASTM 371.
15. PROVIDE COMPRESSION STYLE FITTINGS AND VALVES. FLARED STYLE CONNECTIONS ARE NOT ALLOWED.

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SERVICE LINE:

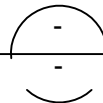
1. ROUTE SERVICE LINES AT A 90 DEGREE ANGLE TO THE FRONT PROPERTY/R-O-W/EASEMENT LINE FROM THE WATER MAIN. AVOID ROUTING SERVICE LINES UNDER DRIVEWAYS.
2. MAINTAIN 5 FEET HORIZONTAL SEPARATION BETWEEN TAP LOCATION AND UTILITY CROSSINGS.
3. DUCTILE IRON WATER MAIN: MAINTAIN 2 FEET SEPARATION BETWEEN SERVICE LINE TAP AND ALL MAIN LINE FITTINGS, VALVES, PIPE JOINTS, AND OTHER SERVICE TAPS.
4. PVC WATER MAIN: MAINTAIN 3 FEET SEPARATION BETWEEN SERVICE LINE TAP AND ALL MAIN LINE FITTINGS, VALVES, PIPE JOINTS, AND OTHER SERVICE TAPS.
5. WATER SERVICE LINE SHALL BE CONTINUOUS. NO BENDS, FITTINGS, COUPLERS OR CONNECTIONS, ARE PERMITTED BETWEEN THE WATER MAIN CORPORATION STOP AND THE METER VAULT CURB VALVE.
6. PROVIDE COMPRESSION STYLE VALVES AND FITTINGS. FLARED CONNECTIONS ARE NOT ALLOWED.
7. METER VAULTS AND SERVICE LINES MUST BE INSPECTED BY THE TOWN PRIOR TO BACKFILLING UNLESS SPECIFIC PRIOR APPROVAL IS PROVIDED BY THE TOWN.
8. TAPPING NEW CONSTRUCTION WATER MAIN: NOTIFY AND SECURE INSPECTION OF INSTALLATION BY THE PUBLIC WORKS DEPARTMENT PRIOR TO TAPPING WATER MAIN. PROVIDE TAPPING "COUPON" TO THE TOWN INSPECTOR.
9. TAPPING EXISTING WATER MAIN: NOTIFY AND SECURE INSPECTION OF INSTLLATION BY THE PUBLIC WORKS DEPARTMENT 48 HOURS PRIOR TO TAPPING WATER MAIN. PROVIDE TAPPING "COUPON" TO THE TOWN INSPECTOR.
10. SERVICE LINES LARGER THAN 2-INCH DIAMETER SHALL MEET WATER MAIN REQUIREMENTS.
11. ALL BRASS AND BRONZE PIPE, FITTINGS, AND VALVES SHALL MEET LOW LEAD COMPLIANCE REQUIREMENTS IN ACCORDANCE WITH ANSI/ASTM 371.
12. DISINFECT ALL NW WATER SERVICES AND APPURTENANCES IN ACCORDANCE WITH AWWA STANDARD C651-05 AND THE TOWN OF BENNETT WATER SYSTEM FIELD OBSERVATION GUIDELINES. DISINFECTING, FLUSHING, AND HYDROSTATIC PLANS SHALL BE SUBMITTED TO THE TOWN INSPECTOR A MINIMUM OF 5 WORKING DAYS PRIOR TO COMMENCEMENT OF ACTIVITY. CONTRACTOR SHALL NOT OPERATE EXISTING WATER VALVES.

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SECTION

SCALE: NTS



NOTES:

- REFER TO STD. PLAN 520 FOR GENERAL REQUIREMENTS - METER, METER VAULT, AND SERVICE LINE.
- REFER TO STD. PLAN 521 S FOR LEGEND ITEMS, APPROVED PARTS LIST, AND DETAIL NOTES.



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**3/4" AND 1" SINGLE METER
OUTSIDE SETTING**

STD. PLAN

521

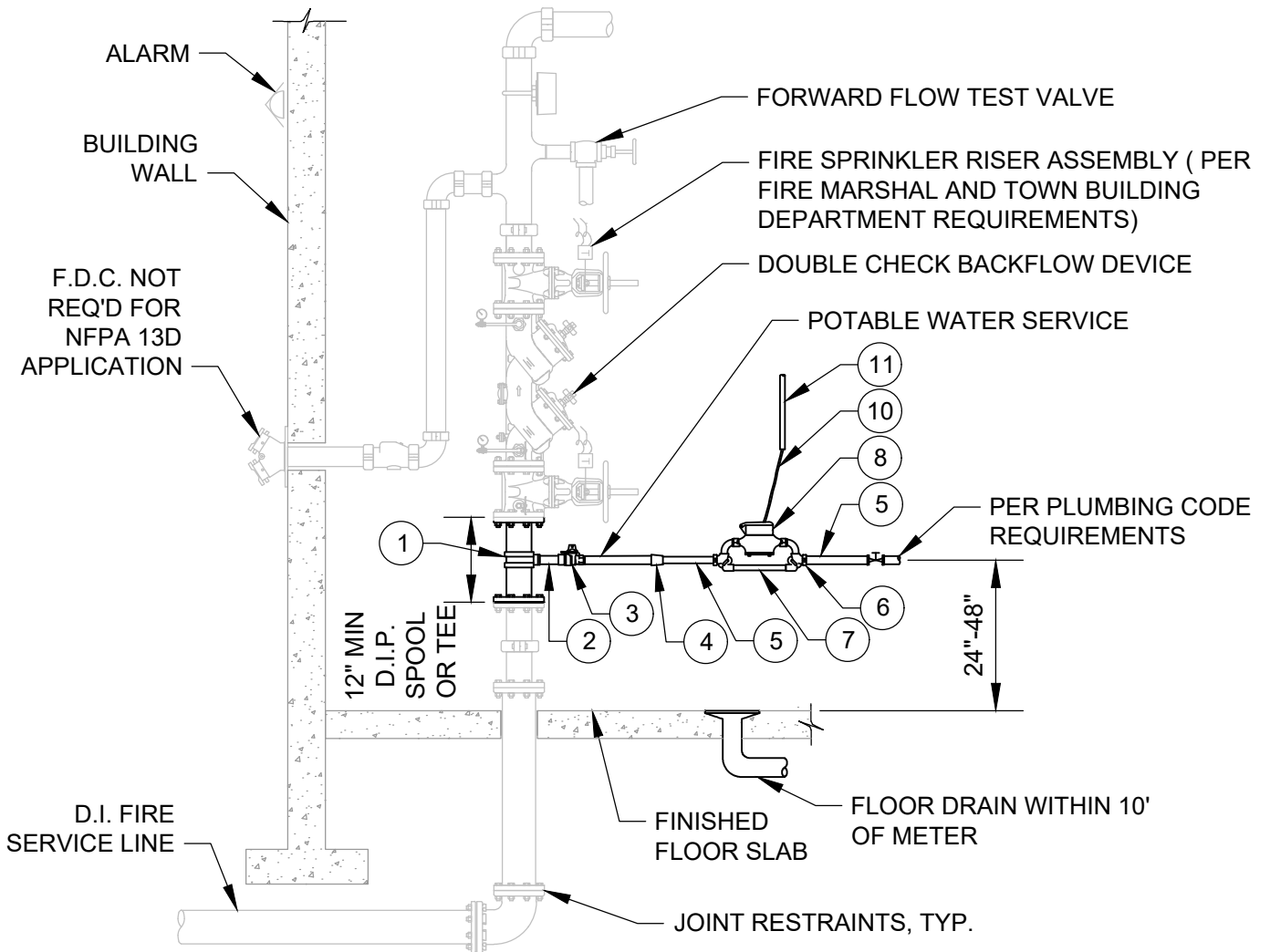
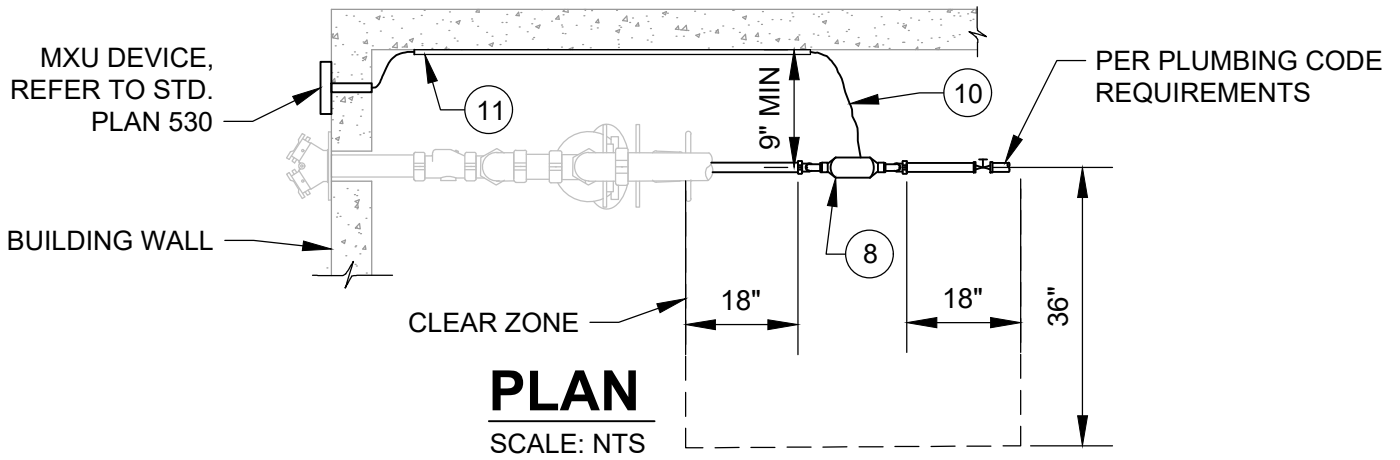
ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	METER VAULT FRAME AND COVER (STD. PLAN 529)		
2	MCU REMOTE LOCATION CONDUIT WITH END CAPS, SCH 40 PVC (STD. PLAN 530)		
3	20" X 48" METER PIT W/ MOUSEHOLE CUTOUTS FOR INLET AND OUTLET, RATED FOR 20,000 PB LOADING	CARSON	0020-48
		MID-STATES PLASTICS	MS2042448B
4	METER, SUPPLIED AND INSTALLED BY TOWN OF BENNETT		
5	3/4" METER YOKE	FORD	V82W-44-33-G-NL
	1" METER YOKE	FORD	V82W-44-44-G-NL
6	CONNECTION, MATCH SIZE OF SERVICE LINE		
7	END CAP AND MARKER, CTS X F.I.P. (OUTLET)	MUELLER	H-15451N AND H-10035N
8	MXU AND WIRING, SUPPLIED AND INSTALLED BY TOWN		

521 S -3/4" AND 1" SINGLE METER OUTSIDE SETTING

DETAIL NOTES


1. LOCATE METER VAULT PER APPROVED PLANS AND SET METER BOX PLUMB
2. SST INSERT STIFFENERS REQUIRED ON ALL CTS TUBING CONNECTIONS

 <p>town of Bennett welcome neighbors.</p>	DATE	3/4" AND 1" METER OUTSIDE SETTING LEGEND AND NOTES	STD. PLAN
	01/2021		521 S
	REV.		
	0		



NOTES:

1. REFER TO STD. PLAN 520 FOR GENERAL REQUIREMENTS - METER, METER VAULT, AND SERVICE LINE.
2. REFER TO STD. PLAN 523 S FOR LEGEND ITEMS, APPROVED PARTS LIST, AND DETAIL NOTES.

	DATE	3/4" AND 1" METER INSIDE SETTING	STD. PLAN
	01/2021		523
	REV.		
	0		

ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	1" BRONZE SERVICE SADDLE, DOUBLE STRAP	MUELLER	BR2B SERIES, CC THREADS
		FORD	STYLE 202B, CC THREADS
2	1" DIA. BRASS NIPPLE X 2" LENGTH, M.I.P.		
3	1" CURB VALVE, F.I.P X F.I.P.	MUELLER	B-20283N
4	1" DIA. BRASS NIPPLE X 2" LENGTH, M.I.P. AND BRONZE BELL REDUCER, 1" X 3/4" DIA. (REQ'D FOR 3/4" METER YOKE ONLY)		
5	3/4" OR 1: DIA. COPPER PIPING AND FITTINGS, AS REQ'D PER SITE SPECIFIC LAYOUT		
6	3/4" OR 1" METER YOKE END CONNECTIONS	MUELLER	MULTI X F.I.P., H-14222N
7	3/4" METER YOKE (STRAIGHT INLET AND OUTLET)	MUELLER	5/8" X 3/4" X 7" B-2418-6AN
		FORD	5/8" X 3/4" LSVH11-233W-NL
	3/4" METER YOKE (VERTICAL INLET AND OUTLET)	MUELLER	5/8" X 3/4" X 10" B-2448-6AN
		FORD	5/8" X 3/4" LSVH11-233W-NL
	1" METER YOKE (STRAIGHT INLET AND OUTLET)	MUELLER	1" VBHC84-12W-11-44-NL
		FORD	1" LSVH11-444W-NL
1" METER YOKE (VERTICAL INLET AND OUTLET)	MUELLER	1" X 12" B-2448-6AN	
	FORD	1" KHVBHC-4-FP-NL	
8	METER, SUPPLIED AND INSTALLED BY TOWN		
9	PIPE SIZE BRASS NIPPLE AND CURB VALVE, F.I.P. X F.I.P.	MUELLER	B-20283N
10	MXU WIRING, SUPPLIED AND INSTALLED BY TOWN		
11	EMT CONDUIT FOR MXU WIRING, AS REQUIRED		


523 S.2 0.75 AND 1-INCH METER INSIDE SETTING

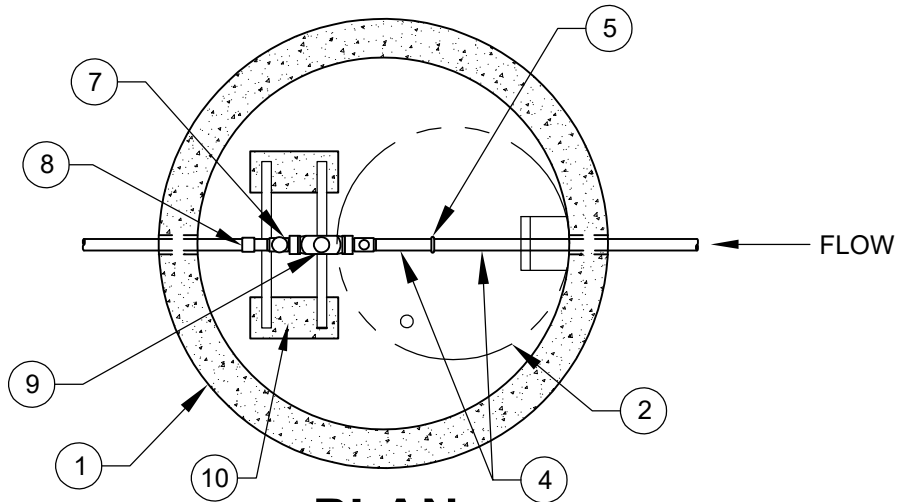
DETAIL NOTES

1. USE OF AN INSIDE WATER METER REQUIRES PUBLIC WORKS DIRECTOR APPROVAL. REFERENCE WATER STANDARD PLAN 520 FOR APPLICABLE CONDITIONS.
2. FIRE SPRINKLER RISER WITH POTABLE WATER SERVICE: A SITE SPECIFIC DESIGN IS REQUIRED. THE FIRE PROTECTION SPRINKLER SYSTEM AND POTABLE WATER SYSTEM DESIGN SHALL BE APPROVED BY THE FIRE MARSHAL AND THE TOWN OF BENNETT BUILDING DEPARTMENT. THE POTABLE WATER SERVICE CONNECTION AND METER ASSEMBLY DESIGN SHALL BE APPROVED BY THE TOWN OF BENNETT BUILDING DEPARTMENT AND THE PUBLIC WORKS DIRECTOR. DESIGN AND CONSTRUCTION SHALL COMPLY WITH APPLICABLE BUILDING AND PLUMBING CODES.

	DATE	3/4" - 1" METER INSIDE SETTING LEGEND AND NOTES	STD. PLAN
	01/2021		523 S.1
	REV.		
	0		

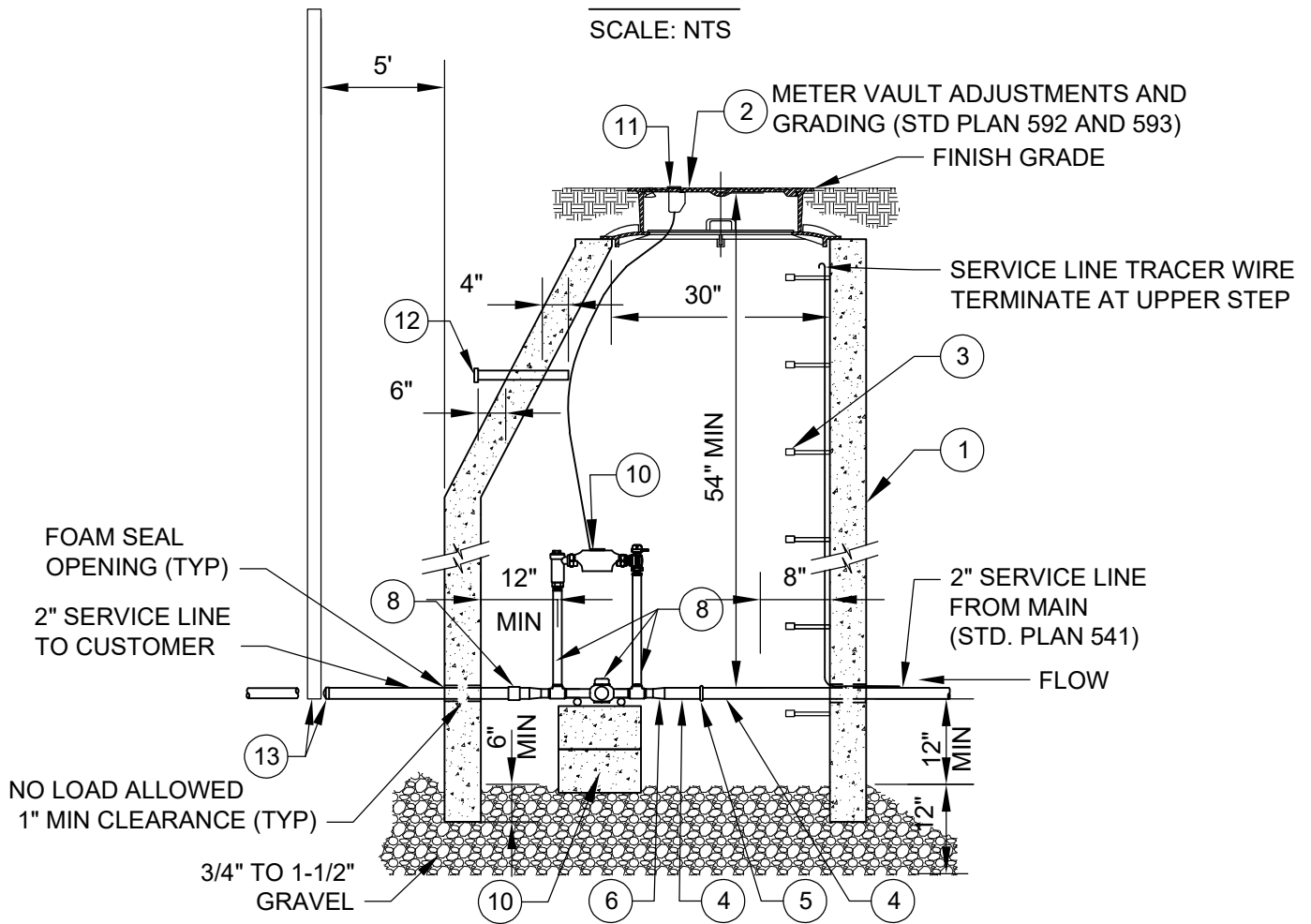
3. BACKFLOW PREVENTER: PROVIDE A DOUBLE CHECK BACKFLOW ASSEMBLY (DCBA) OR REDUCED PRESSURE PRINCIPAL BACKFLOW ASSEMBLY (RPBA) ON THE FIRE SPRINKLER RISER ASSEMBLY. STYLE TO BE DETERMINED BY THE BUILDING DEPARTMENT AND PUBLIC WORKS DEPARTMENT BASED ON DEGREE OF HAZARD POSED BY FIRE SPRINKLER PROTECTION SYSTEM. BEFORE A CERTIFICATE OF OCCUPANCY CAN BE ISSUED BY THE BUILDING DEPARTMENT, BACKFLOW ASSEMBLY TESTING FOR PROPER OPERATION (PER TOWN REQUIREMENTS BY A CERTIFIED TESTER RECOGNIZED BY THE TOWN) IS REQUIRED AND A REPORT SUBMITTED.
4. CONNECTIONS TO THE WATER SYSTEM ARE NOT PERMITTED PRIOR TO THE POTABLE WATER METER ASSEMBLY OR THE FIRE SPRINKLER RISER BACKFLOW ASSEMBLY. THIS INCLUDES OUTSIDE IRRIGATION SUPPLY.
5. CLEARANCES: PROVIDE ADEQUATE CLEARANCES FROM FIRE RISER AND AROUND WATER METER ASSEMBLY. MAINTAIN:
 - a. 9" MINIMUM FROM WALL TO FACE OF POTABLE WATER PIPING
 - b. 18" CLEAR ON EACH SIDE OF METER ASSEMBLY
 - c. 36" CLEAR IN FRONT OF METER ASSEMBLY
6. LOCATE METER ASSEMBLY TWO (2) TO FOUR (4) FEET ABOVE THE FLOOR. POSITION METER HORIZONTAL WITH DIAL POINTING UP.
7. PROVIDE ISOLATION (CURB) VALVES BETWEEN THE CORP STOP AND METER.
8. PROVIDE A FLOOR DRAIN IN THE FIRE RISER ROOM WITHIN 10 FEET OF THE WATER METER LOCATION.
9. PROVIDE PIPE LABELS ON THE POTABLE WATER LINE BETWEEN THE FIRE RISER AND THE WATER METER DESIGNATING PIPE AS "POTABLE WATER".
10. PROVIDE PIPE ANCHORAGE TO SUPPORT METER YOKE AND ASSEMBLY INDEPENDENT OF THE POTABLE WATER SUPPLY PIPING AND BUILDING PLUMBING. PROVIDE PIPE STANDS OR UNISTRUT WALL STANDOFFS. DO NOT SUPPORT METER ASSEMBLY FROM OTHER PIPING.
11. PROVIDE A WALL PENETRATION AND CONDUIT FOR REMOTE RADIOREAD METER TRANSCEIVER UNIT (MXU) DEVICE(S). COORDINATE ROUTING AND WALL PENETRATION LOCATION WITH THE PUBLIC WORKS DEPARTMENT. REFERENCE WATER STANDARD PLANS 520 AND 530.
12. PROVIDE ½" EMT CONDUIT AND SUPPORTS FOR MXU SIGNAL WIRE IF DISTANCE TO WALL PENETRATION EXCEEDS 10 FEET.
13. INSPECTION: CONTACT THE PUBLIC WORKS DIRECTOR OR THEIR DESIGNEE FOR INSPECTION OF THE POTABLE WATER SYSTEM METER ASSEMBLY INSTALLATION.
14. REFER TO STD. PLAN 500 AND THE SPECIFICATIONS FOR FLUSHING, HYDROSTATIC TESTING, AND DISINFECTION REQUIREMENTS.

	DATE	3/4" - 1" METER INSIDE SETTING NOTES	STD. PLAN
	01/2021		523 S.2
	REV.		
	0		



PLAN

SCALE: NTS




SECTION

SCALE: NTS

NOTES:

1. REFER TO STD. PLAN 520 FOR GENERAL REQUIREMENTS - METER, METER VAULT, AND SERVICE LINE.
2. REFER TO STD. PLAN 524 S FOR LEGEND ITEMS, APPROVED PARTS LIST, AND DETAIL NOTES.

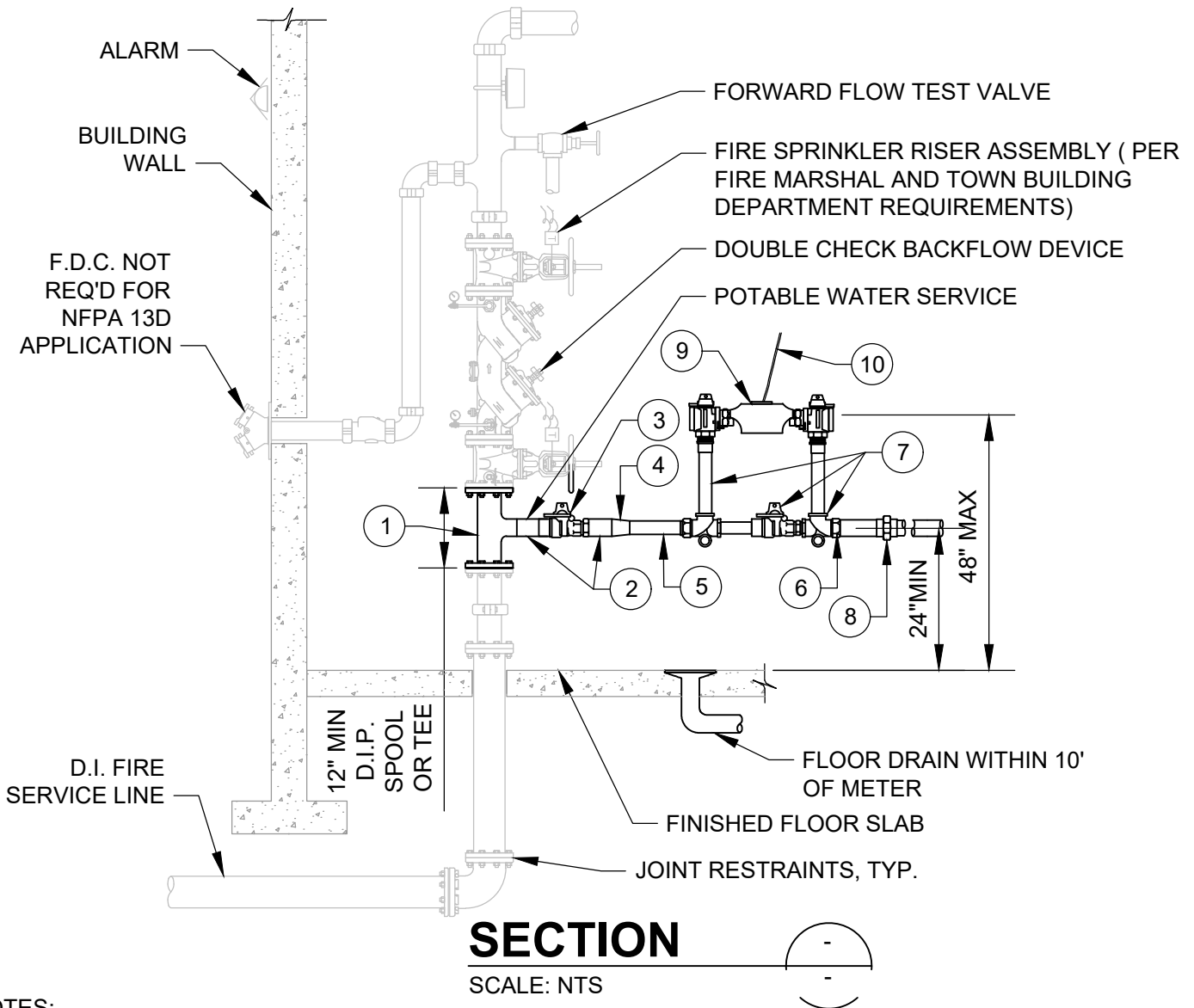
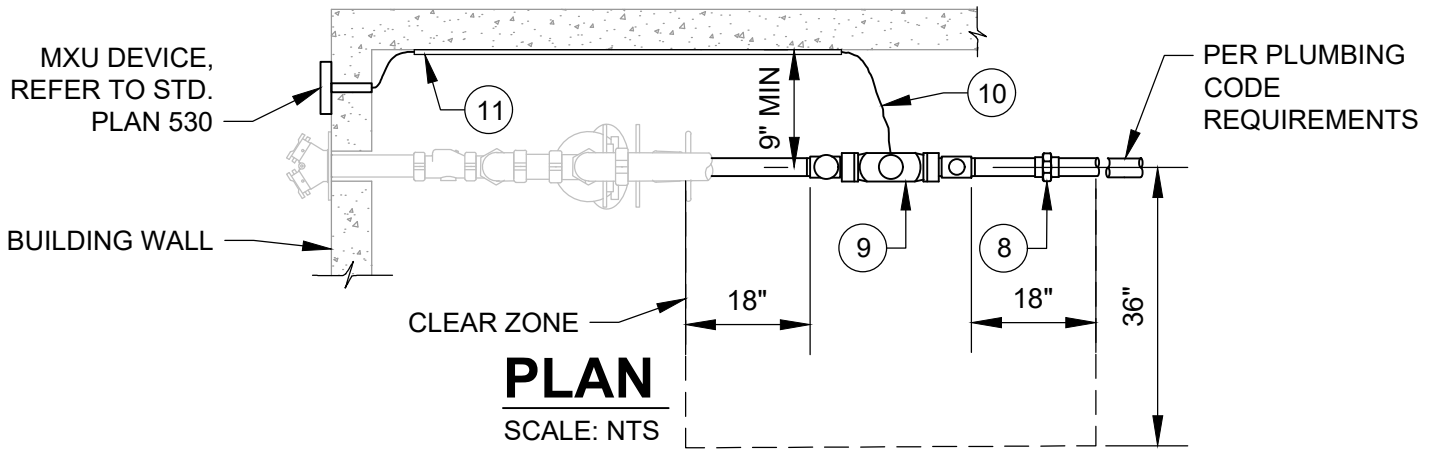
	DATE	1-1/2" AND 2" SINGLE METER OUTSIDE SETTING	STD. PLAN
	01/2021		524
	REV.		
	0		

ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	5' DIA. MANHOLE, PRECAST CONCRETE ECCENTRIC CONE AND WALL SECTIONS	-	ASTM C 478
2	METER VAULT FRAME AND COVER (STD. PLAN 529)	-	-
3	POLYPROPYLENE ENCASED GRADE 60 STEEL STEPS AT 13" C-C, 13-1/2" TREAD WIDTH	M.A. INDUSTRIES OR APPROVED EQUAL	PS2-PFDF
4	2" DIA. BRASS NIPPLE X 4" LENGTH, M.I.P.	-	-
5	2" BRONZE UNION, F.I.P., THREADED	-	-
6	1-1/2" BRASS NIPPLE X 4" LENGTH, 2" X 1-1/2" BRONZE BELL REDUCER, AND 1-1/2" CLOSE BRASS NIPPLE (1-1/2" YOKES ONLY)	-	-
7	1-1/2" METER YOKE, COMMERCIAL SERVICE WITH BYPASS, RESIDENTIAL OR IRRIGATION SERVICE W/O BYPASS	MUELLER	1-1/2"X15" B2423-2-01N (WITH BYPASS), 1-1/2"X15" B2422-2N (WITHOUT BYPASS)
		FORD	1-1/2" VBHH76-15B-11-66-NL (WITH BYPASS), 1-1/2" VBHH76-15-11-66-NL (WITHOUT BYPASS)
	2" METER YOKE, COMMERCIAL SERVICE WITH BYPASS, RESIDENTIAL OR IRRIGATION SERVICE W/O BYPASS	MUELLER	2"X15" B2423-2-01N (WITH BYPASS), 2"X15" B2422-2N (WITHOUT BYPASS)
		FORD	2" VBHH77-15B-11-77-NL (WITH BYPASS) 2" VBHH77-15-11-77-NL (WITHOUT BYPASS)
8	2" CONNECTION, F.I.P. X CTS AND 2" BRASS NIPPLE X 4" LENGTH (OUTLET); 1-1/2" YOKE ONLY: ADD 2"X1-1/2" BRONZE BELL REDUCER AND 1-1/2" CLOSE BRASS NIPPLE	MUELLER	H-1545N
		FORD	C-14-66-G-NL
9	METER, SUPPLIED AND INSTALLED BY TOWN OF BENNETT	-	-
10	PIPE SUPPORTS (4) 16"X8"X8" CMU BLOCK, (2) METER SUPPORT RODS, GALVANIZED	-	-
11	MXU WIRING, SUPPLIED AND INSTALLED BY TOWN OF BENNETT	-	-
12	MXU REMOTE LOCATION CONDUIT WITH END CAPS, SCH 40 PVC (STD. PLAN 531)	-	-
13	END CAP AND MARKER, CTS X F.I.P. (OUTLET)		H-15451N AND H-10035N

524 S 1.5 INCH AND 2 INCH SINGLE METER SETTING OUTSIDE DETAIL NOTES


1. LOCATE METER VAULT PER APPROVED PLANS AND SET METER BOX PLUMB
2. SST INSERT STIFFENERS REQUIRED ON ALL CTS TUBING CONNECTIONS

	DATE	1-1/2" AND 2" SINGLE METER OUTSIDE LEGEND AND NOTES	STD. PLAN
	01/2021		524 S
	REV.		
	0		




NOTES:

1. REFER TO STD. PLAN 520 FOR GENERAL REQUIREMENTS - METER, METER VAULT, AND SERVICE LINE.
2. REFER TO STD. PLAN 526 S FOR LEGEND ITEMS, APPROVED PARTS LIST, AND DETAIL NOTES.

