

NOTES:

1. ALL CONSTRUCTION SHALL CONFORM TO CITY OF KEIZER CONSTRUCTION SPECIFICATIONS AND DESIGN STANDARDS.
2. CALL ALL AFFECTED UTILITIES AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION TO REQUEST FIELD LOCATES.
3. CONTRACTORS TO NOTIFY THE DIRECTOR AT LEAST 48 HOURS PRIOR TO ANY CONSTRUCTION. A PRE-CONSTRUCTION MEETING IS REQUIRED.
4. USE GRANULAR BACKFILL ABOVE THE PIPE ZONE IN ALL AREAS PER STANDARD DETAIL 350.
5. WATER MAINS TO BE CLASS 52 DUCTILE IRON PIPE (AWWA C151), PRESSURE CLASS 350. WATER SERVICES TO BE MINIMUM 1" DIAMETER, TYPE "K" COPPER (AWWA C800), UNLESS OTHERWISE NOTED.
6. MAINTAIN 36" MINIMUM COVER OVER MAINS, MEASURED FROM FINAL FINISHED GRADE. IF APPROVED BY THE DIRECTOR, COVER MAY BE REDUCED TO 30" WHERE CROSSING THE CURB LINE OF NEWLY-CONSTRUCTED STREETS.
7. MAIN LINE VALVES SHALL BE:

<u>MAIN SIZE</u>	<u>VALVE TYPE</u>	<u>SPECIFICATION</u>
4-INCH TO 10-INCH	GATE VALVE RESILIENT WEDGE	AWWA C509
LARGER THAN 10-INCH	BUTTERFLY RUBBER GASKETED	AWWA C504

8. FLUSH, PRESSURE TEST, & DISINFECT NEW MAINS PRIOR TO ACTIVATING OR RECONNECTING SERVICES. PRESSURE TEST TO BE WITNESSED BY CITY PUBLIC WORKS STAFF. COORDINATE CHLORINATION WITH CITY AND PROVIDE TEMPORARY WATER SERVICE WHERE SHUTDOWN MAY EXCEED FOUR (4) HOURS. ALL VALVES UNDER PRESSURE TO BE OPERATED BY CITY PUBLIC WORKS STAFF.
9. PROVIDE POLYWRAP ON ALL MAINS IN ACCORDANCE WITH ANSI/AWWA C105.
10. SAWCUT ALL EXISTING PAVED AREAS PRIOR TO TRENCHING.
11. TAPS INTO EXISTING MAINS TO BE FURNISHED BY CITY PUBLIC WORKS. CONTACT CITY TO OBTAIN COSTS AND ARRANGE SCHEDULING.
12. INSTALL METERS LARGER THAN 2-INCH IN CITY-APPROVED METER VAULTS. SUBMIT PLANS & DETAILS TO CITY FOR APPROVAL PRIOR TO INSTALLATION.
13. PRIOR TO FINAL ACCEPTANCE, PROJECT ENGINEER TO SUPPLY THE CITY WITH COMPLETE SET OF "AS-BUILT" DRAWINGS SHOWING SERVICE LOCATIONS, LENGTHS, DEPTHS, SIZES, DISTANCES BETWEEN STRUCTURES AND CORPORATION STOPS.

ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

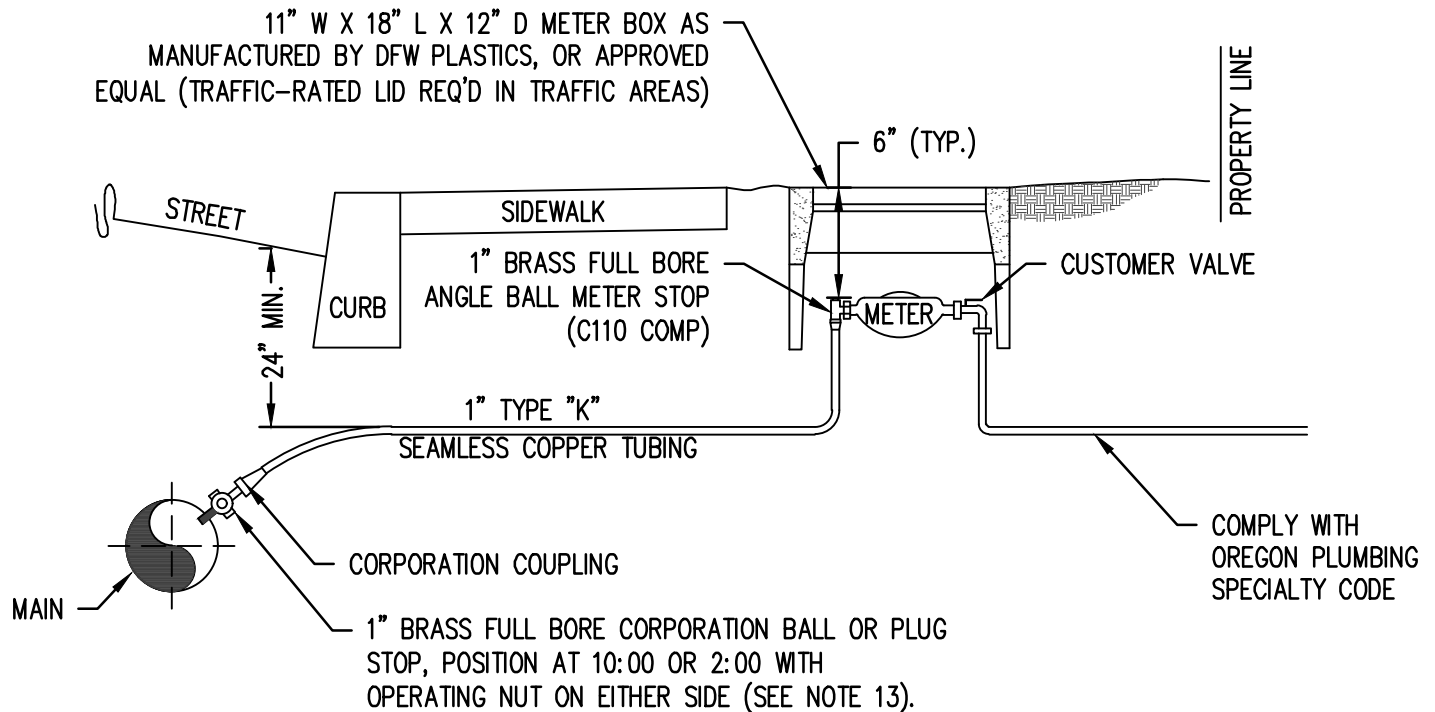
CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE



METER BOX LOCATION

CURBLINE SIDEWALK – 6" FROM BACK OF SIDEWALK

PROPERTY LINE SIDEWALK – 6" FROM BACK OF CURB

NOTES:

1. "BRASS" FITTINGS TO BE 'FORD', 'MUELLER', OR 'McDONALD,' CONFORMING TO ASTM SPEC. B62.  
ALL FITTINGS SHALL MATCH SERVICE LINE SIZE.
2. TEFLON PASTE TO BE USED ON BRASS FITTINGS; TEFLON TAPE TO BE USED ON BRASS OR PLASTIC FITTINGS.
3. FINAL CONNECTION TO METER SHALL BE MADE BY CONTRACTOR AFTER TESTING AND DISINFECTION.
4. EASEMENT REQUIRED FOR METERS ON PRIVATE PROPERTY.
5. METER TO BE INSTALLED BY CITY FORCES.
6. METER BOX CENTERLINE SHALL BE LOCATED A MINIMUM OF 18" FROM SIDE PROPERTY LINE.
7. SERVICE TAPS TO HAVE A MINIMUM OF 18" SPACING AT THE MAIN AND BE A MINIMUM OF 18" FROM JOINT OR FITTING.
8. MAINTAIN MINIMUM 6" SPACING BETWEEN ANY TWO METER BOXES.
9. ALL NEW SERVICE TAPS ON EXISTING MAINS MUST BE DONE BY CITY FORCES.
10. LONG-SIDE SERVICES SHALL BE IN A COMMON TRENCH WHERE POSSIBLE.
11. CORPORATION COUPLING IS A REQUIRED FITTING. USE 0°-90° BEND AS FIELD CONDITIONS REQUIRE.
12. IF USED FOR IRRIGATION, BACKFLOW ASSEMBLY REQUIRED.
13. A 4" MAIN REQUIRES AN EPOXY COATED SADDLE WITH STAINLESS STEEL BANDS, SADDLE SHALL BE F.I.P. THREAD.

ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

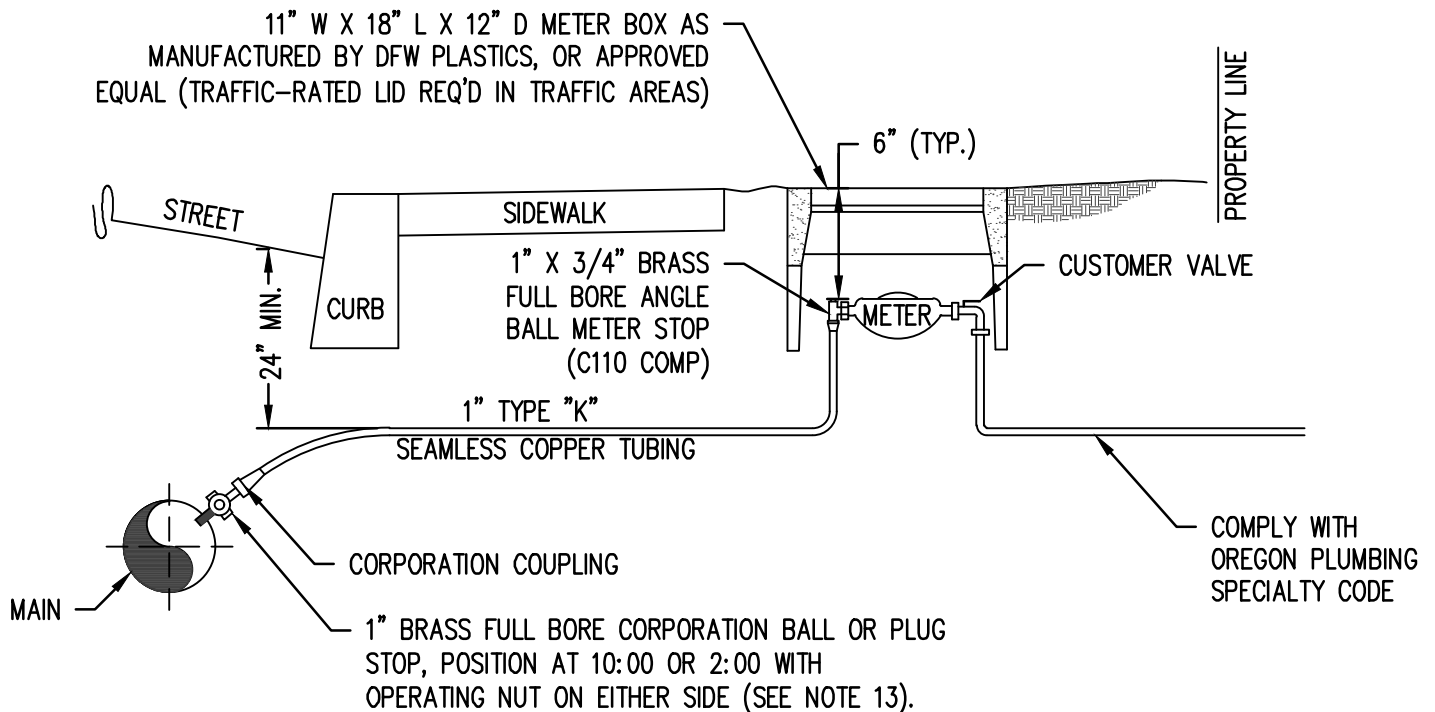
CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE



METER BOX LOCATION

CURBLINE SIDEWALK – 6" FROM BACK OF SIDEWALK

PROPERTY LINE SIDEWALK – 6" FROM BACK OF CURB

NOTES:

1. "BRASS" FITTINGS TO BE 'FORD', 'MUELLER', OR 'McDONALD,' CONFORMING TO ASTM SPEC. B62.  
ALL FITTINGS SHALL MATCH SERVICE LINE SIZE.
2. TEFLON PASTE TO BE USED ON BRASS FITTINGS; TEFLON TAPE TO BE USED ON BRASS OR PLASTIC FITTINGS.
3. FINAL CONNECTION TO METER SHALL BE MADE BY CONTRACTOR AFTER TESTING AND DISINFECTION.
4. EASEMENT REQUIRED FOR METERS ON PRIVATE PROPERTY.
5. METER TO BE INSTALLED BY CITY FORCES.
6. METER BOX CENTERLINE SHALL BE LOCATED A MINIMUM OF 18" FROM SIDE PROPERTY LINE.
7. SERVICE TAPS TO HAVE A MINIMUM OF 18" SPACING AT THE MAIN AND BE A MINIMUM OF 18" FROM JOINT OR FITTING.
8. MAINTAIN MINIMUM 6" SPACING BETWEEN ANY TWO METER BOXES.
9. ALL NEW SERVICE TAPS ON EXISTING MAINS MUST BE DONE BY CITY FORCES.
10. LONG-SIDE SERVICES SHALL BE IN A COMMON TRENCH WHERE POSSIBLE.
11. CORPORATION COUPLING IS A REQUIRED FITTING. USE 0°-90° BEND AS FIELD CONDITIONS REQUIRE.
12. IF USED FOR IRRIGATION, BACKFLOW ASSEMBLY REQUIRED.
13. A 4" MAIN REQUIRES AN EPOXY COATED SADDLE WITH STAINLESS STEEL BANDS, SADDLE SHALL BE F.I.P. THREAD.

ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

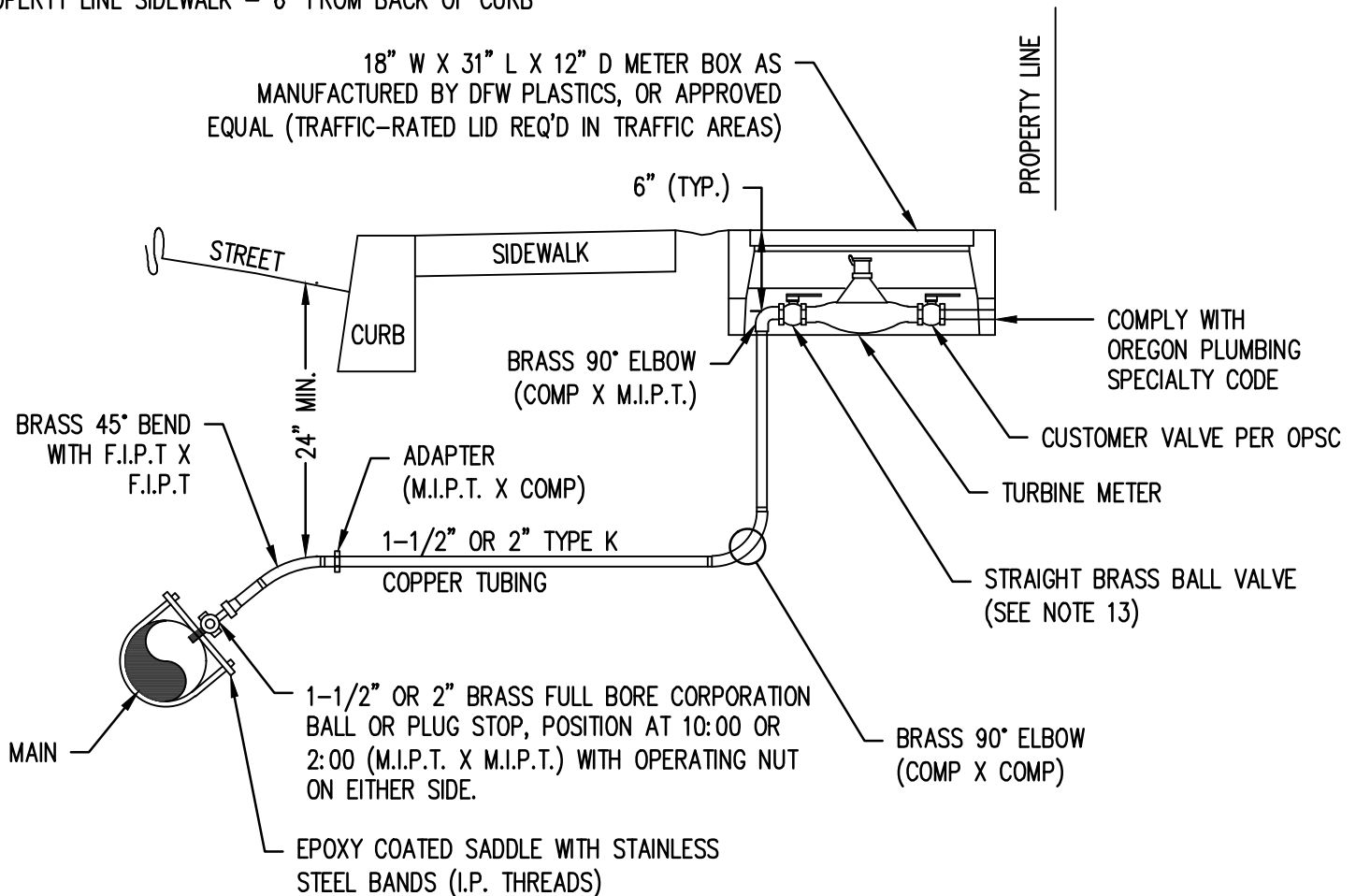
CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE



**METER BOX LOCATION**

CURBLINE SIDEWALK – 6" FROM BACK OF SIDEWALK

PROPERTY LINE SIDEWALK – 6" FROM BACK OF CURB

**NOTES:**

1. "BRASS" FITTINGS TO BE 'FORD', 'MUELLER', OR 'McDONALD,' CONFORMING TO ASTM SPEC. B62.  
ALL FITTINGS SHALL MATCH SERVICE LINE SIZE.
2. TEFLON PASTE TO BE USED ON BRASS FITTINGS; TEFLON TAPE TO BE USED ON BRASS OR PLASTIC FITTINGS.
3. FINAL CONNECTION TO METER SHALL BE MADE BY CONTRACTOR AFTER TESTING AND DISINFECTION.
4. EASEMENT REQUIRED FOR METERS ON PRIVATE PROPERTY.
5. METER TO BE INSTALLED BY CITY FORCES.
6. METER BOX SHALL BE LOCATED A MINIMUM OF 6" FROM SIDE PROPERTY LINE.
7. SERVICE TAPS TO HAVE A MINIMUM OF 18" SPACING AT THE MAIN AND BE A MINIMUM OF 18" FROM JOINT OR FITTING.
8. MAINTAIN MINIMUM 6" SPACING BETWEEN ANY TWO METER BOXES.
9. ALL NEW SERVICE TAPS ON EXISTING MAINS MUST BE DONE BY CITY FORCES.
10. LONG-SIDE SERVICES SHALL BE IN A COMMON TRENCH WHERE POSSIBLE.
11. CORPORATION COUPLING IS A REQUIRED FITTING. USE 0°-90° BEND AS FIELD CONDITIONS REQUIRE.
12. BACKFLOW ASSEMBLY REQUIRED.
13. F.I.P.T x METER FLANGE – OPTIONS:
  - 13.1. 1-1/2" SERVICE: MUELLER B-24337N; A.Y. MCDONALD 5149-128; FORD BF13-666W-NL; JONES E-1912J, E-1912WJ; OR APPROVED EQUAL.
  - 13.2. 2" SERVICE: MUELLER B-24337N; A.Y. MCDONALD 5149-129; FORD BF13-777W-NL; JONES E-1912J, E-1912WJ, E-1912WS; OR APPROVED EQUAL.