	DATE	1-1/2" AND 2" METER INSIDE SETTING	STD. PLAN
	01/2021		526
	REV.		
	0		


ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	DUCTILE IRON TEE OR 2" BRONZE SERVICE SADDLE, DOUBLE STRAP	MUELLER	BR2B SERIES, FIP THREADS
		FORD	STYLE 202B, FIP THREADS
2	2" DIA. BRASS NIPPLE X 2" LENGTH, M.I.P.	-	-
3	2" CURB VALVE, F.I.P. X F.I.P.	MUELLER	B-20283N
4	2" DIA. BRASS NIPPLE X 2" LENGTH, M.I.P. AND BRONZE BELL REDUCER, 2" X 1-1/2" DIA. (REQ'D FOR 1-1/2" YOKE ONLY)	-	-
5	1-1/2" OR 2" DIA. BRASS NIPPLES AND BRASS FITTINGS OR COPPER PIPING AND FITTINGS, AS REQ'D PER SITE SPECIFIC LAYOUT	-	-
6	1-1/2" OR 2" METER YOKE END CONNECTIONS	MUELLER	MULTI X F.I.P, H-14222N
7	1-1/2" METER YOKE, COMMERCIAL SERVICE WITH BYPASS, RESIDENTIAL OR IRRIGATION SERVICE WITHOUT BYPASS	MUELLER	1-1/2" X 12" B2423-2-01N (WITH BYPASS), 1-1/2" X 12" B2422-2N (WITHOUT BYPASS)
		FORD	1-1/2" VBHH76-12B-11-66-NL (WITH BYPASS), 1-1/2" VBHH76-12-11-66-NL (WITHOUT BYPASS)
	2" METER YOKE, COMMERCIAL SERVICE WITH BYPASS, RESIDENTIAL OR IRRIGATION SERVICE WITHOUT BYPASS	MUELLER	2" X 12" B2423-2-01N (WITH BYPASS), 2" X 12" B2422-2N (WITHOUT BYPASS)
		FORD	2" VBHH77-12B-11-77-NL (WITH BYPASS), 2" VBHH77-12-11-77-NL (WITHOUT BYPASS)
8	PIPE SIZE BRASS NIPPLE AND BRONZE UNION, F.I.P., THREADED	-	-
9	METER, SUPPLIED AND INSTALLED BY TOWN OF BENNETT	-	-
10	MXU AND WIRING, SUPPLIED AND INSTALLED BY TOWN OF BENNETT	-	-
11	EMT CONDUIT FOR MXU WIRING, AS REQUIRED	-	-

	DATE	1-1/2" AND 2" METER INSIDE SETTING LEGEND	STD. PLAN
	01/2021		526 S.1
	REV.		
	0		


526 S.2 1.5 INCH AND 2 INCH METER INSIDE SETTING

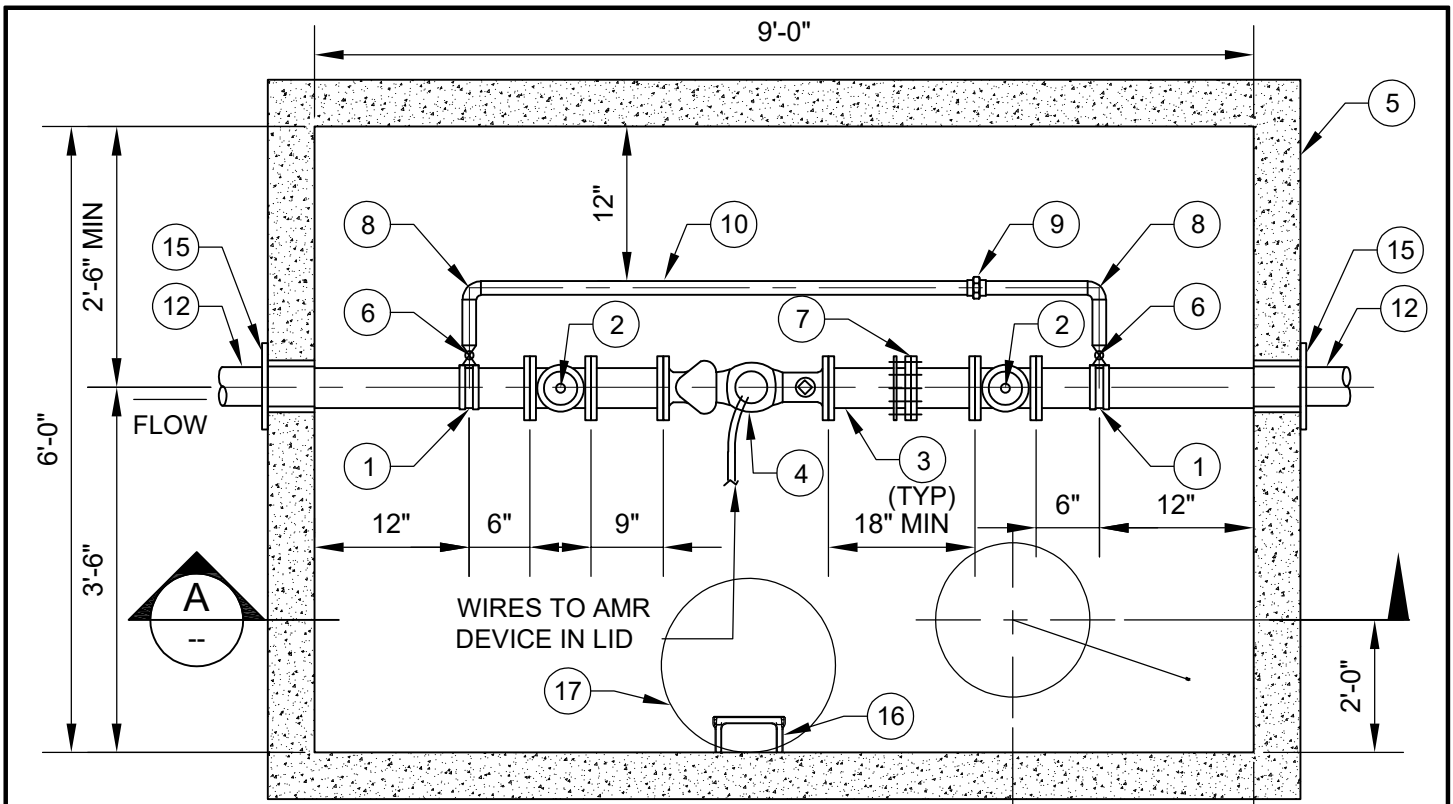
DETAIL NOTES

1. USE OF AN INSIDE WATER METER REQUIRES PUBLIC WORKS DIRECTOR APPROVAL. REFERENCE WATER STANDARD PLAN 520 FOR APPLICABLE CONDITIONS.
2. FIRE SPRINKLER RISER WITH POTABLE WATER SERVICE: A SITE SPECIFIC DESIGN IS REQUIRED. THE FIRE PROTECTION SPRINKLER SYSTEM AND POTABLE WATER SYSTEM DESIGN SHALL BE APPROVED BY THE FIRE MARSHAL AND THE TOWN OF BENNETT BUILDING DEPARTMENT. THE POTABLE WATER SERVICE CONNECTION AND METER ASSEMBLY DESIGN SHALL BE APPROVED BY THE TOWN OF BENNETT BUILDING DEPARTMENT AND THE PUBLIC WORKS DIRECTOR. DESIGN AND CONSTRUCTION SHALL COMPLY WITH APPLICABLE BUILDING AND PLUMBING CODES.
3. BACKFLOW PREVENTION: PROVIDE A DOUBLE CHECK BACKFLOW ASSEMBLY (DCBA) OR REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY (RPBA) ON THE FIRE SPRINKLER RISER ASSEMBLY. STYLE TO BE DETERMINED BY THE BUILDING AND PUBLIC WORKS DEPARTMENT BASED ON DEGREE OF HAZARD POSED BY FIRE SPRINKLER PROTECTION SYSTEM. BEFORE A CERTIFICATE OF OCCUPANCY CAN BE ISSUED BY THE BUILDING DEPARTMENT, BACKFLOW ASSEMBLY TESTING FOR PROPER OPERATION (PER TOWN REQUIREMENTS BY A CERTIFIED TESTER RECOGNIZED BY THE TOWN) IS REQUIRED AND A REPORT SUBMITTED.
4. CONNECTIONS TO THE WATER SYSTEM ARE NOT PERMITTED PRIOR TO THE POTABLE WATER METER ASSEMBLY OR THE FIRE SPRINKLER RISER BACKFLOW ASSEMBLY. THIS INCLUDES OUTSIDE IRRIGATION SUPPLY.
5. CLEARANCES: PROVIDE ADEQUATE CLEARANCES FROM FIRE RISER AND AROUND WATER METER ASSEMBLY. MAINTAIN: 9" MINIMUM FROM EACH WALL TO FACE OF POTABLE WATER PIPING; 18" CLEAR ON EACH SIDE OF METER ASSEMBLY; 36" CLEAR IN FRONT OF METER ASSEMBLY
6. LOCATE METER ASSEMBLY TWO (2) TO FOUR (4) FEET ABOVE THE FLOOR. POSITION METER HORIZONTAL WITH DIAL POINTING UP.
7. PROVIDE ISOLATION (CURB) VALVES AT METER INLET AND OUTLET
8. FOR MULTIPLE METERS PROVIDE A MANIFOLD WITH A MAIN CURB VALVE PRIOR TO THE MANIFOLD AND INDIVIDUAL CURB VALVES LOCATED PRIOR TO AN AFTER METERS
9. PROVIDE A FLOOR DRAIN IN THE FIRE RISER ROOM WITHIN 10 FEET OF THE WATER METER LOCATION.
10. PROVIDE PIPE LABELS ON THE POTABLE WATER LINE BETWEEN THE FIRE RISER AND THE WATER METER DESIGNATING PIPE AS "POTABLE WATER"
11. PROVIDE PIPE ANCHORAGE TO SUPPORT METER YOKE AND ASSEMBLY INDEPENDENT OF THE POTABLE WATER SUPPLY PIPING AND BUILDING PLUMBING. PROVIDE PIPE STANDS OR UNISTRUT WALL STANDOFFS. DO NOT SUPPORT METER ASSEMBLY FROM OTHER PIPING.

	DATE	1-1/2" AND 2" METER INSIDE SETTING DETAIL NOTES	STD. PLAN
	01/2021		526 S.2
	REV.		
	0		

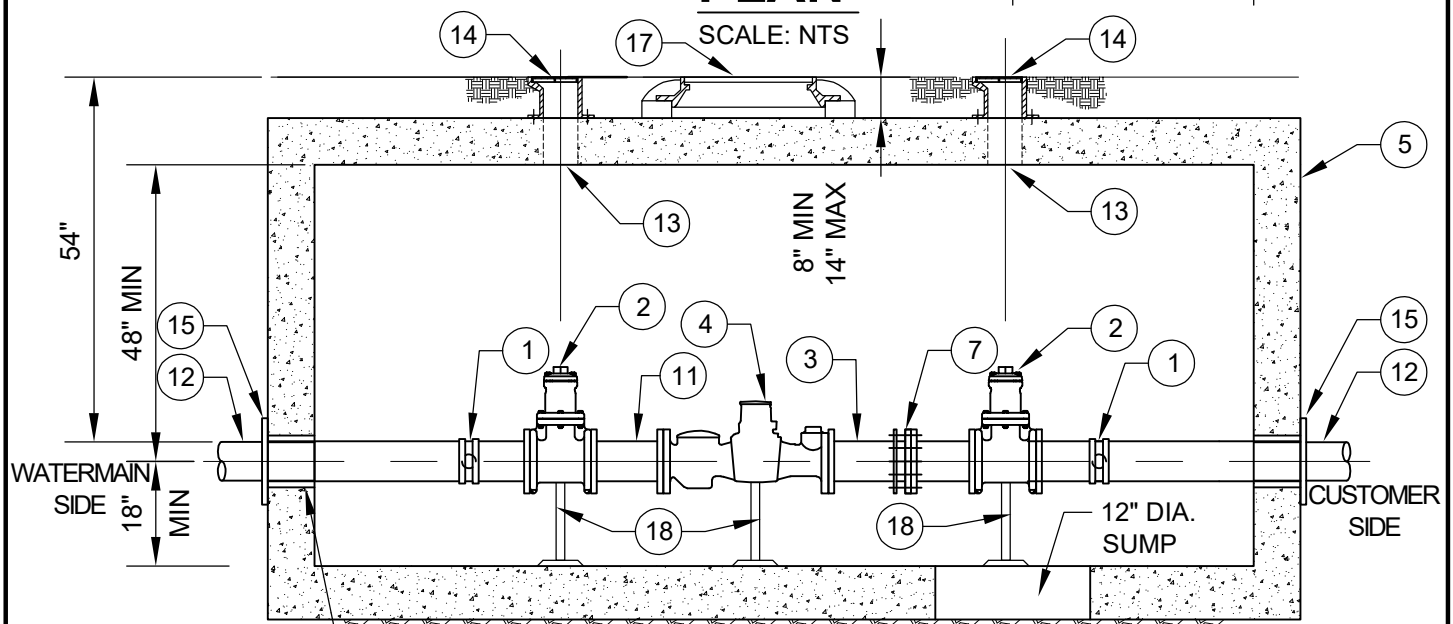
12. PROVIDE A WALL PENETRATION AND CONDUIT FOR REMOTE RADIOREAD METER TRANSCIEVER UNIT (MXU) DEVICE(S). COORDINATE ROUTING AND WALL PENETRATION LOCATION WITH THE PUBLIC WORKS DEPARTMENT. REFER TO WATER STANDARD PLANS 520 AND 530.
13. PROVIDE ½" EMT CONSUIT AND SUPPORTS FOR MXU SIGNAL WIRE IF DISTANCE TO WALL PENETRATION EXCEEDS 10 FEET.
14. INSPECTION: CONTACT THE PUBLIC WORKS DEPARTMENT FOR INSPECTION OF THE POTABLE WATER SYSTEM METER ASSEMBLY INSTALLATION.
15. REFER TO STD. PLAN 500 AND THE SPECIFICATIONS FOR FLUSHING, HYDROSTATIC TESTING, AND DISINFECTION REQUIREMENTS

	DATE	1-1/2" AND 2" METER INSIDE SETTING DETAIL NOTES	STD. PLAN
	01/2021		526 S.3
	REV.		
	0		



PLAN

SCALE: NTS




SECTION

SCALE: NTS

NOTES:


1. REFER TO STD. PLAN 520 FOR GENERAL REQUIREMENTS - METER, METER VAULT, AND SERVICE LINE.
2. REFER TO STD. PLAN 527 S FOR LEGEND ITEMS, APPROVED PARTS LIST, AND DETAIL NOTES.

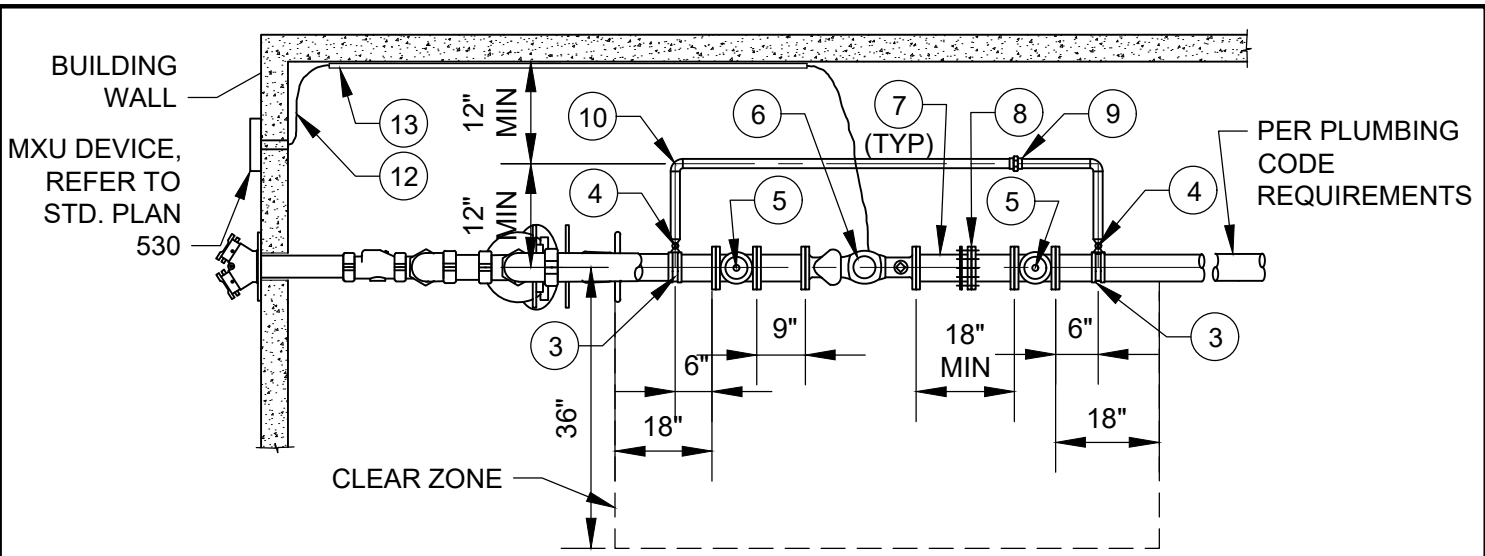
	DATE	3" AND LARGER METER OUTSIDE SETTING	STD. PLAN
	01/2021		527
	REV.		
	0		

ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	2" BRONZE SERVICE SADDLE, DOUBLE STRAP	MUELLER	BR2B SERIES, F.I.P. THREADS
		FORD	202B SERIES, F.I.P. THREADS
2	GATE VALVE, PIPE SIZE, NRS, FLANGED, 2" SQ. OPERATING NUT, AWWA C509	MUELLER	SERIES A-2360
3	DUCTILE IRON PIPE SPOOL (2), FLG X PE		
4	METER, SUPPLIED AND INSTALLED BY TOWN OF BENNETT		
5	PRECAST CONCRETE VAULT, H20 RATED		
6	2" BRONZE BALL VALVE WITH LOCKING HANDLE, F.I.P., THREADED, 300 PSI RATED		
7	DISMANTLING JOINT	ROMAC	DJ400 OR APPROVED EQUAL
8	2" DIA. COPPER 90 DEGREE ELBOW, SOLDERED, OR BRONZE, F.I.P., THREADED		
9	2" DIA. BRONZE UNION, F.I.P., THREADED		
10	2" COPPER PIPE, TYPE K, OR BRASS NIPPLE		
11	DUCTILE IRON PIPE SPOOL, 9" LENGTH, FLG X FLG		
12	DUCTILE IRON PIPE SPOOL, FLG X PE		
13	AFTER PIPING INSTALLATION CORE DRILL 6" DIA. HOLE IN VAULT LID DIRECTLY ABOVE GATE VALVES		
14	VALVE BOX, FASTEN VALVE BOX TO VAULT WITH TWO EPOXIED ALL-THREAD ROD/NUT SST EXP ANCHOR	D&L SUPPLY, HILTI	M-8065 AND M-8048 TO M-8053 3/8" DIA. ROD SST 316, OR KWIK BOLT 3-3/8" X 3" SS316
15	THRUST RESTRAINTS	EBBA IRON	MEGALUG SERIES 1100
16	POLYPROPYLENE ENCASED GRADE 60 STL STEPS AT 13" C-C, 13-1/2" TREAD WIDTH	M.A. INDUSTRIES OR APPROVED EQUAL	PS2-PFDF
17	METER VAULT FRAME AND COVER (STD. PLAN 529)		
18	PIPE SUPPORTS, 5 REQ'D (STD. PLAN 533)		
19	MXU AND WIRING, SUPPLIED AND INSTALLED BY TOWN OF BENNETT		

527 S - 3" AND LARGER METER OUTSIDE SETTING
DETAIL NOTES

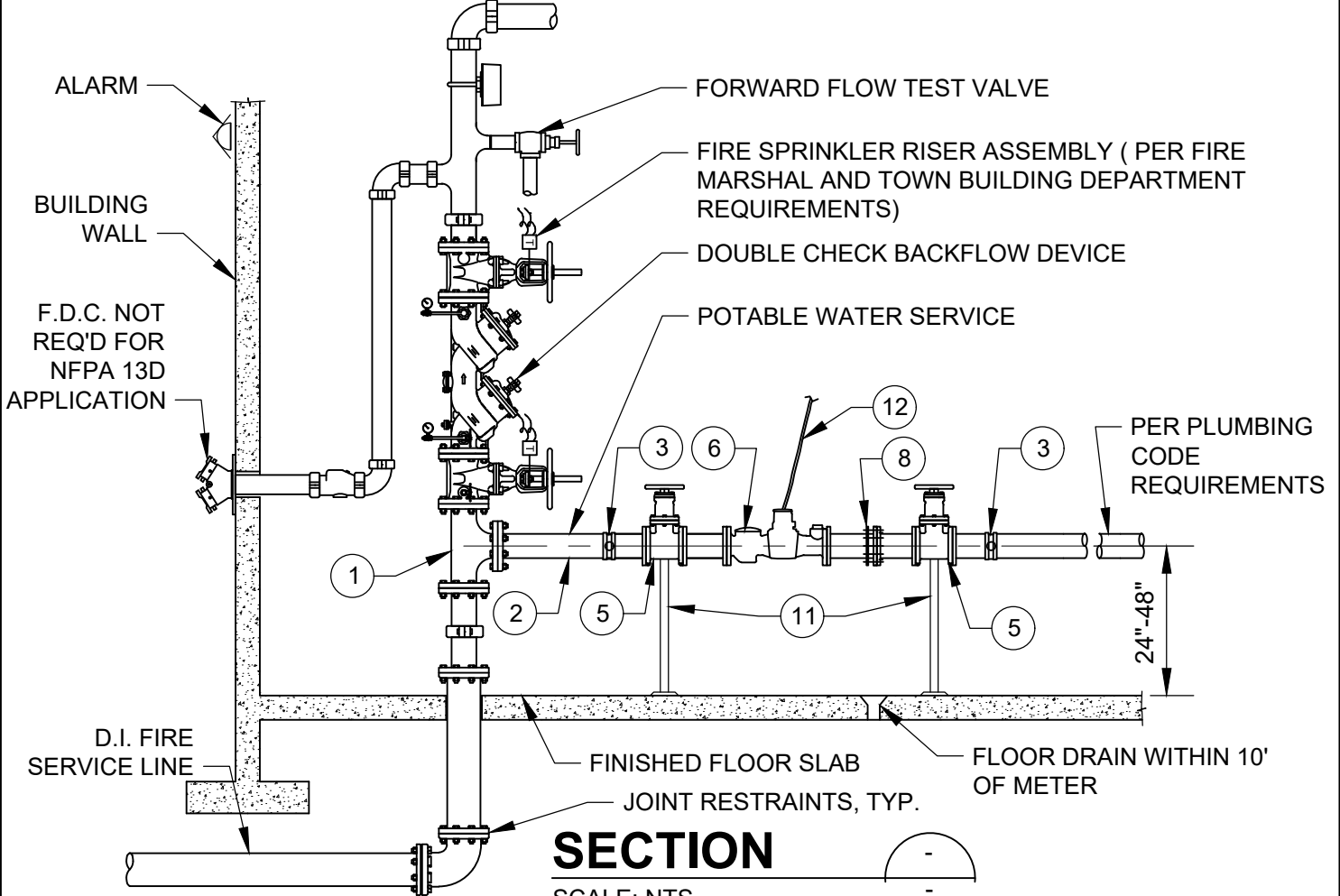
1. REFER TO STD. PLAN 520 FOR GENERAL REQUIREMENTS - METER, METER VAULT, AND SERVICE LINE
2. LOCATE METER VAULT PER APPROVED PLANS AND SET METER BOX PLUMB
3. SST FASTENERS REQUIRED ON ALL FITTINGS
4. NO BYPASS ALLOWED FOR IRRIGATION METERS
5. NO SERVICE LINE REDUCERS OR BENDS WITHIN 5' OF VAULT
6. COORDINATE METER SIZE AND LENGTH WITH TOWN PRIOR TO ORDERING MATERIALS
7. REFER TO STD. PLAN 592 FOR MANHOLE ADJUSTMENT AND GRADING REQUIREMENTS

	DATE	3" AND LARGER METER OUTSIDE SETTING LEGEND AND NOTES	STD. PLAN
	01/2021		527 S
	REV.		
	0		



PLAN

SCALE: NTS



SECTION

SCALE: NTS

NOTES:


- 1. REFER TO STD. PLAN 520 FOR GENERAL REQUIREMENTS - METER, METER VAULT, AND SERVICE LINE.
- 2. REFER TO STD. PLAN 528 S FOR LEGEND ITEMS, APPROVED PARTS LIST, AND DETAIL NOTES.

	DATE	3" AND LARGER METER INSIDE SETTING	STD. PLAN
	01/2021		528
	REV.		
	0		

ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	DUCTILE IRON TEE, FLG., PRESSURE CLASS 350, CEMENT-MORTAR LINED, ASPHALTIC INTERIOR COATING, AWWA C150/C151/C104	U.S. PIPE	
		PACIFIC STATES	
2	DUCTILE IRON PIPE SPOOL, FLG. X FLG., 3" TO 12" DIAMETER, FULL BODY, PRESSURE CLASS 350, CEMENT-MORTAR LINED, ASPHALTIC INTERIOR COATING, AWWA C150/C151/C104	U.S. PIPE	
		PACIFIC STATES	
3	2" BRONZE SERVICE SADDLE, DOUBLE STRAP	MUELLER	BR2B SERIES, F.I.P.
		FORD	STYLE 202B, F.I.P.
4	2" BRONZE BALL VALVE WITH LOCKING HANDLE, F.I.P., THREADED, 300 PSI RATED		
5	GATE VALVE, PIPE SIZE, NRS WITH HANDWHEEL, FLG, 2" SQ. OPERATING NUT, AWWA C509	MUELLER	SERIES A-2360
		CLOW	MODEL 2639
6	METER, SUPPLIED BY TOWN OF BENNETT		
7	DUCTILE IRON PIPE SPOOL (2), FLG X PE	MUELLER	MULTI X F.I.P., H-14222N
8	DISMANTLING JOINT, WITH RESTRAINING BOLTS	ROMAC	DJ400 OR APPROVED EQUAL
9	2" BRONZE UNION, F.I.P., THREADED, LEAD FREE		
10	2" COPPER PIPE, TYPE K, WITH COPPER 90 DEGREE ELBOW, SOLDERED, OR BRONZE NIPPLE, F.I.P., WITH THREADED 90 DEGREE ELBOW (NO GALVANIZED MATERIALS)		
11	PIPE SUPPORTS, 2 REQ'D ON MAIN SERVICE LINE AND 2 REQ'D ON BYPASS SERVICE		
12	MXU AND WIRING, SUPPLIED BY TOWN OF BENNETT		
13	1/2" EMT CONDUIT FOR MXU WIRING, AS REQUIRED		

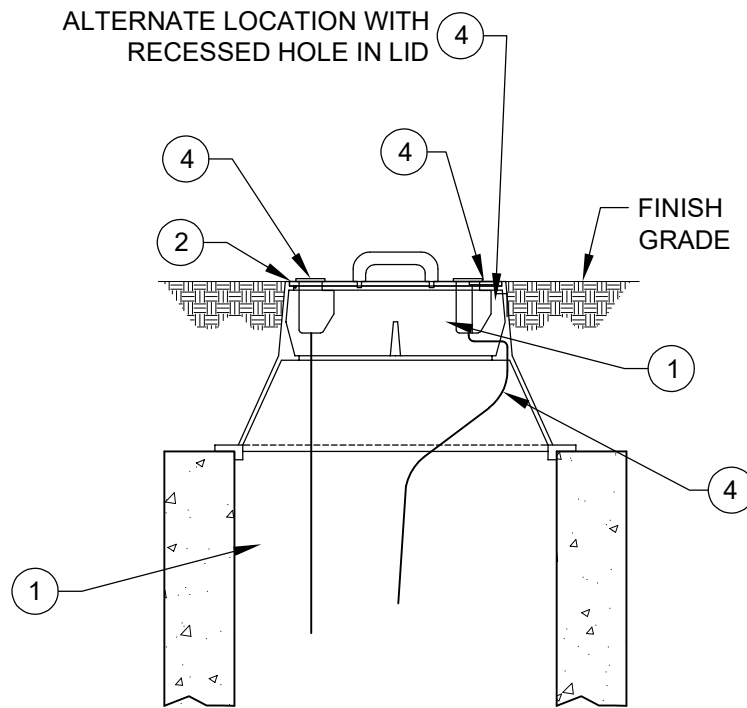
528 S.2 - 3" AND LARGER METER INSIDE SETTING DETAIL NOTES

- USE OF AN INSIDE WATER METER REQUIRES PUBLIC WORKS DIRECTOR APPROVAL. REFERENCE WATER STANDARD PLAN 520 FOR APPLICABLE CONDITIONS.
- FIRE SPRINKLER RISER WITH POTABLE WATER SERVICE: A SITE SPECIFIC DESIGN IS REQUIRED. THE FIRE PROTECTION SPRINKLER SYSTEM AND POTABLE WATER SYSTEM DESIGN SHALL BE APPROVED BY THE FIRE MARSHAL AND THE TOWN OF BENNETT BUILDING DEPARTMENT. THE POTABLE WATER SERVICE CONNECTION AND METER ASSEMBLY DESIGN SHALL BE APPROVED BY THE TOWN OF BENNETT BUILDING DEPARTMENT AND THE PUBLIC WORKS DIRECTOR. DESIGN AND CONSTRUCTION SHALL COMPLY WITH APPLICABLE BUILDING AND PLUMBING CODES.
- BACKFLOW PREVENTION: PROVIDE A DOUBLE CHECK BACKFLOW ASSEMBLY (DCBA) OR REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY (RPBA) ON THE FIRE SPRINKLER RISER ASSEMBLY. STYLE TO BE DETERMINED BY THE BUILDING AND PUBLIC WORKS DEPARTMENT BASED ON DEGREE OF HAZARD POSED BY FIRE SPRINKLER PROTECTION SYSTEM. BEFORE A CERTIFICATE OF OCCUPANCY CAN BE ISSUED BY THE BUILDING DEPARTMENT, BACKFLOW ASSEMBLY TESTING FOR PROPER OPERATION (PER CITY REQUIREMENTS BY A CERTIFIED TESTER RECOGNIZED BY THE TOWN) IS REQUIRED AND A REPORT SUBMITTED.

	DATE	3" AND LARGER METER INSIDE SETTING LEGEND AND NOTES	STD. PLAN
	01/2021		528 S.1
	REV.		
	0		

4. CONNECTIONS TO THE WATER SYSTEM ARE NOT PERMITTED PRIOR TO THE POTABLE WATER METER ASSEMBLY OR THE FIRE SPRINKLER RISER BACKFLOW ASSEMBLY. THIS INCLUDES OUTSIDE IRRIGATION SUPPLY.
5. CLEARANCES: PROVIDE ADEQUATE CLEARANCES FROM FIRE RISER AND AROUND WATER METER ASSEMBLY. MAINTAIN: 9" MINIMUM FROM EACH WALL TO FACE OF POTABLE WATER PIPING; 18" CLEAR ON EACH SIDE OF METER ASSEMBLY; 36" CLEAR IN FRONT OF METER ASSEMBLY
6. LOCATE METER ASSEMBLY TWO (2) TO FOUR (4) FEET ABOVE THE FLOOR. POSITION METER HORIZONTAL WITH DIAL POINTING UP.
7. VERIFY METER LAY LENGTH WITH PUBLIC WORKS DEPARTMENT PRIOR TO INSTALLING PIPING
8. PROVIDE ISOLATION VALVES AT METER INLET AND OUTLET.
9. FOR MULTIPLE METERS PROVIDE A MANIFOLD WITH A MAIN VALVE PRIOR TO THE MANIFOLD AND INDIVIDUAL VALVES LOCATED PRIOR TO AN AFTER METERS.
10. PROVIDE A FLOOR DRAIN IN THE FIRE RISER ROOM WITHIN 10 FEET OF THE WATER METER LOCATION.
11. PROVIDE PIPE LABELS ON THE POTABLE WATER LINE BETWEEN THE FIRE RISER AND THE WATER METER DESIGNATING PIPE AS "POTABLE WATER".
12. PROVIDE PIPE ANCHORAGE TO SUPPORT METER YOKE AND ASSEMBLY INDEPENDENT OF THE POTABLE WATER SUPPLY PIPING AND BUILDING PLUMBING. PROVIDE PIPE STANDS OR UNISTRUT WALL STANDOFFS. DO NOT SUPPORT METER ASSEMBLY FROM OTHER PIPING.
13. PROVIDE A WALL PENETRATION AND CONDUIT FOR REMOTE RADIOREAD METER TRANSCIEVER UNIT (MXU) DEVICE(S). COORDINATE ROUTING AND WALL PENETRATION LOCATION WITH THE PUBLIC WORKS DEPARTMENT. REFER TO WATER STANDARD PLANS 520 AND 530.
14. PROVIDE 1/2" EMT CONDUIT AND SUPPORTS FOR MXU SIGNAL WIRE IF DISTANCE TO WALL PENETRATION EXCEEDS 10 FEET.
15. INSPECTION: CONTACT THE PUBLIC WORKS DEPARTMENT FOR INSPECTION OF THE POTABLE WATER SYSTEM METER ASSEMBLY INSTALLATION.
16. REFER TO STD. PLAN 500 AND THE SPECIFICATIONS FOR FLUSHING, HYDROSTATIC TESTING, AND DISINFECTION REQUIREMENTS.
17. BUILDING OWNER IS RESPONSIBLE TO HAVE THE BACKFLOW PREVENTER FLOW TESTED AND INSPECTED INTERNALLY AT LEAST ONCE PER YEAR, OR MORE AS CONDITIONS WARRANT, IN ACCORDANCE WITH NFPA 13 AND NFPA 25 AND A REPORT SUBMITTED TO THE BUILDING DEPARTMENT.

			DATE	3" AND LARGER METER INSIDE SETTING NOTES	STD. PLAN
			01/2021		528 S.2
			REV.		
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PAVEMENT AREA

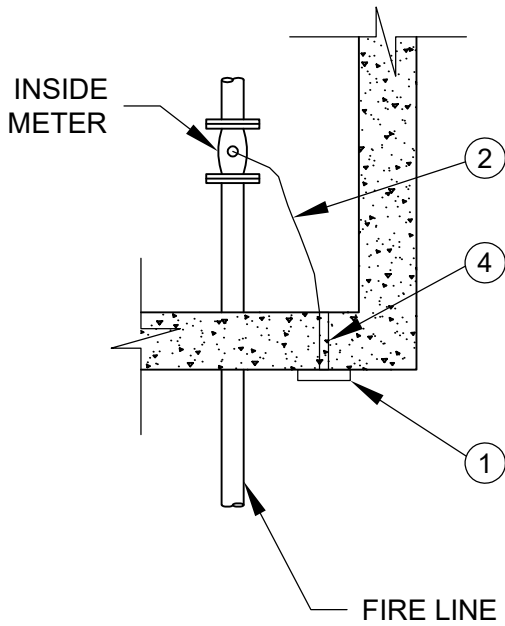
	DATE	METER VAULT FRAME AND COVER / MXU DEVICE LOCATION	STD. PLAN
	01/2021		529
	REV.		
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ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	METER VAULT FRAME AND COVER, TRAFFIC RATED, MARKED "WATER"	CASTINGS, INC.	M-70-20 AL FROST PROOF, TOP LID M70TLCI, FROST COVER ILAL
2	2" TAP WITH RECESSED PLUG, REQUIRED		
3	NOTCH INNER FROST COVER FOR SIGNAL WIRE		
4	MXU AND WIRING, SUPPLIED BY TOWN OF BENNETT		
5	METER VAULT		

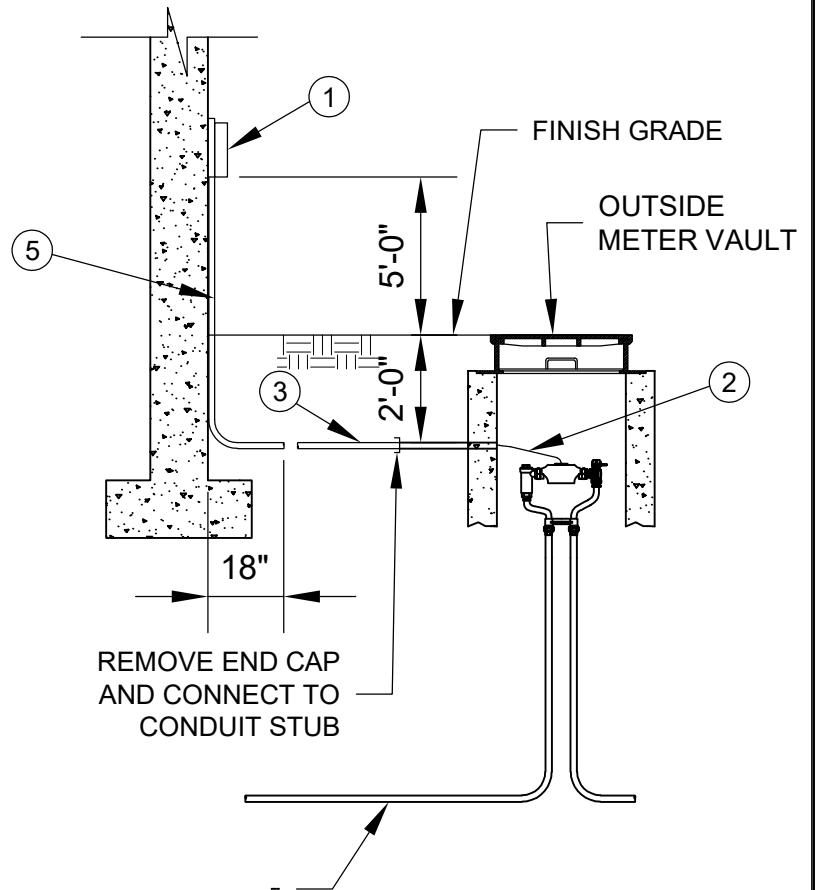
529 S - METER VAULT FRAME AND COVER / MXU DEVICE LOCATION
DETAIL NOTES

1. REFER TO STD. PLAN 592 FOR METER VAULT ADJUSTMENT AND GRADING REQUIREMENTS
2. PROVIDE TAPS FOR STANDARD AND ALTERNATIVE MXU LOCATIONS
3. PROVIDE PLUGS FOR ALL OPENINGS
4. REMOVE ALL BURRS FROM TAPS AND NOTCHES
5. REFER TO STD PLAN 530 FOR REMOTE MXU DEVICE REQUIREMENTS

			DATE	METER VAULT FRAME AND COVER MXU DEVICE LOCATION LEGEND AND DETAIL NOTES	STD. PLAN
			01/2021		529 S
			REV.		
			0		



INSIDE METER PLAN



OUTSIDE METER ELEVATION

LEGEND

ITEM	DESCRIPTION
①	REMOTE RADIO READ MXU, 6"X6", DEVICE SURFACE MOUNT, BY PCMC
②	MXU SIGNAL WIRE, SUPPLIED AND INSTALLED BY PCMC
③	3/4" PVC NEMA TC-2 CONDUIT BY CUSTOMER
④	WALL PENETRATION, BY CUSTOMER
⑤	3/4" GALVANIZED RIGID STEEL CONDUIT, BY CUSTOMER

NOTES:

- REFER TO STD. PLAN 520 FOR GENERAL REQUIREMENTS - METER, METER VAULT, AND SERVICE LINE.



DATE

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REMOTE MXU DEVICE

STD. PLAN

530

HYDRANT OPERATING NUT SHALL BE OPERATED WITH A HYDRANT WRENCH AND OPENED FULLY (DO NOT THROTTLE)

EXISTING FIRE HYDRANT

GREEN HYDRANT IN-USE TAG

LOCKABLE HYDRANT ADAPTER (BY TOWN)

WATER METER (BY TOWN)

BACKFLOW ASSEMBLY VALVE

GATE VALVES

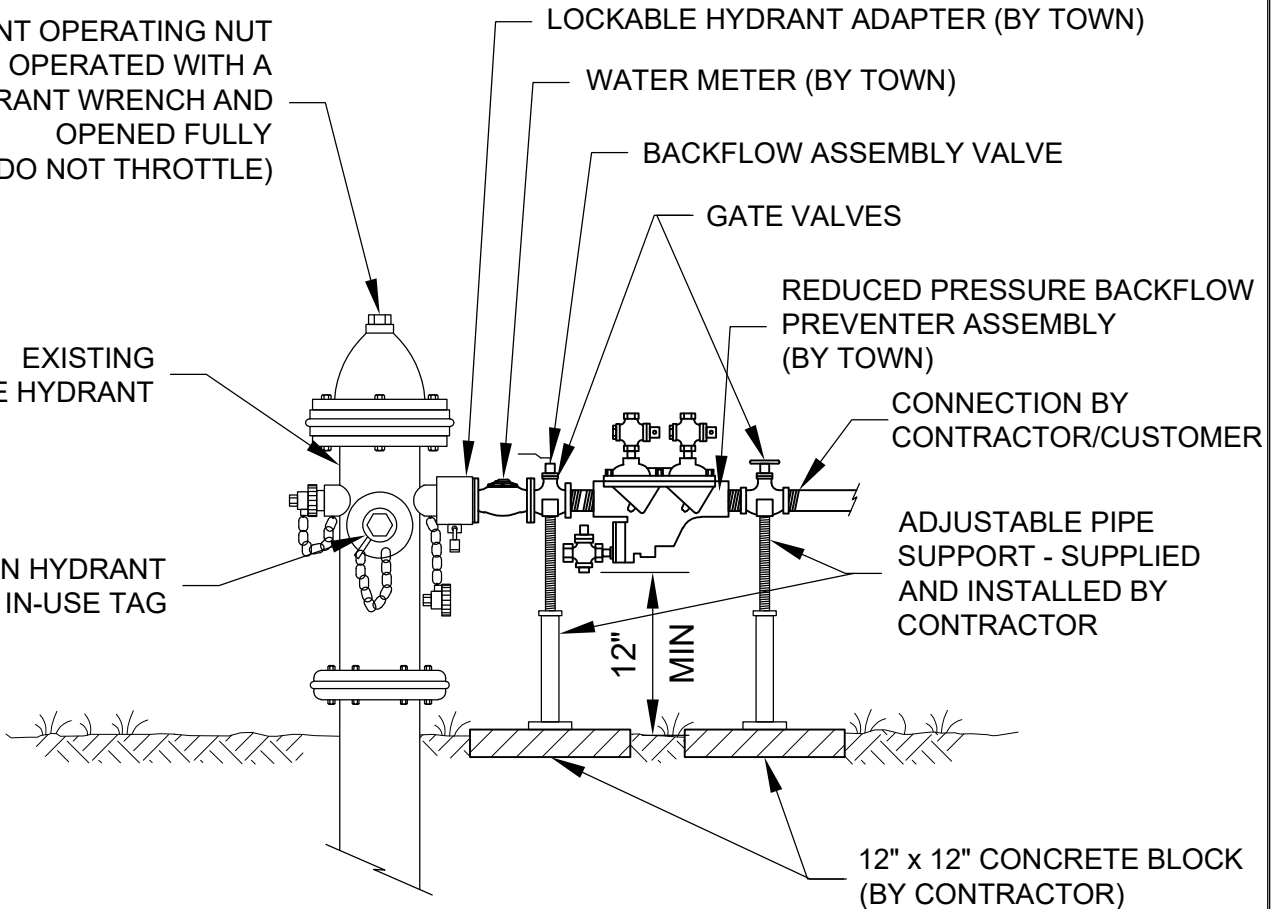
REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY (BY TOWN)

CONNECTION BY CONTRACTOR/CUSTOMER

ADJUSTABLE PIPE SUPPORT - SUPPLIED AND INSTALLED BY CONTRACTOR

12" MIN

12" x 12" CONCRETE BLOCK (BY CONTRACTOR)



NOTES:

1. USE OF A FIRE HYDRANT FOR OBTAINING CONSTRUCTION WATER REQUIRES A VALID CUSTOMER WATER SERVICE AGREEMENT. THE AGREEMENT CAN BE OBTAINED FROM THE PUBLIC WORKS DEPARTMENT. A DEPOSIT FEE IS REQUIRED.
2. CONTRACTOR (CUSTOMER) IS RESPONSIBLE TO PICK UP THE PROVIDED HYDRANT METER ASSEMBLY FROM THE PUBLIC WORKS DEPARTMENT. COORDINATE PICK UP 24 HOURS PRIOR TO ARRIVAL.
3. CONTRACTOR SHALL NOTIFY THE FIRE SERVICE DISTRICT OFFICE OF THE HYDRANT CONNECTION
4. FULLY OPEN THE FIRE HYDRANT VALVE PRIOR TO OPERATION. DO NOT USE THE FIRE HYDRANT VALVE FOR THROTTLING, USE THE BACKFLOW ASSEMBLY VALVE. DO NOT CLOSE VALVES ON THE ASSEMBLY OR THE DISCHARGE LINE QUICKLY.
5. CONTRACTOR SHALL PROTECT THE HYDRANT METER ASSEMBLY FROM DAMAGE, THEFT, AND MISUSE.
6. CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL WATER CONSUMPTION.
7. CONTRACTOR SHALL NOTIFY THE PUBLIC WORKS DEPARTMENT, REMOVE, AND RETURN THE HYDRANT METER ASSEMBLY WHEN HYDRANT USE IS COMPLETE. RELOCATION OF THE HYDRANT METER ASSEMBLY REQUIRES PRIOR NOTIFICATION TO THE PUBLIC WORKS DEPARTMENT AND A MODIFICATION TO THE CUSTOMER SERVICE AGREEMENT.



DATE

01/2021

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**TEMPORARY
HYDRANT METER ASSEMBLY**

STD. PLAN

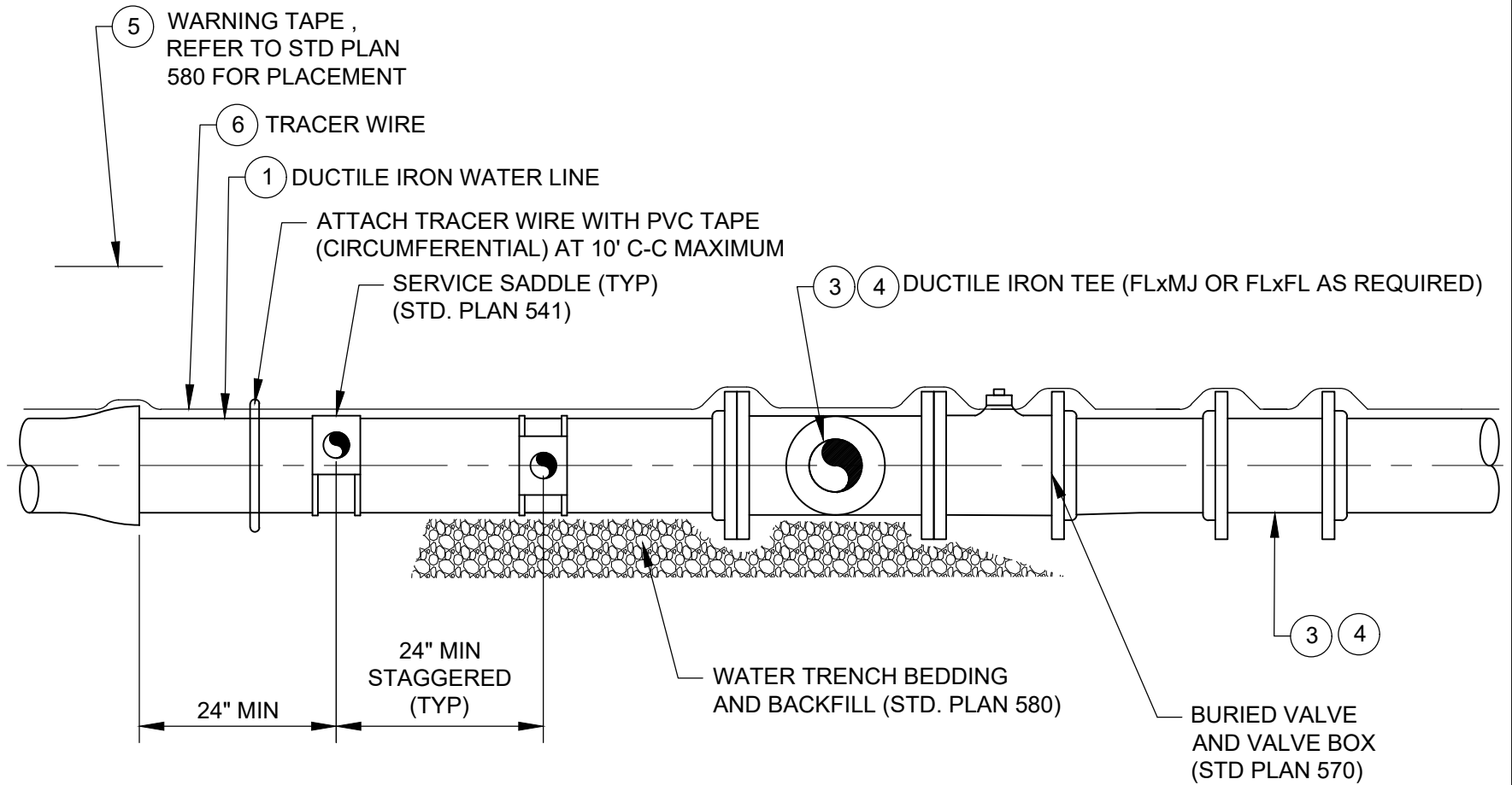
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DATE	01/2021
REV.	0

**WATER MAIN AND FIRE LINE
3" TO 12" DIAMETER**

540-A
STD. PLAN



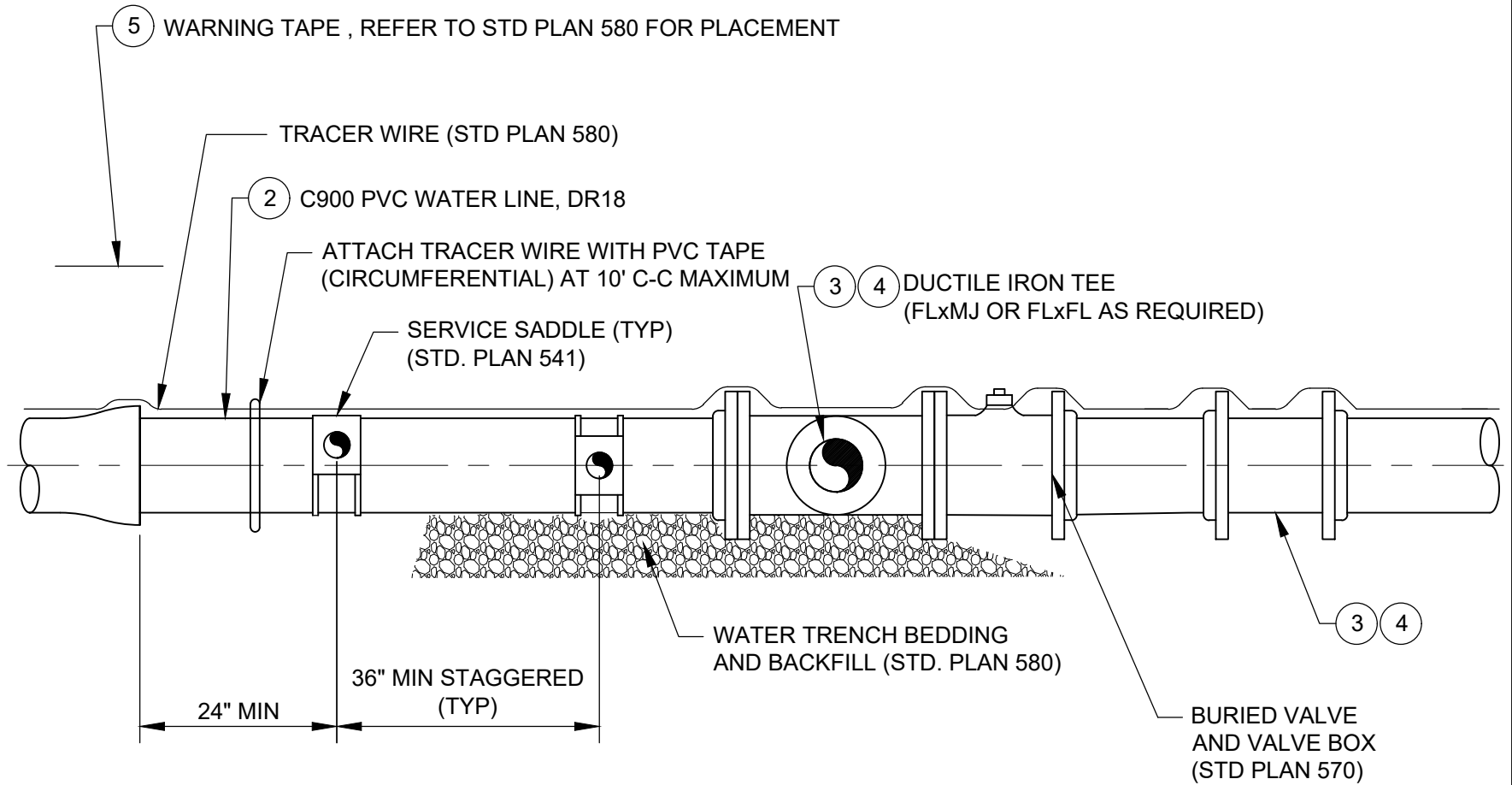
NOTES:

1. PROVIDE RETAINING GLANDS ON MECHANICAL JOINTS
2. STAGGER MULTIPLE TAPS 22-1/2 DEG. AND MAINTAIN 24" C-C MINIMUM SEPARATION
3. PROVIDE CORROSION PROTECTION AS REQUIRED.
4. PROVIDE WATER LINE LOOPS AS REQUIRED TO MAINTAIN SEPARATION WITH OTHER UTILITIES, REFER TO STANDARD PLAN 544

DATE	01/2021
REV.	0

**WATER MAIN - PVC PIPE
 8" TO 12" DIAMETER**

540-B
 STD. PLAN



NOTES:

1. PROVIDE A 10' MINIMUM PVC PIPE SECTION LENGTH BETWEEN FITTINGS, VALVES, AND COUPLINGS
2. PROVIDE RETAINING GLANDS ON MECHANICAL JOINTS
3. STAGGER MULTIPLE TAPS 22-1/2 DEG. AND MAINTAIN 36" C-C MINIMUM SEPARATION
4. PROVIDE CORROSION PROTECTION ON ALL METALLIC FITTINGS, VALVES, COUPLERS, ETC., AS REQUIRED.
5. PROVIDE WATER LINE LOOPS AS REQUIRED TO MAINTAIN SEPARATION WITH OTHER UTILITIES, REFER TO STANDARD PLAN 544

ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	DUCTILE IRON PIPE, 3" TO 12" DIAMETER, PRESSURE CLASS 350, CEMENT-MORTAR LINING, ASPHALTIC EXTERIOR COATING, AWWA C150 / C151 / C104	U.S. PIPE (1), PACIFIC STATES	STANDARD JOINT PIPE: PUSH ON TYTON JOINT
		U.S. PIPE (1), PACIFIC STATES	RESTRAINED JOINT PIPE: THRUST-LOCK TR FLEX
2	POLYVINYL CHLORIDE (PVC) PIPE, C.I.O.D., C900, DR 18, INTEGRAL BELL JOINT	JM EAGLE (1)	STANDARD JOINT PIPE: BLUE BRUTE
3	DUCTILE IRON FITTINGS, 3" TO 12" DIAMETER, FULL BODY, ASPHALTIC EXTERIOR COATING, AWWA C153 / C104, FLANGES: AWWA C110 / C115, CLASS 125 FLANGE WITH FULL FACE OR RING FLANGE-TYTE GASKETS	U.S. PIPE (1), PACIFIC STATES	PUSH ON STYLE FITTING: TYTON JOINT
		U.S. PIPE (1), PACIFIC STATES	RESTRAINED JOINT PIPE: THRUST-LOCK TR FLEX
4	FITTINGS - DUCTILE IRON MECHANICAL JOINT PIPE WITH RETAINER GLANDS OR SST TIE ROD / NUT RESTRAINTS, AWWA C110 / C111 / C104	EBBA IRON (1)	FITTINGS: MECHANICAL JOINT; RETAINER GLAND: MEGALUG SERIES 1100, STD T-BOLTS AND NUTS
5	DETECTABLE UNDERGROUND WARNING TAPE, 50MIL MINIMUM, ALUMINUM BACKING, BLUE BACKGROUND, MINIMUM 4" WIDE	SETON (1)	85525.00000
6	TRACER WIRE: 12 GA. SOLID, BLUE PVC INSULATION; WIRE-WIRE CONNECTORS SILICONE FILLED WIRE NUTS	CONNECTORS: IDEAL INDUSTRIES (1)	TWISTER DB PLUS (1)

540 S - WATER MAIN AND FIRE LINES

DETAIL NOTES

1. COORDINATE PIPE SIZE WITH APPROVED PLANS PRIOR TO ORDERING MATERIALS
2. LOCATE MAIN, FITTINGS, VALVES, AND FIRE LINES PER APPROVED PLANS
3. DUCTILE IRON PIPE IS REQUIRED WHEN WATER SYSTEM DESIGN PRESSURE EXCEEDS 150 PRESSURE RATING
4. PROVIDE DUCTILE IRON RESTRAINED JOINT PIPE ON FIRE LINES, HYDRANT LINES, AND WHERE REQUIRED ON THE APPROVED PLANS
5. PROVIDE 316 STAINLESS STEEL BOLTS AND NUTS WITH ANTI-SIEZE LUBRICANT ON ALL FLANGED CONNECTIONS
6. REFER TO SPECIFICATIONS FOR FLUSHING, HYDROSTATIC TESTING, AND DISINFECTING REQUIREMENTS
7. (1) DENOTES "OR EQUAL" MANUFACTURER AND MODEL. SUBMIT IN ACCORDANCE WITH TOWN STANDARDS

	DATE	WATER MAIN AND FIRE LINES LEGEND AND NOTES	STD. PLAN
	01/2021		540 S
	REV.		
	0		

ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	BRONZE SERVICE SADDLE: DI & AC PIPE; DOUBLE STRAP; PVC PIPE; TWO-PIECE BOLTED	MUELLER	DI & AC PIPE: BR2B SERIES 1-1/2" SERVICE, CC THDS; 2" SERVICE FIP THDS; PVC PIPE: H13000 SERIES
		FORD	DI & AC PIPE: STYLE 202B 1-1/2" SERVICE, CC THDS; 2" SERVICE, FIP THDS; PVC PIPE: 1-1/2" SERVICE, STYLE S902, CC THDS; 2" SERVICE, STYLE S912, FIP THDS
2	BRASS CORPORATION STOP, INLET CC THREAD, OUTLET CTS COMPRESSION	MUELLER	B-25008
		FORD	FB1100-(SERVICE SIZE)-G-NL
3	DETECTABLE UNDERGROUND WARNING TAPE, 5-MIL MINIMUM. ALUMINUM BACKING, BLUE BACKGROUND, 4" WIDE MINIMUM	SETON OR APPROVED EQUAL	85525.00000
4	WATER SERVICE LINE		TYPE K SOFT COPPER, ONE PIPE SIZE GREATER THAN METER SIZE
5	TRACER WIRE: 12 GA. SOLID, BLUE PVC INSULATION; WIRE-WIRE CONNECTORS SILICONE FILLED WIRE NUTS	IDEAL INDUSTRIES	TWISTER DB PLUS OR APPROVED EQUAL
6	CURB STOP VALVE BOX	TYLER UNION	6500 SERIES SCREW TYPE CURB/SERVICE BOX. 30T & 39B, 41-64 INCHES
		CASTINGS INC	C.I. 95-E (30T 7 39B), 41-061 INCHES
7	CURB STOP VALVE	FORD	B44-XXX-NL, SIZED PER SERVICE LINE

541 S - WATER SERVICE LINE ¾" TO 2" METERS
DETAIL NOTES

1. COORDINATE SERVICE SIZE WITH TOWN PRIOR TO ORDERING MATERIALS
2. LOCATE SERVICE PER APPROVED PLANS
3. NO SERVICE LINE FITTINGS ALLOWED BETWEEN CORPORATION STOP AND CURB STOP VALVE

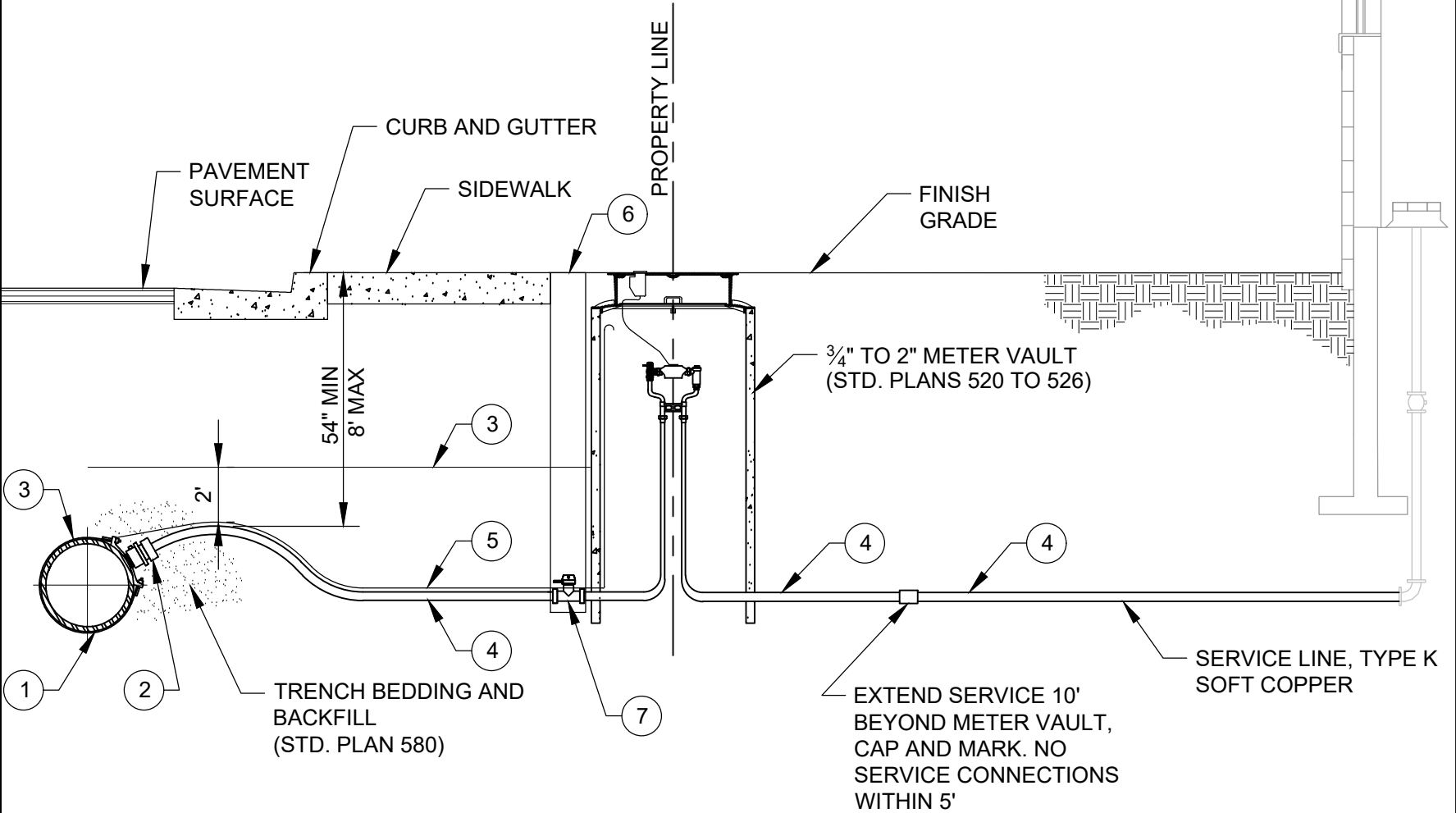
	DATE	WATER SERVICE LINE ¾" - 2" LEGEND AND NOTES	STD. PLAN
	01/2021		541 S
	REV.		
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NOTES:

1. REFERENCE STD. PLAN 520 FOR GENERAL REQUIREMENTS - METER, METER VAULT, AND SERVICE LINE.

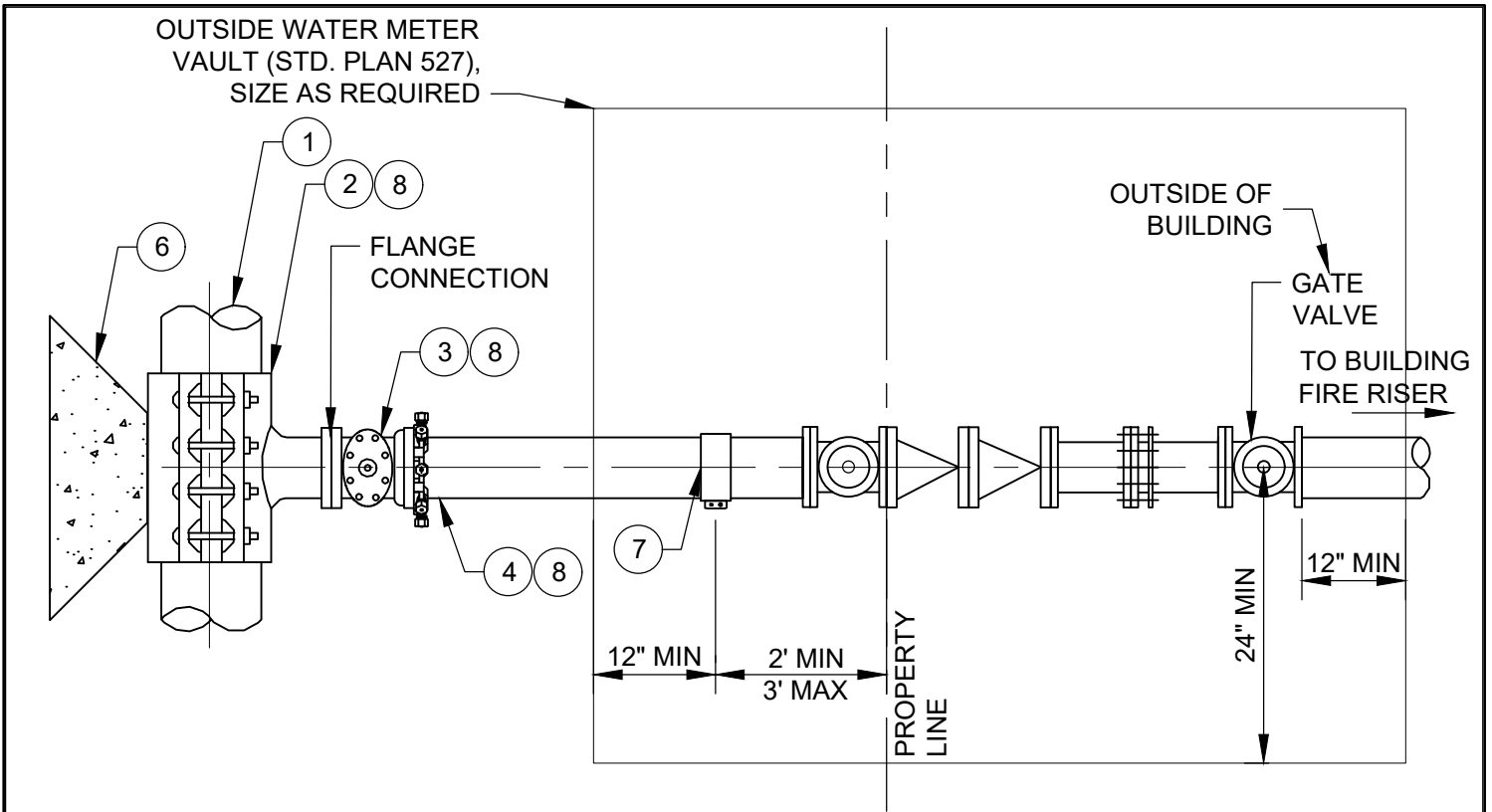
DATE	01/2021
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**WATER SERVICE LINE
3/4" TO 2" METERS**



541

STD. PLAN



3" AND LARGER

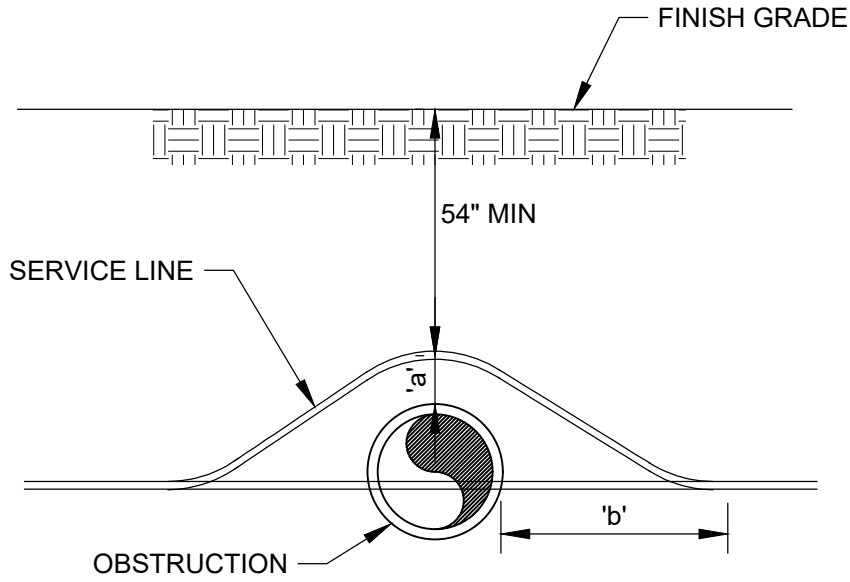
LEGEND

ITEM	DESCRIPTION
①	EXISTING MAIN
②	DUCTILE IRON TAPPING SLEEVE OR DUCTILE IRON TEE
③	TAPPING VALVE OR FLG X MJ GATE VALVE (STD PLAN 570 AND 572)
④	DUCTILE IRON PIPE FULLY RESTRAINED (STD. PLAN 541)
⑤	WATER SERVICE LINE (STD. PLAN 541)
⑥	THRUST BLOCK (STD. PLAN 561)
⑦	BRONZE DOUBLE STRAP SERVICE SADDLE (STD. PLAN 541)
⑧	CORPORATION STOP (STD. PLAN 541)

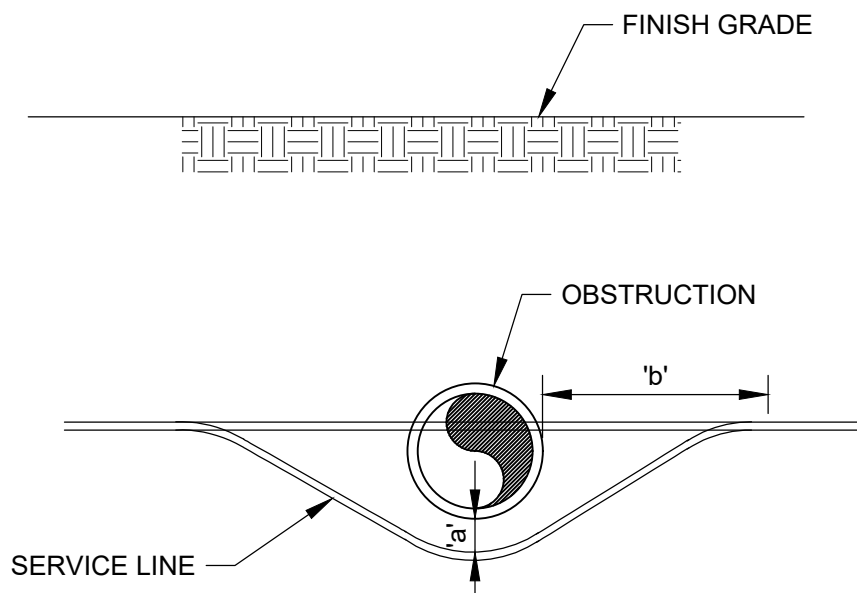
NOTES:

1. PROPERTY OWNER IS RESPONSIBLE FOR FIRE LINE AND APPURTENANCES UP TO AND INCLUDING TAPPING SLEEVE AND ISOLATION VALVE.

	DATE	FIRE SERVICE LINE	STD. PLAN
	01/2021		542
	REV.		
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METHOD A



METHOD B

TABLE OF DIMENSIONS			
	OBSTRUCTION		
	SEWER MAIN	STORM DRAIN OR CULVERT	OTHER
'a'	18"	SEE STD. PLAN 546	12" MIN
'b'	5'-0"		3'-0" MIN

NOTES:

1. ALL POTABLE WATER MAINS AND LATERALS SHALL BE INSTALLED ABOVE SEWER LINES

	DATE	WATER SERVICE LINE LOWERING	STD. PLAN
	01/2021		543
	REV.		
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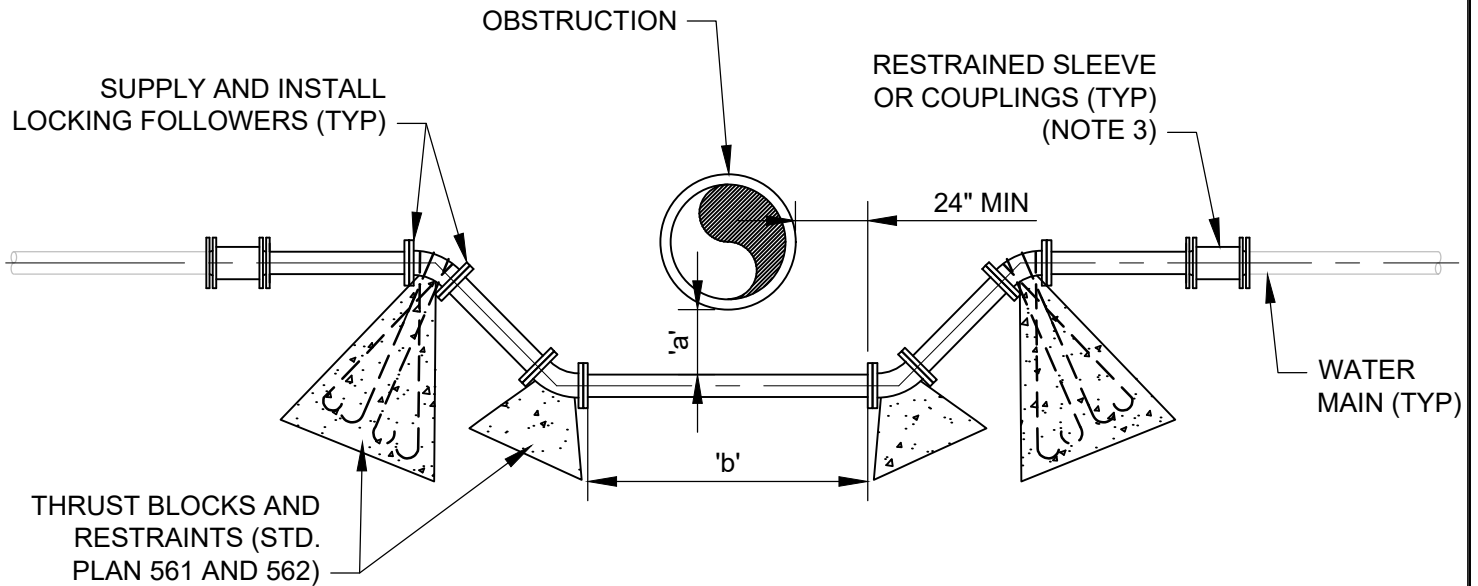


TABLE OF DIMENSIONS		
OBSTRUCTION	'a'	'b'
SEWER	18" MIN	20' MIN
STORM DRAIN OR CULVERT	SEE STD. PLAN 546	O.D. + 6'
OTHER	12" MIN	O.D. + 4'

NOTES:

METHOD A

1. RESTRAINED JOINT PIPE REQUIRED
2. ALL POTABLE WATER MAINS AND LATERALS SHALL BE INSTALLED ABOVE SEWER LINES
3. SUBSTITUTE RESTRAINED SLEEVE OR COUPLING WITH GATE VALVE WHEN LOWERED PORTION IS GREATER THAN 7 FEET BELOW FINISHED GRADE.