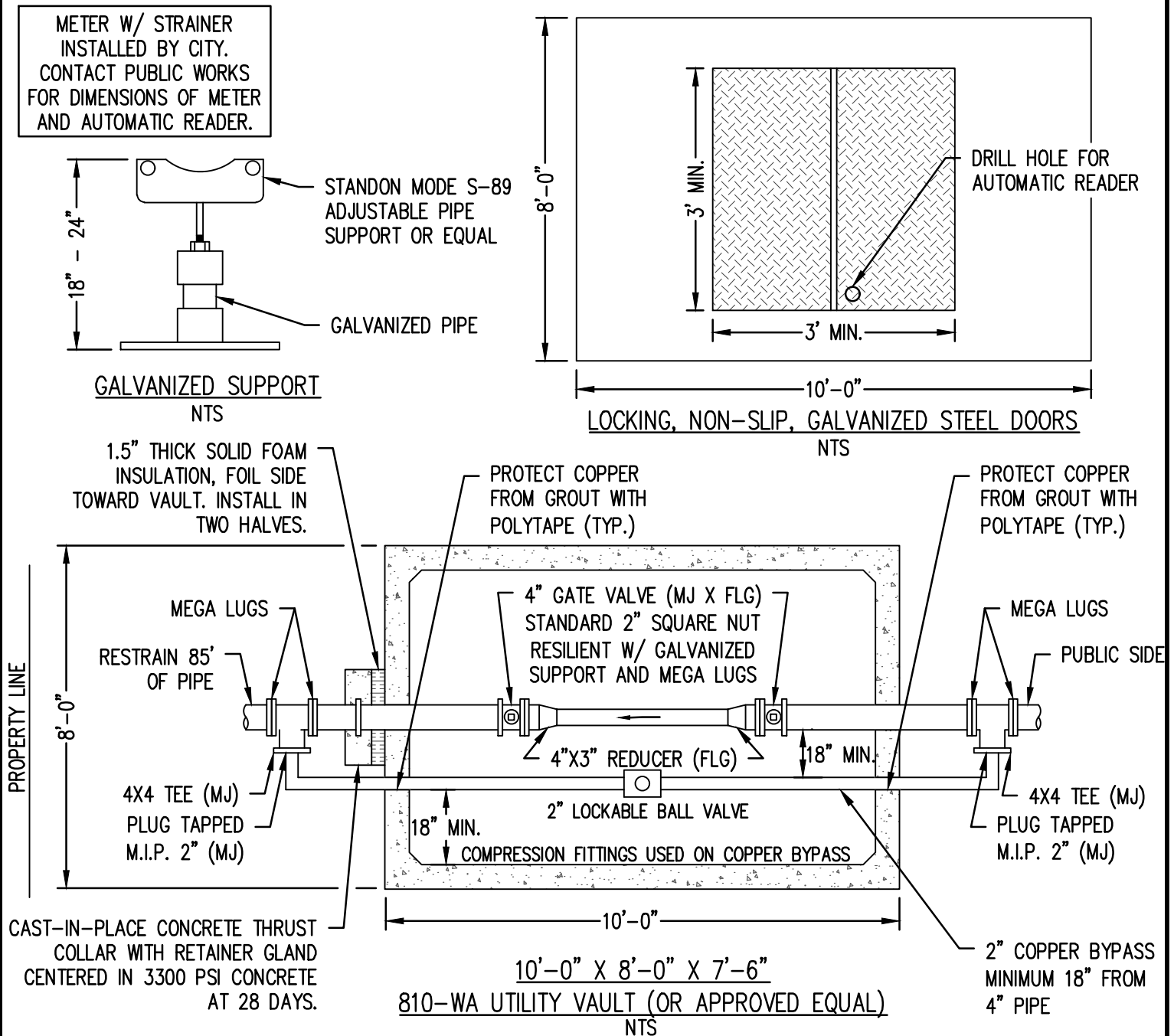
ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE





## NOTES:

1. CONTRACTOR TO INSTALL VAULT AND PIPING SHOWN. CITY FORCES TO INSTALL METER ASSEMBLY. PUBLIC-SIDE PIPE SHALL BE RESTRAINED PER DETAIL 517 OR 518.
2. VAULT SHALL BE PLACED WITHIN RIGHT-OF-WAY OR RECORDED EASEMENT.
3. BENDS, CROSSES, AND TEES SHALL BE A MINIMUM OF 5 FEET OUTSIDE OF THE VAULT.
4. CENTERLINE OF PIPE SHALL BE 24 INCHES ABOVE THE VAULT FLOOR AND CENTERED HORIZONTALLY IN THE VAULT.
5. 2" BALL VALVE SHALL BE MUELLER B20200, FORD B-11-777W-NL, OR APPROVED EQUAL.
6. THRUST COLLAR NOT REQUIRED IF PIPE ON THE PRIVATE SIDE IS RESTRAINED-JOINT.