DATE	01/2021
REV.	0

WATER MAIN LOWERING

STD. PLAN

544-A

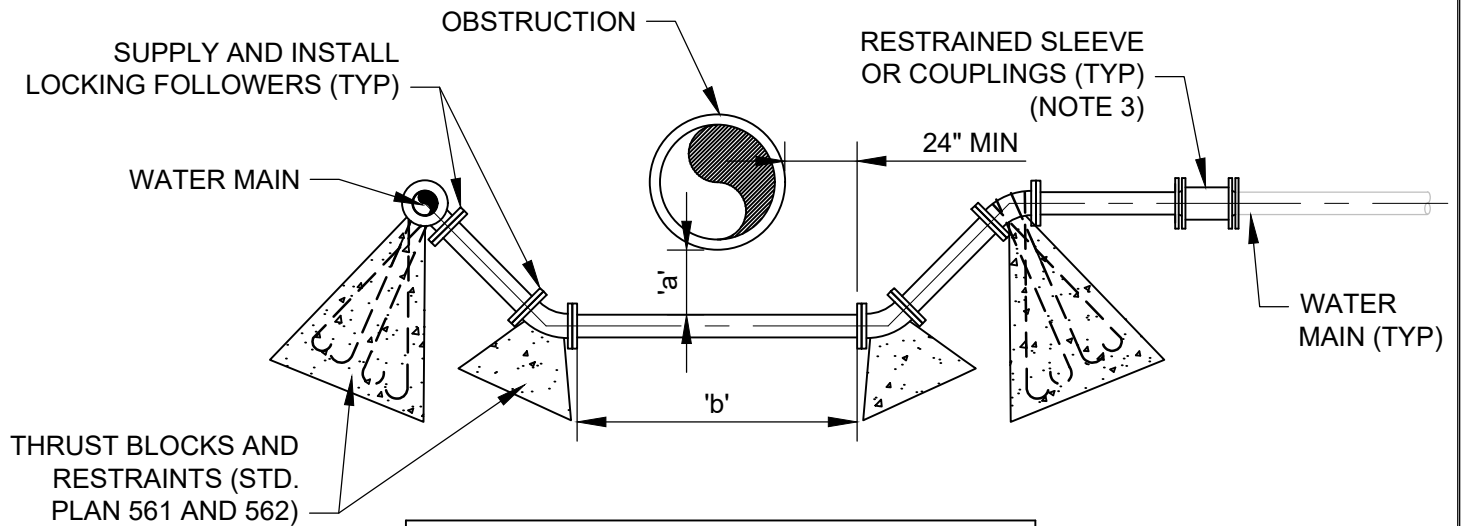


TABLE OF DIMENSIONS		
OBSTRUCTION	'a'	'b'
SEWER	18" MIN	20' MIN
STORM DRAIN OR CULVERT	SEE STD. PLAN 546	O.D. + 6'
OTHER	12" MIN	O.D. + 4'

METHOD B

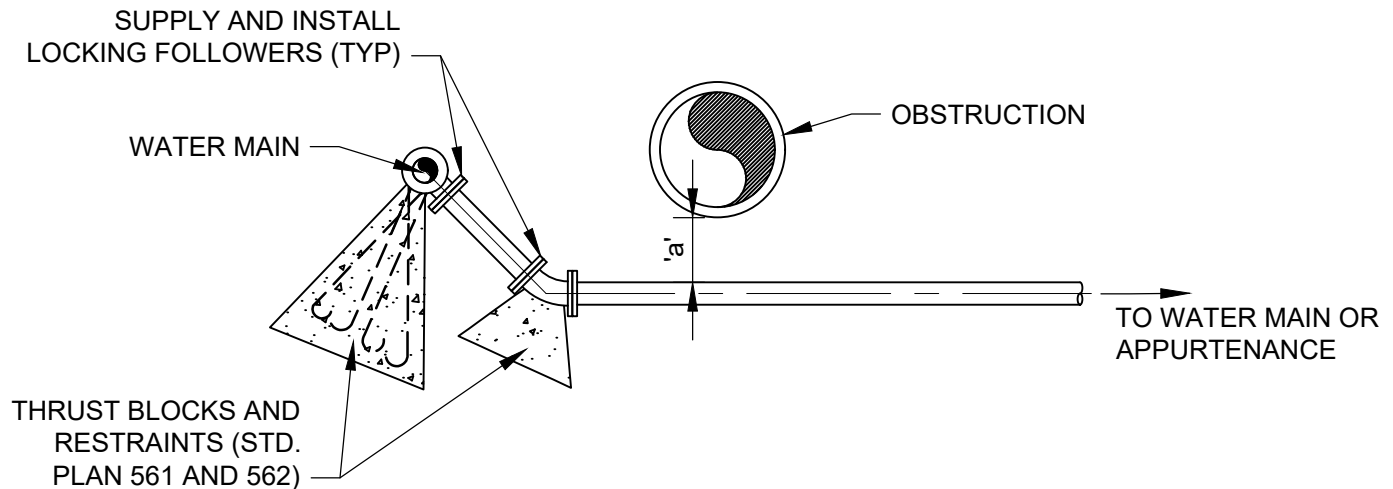


TABLE OF DIMENSIONS	
OBSTRUCTION	'a'
SEWER	18" MIN
STORM DRAIN OR CULVERT	SEE STD. PLAN 546
OTHER	12" MIN

NOTES:

1. RESTRAINED JOINT PIPE REQUIRED.
2. ALL POTABLE WATER MAINS AND LATERALS SHALL BE INSTALLED ABOVE SEWER LINES.

3. SUBSTITUTE RESTRAINED SLEEVE OR COUPLING WITH GATE VALVE WHEN LOWERED PORTION IS GREATER THAN 7 FEET BELOW FINISHED GRADE.

METHOD C



DATE

01/2021

REV.

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WATER MAIN LOWERING

STD. PLAN

544-B

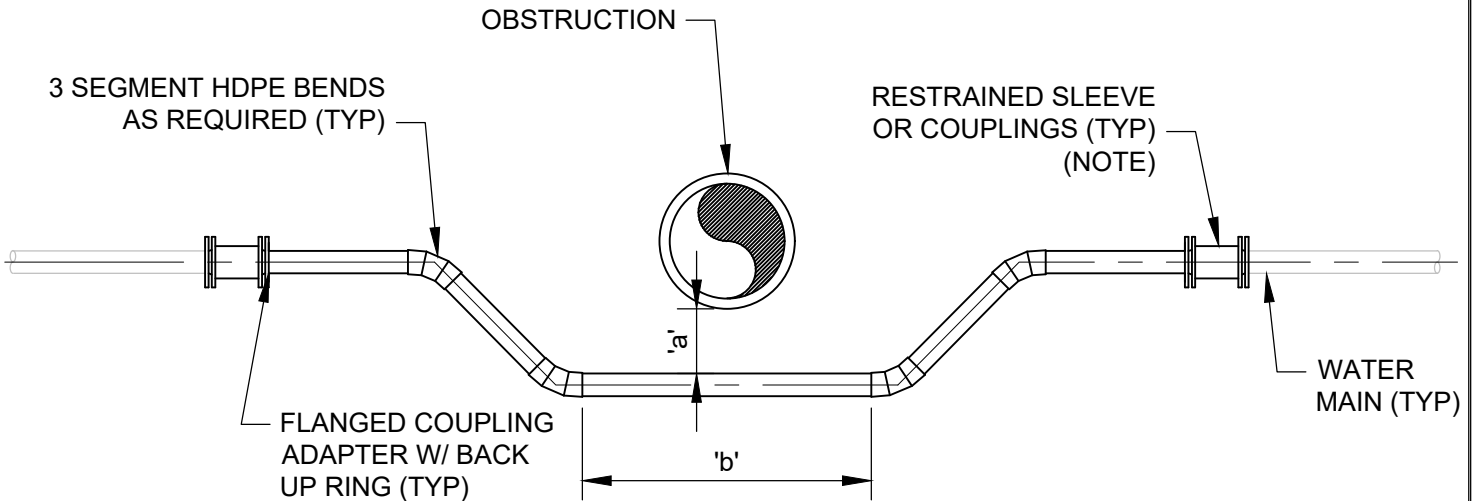


TABLE OF DIMENSIONS		
OBSTRUCTION	'a'	'b'
SEWER	18" MIN	20' MIN
STORM DRAIN OR CULVERT	SEE STD. PLAN 546	O.D. + 6'
OTHER	12" MIN	O.D. + 4'

HDPE METHOD

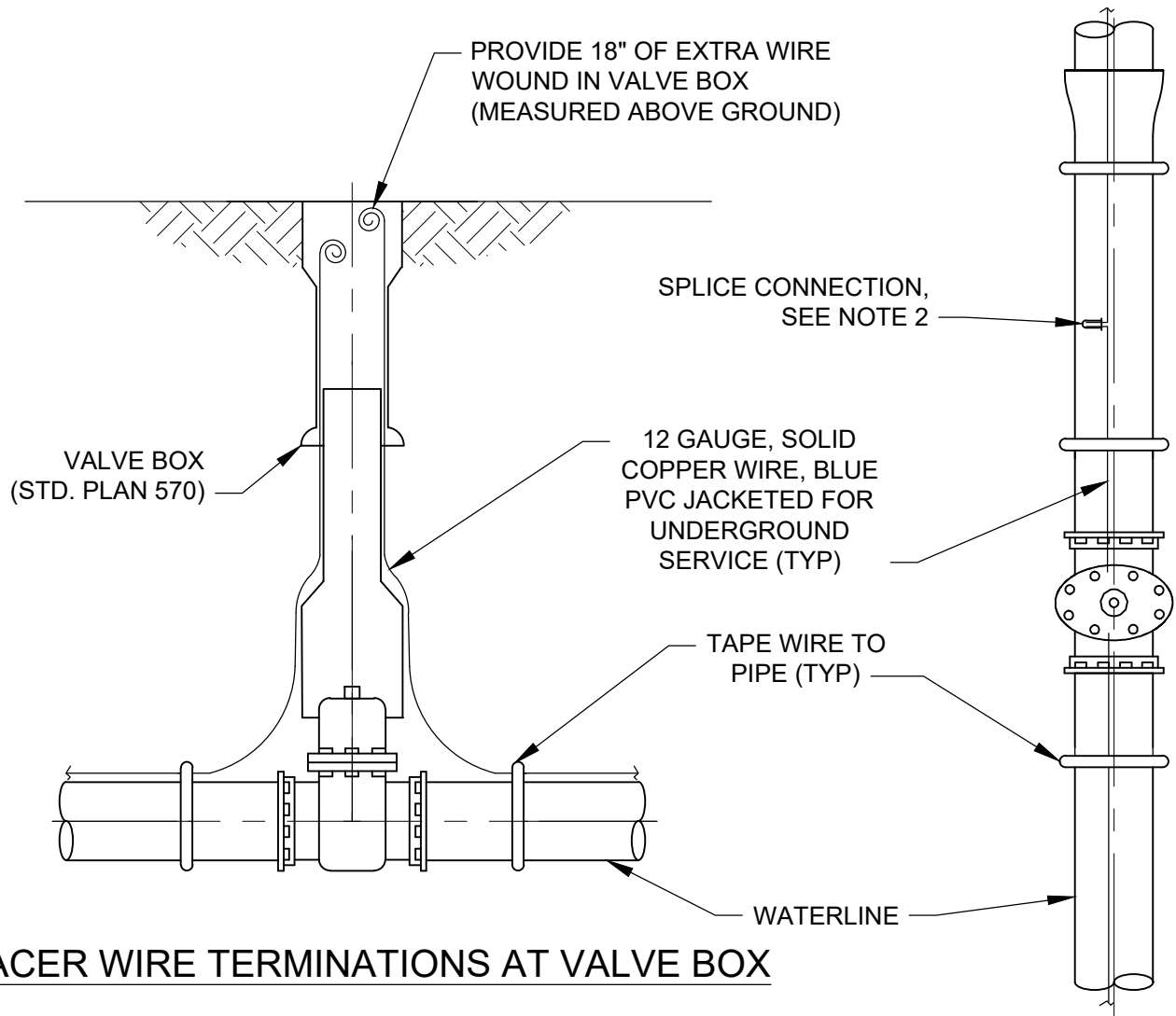
NOTES:

HDPE PIPE WATERLINE LOOP MINIMUM REQUIREMENTS:

1. GENERAL: PIPE SHALL BE HDPE 4710 DR11 WITH AN INSIDE DIAMETER EQUAL TO OR GREATER THAN THE CONNECTING PIPE ON BOTH ENDS.
2. PIPE SHALL BE FUSION WELDED ALONG LENGTH AND FULLY RESTRAINED AT TRANSITIONS TO DIFFERING PIPE MATERIALS WITH FLANGES OR OTHER CITY APPROVED METHOD.
3. FITTINGS ALONG THE LOOP LENGTH SHALL BE HDPE UNLESS OTHERWISE APPROVED BY OWNER.
4. BENDING RADIUS NOT TO EXCEED PIPE MANUFACTURES RECOMMENDATIONS.
5. REDUCERS AND TRANSITION COUPLINGS SHALL BE PROVIDED ON BOTH ENDS AS REQUIRED AND SHALL BE HDPE OR DUCTILE IRON. CATHODIC PROTECTION REQUIRED ON FERROUS COMPONENTS.
6. ALL POTABLE WATER MAINS AND LATERALS SHALL BE INSTALLED ABOVE SEWER LINES.

NOTE:
 SUBSTITUTE RESTRAINED SLEEVE OR COUPLING WITH GATE VALVE WHEN LOWERED PORTION IS GREATER THAN 7 FEET BELOW FINISHED GRADE.

	DATE	WATER MAIN LOWERING	STD. PLAN
	01/2021		544-C
	REV.		
	0		



TRACER WIRE TERMINATIONS AT VALVE BOX

TRACER WIRE PREFERENCE ORDER:

1. HYDRANT
2. VALVE
3. DEDICATED TRACER WIRE BOX

NOTES:

1. INSTALL TRACER WIRE ON ALL CONSTRUCTED (METALLIC AND NON-METALLIC) PIPE.
2. ALL SPLICES SHALL BE SILICONE FILLED WIRE CONNECTORS.
3. MAXIMUM DISTANCE BETWEEN CONNECTIONS OF NO GREATER THAN 500 FEET.
4. AT VAULT AND MANHOLE LOCATIONS COIL WIRE INSIDE.



DATE

01/2021

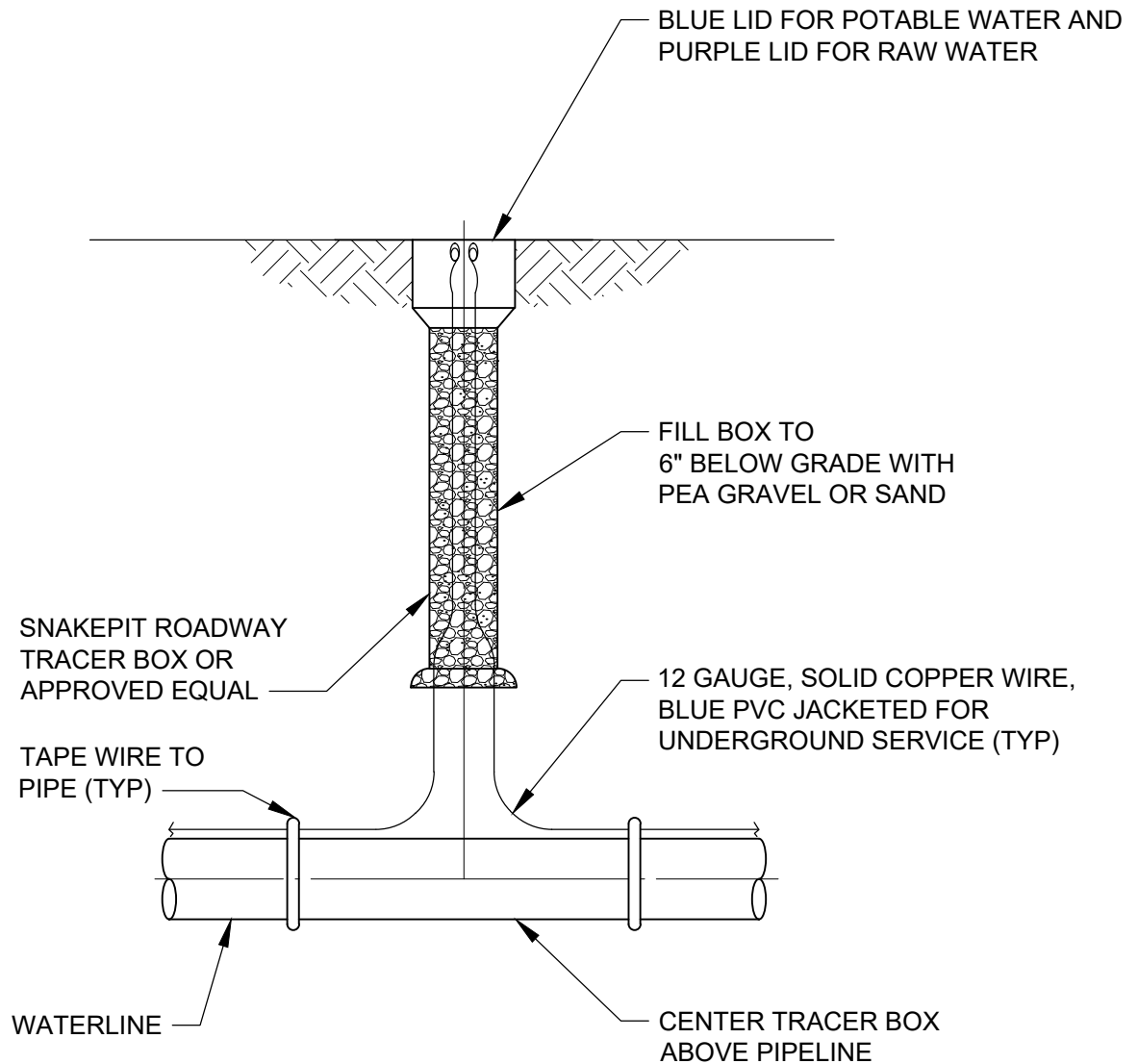
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TRACER WIRE VALVE BOX TERMINATIONS

STD. PLAN

545-A



NOTES:

1. INSTALL LOCATOR WIRE ON ALL CONSTRUCTED (METALLIC AND NON-METALLIC) PIPE.
2. ALL SPLICES SHALL BE WITH SILICONE FILLED WIRE CONNECTORS.
3. PROVIDE LOCATOR WIRE CONNECTIONS PER THIS DETAIL AS REQUIRED TO MAINTAIN A MAXIMUM DISTANCE BETWEEN CONNECTIONS OF NO GREATER THAN 500 FEET. CONTRACTOR SHALL COORDINATE EACH LOCATION WITH OWNER.
4. LOCATOR WIRE AND WARNING TAPE NOT REQUIRED WHERE DIRECTIONAL DRILLING WILL TAKE PLACE.
5. AT VAULT LOCATIONS COIL WIRE INSIDE OF VAULT.

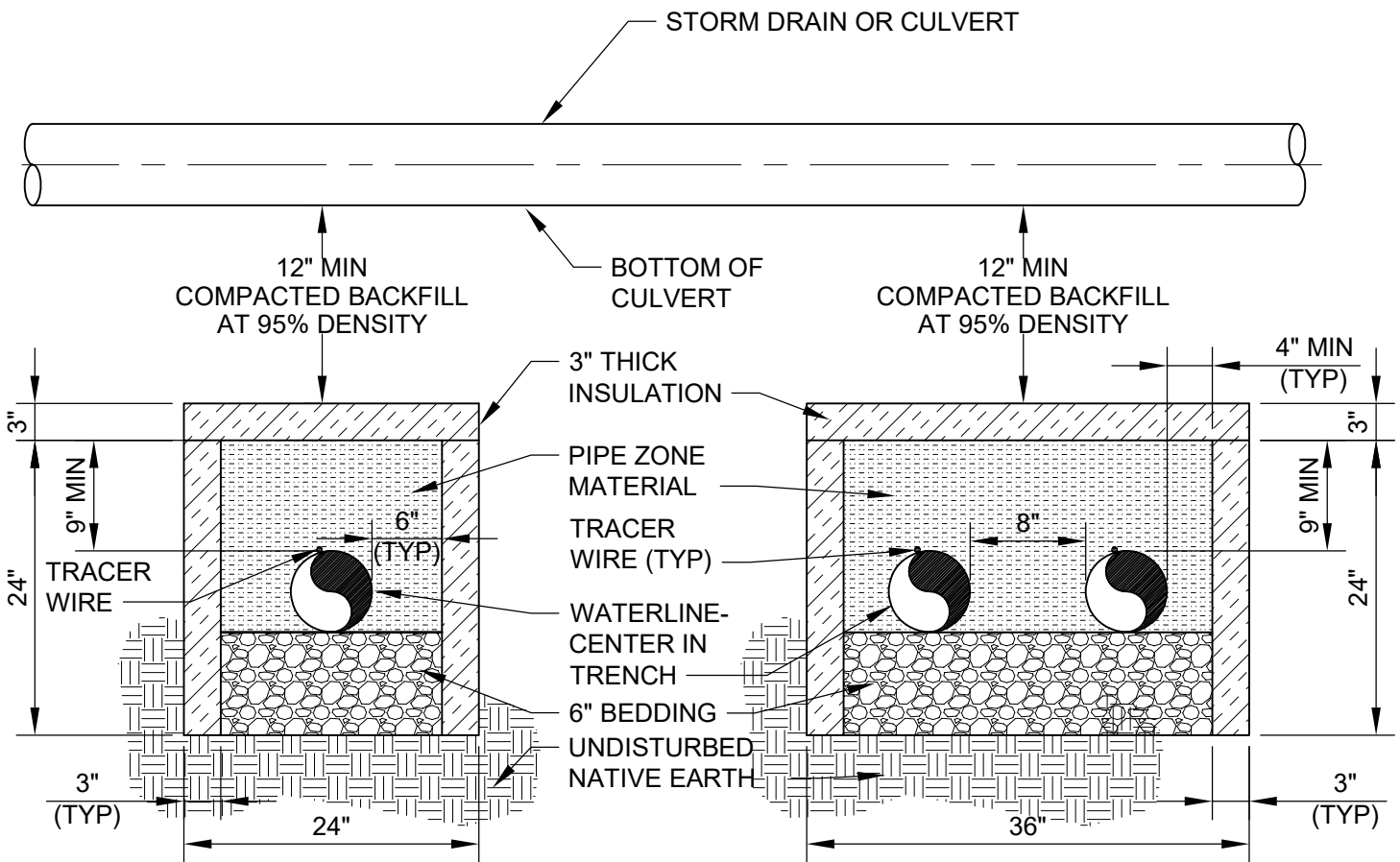


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**TRACER WIRE
VALVE BOX TERMINATIONS**

STD. PLAN

545-B



ONE LINE IN TRENCH

TWO LINES IN TRENCH

NOTES:

1. WHERE WATERLINES INTERSECT STORM DRAINS OR CULVERTS, INSTALL WATERLINE WITH FROST SHIELD. EXTEND FROST SHIELD A MINIMUM OF 3- FEET ON BOTH SIDES STORM DRAIN OR CULVERT.
2. INSULATION SHALL BE 3-INCH THICK INSULATION BOARD (DOW STYROFOAM HIGHLOAD - 60 INSULATION OR APPROVED EQUAL).
3. ALL BACKFILL MATERIAL, INCLUDING SPECIAL BEDDING AND PIPE ZONE MATERIAL, SHALL BE COMPACTED TO AT LEAST 95% DENSITY TO PROVIDE AN ADEQUATE FOUNDATION FOR THE CULVERT AND ROADWAY.
4. INSTALL TRACER WIRES AS REQUIRED (STD. PLAN 540, 541 AND 545)

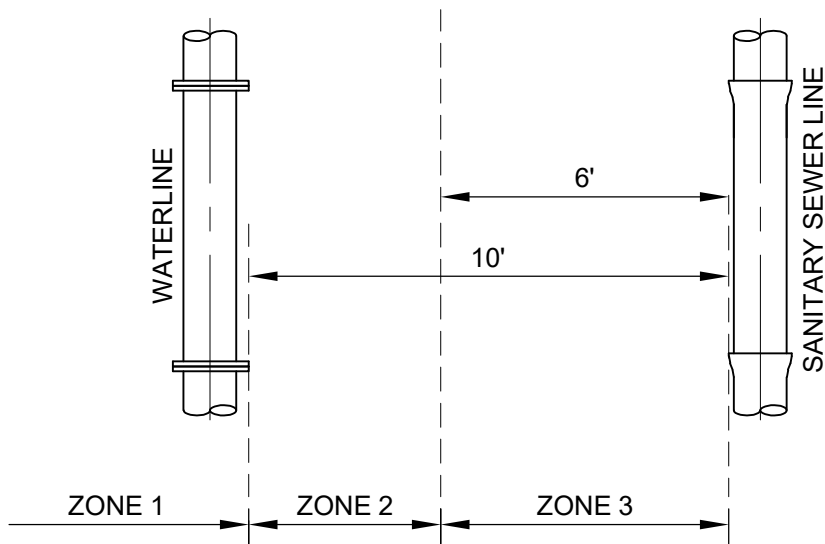


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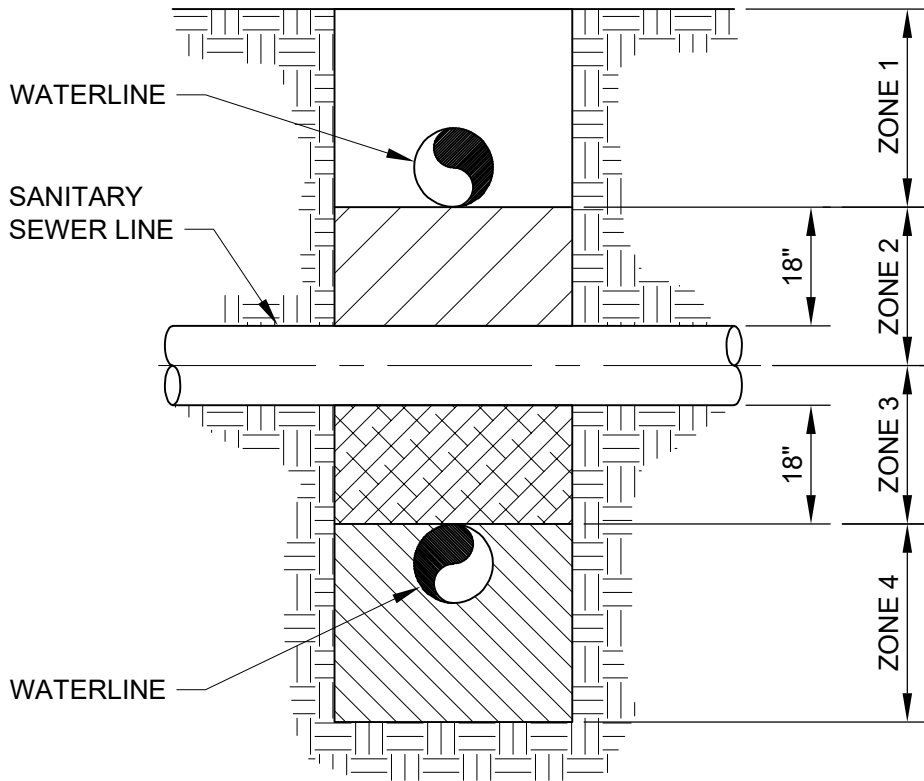
PIPE INSULATION AT STORM DRAIN CROSSINGS

STD. PLAN

546



HORIZONTAL SEPARATION REQUIREMENTS



VERTICAL SEPARATION REQUIREMENTS

NOTES:

1. SEE STD. PLAN 547-B FOR HORIZONTAL AND VERTICAL SEPARATION REQUIREMENT NOTES.
2. ALL CULINARY WATER MAINS AND LATERALS SHALL BE INSTALLED ABOVE SEWER LINES

	DATE	WATER - SANITARY SEWER SEPARATION	STD. PLAN
	01/2021		547-A
	REV.		
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HORIZONTAL SEPARATION

NOTES:

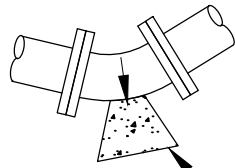
- 1. ZONE 1: WATER LINE AND SEWER LINE SEPARATED 10 FEET OR GREATER - NO SPECIAL REQUIREMENTS
- ZONE 2: A) WATER LINE SEPARATED BY AT LEAST 6 FEET AT OUTSIDE PIPE WALLS AND
B) BOTTOM OF WATER LINE IS AT LEAST 18 INCHES ABOVE TOP OF SEWER LINE AND
C) WATER LINE CONSTRUCTED WITH MECHANICAL, RESTRAINED JOINT PIPE
- ZONE 3: WATER LINE AND SEWER LINE SEPARATION LESS THAN 6 FEET - NOT ALLOWED
- 2. SERVICE LINE TAPS NOT ALLOWED IN ZONE 2.
- 3. SERVICE LINE TAPS WITHIN ZONE 3 ALLOWED ONLY BY SITE SPECIFIC APPROVAL
- 4. MAINTAIN 10 FEET HORIZONTAL SEPARATION AND 18 INCHES VERTICAL SEPARATION ABOVE SANITARY SEWER FORCE MAINS

VERTICAL SEPARATION

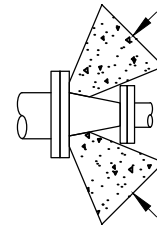
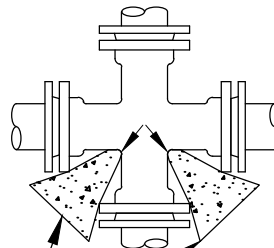
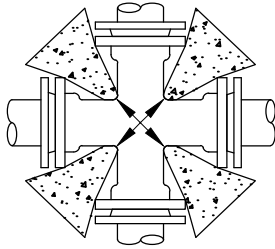
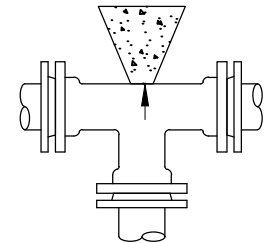
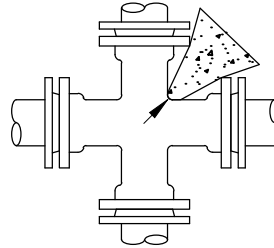
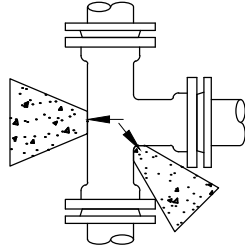
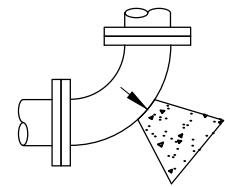
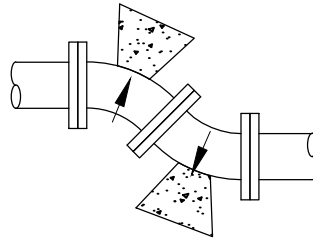
NOTES:

- 1. ZONE 1: WATER LINE ABOVE SEWER LINE AND SEPARATED 18 INCHES OR GREATER - NO SPECIAL REQUIREMENTS
- ZONE 2: WATER LINE ABOVE SEWER LINE SEPARATED LESS THAN 18 INCHES - LOOP WATER LINE, REFER TO STD. PLAN 543. INSTALL CONTROLLED LOW-STRENGTH MATERIAL (CLSM), "FLOWABLE FILL", 150 PSI MAXIMUM MIX DESIGN WITHIN WATER PIPE ZONE AND TO 18 INCHES ABOVE SEWER LINE
- ZONE 3: WATER LINE BELOW SEWER LINE SEPARATED LESS THAN 18 INCHES - LOOP WATER LINE, REFER TO STD. PLAN 543. INSTALL CONTROLLED LOW-STRENGTH MATERIAL (CLSM), "FLOWABLE FILL", 150 PSI MAXIMUM MIX DESIGN WITHIN WATER PIPE ZONE AND TO 18 INCHES ABOVE SEWER LINE
- ZONE 4: WATER LINE BELOW SEWER LINE SEPARATED GREATER THAN 18 INCHES - CENTER ONE FULL UNCUT LENGTH OF WATER PIPE OVER THE CROSSING AND PROVIDE MECHANICAL RESTRAINED PIPE JOINTS UNTIL THE WATER PIPE EXTENDS TO A DISTANCE OF 10 FEET PERPENDICULAR TO EACH SIDE OF THE SEWER LINE. INSTALL CONTROLLED LOW-STRENGTH MATERIAL (CLSM), "FLOWABLE FILL", 150 PSI MAXIMUM MIX DESIGN WITHIN WATER PIPE ZONE AND TO 18 INCHES ABOVE SEWER LINE
- 2. SERVICE LINE TAPS NOT ALLOWED IN ZONES 2 AND 3.
- 3. MAINTAIN 10 FEET HORIZONTAL SEPARATION AND 18 INCHES VERTICAL SEPARATION ABOVE SANITARY SEWER FORCE MAINS
- 4. ALL CULINARY WATER MAINS AND LATERALS SHALL BE INSTALLED ABOVE SEWER LINES

	DATE	WATER - SANITARY SEWER SEPARATION	STD. PLAN
	01/2021		547-B
	REV.		
	0		



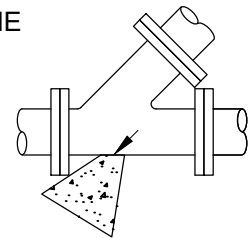
BEARING AREA
UNDISTURBED SOIL (TYP)



MINIMUM BEARING AREA IN SQ. FT.

SIZE OF PIPE	TEES, VALVES, DEAD ENDS	90° BENDS	45° BENDS	22 1/2° BENDS	11 1/4° BENDS
4"	3.5	5	3	1.5	1
6"	7	10	5.5	3	1.5
8"	12.5	17	9.5	5	2.5
10"	18.5	26	14	7.5	3.8
12"	26	37	20	10	5
14"	35	49	26.5	13.5	7
16"	45	63	34	17.5	9

THE AREA OF BEARING PER
THRUST BLOCK TO EQUAL 1/2 THE
AREA SPECIFIED FOR THE
LARGEST PIPE OR FITTING SIZE



NOTE:

1. RESTRAINT SIZING IS BASED UPON A MAXIMUM OPERATING PRESSURE OF 150 PSI AND A TEST PRESSURE OF 250 PSI, AND A MINIMUM SOIL BEARING STRENGTH OF 2,000 PSF. OPERATING PRESSURES IN EXCESS OF 150 PSI OR SOILS WITH LESS THAN 2,000 POUND BEARING STRENGTH WILL REQUIRE SPECIAL DESIGN.
2. PIPE SIZE EXCEEDING 16" REQUIRES SPECIAL DESIGN.
3. SIDE WALLS OF THRUST BLOCK SHALL BE FORMED WITH VERTICAL SIDES.
4. DO NOT ENCASE ADJACENT FITTINGS AND BOLTS.
5. DO NOT THRUST AGAINST ADJACENT PIPES.
6. PLACE PE WRAP PRIOR TO INSTALLING BLOCKING.



DATE

01/2021

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**DIRECT BEARING
THRUST BLOCK**

STD. PLAN

561

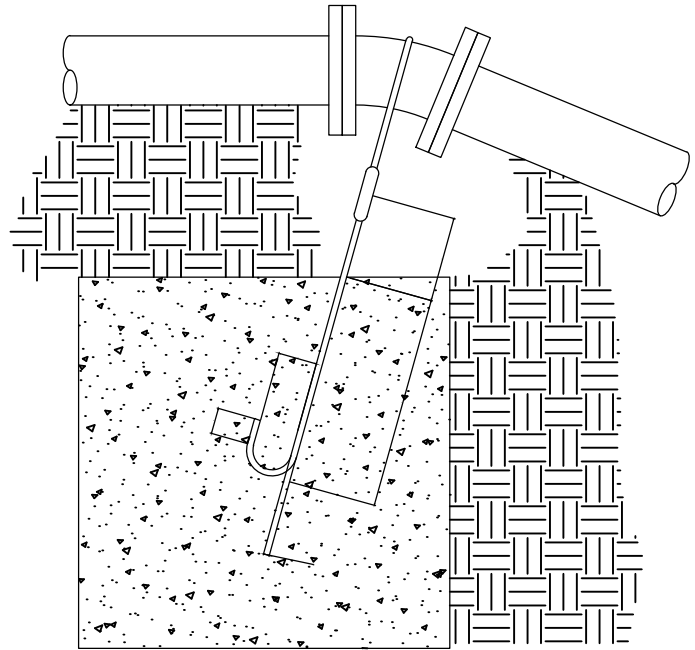


TABLE OF DIMENSIONS

SIZE OF PIPE (NOMINAL DIAMETER)	VERTICAL BEND IN DEGREES	CONCRETE BLOCKING IN CUBIC FEET	'S' SIDE OF CUBE - FEET	'd' DIAMETER OF SHANK OR REBAR RODS - INCH	'L' DEPTH OF ROD IN CONCRETE - FEET
4"	11 1/4	9.5	2.2	5/8"	1.5
	22 1/2	19.0	2.7	5/8"	2.0
6"	11 1/4	20	2.7	5/8"	2.0
	22 1/2	40	3.4	5/8"	2.0
8"	11 1/4	34	3.3	5/8"	2.0
	22 1/2	68	4.1	5/8"	2.0
10"	11 1/4	51	3.8	5/8"	2.0
	22 1/2	102	4.7	3/4"	3.0
12"	11 1/4	72	4.2	5/8"	2.0
	22 1/2	143	5.3	3/4"	3.0
14"	11 1/4	97	4.6	7/8"	3.0
	22 1/2	193	5.8	7/8"	3.0
16"	11 1/4	125	5.0	7/8"	3.0
	22 1/2	249	6.3	7/8"	4.0

TYPE A RESTRAINT

FOR 11-1/4° - 22-1/2° VERTICAL BENDS

NOTE:

1. RESTRAINT SIZING IS BASED UPON A MAXIMUM OPERATING PRESSURE OF 150 PSI AND A TEST PRESSURE OF 250 PSI, AND A MINIMUM SOIL BEARING STRENGTH OF 2,000 PSF. OPERATING PRESSURES IN EXCESS OF 150 PSI OR SOILS WITH LESS THAN 2,000 POUND BEARING STRENGTH WILL REQUIRE SPECIAL DESIGN.
2. PIPE SIZE EXCEEDING 16" REQUIRES SPECIAL DESIGN.
3. SIDE WALLS OF THRUST BLOCK SHALL BE FORMED WITH VERTICAL SIDES.
4. DO NOT ENCASE ADJACENT FITTINGS AND BOLTS.
5. DO NOT THRUST AGAINST ADJACENT PIPES.
6. SHANK AND REBAR MATERIALS SHALL BE EPOXY COATED AT LEAST 15 MILS THICK.
7. REINFORCEMENT SHALL BE DEFORMED STEEL, ASTM A 615. MINIMUM STRESS YIELD STRENGTH OF STEEL TIE-DOWN BARS IS 70,000 KSI.



DATE

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TIE-DOWN THRUST RESTRAINTS

STD. PLAN

562-A

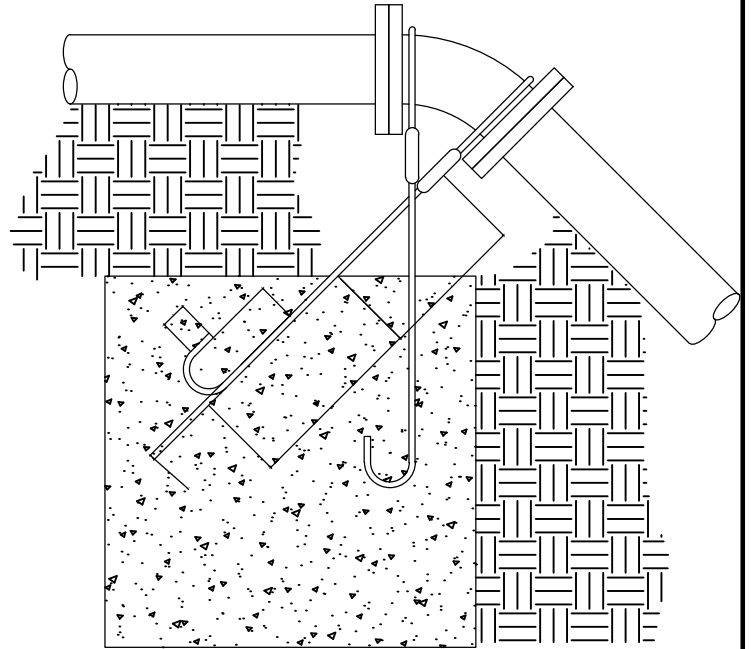


TABLE OF DIMENSIONS

SIZE OF PIPE (NOMINAL DIAMETER)	VERTICAL BEND IN DEGREES	CONCRETE BLOCKING IN CUBIC YARDS	'S'	'd'	'L'
4"	45	1.4	3.4	5/8"	2.0
				5/8"	
6"	45	2.8	4.3	5/8"	2.5
				5/8"	
8"	45	4.9	5.1	5/8"	3.0
				5/8"	
10"	45	7.3	5.9	5/8"	4.0
				5/8"	
12"	45	10.4	6.8	3/4"	4.0
				3/4"	
14"	45	14.0	7.3	3/4"	4.0
				3/4"	
16"	45	18.1	7.9	3/4"	4.0
				3/4"	

TYPE B RESTRAINT

FOR 45° VERTICAL BENDS

NOTE:

1. RESTRAINT SIZING IS BASED UPON A MAXIMUM OPERATING PRESSURE OF 150 PSI AND A TEST PRESSURE OF 250 PSI, AND A MINIMUM SOIL BEARING STRENGTH OF 2,000 PSF. OPERATING PRESSURES IN EXCESS OF 150 PSI OR SOILS WITH LESS THAN 2,000 POUND BEARING STRENGTH WILL REQUIRE SPECIAL DESIGN.
2. PIPE SIZE EXCEEDING 16" REQUIRES SPECIAL DESIGN.
3. SIDE WALLS OF THRUST BLOCK SHALL BE FORMED WITH VERTICAL SIDES.
4. DO NOT ENCASE ADJACENT FITTINGS AND BOLTS.
5. DO NOT THRUST AGAINST ADJACENT PIPES.
6. SHANK AND REBAR MATERIALS SHALL BE EPOXY COATED AT LEAST 15 MILS THICK.
7. REINFORCEMENT SHALL BE DEFORMED STEEL, ASTM A 615. MINIMUM STRESS YIELD STRENGTH OF STEEL TIE-DOWN BARS IS 70,000 KSI.



DATE

01/2021

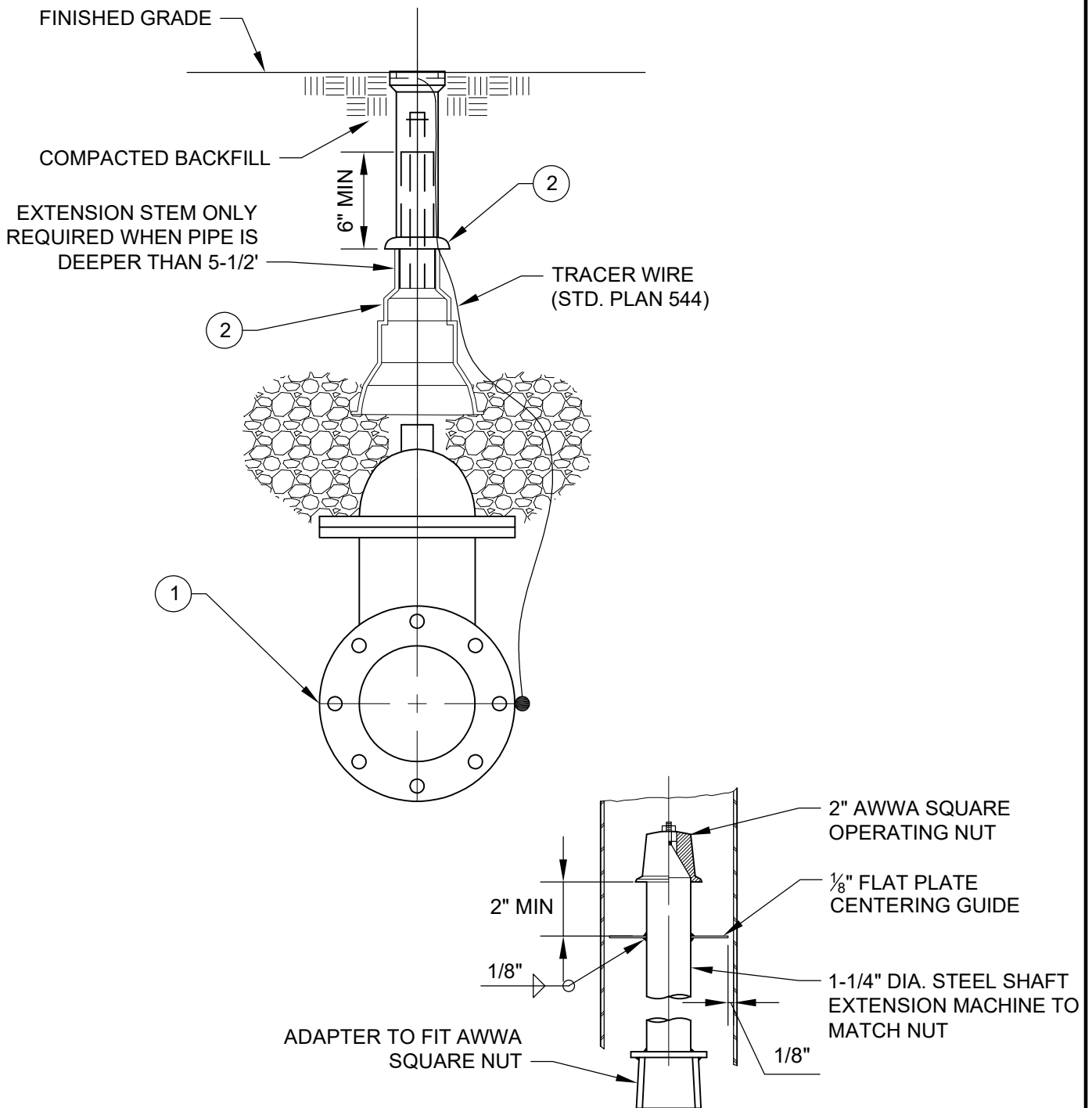
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TIE-DOWN THRUST RESTRAINTS

STD. PLAN

562-B



EXTENSION STEM

SCALE: NTS

NOTES:

- REFER TO STD. PLAN 570 S FOR LEGEND ITEMS, APPROVED PARTS LIST, AND DETAIL NOTES.

	DATE	BURIED VALVE AND VALVE BOX	STD. PLAN
	01/2021		570
	REV.		
	0		

ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	GATE VALVE, NRS, AWWA C509, 250 PSI, SST BONNET BOLTS, END CONNECTIONS PER FOLLOWING: ON TEES: FLG X FLG; IN-LINE VALVES: MJ X MJ; OTHERS: MJ X MJ, OR PER DESIGN	MUELLER	SERIES 2360
2	VALVE BOX, CAST IRON, TWO PIECE SLIP TYPE WITH CAST IRON DROP-IN COVER MARKED AS FOLLOWS: ISOLATION: WATER; BUTTERFLY VALVE: BFV; ZONE VALVE: ZONE; FIRE LINE VALVE: FIRE. VALVE BOX RISER: LIMIT ONE PER VALVE BOX	D&L SUPPLY OR APPROVED EQUAL	BOX AND LID: M-8042; RISER: M-8049 THRU M-8055; EXTENSION: M-8070

570 S - BURIED VALVE AND VALVE BOX
DETAIL NOTES

1. VALVES TO BE RATED FOR WORKING AND TEST PRESSURE OF WATER MAIN
2. PROVIDE FUSION BONDED EPOXY COATING ON VALVE INTERIOR AND EXTERIOR
3. PROVIDE 316 SST BOLTS AND NUTS WITH ANTI-SIEZE LUBRICATION ON FLANGED CONNECTIONS
4. DO NOT LOCATE VALVE AND VALVE BOX WITHIN CURB OR GUTTER
5. CENTER VALVE BOX ON VALVE OPERATING NUT
6. SET VALVE PLUMB WITHOUT DEFLECTIONS IN VALVE BOX JOINTS
7. ALL BURED METALLIC FITTINGS SHALL BE FULLY ENCASED IN POLYETHYLENE WRAP (CHRISTY'S VISQUEEN OR APPROVED EQUAL), 8-MILS MINIMUM, INSTALLED PER MANUFACTURER RECOMMENDATIONS

	DATE	BURIED VALVE AND VALVE BOX LEGEND AND NOTES	STD. PLAN
	01/2021		570 S
	REV.		
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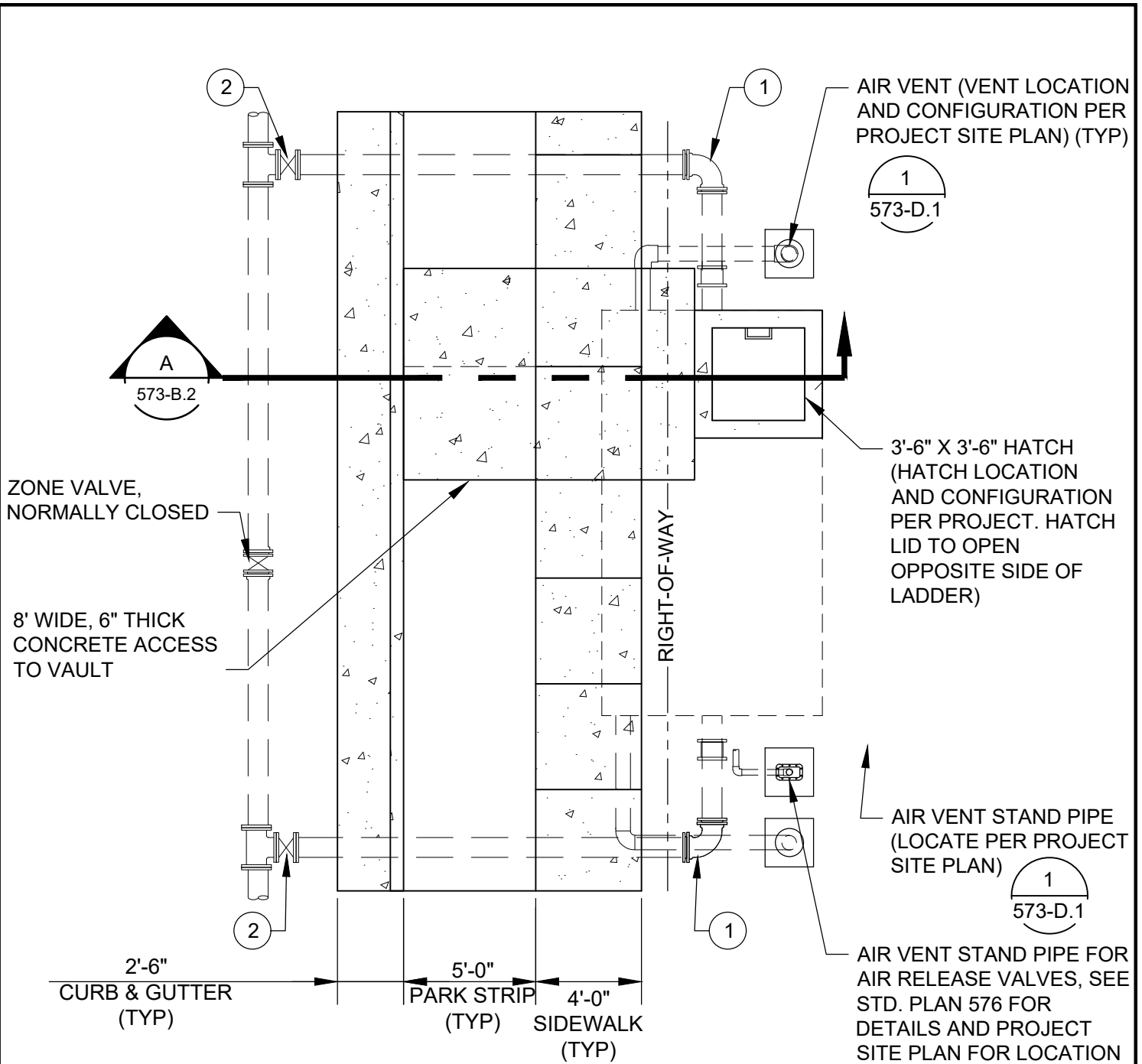
GENERAL NOTES

1. ALL WORK SHALL CONFORM TO TOWN OF BENNETT DESIGN STANDARDS, CONSTRUCTION SPECIFICATIONS, AND STANDARD DRAWINGS.
2. SUBMIT SHOP DRAWINGS TO DESIGN ENGINEER AND PUBLIC WORKS DIRECTOR FOR APPROVAL PRIOR TO CONSTRUCTION. INCLUDE MECHANICAL, STRUCTURAL, ELECTRICAL AND INSTRUMENT DRAWINGS IDENTIFYING CONDUIT, CONDUCTOR, CABLE, SIZE AND ROUTINGS FOR POWER, GROUNDING, INSTRUMENTATION, AND CONTROLS, OPENINGS, PIPE, VALVES, HATCH, AND ALL VAULT COMPONENTS.
3. VAULT BACKFILL: STRUCTURAL FILL MATERIAL COMPACTED TO 95% MINIMUM OF MODIFIED PROCTOR DENSITY.
4. DUCTILE IRON PIPE, FITTINGS, COUPLERS, FLANGES, ETC. SHALL BE IN ACCORDANCE WITH AWWA C153, C111, AND C110 AND RATED FOR A MINIMUM 250 PSI WORKING PRESSURE.
5. FLANGED JOINTS: 125 LB FLANGES, ANSI/AWWA C115/A21.15. "FULL FACE FLANGE-TYTE" GASKET OR "RING FLANGE-TYTE" GASKET (OR PRE-APPROVED EQUAL). GASKETS TO BE HIGH-PERFORMANCE TYPE, 1/8" THICK, AND HAVE AT LEAST (3) BULB TYPE RINGS MOLDED INTO BOTH GASKET FACES, ANSI/AWWA C110/A21.11.
6. FITTINGS: FULL BODY AWWA C110. NO COMPACT FITTINGS.
7. DUCTILE IRON PIPE AND FITTINGS: UNCOATED. PRIME AND PAINT WITH NSF APPROVED HIGH SOLIDS EPOXY PAINT, TNE MEC POTA-POX N140 OR PRE-APPROVED EQUAL. HIGH PRESSURE SIDE, LIGHT BLUE. LOW PRESSURE SIDE, OFF WHITE.
8. ALL VALVES INSIDE VAULT SHALL BE RATED FOR 250 PSI WORKING PRESSURE, OR HIGHER IF REQUIRED FOR PROJECT.
9. VAULT SHALL BE PRECAST CONCRETE. APPROVAL MUST BE GIVEN TO USE CAST IN PLACE CONCRETE. VAULT SHALL BE DESIGNED FOR HS-20 LOADING. THE LOCATION OF THE PRECAST JOINTS MUST BE APPROVED. SITE SPECIFIC APPROVAL REQUIRED.
10. SEAL ALL JOINTS WITH PREFORMED FLEXIBLE SEALANT CONFORMING TO ASTM C990, AND WRAP WITH EXTERNAL JOINT SEALANT MEETING ASTM C877. FILL JOINTS INSIDE VAULT WITH CAULK OR GROUT.
11. PROVIDE (2) 8 HR DAYS FOR TESTING, STARTUP, AND TRAINING FOR PRV VALVES WITH MANUFACTURER REPRESENTATIVE.
12. SEAL ALL VAULT PENETRATIONS WITH HYDROPHILIC NON-SHRINK GROUT.

NOTES:

1. THE FOLLOW PRV STANDARD DETAILS ILLUSTRATE AN EXAMPLE TYPICAL INSTALLATION WITH A 6-INCH PRV. SIZING OF PRESSURE REDUCING VALVE, PRESSURE RELIEF VALVES, AIR VALVES, PIPING AND APPURTENANCES ARE THE RESPONSIBILITY OF THE DESIGN ENGINEER AND ARE SUBJECT TO TOWN APPROVAL.

	DATE	PRESSURE REDUCING VALVE VAULT	STD. PLAN
	01/2021		573-A
	REV.		
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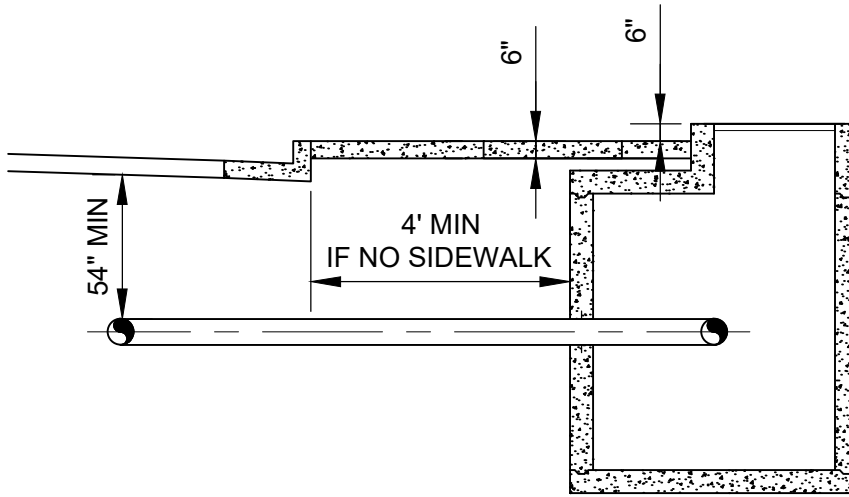
VAULT LOCATION PLAN

SCALE: NTS

NOTES:

1. FOR GENERAL NOTES, SEE STD. PLAN 573-A, AND FOR (#) KEYED ITEMS, SEE STD. PLAN 573-C.3 AND C.4.
2. SITE SPECIFIC APPROVAL REQUIRED. NEW EASEMENTS WILL BE REQUIRED IF VAULT IS LOCATED OUTSIDE OF PROPERTY LINE.

	DATE	PRESSURE REDUCING VALVE VAULT LOCATION PLAN	STD. PLAN
	01/2021		573-B.1
	REV.		
	0		



VAULT SECTION

SCALE: NTS

A
573-B.1



DATE	01/2021
REV.	0

PRESSURE REDUCING VALVE VAULT VAULT SECTION

STD. PLAN

573-B.2

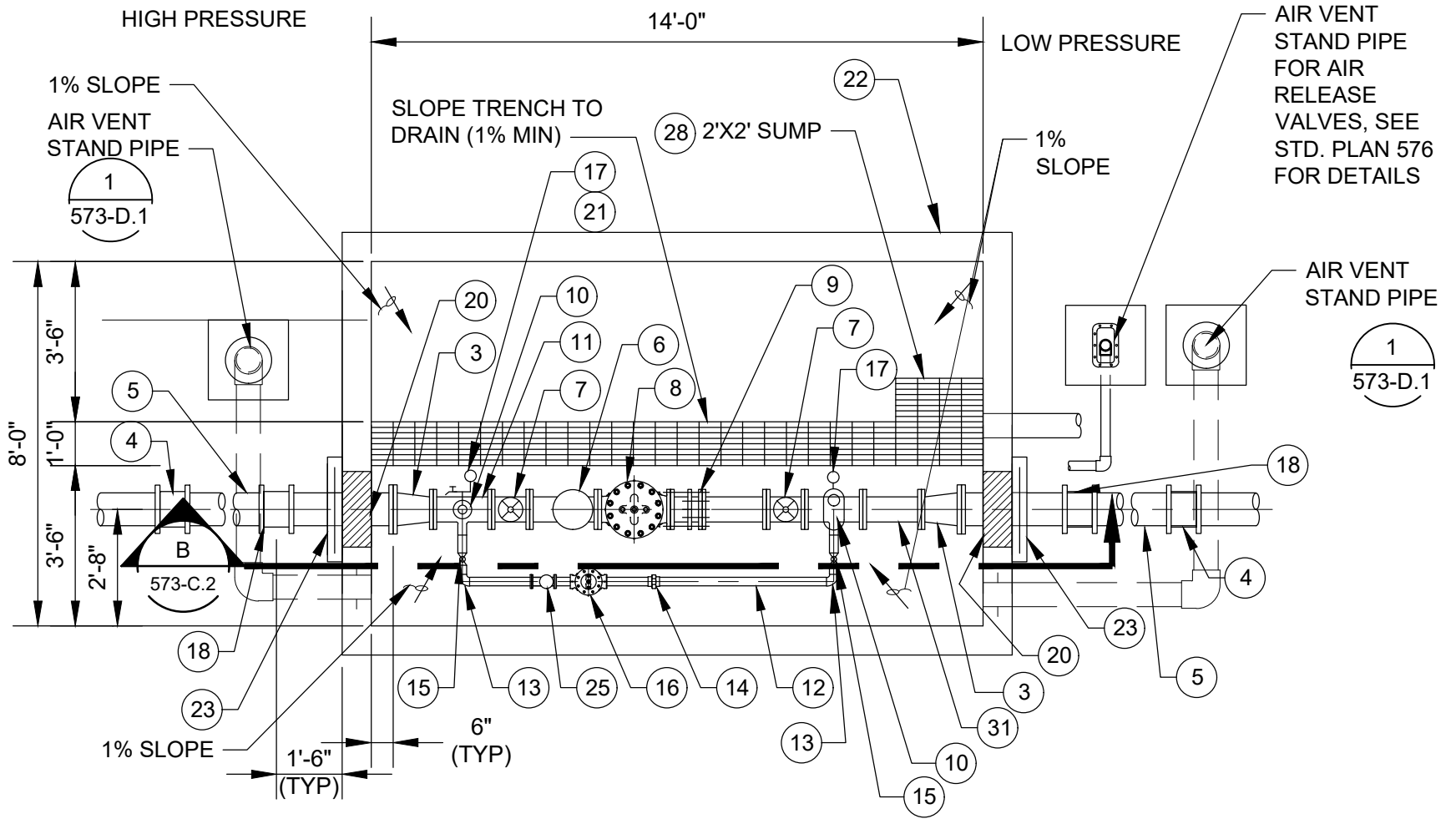


DATE	01/2021
REV.	0

**PRESSURE REDUCING
VALVE VAULT
MECHANICAL PLAN**

573-C.1

STD. PLAN

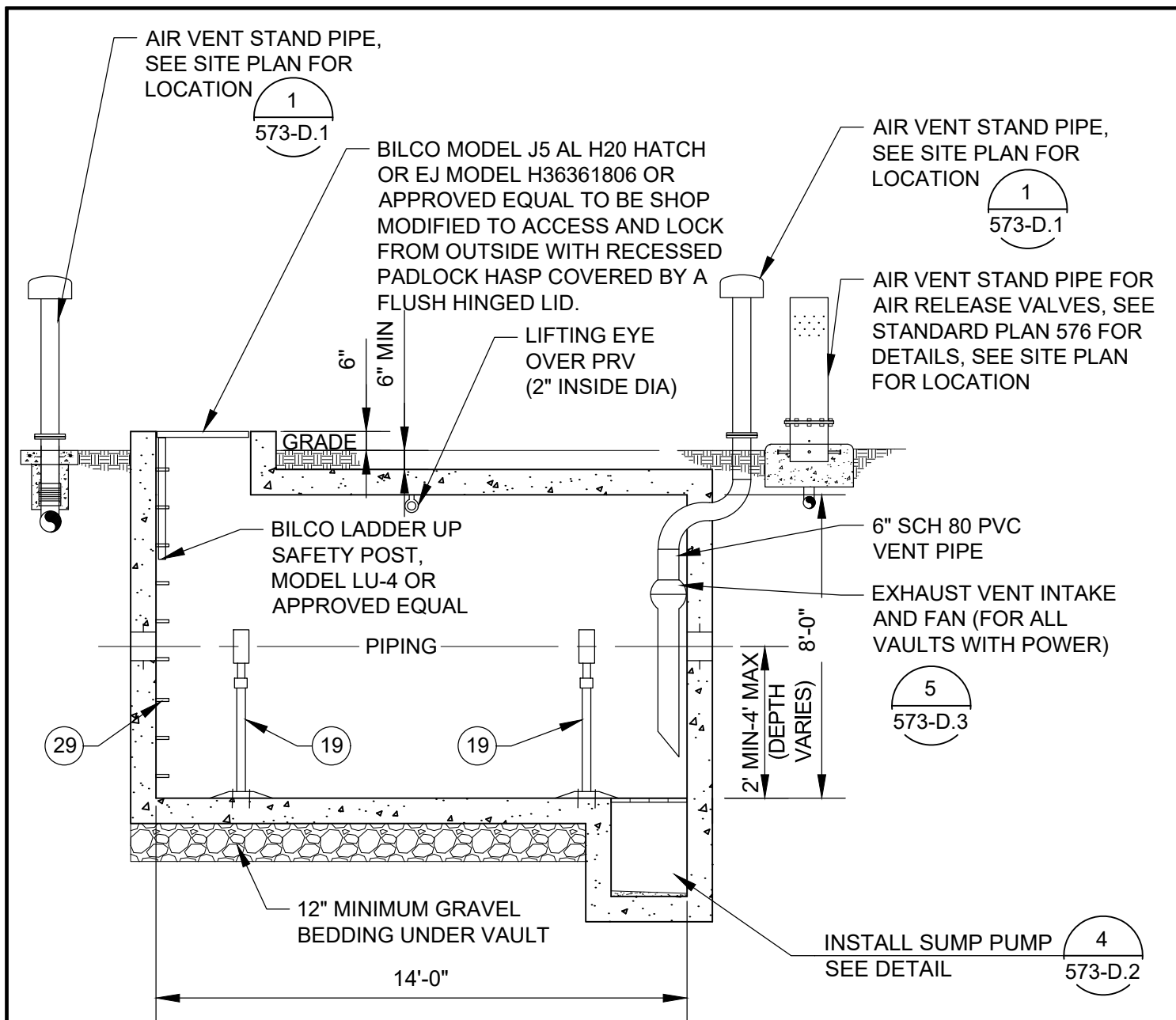


MECHANICAL PLAN

SCALE: NTS

NOTE:

1. FOR GENERAL NOTES, SEE STD. PLAN 573-A, AND FOR (#) KEYED ITEMS, SEE STANDARD PLAN 573-C.3 AND C.4.
2. SEE PROJECT SITE PLAN FOR ACTUAL LOCATION OF VENT STAND PIPES, HATCH, SUMP, AND HIGH/LOW PRESSURE SIDES.




VAULT SECTION B
 SCALE: NTS 573-C.1

NOTES:


- FOR GENERAL NOTES, SEE STD. PLAN 573-A, AND FOR # KEYED ITEMS, SEE STD. PLAN 573-C.3 AND C.4.

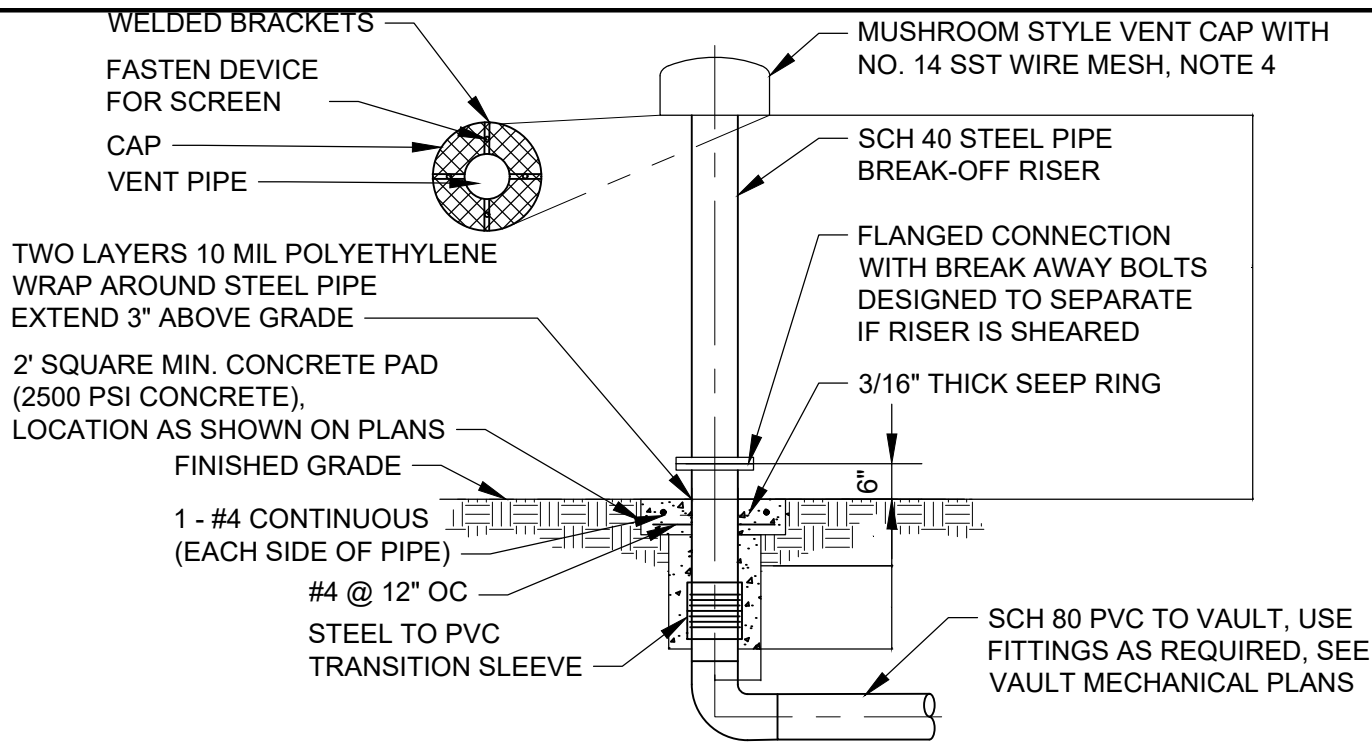
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	01/2021		<p style="font-size: 1.5em; font-weight: bold;">573-C.2</p>
	REV.		
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MATERIAL LIST	
ITEM	PRESSURE REDUCING VALVE VAULT
①	INSTALL 8" WATER MAIN WITH 90° DI BENDS WITH RETAINER GLANDS AND THRUST BLOCKS
②	INSTALL 8" RESILIENT SEAT VALVE, FL X MJ, W/ TEE AND RETAINER GLANDS AND TRUST BLOCKS ON EXISTING WATER MAIN
③	8"X6" DI REDUCER FL X FL
④	8" DI WATER MAIN, USE FLEXIBLE OR DUCTILE IRON MJ SLEEVES (POWERSEAL MODEL 3506 POWERMAX OR EQUAL) AS NECESSARY TO LEVEL EXISTING LINES
⑤	8" DI PIPE
⑥	6" CLA-VAL X 43 H (H STYLE STRAINER), FLANGED ENDS, 10 MESH SCREEN, CAGE SUPPORT, AND O-RING
⑦	6" RESILIENT SEAT VALVE, FL X FL W/HAND WHEEL AND POSITION INDICATOR
⑧	6" PRESSURE REDUCING VALVE, CLA-VAL MODEL 92-01, STRAINERS, FLOW CONTROL SHUT OFF COCKS, FLOW STABILIZER, STAINLESS STEEL TRIM, FLANGE X FLANGE, AND E-FLOW METER MODEL X144 WITH 4-20mA OUTPUT TO READ AT SCADA (SUBMITTAL REQUIRED, PRESSURE SUSTAINING VALVE IS REQUIRED UNLESS NOTED OTHERWISE)
⑨	6" DISMANTLING JOINT, ROMAC DJ 400, OR EQUAL.
⑩	1" COMBINATION AIR VALVE WITH BALL VALVE ISOLATION, CLA-VAL MODEL 361-CAV564.3 OR EQUAL. VENT ABOVE GRADE. OBTAIN OWNER APPROVAL FOR VENT PIPE ROUTING. SEE STD. PLAN 576 FOR DETAILS (SIMILAR).
⑪	6" X 6" X 2" DI TEE FL X FL X IP THREAD WITH TAP FOR PRESSURE GAUGE (ITEM 17), AND HOSE BIBBS (ITEM 22), AND AIR VALVE (ITEM 10)
⑫	2" BRASS OR RIGID COPPER PIPE, SCHEDULE 40, THREADED, TYPICAL
⑬	2" BRONZE 90° ELBOW, THREADED
⑭	2" BRONZE UNION COUPLING, THREADED
⑮	2" THREADED BRONZE BALL VALVE WITH HANDLE, 300 PSI, MUELLER 300
⑯	2" PRESSURE REDUCING VALVE CLA-VAL 92-01, STRAINERS, FLOW CONTROL SHUT OFF COCKS, FLOW STABILIZER, STAINLESS STEEL TRIM, THD X THD, AND E-FLOW METER MODEL X144 WITH 4-20mA OUTPUT TO READ AT SCADA (SUBMITTAL REQUIRED, PRESSURE SUSTAINING VALVE IS REQUIRED UNLESS NOTED OTHERWISE)
⑰	2" LIQUID FILLED PRESSURE GAUGE, GRADE B, UPSTREAM (0-300 PSI) DOWNSTREAM (0-200 PSI), THREADED, WITH STEM VALVE - SEE STD. PLAN 573-D.1
⑱	8" MJ SOLID SLEEVE, MEGA-LUG RESTRAINTS WITH COR-TEN TEE BOLTS

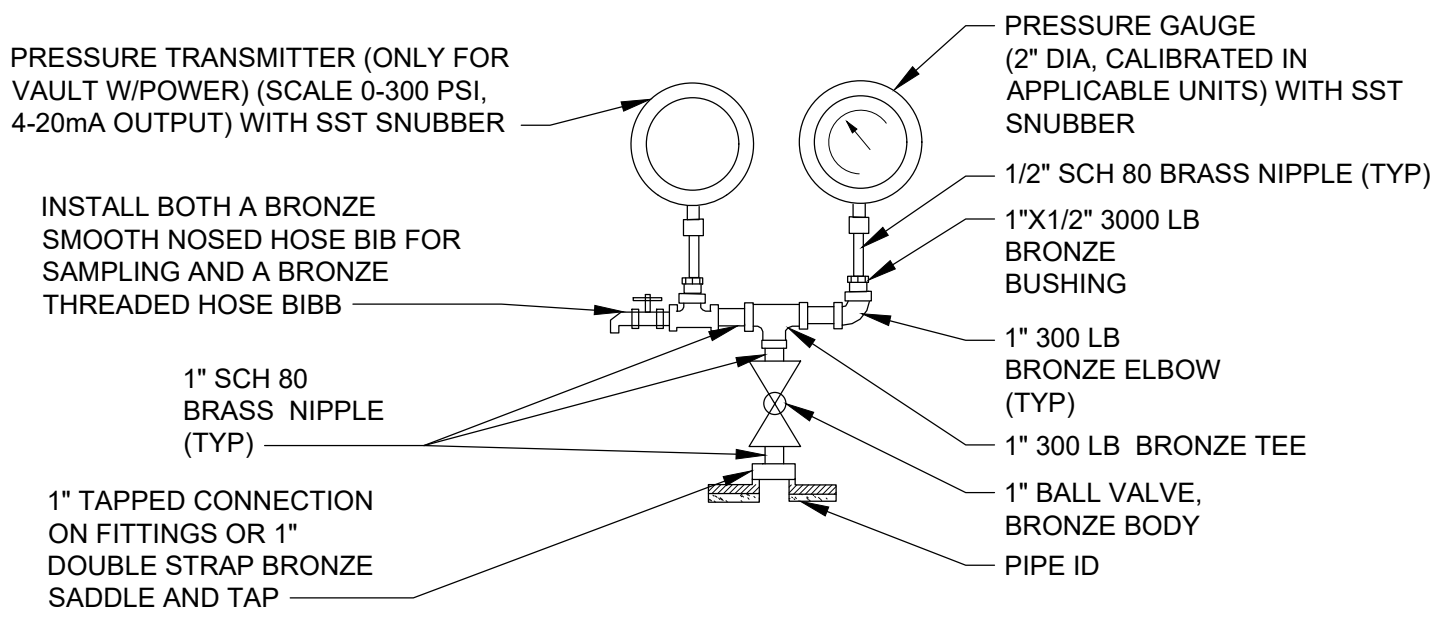
	DATE	PRESSURE REDUCING VALVE VAULT LEGEND	STD. PLAN
	01/2021		573-C.3
	REV.		
	0		

MATERIAL LIST (CON'T)	
ITEM	PRESSURE REDUCING VALVE VAULT
19	2" STEEL PIPE SUPPORT STAND, ADJUSTABLE (2 REQUIRED ON 6" PIPE SYSTEM, 2 REQUIRED ON 2" PIPE SYSTEM), SEE STD. PLAN 578
20	CORE DRILL OPENING WITH LINK-SEAL PIPE-TO-WALL SEAL. TYPICAL ON ALL OPENING. FILL OUTSIDE OPENINGS WITH NON-SHRINK GROUT AND CAULK
21	3/4" HOSE BIBBS, I.P. THREAD - SEE STD. PLAN 573-D.1
22	VAULT IN ACCORDANCE WITH 573-A AND 573-B A. PRECAST CONCRETE VAULT RATED FOR HS-20 LOADING. MAY BE CAST IN PLACE PER TOWN APPROVAL. PROVIDE STAMPED STRUCTURAL DRAWINGS B. WATERPROOF OUTSIDE WALLS AND TOP SLAB PER IBC CODE FOR BURIED FOUNDATIONS
23	MECHANICAL JOINT DUCTILE IRON RETAINER GLAND WITH CONCRETE THRUST BLOCK, REINFORCE CONCRETE WITH (4) #4 EACH SIDE OF PIPE.
24	6"X6"X3" DI TEE FLANGE X FLANGE X FLANGE
25	2" CLA-VAL X 43H (H STYLE STRAINER), FLANGED ENDS, 10 MESH SST SCREEN, CAGE SUPPORT, AND O-RING
26	3" PRESSURE RELIEF VALVE, CLA-VAL MODEL 50A-01 BKCX WITH MOUNTED LIMIT SWITCH OR MICRO SWITCH WITH SCADA CONNECT FOR "OPEN" ALARM CONDITION, SEE STD. PLAN 573-D.2
27	IN-LINE GAUGE PRESSURE TRANSMITTER, ROSEMOUNT MODEL 3051TG 800 PSI ASSEMBLED TO INTEGRAL, 2-VALVE, ROSEMOUNT 306 MANIFOLD. SEE STD. PLAN 573-D.1. 4-20 MA ANALOG
28	FRP GRATING, 1-1/2" THICK MIN. AND RATED FOR 300 LB/FT PEDESTRIAN TRAFFIC. INSIDE TRENCH WIDTH TO BE 8" MINIMUM, AND 2-1/2" DEEP.
29	VAULT LADDER, SEE DETAIL 7 ON 573-D.4
30	SUMP PUMP: 2" SUMP PUMP, TSURUMI MODEL HSZ2.4S-62 OR EQUAL. SEE STD. PLAN 573-D.2
31	6" DI PIPE. IF VAULT HAS POWER, THIS ITEM SHALL BE REPLACED WITH ITEMS 25 AND 27.

	DATE	PRESSURE REDUCING VALVE VAULT LEGEND	STD. PLAN
	01/2021		573-C.4
	REV.		
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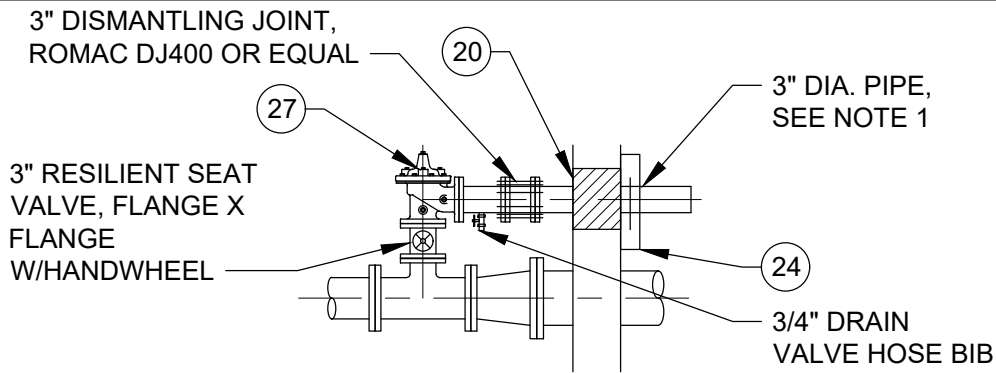


AIR VENT STAND PIPE 1
 SCALE: NTS 573-B, 573-C



PRESSURE GAUGE AND TRANSMITTER DETAIL 2
 SCALE: NTS 573-C

	DATE	PRESSURE REDUCING VALVE VAULT DETAILS	STD. PLAN
	01/2021		573-D.1
	REV.		
	0		



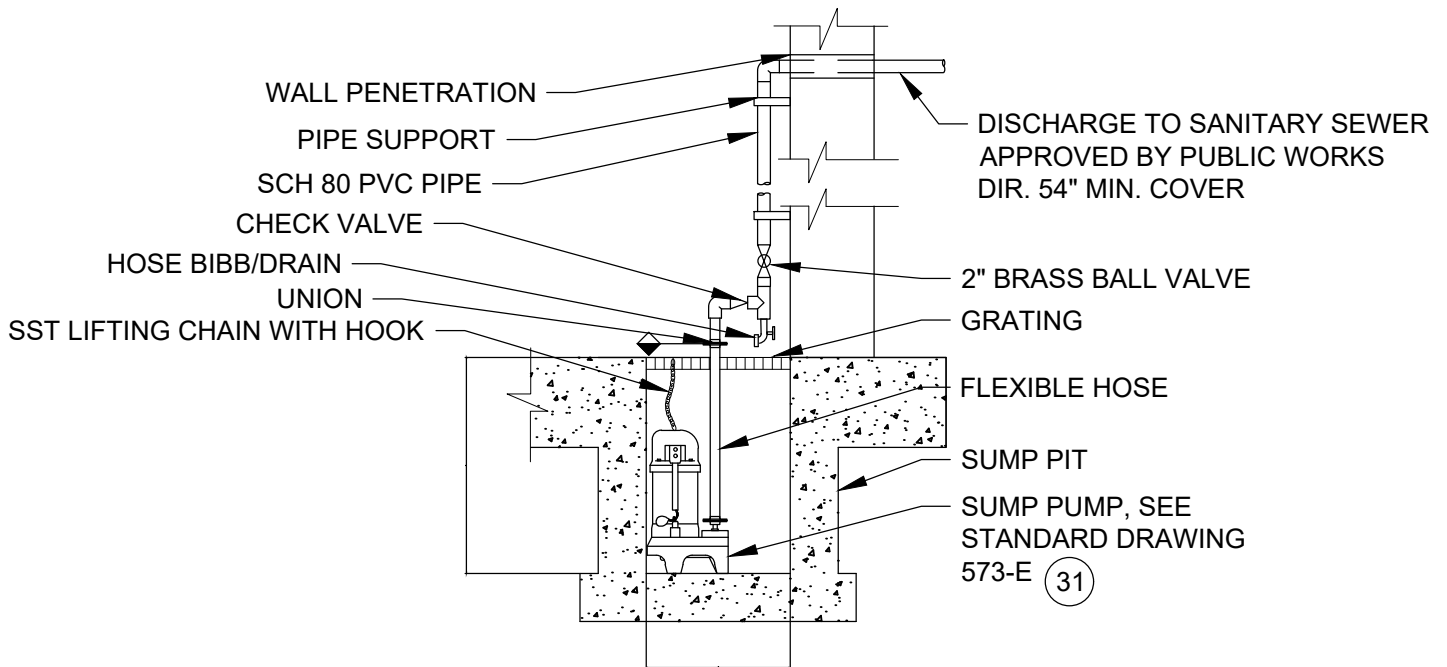
NOTES:

1. ROUTE TO NEAREST APPROVED DISCHARGE LOCATION WITH 12" AIR GAP AND #4 SST MESH SCREEN BETWEEN FLANGES AND EROSION CONTROL. ALL FITTINGS MUST BE FLANGED OR RESTRAINED. 5' MIN COVER.
2. FOR GENERAL NOTES, SEE STD. PLAN 573-A, AND FOR (#) KEYED ITEMS, SEE STD. PLAN 573-C.3 AND C.4

3" PRESSURE RELIEF VALVE DETAIL

SCALE: NTS

3
573-C



NOTES:

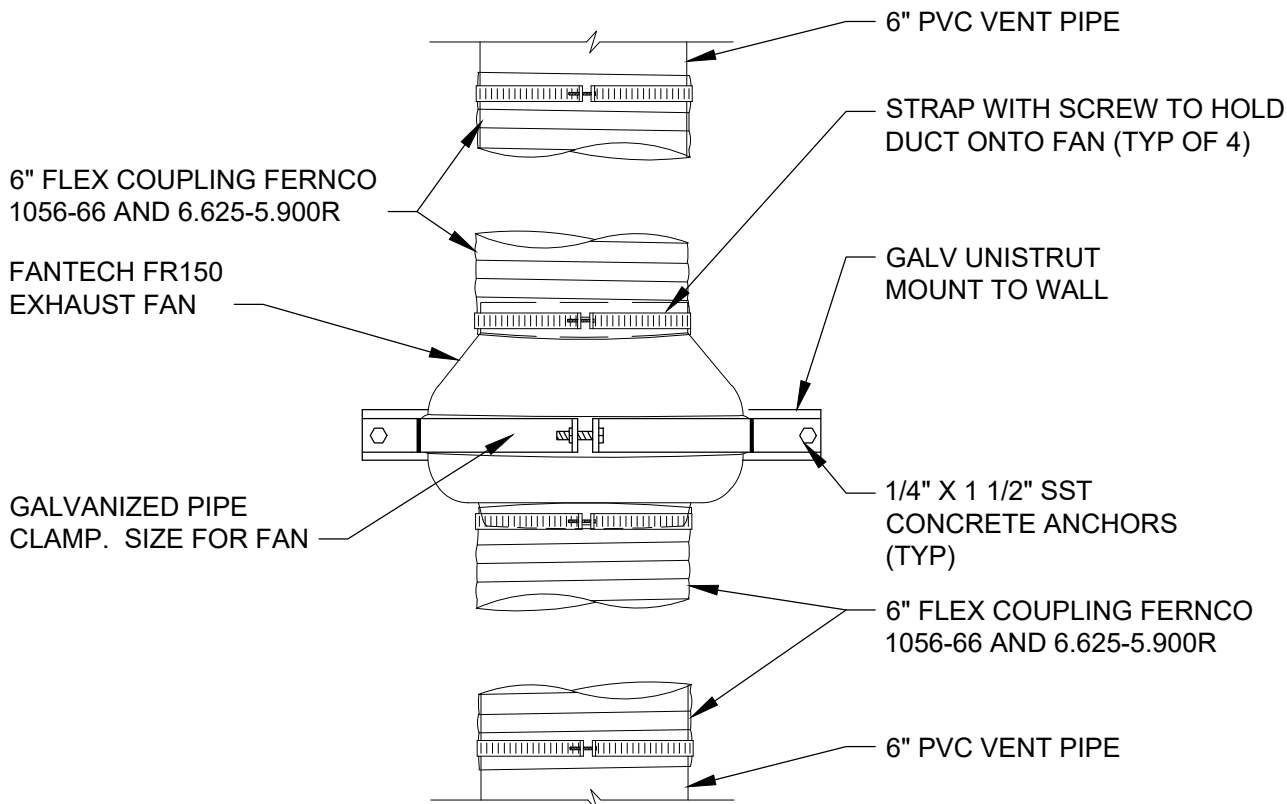
1. SUMP PUMP DISCHARGE ROUTING SUBJECT TO TOWN APPROVAL.
2. FOR GENERAL NOTES, SEE STD. PLAN 573-A, AND FOR (#) KEYED ITEMS, SEE STD. PLAN 573-C.3 AND C.4

TYPICAL SUMP SECTION DETAIL

SCALE: NTS

4
573-C

	DATE	PRESSURE REDUCING VALVE VAULT DETAILS	STD. PLAN
	01/2021		573-D.2
	REV.		
0			

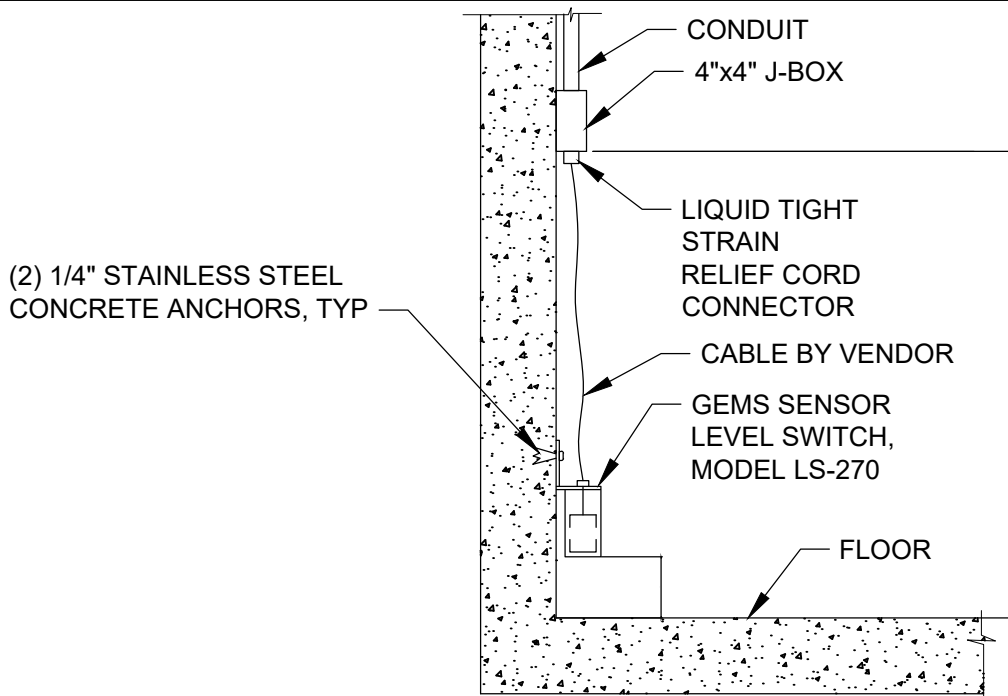


IN-LINE EXHAUST FAN DETAIL

SCALE: NTS

5

573-C, 573-E



FLOOD SWITCH INSTALLATION DETAIL

SCALE: NTS

6

573-E



DATE

01/2021

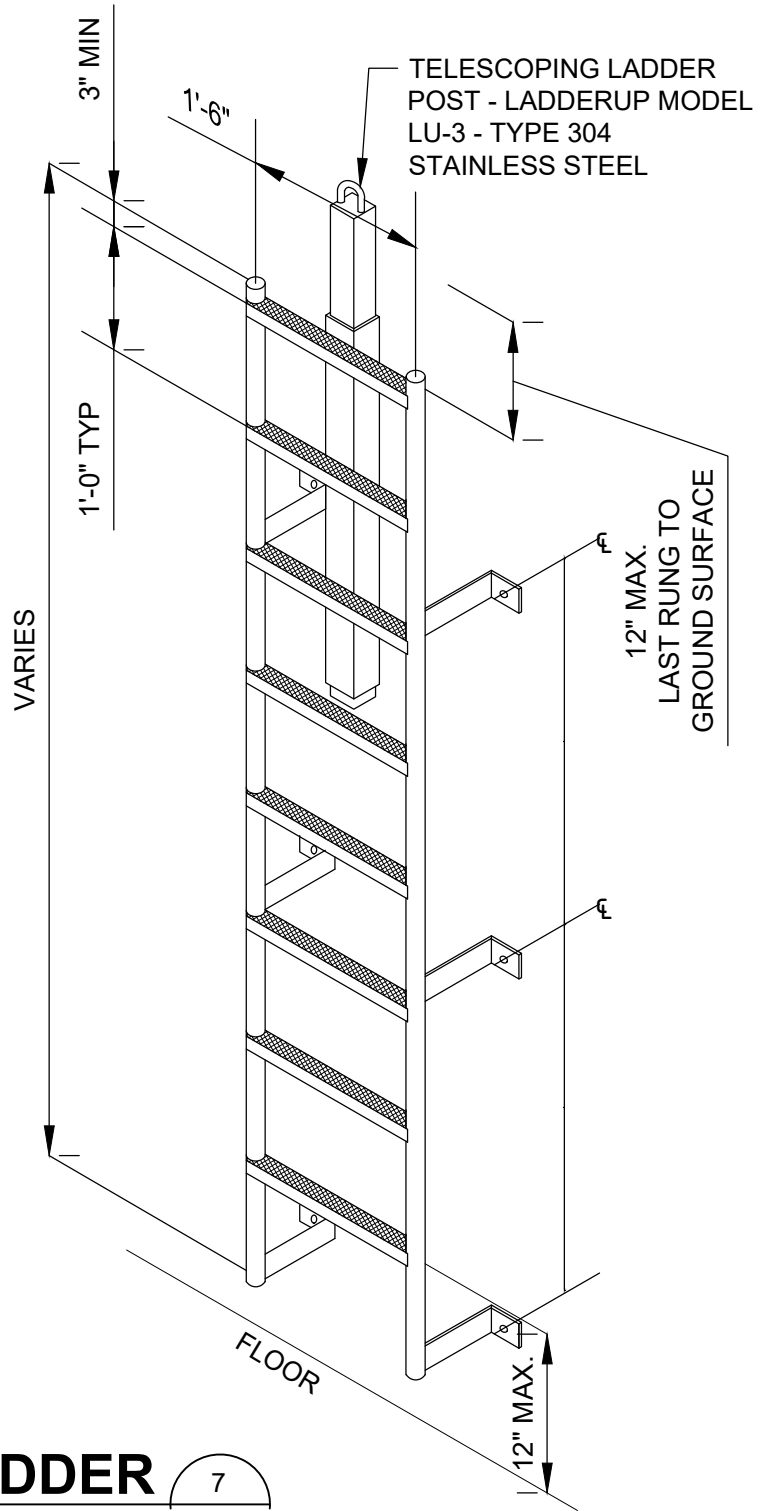
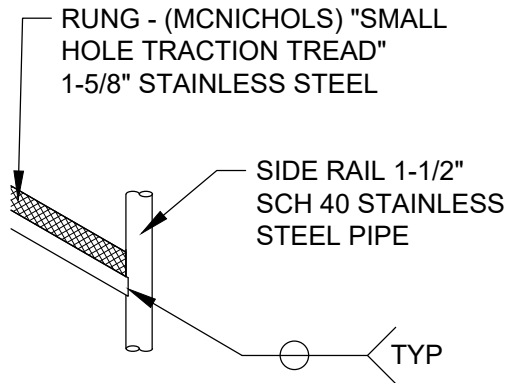
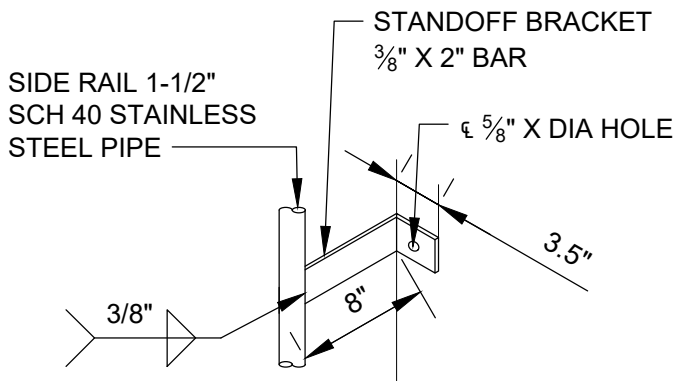
REV.

0

PRESSURE REDUCING VALVE VAULT DETAILS

STD. PLAN

573-D.3



Vault Ladder

SCALE: NTS

7
573-C

NOTE:

- LADDER, ANCHORS, AND BOLTS TO BE STAINLESS STEEL.

	DATE	PRESSURE REDUCING VALVE VAULT DETAILS	STD. PLAN
	01/2021		573-D.4
	REV.		
	0		

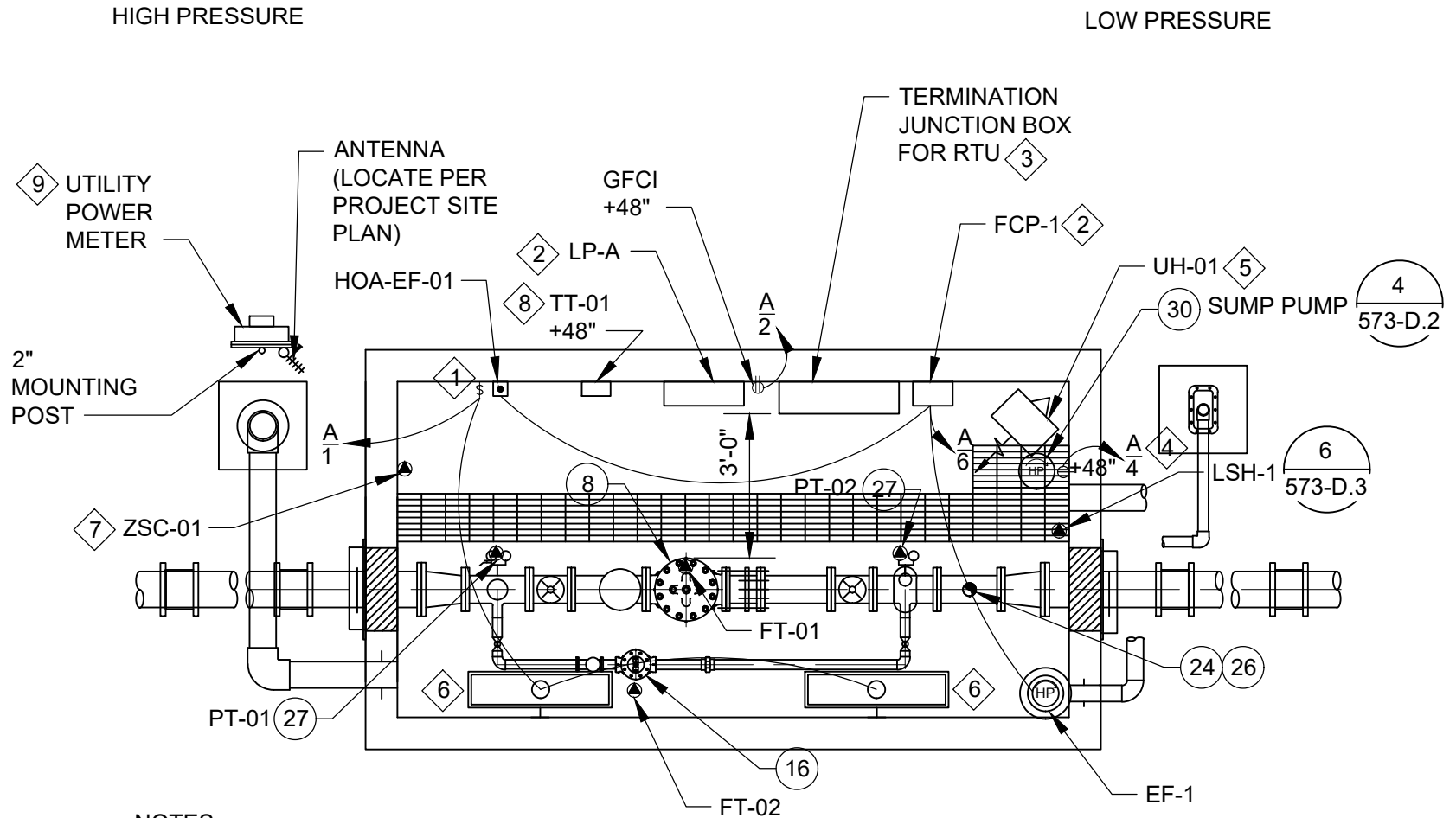


DATE	01/2021
REV.	0

PRESSURE REDUCING VALVE VAULT ELECTRICAL PLAN

573-E.1

STD. PLAN



NOTES:

1. SEE STD. PLAN 573-E.3 FOR # KEYED ITEMS.
2. FOR GENERAL NOTES, SEE STD. PLAN 573-A, AND FOR (6) KEYED ITEMS, SEE STD. PLAN 573-C.3 AND C.4
3. SEE STD. PLAN 573-E.2 FOR PANEL SCHEDULE.
4. SEE STD. PLANS 573-E.4 AND 573-E.5 FOR ONE LINE DIAGRAMS.

TYPICAL VAULT WITH POWER - PLAN VIEW

SCALE: NTS

PANEL SCHEDULE LP-A

LOCATION: IN VAULT	MFGR: CULTER HAMMER OR EQUAL	100 AMPS	VOLTS: 120/240
DIMENSIONS: SIZE BY CONTRACTOR	TYPE: PANELBOARD	M.L.O.	PHASE: 1
MOUNTING: SURFACE	NEMA: 3R	50 M.C.B.	WIRES: 3
FEED: TOP		10000 A.I.C.	


					PHASE LOADS									
BRKR	DESCRIPTION	CONT. WATTS	N-CONT. WATTS	NO	A		B		NO	N-CONT. WATTS	CONT. WATTS	DESCRIPTION	BRKR	
					CONT.	N-CONT.	CONT.	N-CONT.					A	P
20	1	LIGHTS		148	1	0	328			2	180	OUTLETS	15	1
20	1	RTU		500	3			0	1246	4	746	SUMP PUMP OUTLET	20	1
20	2	UNIT HEATER (UH-1)	1300		5	1300	560			6	560	FAN CONTROL PANEL	20	1
20	-	-	1300		7			1300	0	8		SPARE	20	1
20	1	SPARE			9	0	0			10		SPARE	20	1
20	1	SPARE			11			0	0	12		SPACE		
		SPACE			13	0	0			14		SPACE		
		SPACE			15			0	0	16		SPACE		
		SPACE			17					18		SPACE		

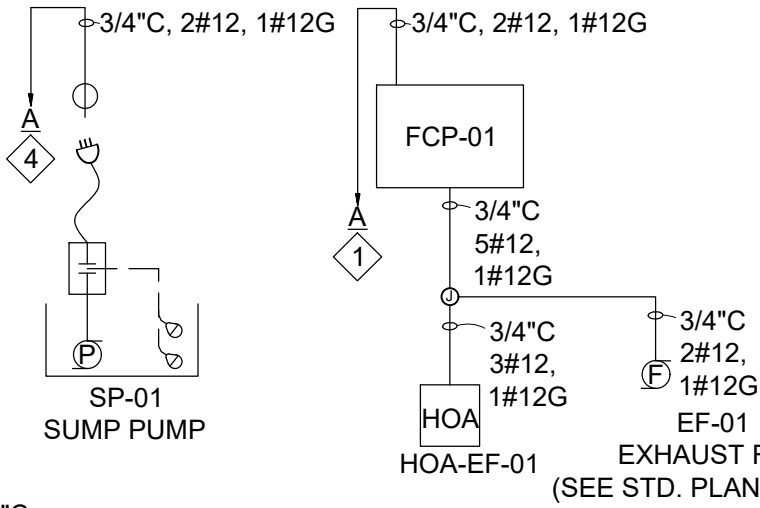
TOTAL WATTS:	2600	648	1,300	888	1,300	1246	1,486	0
CONTINUOUS LOAD:	2600							
CONTINUOUS LOAD *125%:	3,250							
NON-CONTINUOUS LOAD:	2,134							
DESIGN WATTS:	5,384							
MIN. RATING (AMPS):	15							

	DATE	<h2 style="margin: 0;">PRESSURE REDUCING VALVE VAULT LIGHTING PANEL SCHEDULE</h2>	STD. PLAN
	01/2021		<h1 style="margin: 0;">573-E.2</h1>
	REV.		
	0		

PANEL NOTE:

- 1 INSTALL WEATHERPROOF LIGHT SWITCH AND NEMA 4X HOA CONTROL BOX IN HATCH OPENING ABOUT 8" FROM TOP OF CONCRETE.
- 2 MAINTAIN NATIONAL ELECTRICAL CODE REQUIRED CLEARANCE AND WORKING SPACE AROUND PANELS.
- 3 COORDINATE WITH PCMC FOR RTU PANEL, ANTENNA, AND CABLE REQUIREMENTS. CONTRACTOR TO FURNISH AND INSTALL RTU PANEL, ANTENNA, ANTENNA MAST, CONDUIT, CONDUCTOR, AND CABLE WITH WIRING TERMINATIONS INSIDE THE RTU PANEL. CONTRACTOR TO SIZE RTU RELATED EQUIPMENT FOR 11 I/O POINTS INCLUDING 3 SPARES. (2 FLOW METERS, 2 PRESSURE TRANSDUCERS, 1 TEMPERATURE SENSOR, 1 FLOOD ALARM, 1 ENTRY SECURITY ALARM, 1 PRESSURE RELIEF OPEN ALARM, 2 SPARE DIGITAL INPUTS AND 1 SPARE ANALOG INPUT). PCMC WILL PROVIDE AND INSTALL A PRE-ASSEMBLED AND PRE-WIRED BACKPANEL IN RTU PANEL AND PROVIDE SCADA PROGRAMMING.
- 4 SUMP PUMP RECEPTACLE TO BE A 20 AMP, SIMPLEX, NON-GFCI OUTLET.
- 5 UNIT HEATER TO BE A 2600W, 240V, COMFORT HEATER WITH FAN AND INTEGRAL THERMOSTAT CHROMALOX LUH02 21 34 40 1 OR EQUAL. MOUNT ON CEILING USING CEILING MOUNT KIT. LOCATE ON OPPOSITE SIDE OF VAULT FROM HATCH DAYTON MODEL 24U58.
- 6 GASKETED AND ENCLOSED INDUSTRIAL FIXTURE, FIBERGLASS HOUSING, WET LOCATION TWO LAMP FLUORESCENT, 120 VOLT, INSTANT START ELECTRONIC BALLAST METALUX VT3-232DR-120V-EB81-WL-U OR EQUAL. MOUNT FIXTURE ON WALL AT ABOUT 7 FEET ABOVE FINISHED FLOOR.
- 7 NEMA 4 HEAVY-DUTY LIMIT SWITCH WITH 1NO 1NC CONTACT 5A 120 VAC. SQUARE D COMPANY, CLASS 9007 OR EQUAL.
- 8 ROOM TEMPERATURE DISPLAY AND 4-20 mA TRANSMITTER WITH 100 OHM PLATINUM RTD. DEVAR MODEL D-RTTI-0024.
- 9 INSTALL UTILITY POWER METER WITH 50 AMP BREAKER ON BACK TO BACK UNISTRUT TO 2" GALVANIZED STEEL POLE ACCORDING TO UTILITY COMPANY STANDARDS.

	DATE	PRESSURE REDUCING VALVE VAULT LIGHTING PANEL NOTES	STD. PLAN
	01/2021		573-E.3
	REV.		
	0		

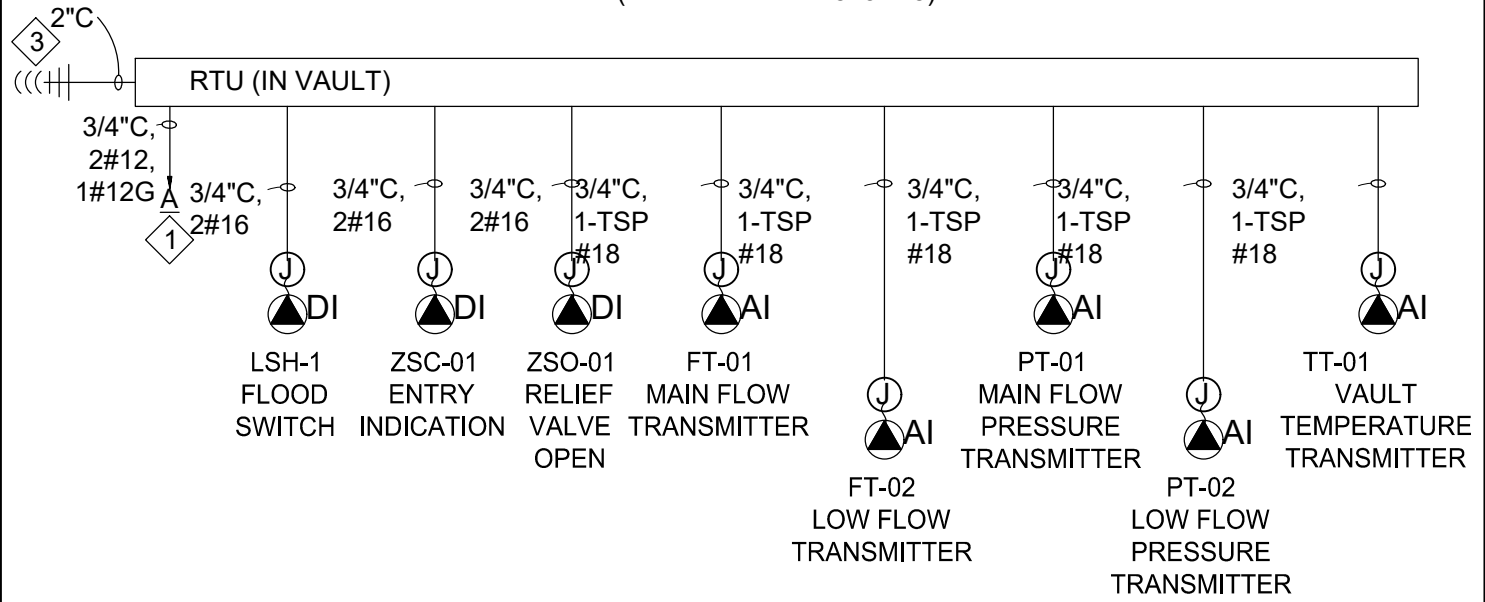


GENERAL NOTES:

1. REFER TO STD. PLAN 573-E.1 FOR EQUIPMENT LOCATIONS, 573-E.2 FOR PANEL SCHEDULE, AND 573-E.3 FOR # KEYED ITEMS.

LEGEND

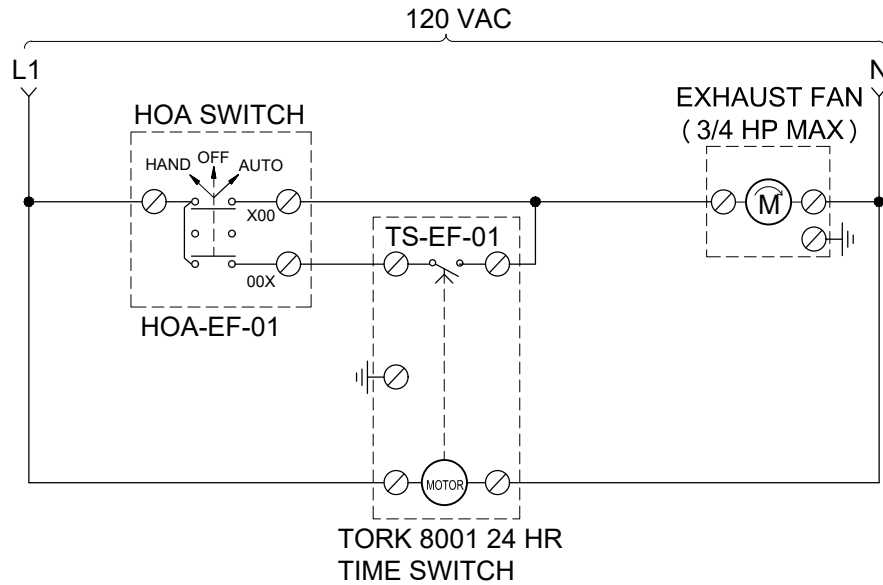
- AI - ANALOG INPUT
- DI - DIGITAL INPUT
- TSP - TWISTED SHIELDED PAIR CABLE



CONTROL ONE-LINE DIAGRAM

SCALE: NTS

	DATE	PRESSURE REDUCING VALVE VAULT CONTROL ONE-LINE DIAGRAM	STD. PLAN
	01/2021		573-E.4
	REV.		
	0		



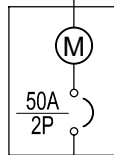
TYP. VAULT EXHAUST FAN CONTROL SCHEMATIC

SCALE: NTS

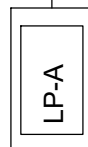
ELECTRIC POWER UTILITY

UTILITY TRANSFORMER
240/120V (PER PROJECT SITE PLAN)

3" C, CABLE
BY UTILITY



1-1/2" C,
3#6
1#10G



NOTE:

LARGER CONDUITS AND CONDUCTORS
MAY BE REQUIRED TO MEET INDUSTRY
STANDARD ACCEPTABLE VOLTAGE
DROP CRITERIA.

POWER ONE-LINE

SCALE: NTS



DATE

01/2021

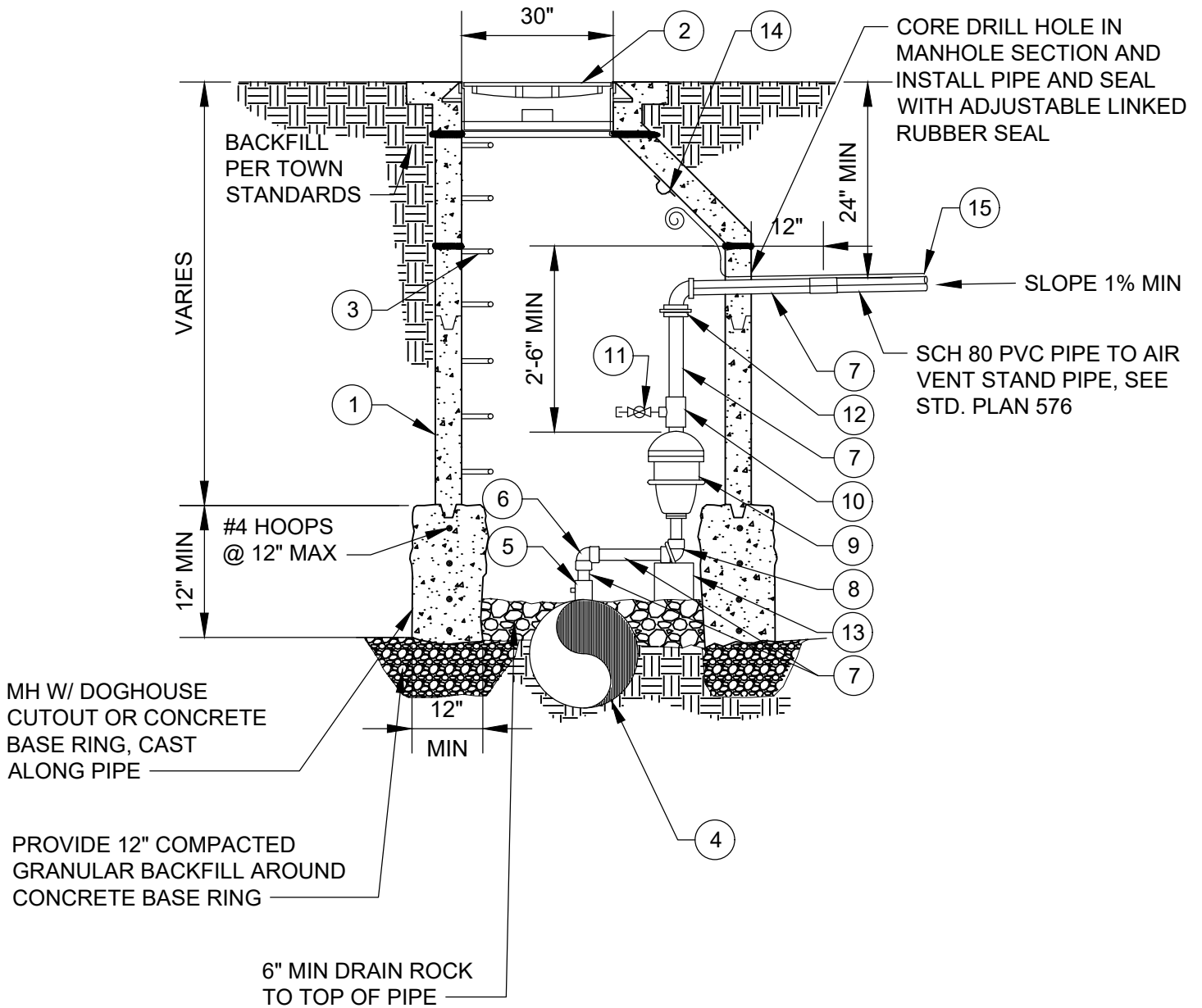
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**PRESSURE REDUCING
VALVE VAULT**

STD. PLAN

573-E.5



DATE

01/2021

REV.

0

**AIR RELEASE / CAV
VALVE MANHOLE**

STD. PLAN

574

ITEM	DESCRIPTION	ACCEPTABLE MANUFACTURER	MODELS
1	5' DIA. MANHOLE, PRECAST CONCRETE ECCENTRIC CONE AND WALL SECTIONS		ASTM C 478
2	MANHOLE FRAME AND COVER (STD. PLAN 529)		
3	POLYPROPYLENE ENCASED GRADE 60 STEEL STEPS AT 13" C-C, 13-1/2" TREAD WIDTH	M.A. INDUSTRIES OR APPROVED EQUAL	PS2-PFDF
4	VALVE LARGER THAN 2": DUCTILE IRON FLANGED TEE WITH 4" BLIND FLANGE BRONZE AND NPT SERVICE TAP. VALVE 2" AND SMALLER: BRONZE SERVICE SADDLE DI MAIN: DOUBLE STRAP; PVC MAIN: TWO-PIECE BOLTED	MUELLER	DI PIPE SADDLE: BR2B SERIES, I.P. THDS; PVC PIPE SADDLE: H-13000 SERIES, I.P. THDS
		FORD	DI PIPE SADDLE: STYLE 202B I.P. THDS; PVC PIPE SADDLE: STYLE S902, I.P. THDS
5	BRASS CORPORATION STOP, INLET I.P. THREAD, OUTLET F.I.P. THREAD (VALVE INLET SIZE)	MUELLER	B-20046N
		FORD	FB1100-(SERVICE SIZE)-G-NL
6	BRONZE ANGLE VALVE, 300 PSI (VALVE INLET DIAMETER)		
7	BRASS NIPPLES X LENGTH AS REQUIRED, M.I.P., (VALVE INLET DIAMETER)		
8	BRASS 90 DEGREE ELBOW, F.I.P (VALVE INLET/OUTLET DIAMETER)		
9	COMBINATION AIR/VACUUM.RELEASE VALVE, NPT, SIZE PER ENGINEER DESIGN AND APPROVED PLANS		
10	BRONZE TEE, F.I.P., THREADE, (VALVE OUTLET DIAMETER X 3/4" DIA.)		
11	DRAIN ASSEMBLY: 3/4" DIA. BRASS CLOSE NIPPLE, M.I.P.; 3/4" BRONZE BALL VALVE; 3/4" BRONZE PLUG		
12	BRONZE UNION, (VALVE OUTLET DIAMETER)		
13	CAV ASSEMBLY SUPPORT, (1) 16" X 8" X 8" CMU BLOCK		
14	LIFTING EYE ABOVE AIR VALVE, GALVANIZED		
15	TRACER WIRE: 12 GA. SOLID, BLUE PVC INSULATION; WIRE-WIRE CONNECTORS SILICONE-FILLED WIRE NUTS	IDEAL INDUSTRIES	TWISTER DB PLUS OR APPROVED EQUAL

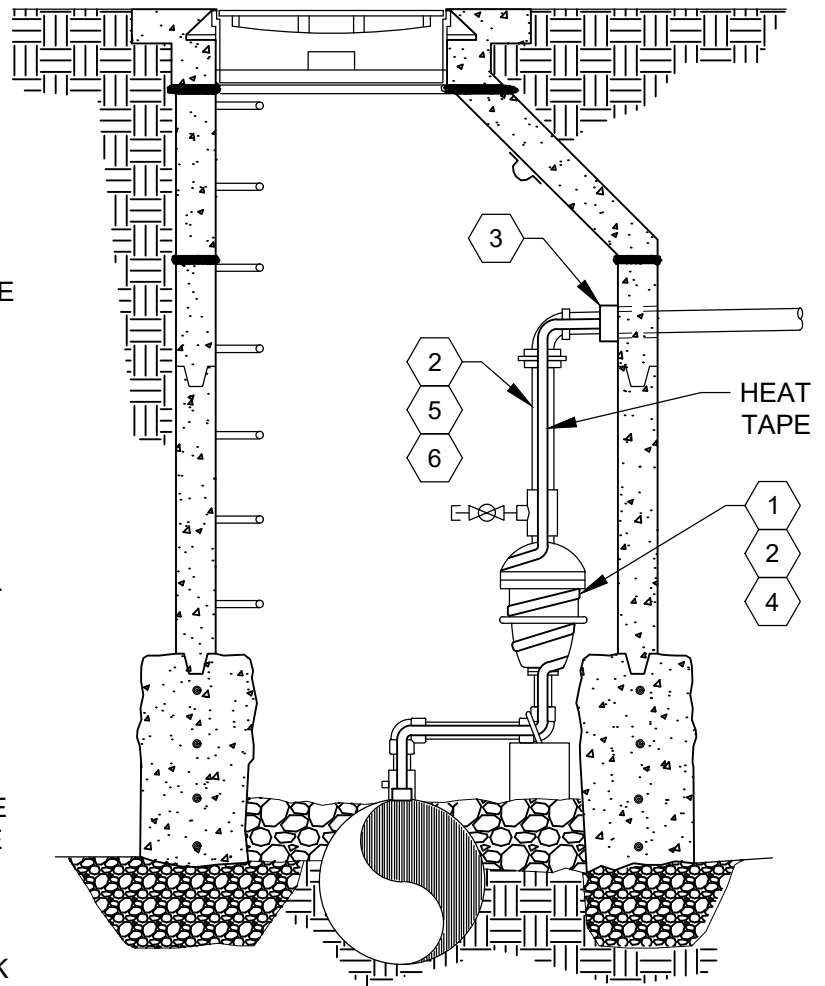
574 S - AIR RELEASE / CAV MANHOLE
DETAIL NOTES

1. ALL VALVES AND FITTINGS SHALL BE RATED FOR THE SAME WORKING AND TEST PRESSURES AS THE CONNECTED WATERLINE
2. LOCATE VALVE, VAULT, AND AIR VENT PER APPROVED PLANS AND SET VAULT PLUMB
3. REFER TO STD. PLAN 575 FOR HEAT TRACE REQUIREMENTS

	DATE	AIR RELEASE & CAV MANHOLE LEGEND AND NOTES	STD. PLAN
	01/2021		574 S
	REV.		
	0		

KEY NOTES:

- 1 WRAP HEAT TAPE AROUND THE AIR/VAC VALVE. USE MANUFACTURER'S RECOMMENDATIONS FOR THE NUMBER OF WRAPS.
- 2 SECURE THE HEATING CABLE IN PLACE WITH CHROMALOX FT-3 FIBERGLASS TAPE.
- 3 END KIT WITH INDICATING LIGHT.
- 4 INSULATE THE ISOLATION VALVE AND THE COMBINATION AIR VACUUM RELEASE VALVE WITH A REMOVABLE AND REUSABLE INSULATING BLANKET. ENERGY-WRAP INSULATION SYSTEM AS MANUFACTURED BY THERMAL ENERGY PRODUCTS.
- 5 INSTALL CHROMALOX AT-1 ALUMINUM TAPE NEXT TO PVC PIPE BEFORE INSTALLING HEAT TAPE AND THEN THE HEAT TAPE WILL CONTINUE FROM THE AIR/VAC VALVE AND LAY ALONG THE ALUMINUM TAPE.
- 6 INSULATE THE PIPE WITH 2 INCH THICK FIBERGLASS PIPE INSULATION.



NOTES:

1. INSTALL HEAT TAPE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
2. REFER TO STD. PLAN 575-B FOR POWER ONE-LINE DETAIL.
3. SEE AIR RELEASE / CAV VALVE MANHOLE, STD. PLAN 574



DATE

01/2021

REV.

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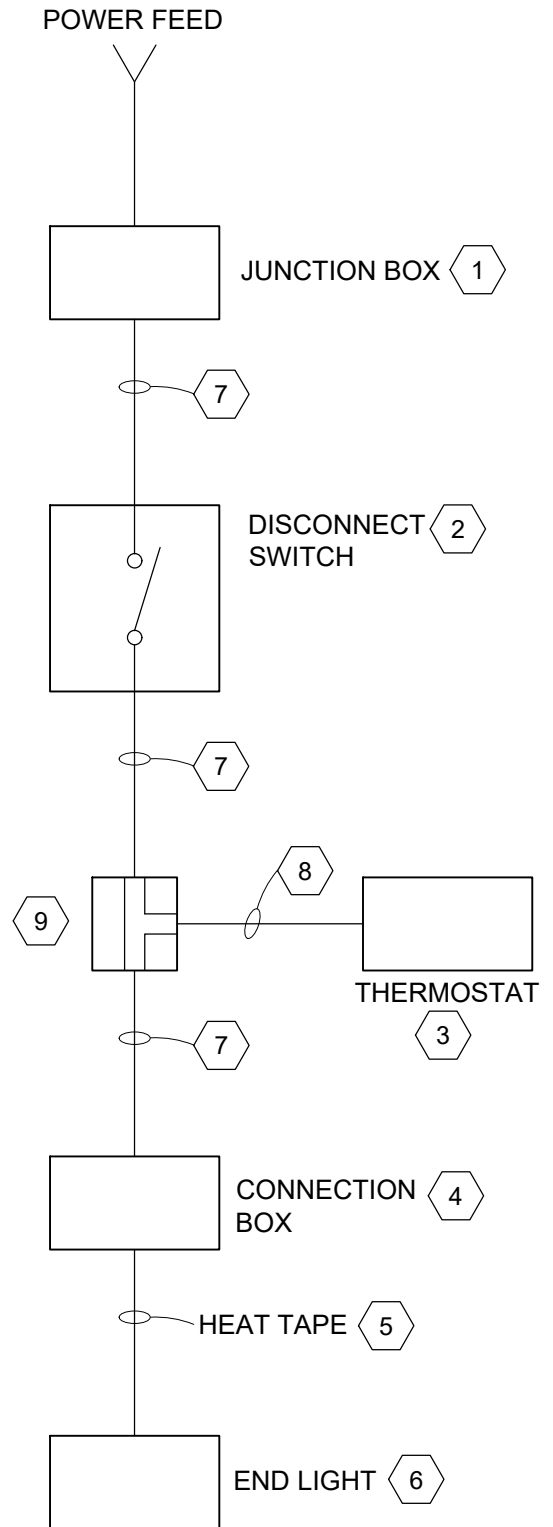
HEAT TAPE INSTALLATION FOR AIR RELEASE / CAV VALVE

STD. PLAN

575-A

KEY NOTES:

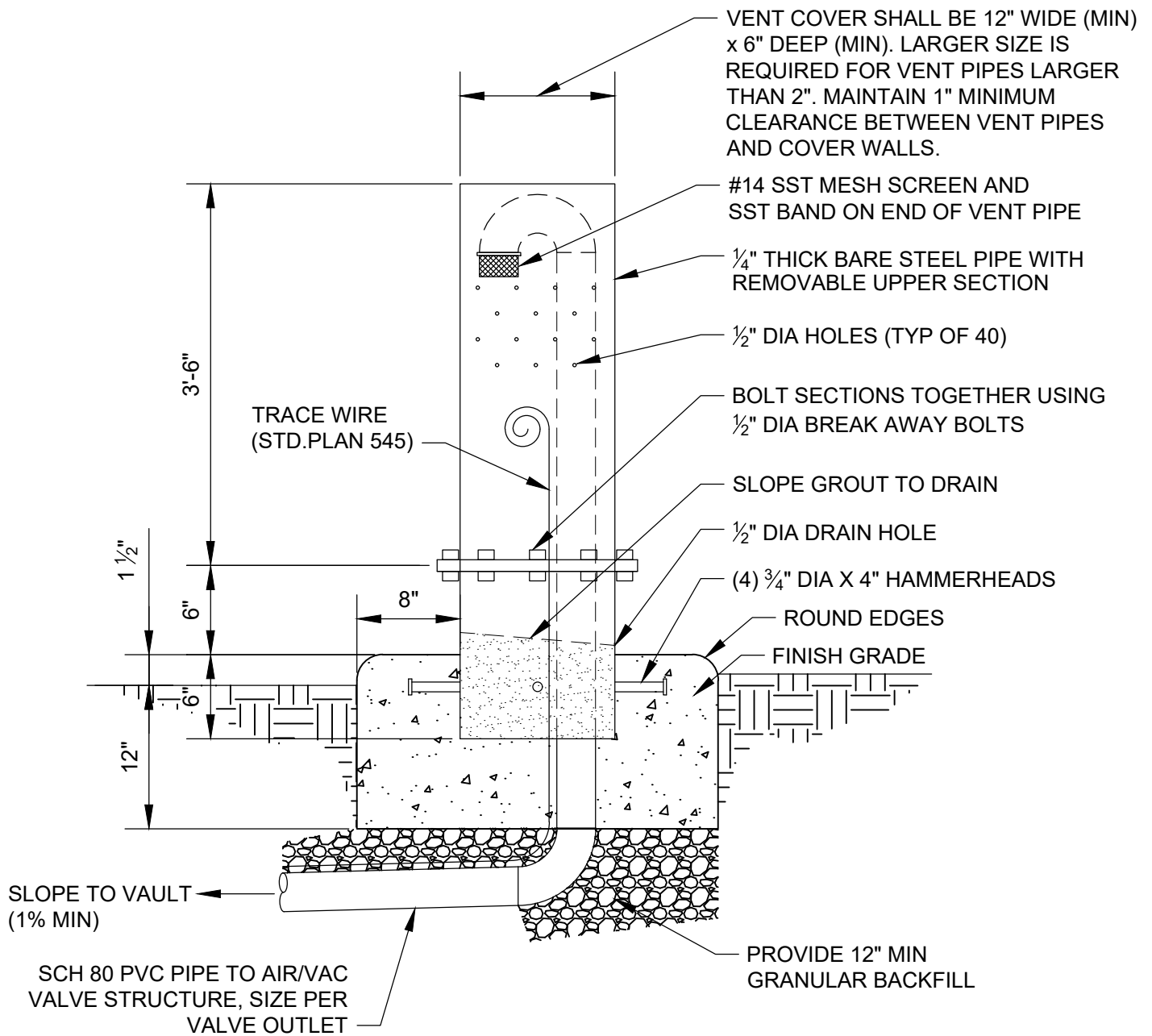
- 1 TYPE 4X NONMETALLIC J-BOX FOR WIRE CONNECTIONS AS NEEDED.
- 2 CROUSE HINDS FS BOX, WITH 20 AMP SINGLE POLE SWITCH, AND A CROUSE HINDS P/N DS185 COVER.
- 3 CHROMALOX NON INDICATING TEMPERATURE CONTROL, 0 TO 150 DEGREES F, P/N PIT-15.
- 4 CHROMALOX PIPE MOUNTED POWER CONNECTION BOX NEMA 4X, P/N RTPC.
- 5 HEAT TAPE 120 VOLT, 5 WATTS PER FOOT, SELF-REGULATING, TINNED COPPER BRAID, WITH A FLUOROPOLYMER OVERJACKET. CONNECT GROUNDING CONDUCTOR TO COPPER BRAID. CHROMALOX P/N SRL 5-1CT HEATING CABLE.
- 6 END KIT WITH INDICATING LIGHT 120 VOLT, CHROMALOX P/N RTPC-SL1.
- 7 3/4" RIGID CONDUIT GALVANIZED WITH TWO #12 CONDUCTORS AND ONE #12 GROUND.
- 8 1/2" RIGID CONDUIT GALVANIZED WITH TWO #12 CONDUCTORS AND ONE #12 GROUND.
- 9 3/4" RIGID T CONDUIT GALVANIZED BODY WITH ONE REDUCER FOR 1/2" CONDUIT.



HEAT TRACE POWER ONE-LINE DETAIL

SCALE: NTS

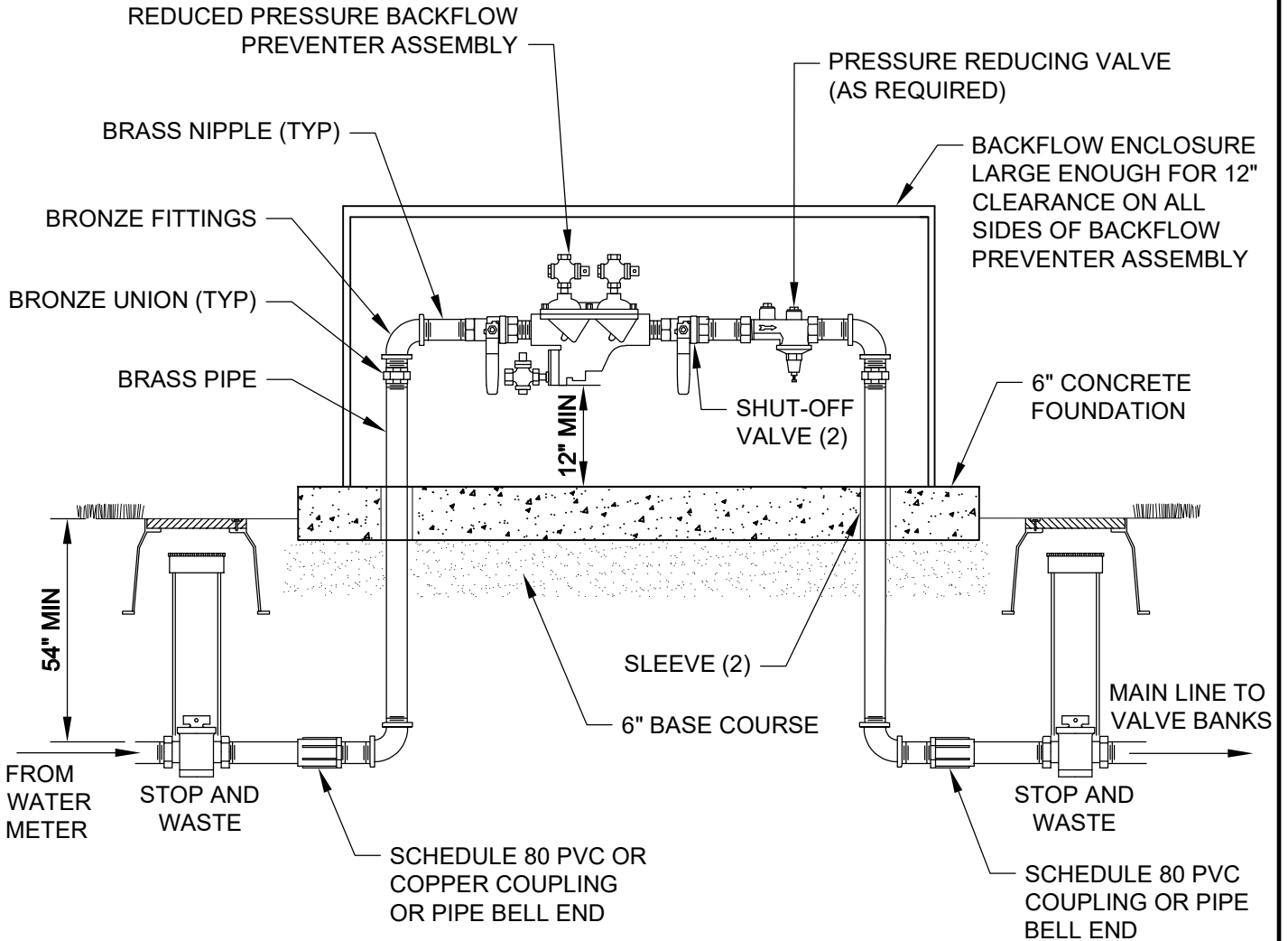
	DATE	HEAT TAPE INSTALLATION FOR AIR RELEASE / CAV VALVE	STD. PLAN
	01/2021		575-B
	REV.		
	0		



NOTES:

1. LOCATE VENT AS SHOWN ON APPROVED PLANS, 1'-6" MINIMUM BEHIND TOP BACK OF CURB / GUTTER OR SIDEWALK.

	DATE	AIR VENT STAND PIPE	STD. PLAN
	01/2021		576
	REV.		
	0		



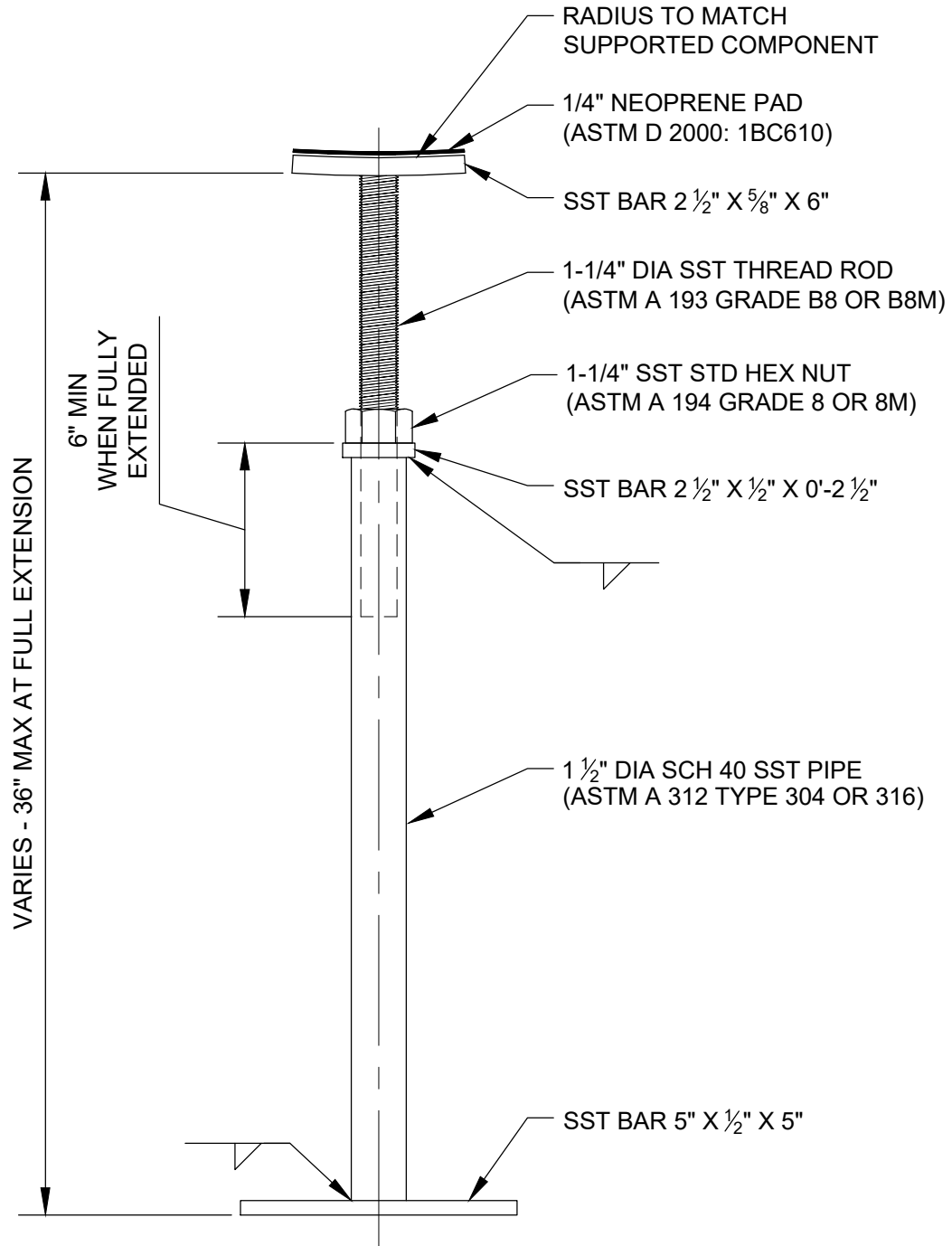
LESS THAN 3" DIAMETER

SCALE: NTS

NOTES:


1. BACKFLOW PREVENTER ASSEMBLY SHALL BE COMPLIANT WITH AWWA C-510 AND C-511.

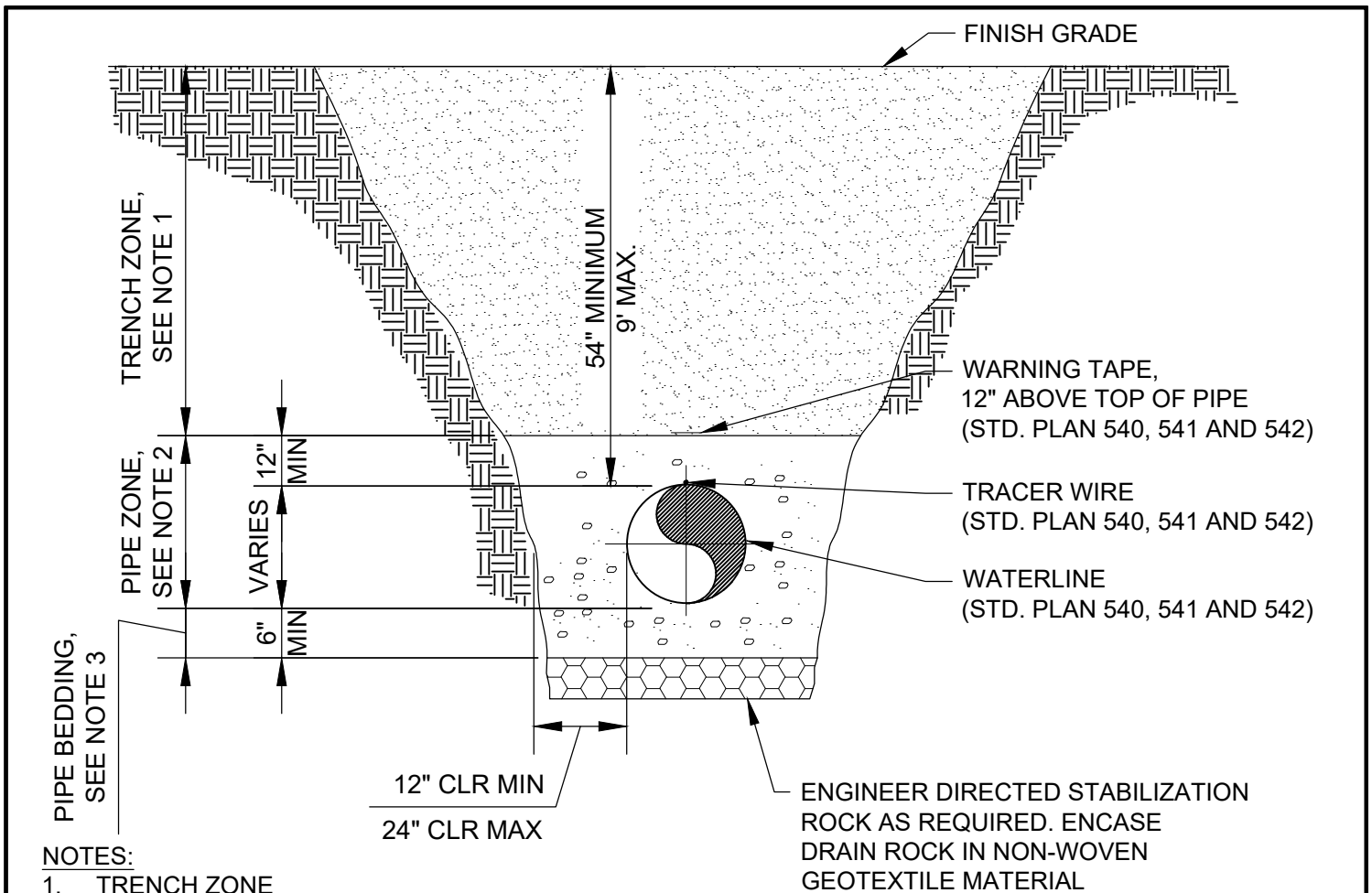
	DATE	IRRIGATION BACKFLOW PREVENTER - OUTSIDE SETTING	STD. PLAN
	01/2021		577
	REV.		
	0		



NOTES:

1. BAR MATERIAL TO BE ASTM A 240 TYPE 304 OR 316 (Fy= 30 KSI MIN.)

	DATE	PIPE SUPPORT	STD. PLAN
	01/2021		578
	REV.		
	0		



NOTES:

1. TRENCH ZONE

WATER MAIN, FIRE LINE, AND APPURTENANCES:

BACKFILL AND COMPACT PER DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS UNLESS OTHERWISE REQUIRED BY SPECIAL CONDITIONS

WATER SERVICE - NEW PAVEMENT AND LANDSCAPE AREA:

BACKFILL AND COMPACT PER DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS UNLESS OTHERWISE REQUIRED BY SPECIAL CONDITIONS

WATER SERVICE - EXISTING ROADWAY AND PAVED AREA:

BACKFILL TO PAVEMENT DEPTH WITH CONTROLLED LOW-STRENGTH MATERIAL (CLSM), "FLOWABLE FILL", 100 PSI MINIMUM AND 150 PSI MAXIMUM MIX DESIGN.

2. PIPE ZONE

BACKFILL MATERIAL SHALL BE TAMPED IN LAYERS AROUND THE PIPE ND TO A SUFFICIENT HEIGHT ABOVE THE PIPE TO ADEQUATELY SUPPORT AND PROTECT THE PIPE. THE MATERIAL AND BACKFILL ZONES SHALL BE AS SPECIFIED BY THE APPLICABLE AWWA WATER MAIN, FILE LINE, AND APPURTENANCES:

SAND OR 3/4" MAXIMUM PARTICLE SIZE ROADBASE COMPACT TO 96% OF MODIFIED PROCTOR DENSITY OR 1/4" MINUS AGGREGATE "SQUEEGEE".

WATER SERVICE:

SAND COMPACTED TO 96% OF MODIFIED PROCTOR DENSITY

3. PIPE BEDDING

WATER MAIN, FIRE LINE, AND APPURTENANCES:

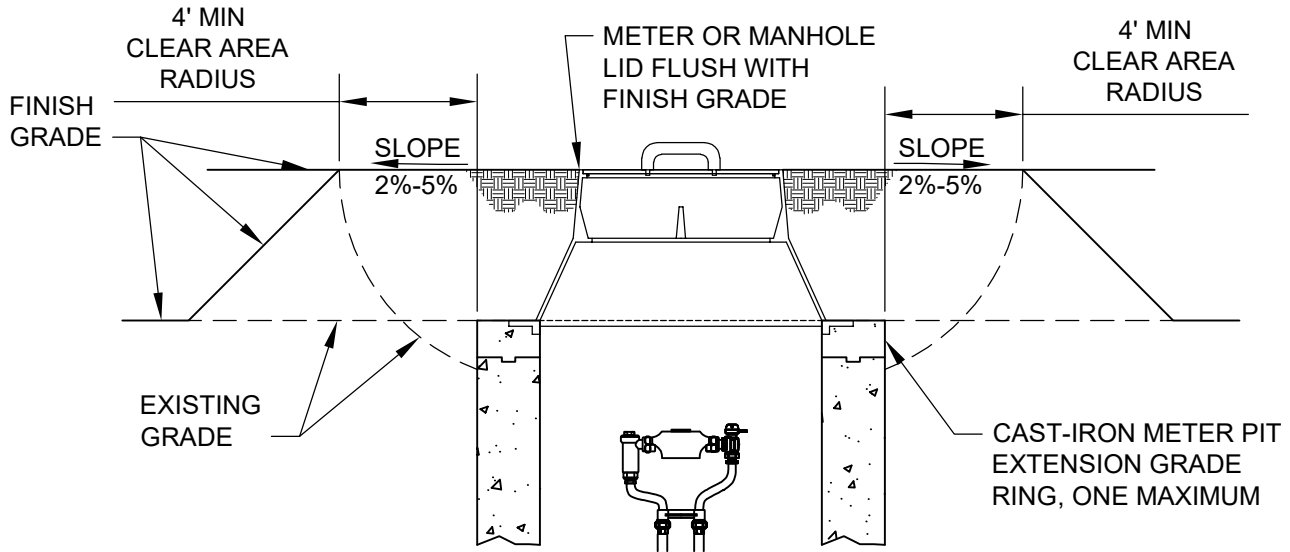
SAND OR 1/4" MINUS AGGREGATE "SQUEEGEE" 96% OF MODIFIED PROCTOR DENSITY

WATER SERVICE:

SAND COMPACTED TO 96% OF MODIFIED PROCTOR DENSITY

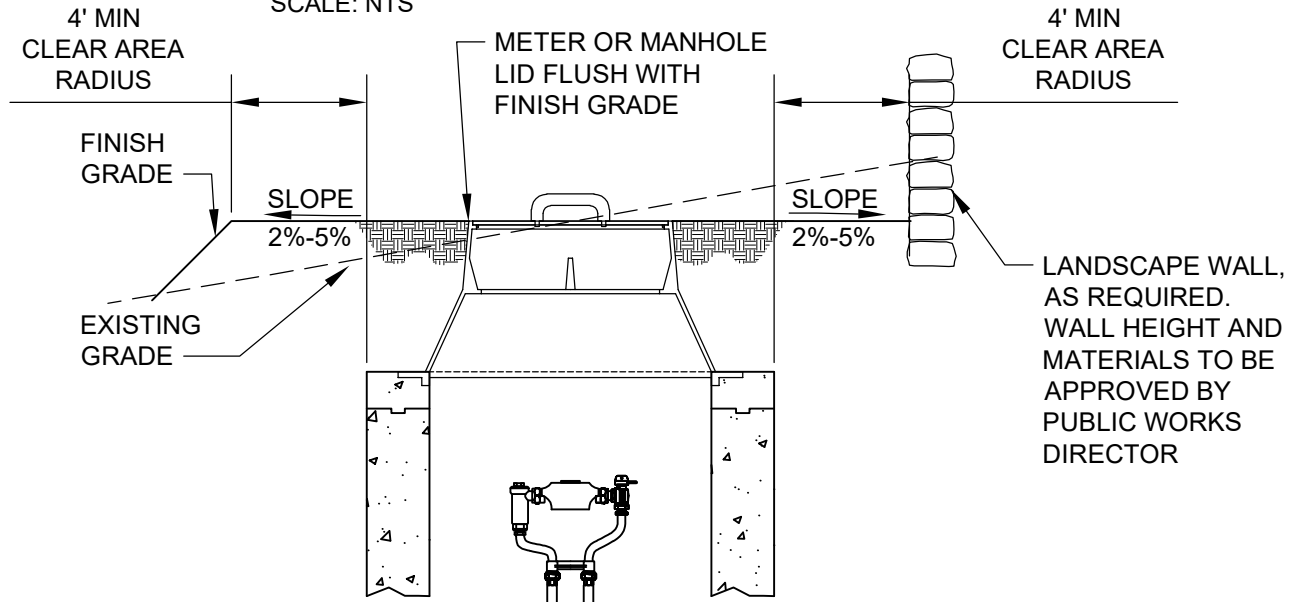
4. PROVIDE TRENCH PLATING AS REQUIRED FOR CLSM BACKFILL INSTALLATIONS

	DATE	WATER TRENCH BEDDING AND BACKFILL	STD. PLAN
	01/2021		580
	REV.		
	0		



LOWHIGH GRADE ADJUSTMENT

SCALE: NTS



SLOPE GRADE ADJUSTMENT

SCALE: NTS

NOTES:

1. REFER TO STD. PLAN 520 FOR GENERAL REQUIREMENTS - METER, METER VAULT, AND SERVICE LINE.
2. METER YOKE DEPTH MUST MEET THE METER VAULT REQUIREMENTS. (PLAN 521 THRU 525)
3. METER LID HIGHER THAN THE SURROUNDING FINISH GRADE:
RAISE GRADE SURROUNDING METER LID TO THE TOP OF METER LID.
PROVIDE DRAINAGE AWAY FROM THE METER LID.
4. METER LID LOWER THAN THE SURROUNDING FINISH GRADE:
RAISE METER VAULT AND COMPONENTS TO MEET METER VAULT REQUIREMENTS.

	DATE	METER VAULT AND WATER MANHOLE GRADING LANDSCAPE AREAS	STD. PLAN
	01/2021		592
	REV.		
	0		

WATER SERVICE LINE FLOW CHART

SYS. PRESS. (PSI)	MIN. SYS. RESID. FIRE FLOW PRESS. (PSI)	AVAIL. PRESS. DROP (PSI)	SERVICE SIZE (INCH)							
			3/4		1		1 1/2		2	
			AVAIL. FLOW W/OUT METER (GPM)	*RATED FLOW THRU METER (GPM)	AVAIL. FLOW W/OUT METER (GPM)	*RATED FLOW THRU METER (GPM)	AVAIL. FLOW W/OUT METER (GPM)	*RATED FLOW THRU METER (GPM)	AVAIL. FLOW W/OUT METER (GPM)	*RATED FLOW THRU METER (GPM)
150	20	130	53	30	113	50	928	100	700	160
145	20	125	52	30	111	50	322	100	686	160
140	20	120	51	30	108	50	315	100	671	160
135	20	115	50	30	106	50	307	100	655	160
130	20	110	48	30	103	50	300	100	640	160
125	20	105	47	30	101	50	293	100	624	160
120	20	100	46	30	98	50	285	100	608	160
115	20	95	45	30	95	50	277	100	591	160
110	20	90	43	30	93	50	269	100	574	160
105	20	85	42	30	90	50	261	100	557	160
100	20	80	41	30	87	50	253	100	539	160
95	20	75	39	30	84	50	244	100	520	160
90	20	70	38	30	81	50	235	100	501	160
85	20	65	36	30	78	50	226	100	482	160
80	20	60	35	30	74	50	216	100	461	160
75	20	55	33	30	71	50	206	100	440	160
70	20	50	32	28	67	50	196	100	418	160
65	20	45	30	26	64	50	185	100	395	160
60	20	40	28	24	60	50	174	100	370	160
55	20	35	26	23	56	48	162	100	345	160
50	20	30	24	21	51	44	149	100	317	160
45	20	25	22	19	46	40	135	100	287	160
40	20	20	19	17	41	36	119	88	255	158
35	20	15	16	14	35	30	102	76	218	135
30	20	10	13	12	28	24	82	62	175	110
25	20	5	9	8	19	17	56	43	120	77
20	20	0	0	0	0	0	0	0	0	0

	DATE	WATER SERVICE LINE FLOW CHART	STD. PLAN
	01/2021		594.1
	REV.		
	0		

*VALUES DERIVED FROM SR WATER METERS TYPICAL PERFORMANCE CURVES AND THE METERS AWWA MAXIMUM CAPACITY

ASSUMED:

L (FT) = 40.0 (MAX LENGTH IN FEET FROM MAIN TO METER)

C = 135.0 (OLDER PIPE)

WHEN USED TO CALCULATE THE PRESSURE DROP USING THE US CUSTOMARY UNITS SYSTEM, THE EQUATION IS:

$$Pd = \frac{4.25 \times L \times Q^{1.85}}{C^{1.85} \times d^{4.87}}$$

WHERE:

Pd = PRESSURE DROP OVER A LENGTH OF PIPE, PSIG (POUNDS PER SQUARE INCH GAUGE PRESSURE)

L = LENGTH OF PIPE, FT (FEET)

Q = FLOW, GPM (GALLONS PER MINUTE)

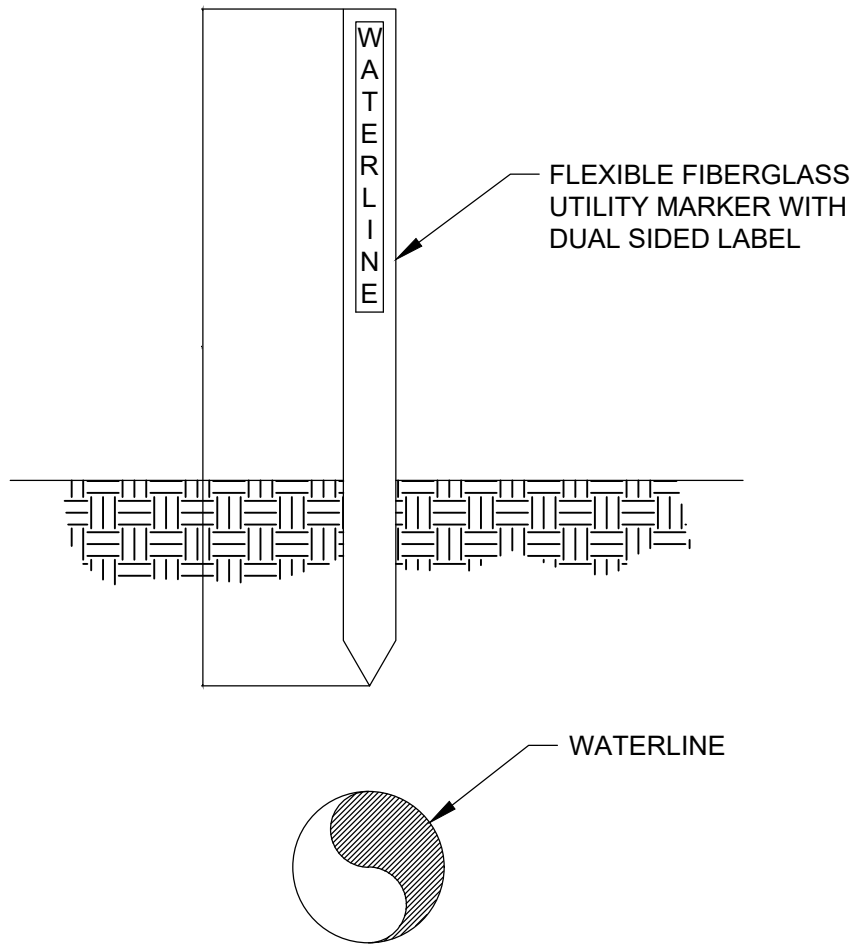
D = INSIDE PIPE DIAMETER, IN (INCHES)

C = HAZEN-WILLIAMS COEFFICIENT OF FRICTION

NOTES:


1. THIS TABLE IS FOR REFERENCE PURPOSES ONLY AND REPRESENTS MAXIMUM ANTICIPATED FLOW TO THE POINT OF CONNECTION (40 FOOT MAXIMUM LENGTH) WITHOUT ADDITIONAL VALVES AND PIPING. HOMEOWNERS, ARCHITECTS, ENGINEERS, FIRE SPRINKLER DESIGNERS, ETC., ARE RESPONSIBLE TO VERIFY EXISTING WATER SYSTEM PRESSURES PRIOR TO DESIGN AND INCORPORATE THE INFORMATION INTO THE WATER SERVICE AND FIRE SERVICE LINE DESIGN. ADDITIONAL PRESSURE LOSSES WILL OCCUR THROUGH ADDITIONAL REQUIRED VALVES AND PIPING.
2. THE MINIMUM WATER PRESSURE AT THE POINT OF CONNECTION SHALL BE ABOVE 20 PSI WITH FIRE FLOW AND PEAK DAY DEMANDS, ABOVE 30 PSI WITH PEAK INSTANTANEOUS DEMANDS, AND ABOVE 40 PSI WITH PEAK DAY DEMANDS.
3. INDIVIDUAL HOME BOOSTER PUMPS SHALL NOT BE ALLOWED FOR ANY INDIVIDUAL SERVICE FROM THE PUBLIC WATER SUPPLY MAIN.

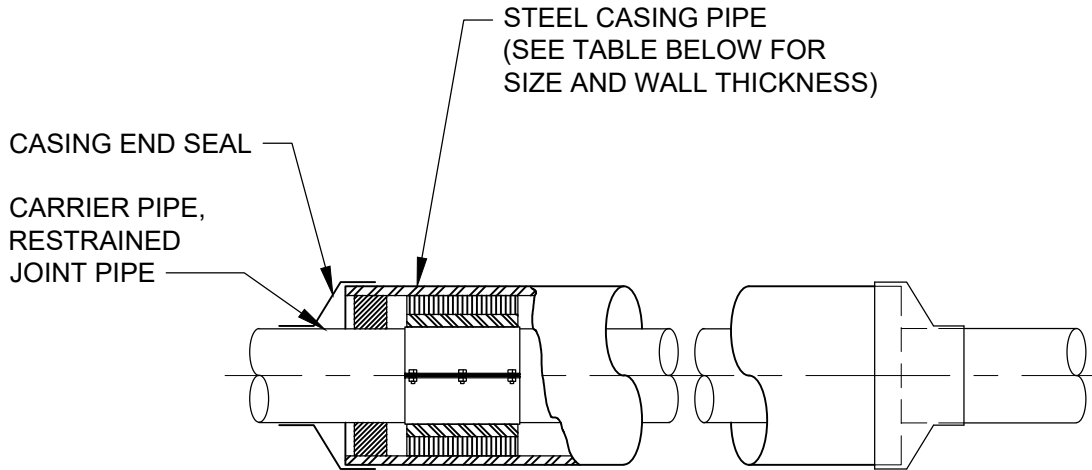
	DATE	WATER SERVICE LINE FLOW CHART NOTES	STD. PLAN
	01/2021		594.2
	REV.		
	0		



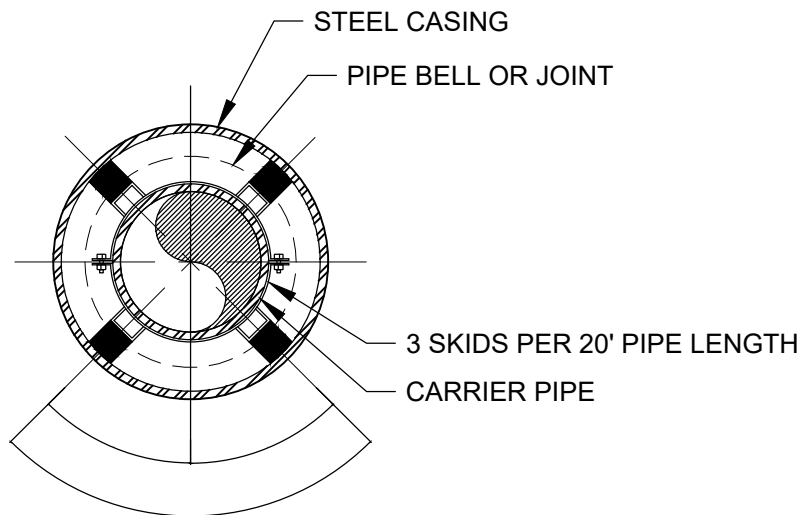
NOTES:

1. INSTALL REFERENCE POST WHEN WATERLINE IS LOCATED OUTSIDE OF PUBLIC RIGHT-OF-WAYS WHEN DIRECTED BY THE TOWN.
2. BURIED WATER LINE MARKER SHALL BE CONSTRUCTED ON 4" RHINO 3-RAIL FIBERGLASS UTILITY MARKER POSTS BY "RHINO" OR EQUAL. (WWW.RHINOMARKERS.COM)
3. MOUNT MARKERS PER MANUFACTURERS RECOMMENDATIONS.
4. INSTALL MARKERS AT LOCATIONS INDICATED ON PLANS BUT TYPICALLY EVERY 500 FT AND AT VALVES, TRACER WIRE BOXES, AND BENDS IN ALIGNMENT.
5. PLACE MARKER ON PIPE CENTERLINE.
6. PRINTING MATERIAL AND SIGN MATERIAL SHALL BE WATER-RESISTANT.
7. LABEL TO READ "CAUTION WATER PIPELINE - BEFORE DIGGING CALL 811"

	DATE	WATER LINE REFERENCE MARKER	STD. PLAN
	01/2021		596
	REV.		
	0		



SLED



PIPE CASING

CARRIER PIPE NOMINAL DIAMETER	CASING PIPE	
	MIN OD	MIN WALL THICKNESS
4"	12"	0.25"
6"	16"	0.3125"
8"	18"	0.3125"
12"	22"	0.375"
16"	28"	0.50"
20"	32"	0.50"



DATE

01/2021

REV.

0

WATER LINE CASING

STD. PLAN

597

PUBLIC WATER SYSTEM FIELD OBSERVATION GUIDELINES

***FOR PROJECTS WITHIN THE
TOWN OF BENNETT***



YEAR 2021

FORWARD

This manual provides information to assist the field representative in their duties of observing the progress and quality of public water line construction within the Town of Bennett and determining if the work is proceeding in accordance with the Town of Bennett Standards. The information, checklists and procedures included in the manual are not all inclusive but are intended to serve as guidelines for the performance of periodic construction observations, required sampling and testing observation by the field representative. **It is important that field representatives contact the Project Manager or the Town of Bennett Public Works Director for clarification if there are any questions related to the requirements of the Town of Bennett Design Standards.**

DISINFECTING

All new water mains, services, and appurtenances shall be disinfected in accordance with AWWA Standard C651-05.

The method typically employed by the Contractor to disinfect new water distribution systems is to place calcium hypochlorite granules in the pipeline as it is being installed. The field representative should pay special attention to the following items:

- **Active chlorine content of disinfecting solution within water service tubing (CTS) for water services shall not exceed 12%.**
- Water mains shall be filled slowly to prevent "pushing" the calcium hypochlorite granules to one end of the pipe line. If the new water lines are to be filled by introducing water from the existing water distribution system, via opening the isolation valve between the two systems, the field representative shall monitor the opening of the valve. The field representative shall pay special attention to the following during water system filling by the Contractor:
 1. Verify that the static water pressure of the distribution system (typically 40 psi) is capable of overcoming the static head required to fill the new water line.
 2. Be certain a means of releasing air at the high point of the water system to be filled is provided and is open.
 3. The isolation valve shall be opened only slightly (**existing water system valves are to be operated only by Water Operations staff**).
 4. Listen for water passing the valve. The valve shall be closed immediately if it appears that the water pressures begin to equalize on each side of the valve. Backflow of chlorinated water into the existing water distribution system must not occur.
- After the water mains and services have been filled by the Contractor, the field representative shall sample and test the water for chlorine concentration. Observe the following:
 1. Select sampling frequency and locations to achieve representative samples. Typical locations for samples at water meter services, taps or fire hydrants. The sampling frequency will depend on length of the water line being chlorinated, availability of sampling points, and results of chlorination concentration tests.
- The field representative should observe the disinfection of the interior of all pipe, fittings, valves, tapping sleeves, and other materials when existing water mains are cut into or repaired. The Contractor can accomplish this by swabbing the materials with a hypochlorite solution.
- **Remember: Good disinfection practices improve the opportunity for successful bacteriological test results.**

WATER SYSTEM FLUSHING

Flushing of the installed water system is to be completed in two steps. The initial flushing is to be performed following installation and disinfection of the water main but prior to hydrostatic testing. The final flushing is to be performed following hydrostatic testing and leakage testing.

INITIAL FLUSHING

The following items should be considered by the field representative and may need to be reviewed with the Public Works Director or their designee:

1. When notified that the Contractor intends to begin the initial flushing but before the Contractor utilizes water contact the Public Works Department to be certain that water is available from the Town for flushing purposes. **Inform the Contractor not to begin flushing without authorization (existing water system valves are to be operated only by Water Operations staff).**
2. Review with the Contractor the proposed discharge location for flushing operations and the method by which the Contractor intends to control the discharge of chlorinated water from the water system.
Typically, Contractors will discharge the water into a water truck or tank and haul the water offsite for disposal. Chlorinated water shall not be allowed to be discharged in a manner that it could flow onto vegetation or into streams, waterways, storm drains or sanitary sewer systems.
3. Determine the required diameter of opening(s) for discharge from the water line. The opening must be sized to achieve velocities capable of moving dirt and rock through the pipe, approximately **6 to 8 feet per second**. Note that required flowrate and opening size(s) referenced in AWWA Table 3 Required Flow and Openings to Flush Pipelines, is based on only 2.5 feet per second velocity at 40 psi pressure. *Required opening size will be determined based on site specific available water system pressure to achieve the required velocity.*
4. Determine the total volume of water to be expelled from the section of water system being flushed. The entire contents of the water line must be discharged and replaced with new water. To determine the volume required, ensuring that the entire pipe line has been flushed, utilize the following formula:

$$V = \frac{\pi d^2}{4} \times L \times 7.481$$

where:

V = Volume (gallons)

d = Pipe Diameter (ft)

L = Pipe Segment Length (ft)

5. If the section of water line to be flushed is very long, making the transport of sediment and rock to the discharge location may be difficult, an intermediate discharge location for flushing should be considered. *The end of a fire service line, prior to setting the hydrant, or a properly sized service tap could be utilized.*
6. After initial flushing has been completed, perform sampling and testing for "low" chlorination concentration.

FINAL FLUSHING

1. Utilize the same procedure for final flushing as for initial flushing, except that concerns regarding the chlorine concentration of discharge water do not apply.
2. Fire hydrants are to be flushed and can be utilized as flushing locations.
3. Services are to be flushed at the meter vaults. *Proper flushing of the service lines is important since water samples for bacteriological testing are typically taken at the service lines.*

HYDROSTATIC TESTING

Hydrostatic testing is required for every section of water main (valve to valve). Testing every section is intended to test both sides of isolation valves to ensure proper functioning of the valve. Prior to hydrostatic testing and leakage testing the water system should be flushed and tested for proper disinfection.

HYDROSTATIC TESTING

The specified hydrostatic test pressure is to be met at the highest elevation in the section of water line being tested. The specified test pressure shall be achieved by means of a Contractor supplied pump/gauge system connected to the pipe. The gauge shall have sufficient increments to enable accurate readings to be taken.

To achieve proper hydrostatic test pressure at the highest elevation of the water line section being tested, consider the locations available for installing the testing apparatus. To determine the required test pressure at the test gauge, utilize the following formula:

$$P_g = P_r + \frac{(H_v + H_g)}{2.31}$$

where:

P_g = required gauge pressure reading (psi)

P_r = required test pressure (psi)

*H_v = elevation at highest valve (feet) H_g =
elevation at gauge (psi)*

Note: 1 psi = 2.31 feet of elevation, or 0.43 psi X elevation difference in feet.

The following items should be considered and may need to be reviewed with the Public Works Director:

- The possibility of requiring/requesting a water valve to be installed in the water main to reduce the pressure difference in the water line to be tested. This may occur when there is a significant difference in elevation between water valves;
- The installation of an additional service tap to accommodate proper testing.
- In achieving the required hydrostatic pressure at the highest elevation of the water line section being tested, the hydrostatic pressures at the lowest elevation may exceed acceptable pressures for the pipe, valves or fittings. Typically, if the calculated pressure at the lowest elevation exceeds 300 psi, the Public Works Director should be notified before testing is performed.

HYDROSTATIC TESTING

The field representative shall perform all sampling for bacteriological testing and deliver samples to the Adams County Health Department (or a pre-approved state certified laboratory) for analysis. To achieve consistent and representative sampling, the following procedures shall be observed by the field representative:

- Select the location and number of samples to be taken. Samples are typically taken at water meter services and ends of the water line. Intervals of 200 feet between sampling locations is preferred.
- Procedures for obtaining samples for bacteriological testing of the water system are as follows:
 1. Obtain sample bottles from the Public Works Water Department office or Adams County Health Department, if not available in the office.
 2. When sampling, first disinfect or sterilize the discharge area.
 3. Open the control valve slowly and allow water to flow for a short period.
 4. Close the valve slightly to reduce the flowrate and fill the sample bottle to the fill line. Place the lid on the sample bottle and seal shut. Note: Be sure to identify the location of the sample bottle before obtaining other samples.
- After all samples are taken, complete the identification form and add other pertinent information to each sample bottle. Reference the sample identification form contained in the Report Forms and Checklists section of this manual. *Note: Pay special attention to Item No. 2, "Investigative Sample (not included on official records)" on the identification form. Always check this box on the form.*

FIELD OBSERVATION REPORT FORMS AND CHECKLISTS

This section includes typical forms checklists that are to be used as generalized guidelines to assist in the verification of the material and dimensional requirements of the Town of Bennett Design Standards. Field Representatives are to utilize the checklists during water system construction to assist the Contractor in understanding the requirements of the final product and during the final walk-through to verify consistency with the standards and specifications. Additionally, the fire hydrant inspection forms, illustrating the placement of a fire hydrant in three different terrain conditions, are to be completed during the Final Walk- through to provide the Public Works Director with information regarding the hydrant's installed elevation and location relative to the curb and gutter and the auxiliary valve.

FIELD OBSERVATION QUICK CHECKLIST

WATER LINE INSTALLATION:

- Verify that marking tape and locator wire is installed above the water main in the trench
- Verify that water main is bedded with approved gravel-sand material
- Verify that water main is installed at proper horizontal location (within pavement and inside of curb & gutter limits) and depth. Require additional survey staking be provided if necessary to determine design grades and curb & gutter alignment
- Verify that correct polyethylene encasement is provided and properly installed
- Verify that thrust blocking is of adequate size, extended to undisturbed soil before concrete is placed
- Verify that service taps are at 45 degrees to the main with 2 feet minimum separation
- Verify that every service corporation stop is open. This can be verified during flushing procedures
- Verify that water valves are properly set, valve boxes are clear of debris, and that a valve key can be placed on the valve. This must be verified during the final walk-through

FIELD OBSERVATION QUICK CHECKLIST

FIRE HYDRANT INSTALLATION:

- Verify that adequate gravel is placed around the fire hydrant base
- Verify that thrust blocking is properly placed and fire hydrant drain ports are not covered by concrete.
- Flush fire hydrant drain ports. Close main hydrant valve to the position at which the drains open and allow flow through the drains under pressure for about ten seconds to flush the drains. Then close hydrant valve completely.
- Check fire hydrant barrels for drainage. Remove nozzle cap, open hydrant valve, allow hydrant to run briefly and close hydrant valve. Place palm of hand over nozzle outlet. Drainage should be sufficient to create a suction.
- Check fire hydrant nozzle caps for thread damage from impact or cross threading
- Verify that the auxiliary valve is in the wide-open position.
- Verify that fire hydrant is properly extended above grade and hydrant pad is properly constructed.

FIELD OBSERVATION QUICK CHECKLIST

WATER METER INSTALLATION:

- Verify that meter service assembly materials are in accordance with Checklist. *See checklists for specific size water meter.*

- Verify that water meter box is adjusted to grade. *See meter box adjustment detail sheet.*

- Verify that water meter box is located properly. Require additional staking as required for verification.

TYPICAL PROCESS FOR WATER SYSTEM CONSTRUCTION

1. INSTALL WATER MAIN AND FIRE HYDRANTS
If the Contractor elects to perform hydrostatic testing of water services independently of the water main, Items 3, 5, 7 and 9 will be performed on the water main prior to installation of the water services.
2. INSTALL WATER SERVICES
If water services are installed after water main testing, then each service must be disinfected separately.
3. INITIAL FLUSHING OF WATER MAIN
Sampling and testing for "high" chlorine concentration is performed prior to initial flushing.
4. INITIAL FLUSHING OF WATER SERVICES
5. PERFORM HYDROSTATIC AND LEAKAGE TESTING ON WATER MAIN
6. PERFORM HYDROSTATIC AND LEAKAGE TESTING ON FIRE HYDRANTS & WATER SERVICES
7. FINAL FLUSHING OF WATER MAIN
Sampling and testing for "low" chlorine concentration is performed following final flushing.
8. FINAL FLUSHING OF FIRE HYDRANTS & WATER SERVICES
9. PERFORM BACTERIOLOGICAL TESTING
10. ALLOW ACTIVATION OF WATER SYSTEM
Permanent opening of isolation valves upon receipt of successful bacteriological test results.



WATER SYSTEM TESTING SUMMARY REPORT

welcome neighbors.

PROJECT NAME _____ PROJECT # _____

CONTRACTOR _____

WATER SYSTEM SECTION _____

DISINFECTION: 703.2.12C & J

TYPE OF CHLORINE: GRANULAR INJECTION, WHERE: _____

SAMPLE LOCATION: _____

	<u>DATE</u>	<u>TIME</u>	<u>CHLORINE, PPM</u>
START:	_____	_____	_____
END:	_____	_____	_____
RESULT:	<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL	INITIALS _____

DISPOSAL OF CHLORINATED WATER: _____

FLUSHING: 703.2.12A

MAIN:

LENGTH OF SECTION: _____ feet PIPE MAT'L: _____ PIPE DIAMETER: _____ inches

CITY WATER USED OTHER

FLUSH ORIFICE SIZE: _____ inches STATION: _____

ESTIMATED TO BE FLUSHED: _____ gal. ESTIMATED DURATION: _____ min.

ACTUAL DURATION: _____ min.

DATE: _____ INITIAL _____ FINAL _____ INITIALS _____

SERVICES:

LOT No's: _____

DATE: _____ INITIAL _____ FINAL _____ INITIALS _____

HYDRANTS:

STATION: _____ INITIAL _____ FINAL _____ INITIALS _____

STATION: _____ INITIAL _____ FINAL _____ INITIALS _____

STATION: _____ INITIAL _____ FINAL _____ INITIALS _____

BACTERIOLOGICAL SAMPLING: 703.2.12M

DATE OF SAMPLE: _____

SAMPLE TAKEN BY: _____ P.O. No.: _____

SAMPLES DELIVERED TO: _____ DATE: _____ TIME: _____

SAMPLES ANALYZED BY: _____

SAMPLE NO. 1 TAKEN AT: _____ PASS FAIL

SAMPLE NO. 2 TAKEN AT: _____ PASS FAIL

SAMPLE NO. 3 TAKEN AT: _____ PASS FAIL

DATE OF RESULT: _____ (REFERENCE ATTACHED TESTING REPORT)



welcome neighbors.

WATER SYSTEM TESTING SUMMARY REPORT (continued)

HYDROSTATIC TEST: 703.2.11

MAIN:

INITIAL TEST DATE: _____

RETEST DATE: _____

TEST PRESSURE @ START: _____ psi
 @ 30 min: _____ psi
 @ 60 min: _____ psi
 @ 90 min: _____ psi
 @ FINISH: _____ psi

@ START: _____ psi
 @ 30 min: _____ psi
 @ 60 min: _____ psi
 @ 90 min: _____ psi
 @ FINISH: _____ psi

PASS FAIL

PASS FAIL

INITIALS _____

INITIALS _____

COMMENTS _____

SERVICES:

LOTS SERVICED: _____

INITIAL TEST DATE: _____

RETEST DATE: _____

TEST PRESSURE @ START: _____ psi
 @ 30 min: _____ psi
 @ FINISH: _____ psi

@ START: _____ psi
 @ 30 min: _____ psi
 @ FINISH: _____ psi

PASS FAIL

PASS FAIL

INITIALS _____

INITIALS _____

COMMENTS _____

HYDRANTS:

STREET & STATION: _____

STREET & STATION _____

STREET & STATION: _____

TEST DATE: _____

TEST DATE _____

TEST DATE: _____

@ START: _____ psi

@ START: _____ psi

@ START: _____ psi

@ 30 min.: _____ psi

@ 30 min.: _____ psi

@ 30 min.: _____ psi

@ FINISH: _____ psi

@ FINISH: _____ psi

@ FINISH: _____ psi

PASS FAIL

PASS FAIL

PASS FAIL

INITIALS: _____

INITIALS: _____

INITIALS: _____

COMMENTS _____

LEAKAGE TEST: 703.2.11

DATE _____

LENGTH OF SECTION: _____ PIPE MAT'L.: _____ DIAMETER: _____

LENGTH OF TEST: _____ hours _____ minutes

ACCEPTABLE LOSS, per AWWA C600. TABLE 6: _____ gph per 1000 feet, _____ total gallons

GALLONS USED: _____ gallons

RESULT: PASS FAIL

INITIALS _____