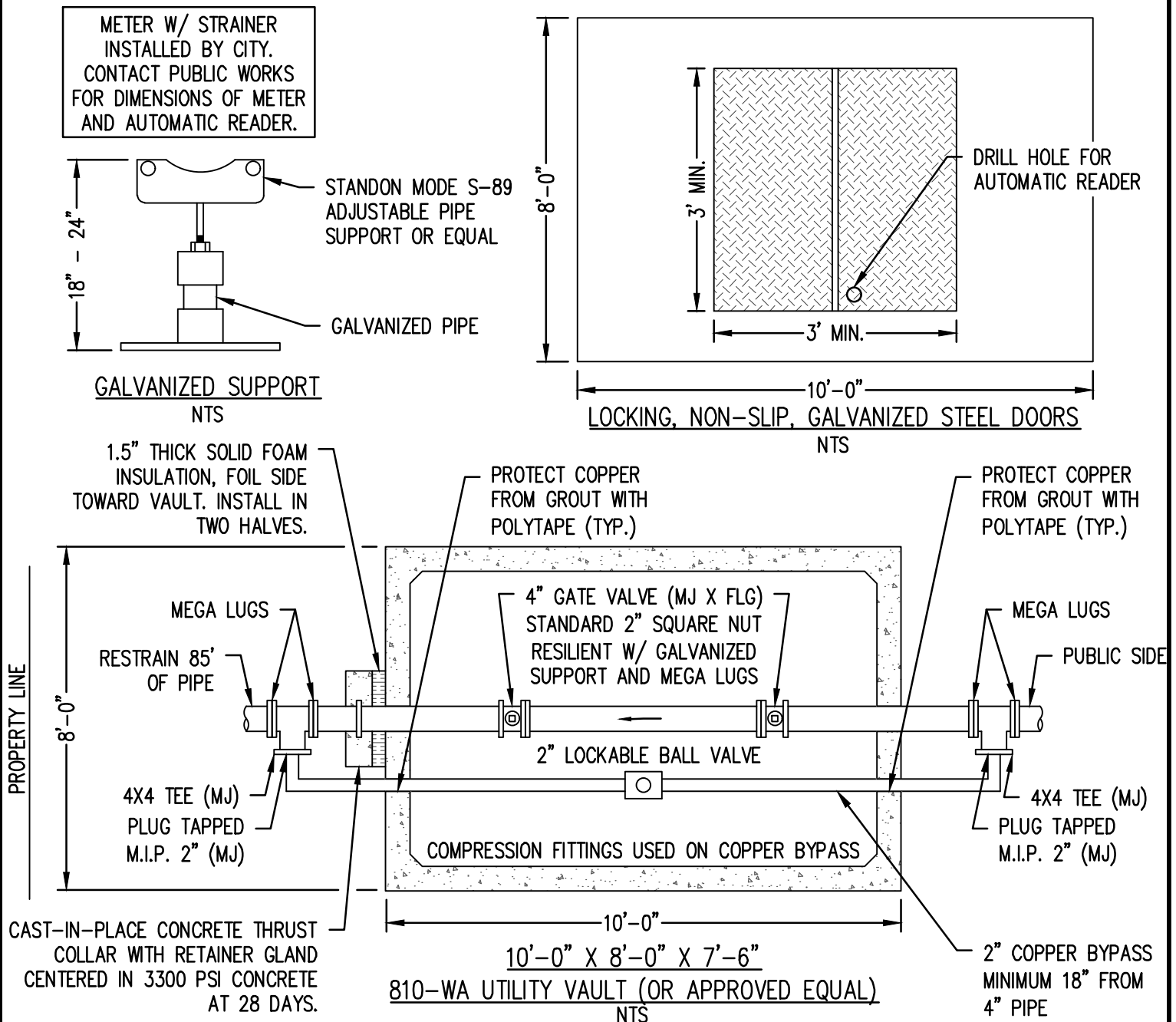
ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE



**NOTES:**

1. CONTRACTOR TO INSTALL VAULT AND PIPING SHOWN. CITY FORCES TO INSTALL METER ASSEMBLY. PUBLIC-SIDE PIPE SHALL BE RESTRAINED PER DETAIL 517 OR 518.
2. VAULT SHALL BE PLACED WITHIN RIGHT-OF-WAY OR RECORDED EASEMENT.
3. BENDS, CROSSES, AND TEES SHALL BE A MINIMUM OF 5 FEET OUTSIDE OF THE VAULT.
4. CENTERLINE OF PIPE SHALL BE 24 INCHES ABOVE THE VAULT FLOOR AND CENTERED HORIZONTALLY IN THE VAULT.
5. 2" BALL VALVE SHALL BE MUELLER B20200, FORD B-11-777W-NL, OR APPROVED EQUAL.
6. THRUST COLLAR NOT REQUIRED IF PIPE ON THE PRIVATE SIDE IS RESTRAINED-JOINT.

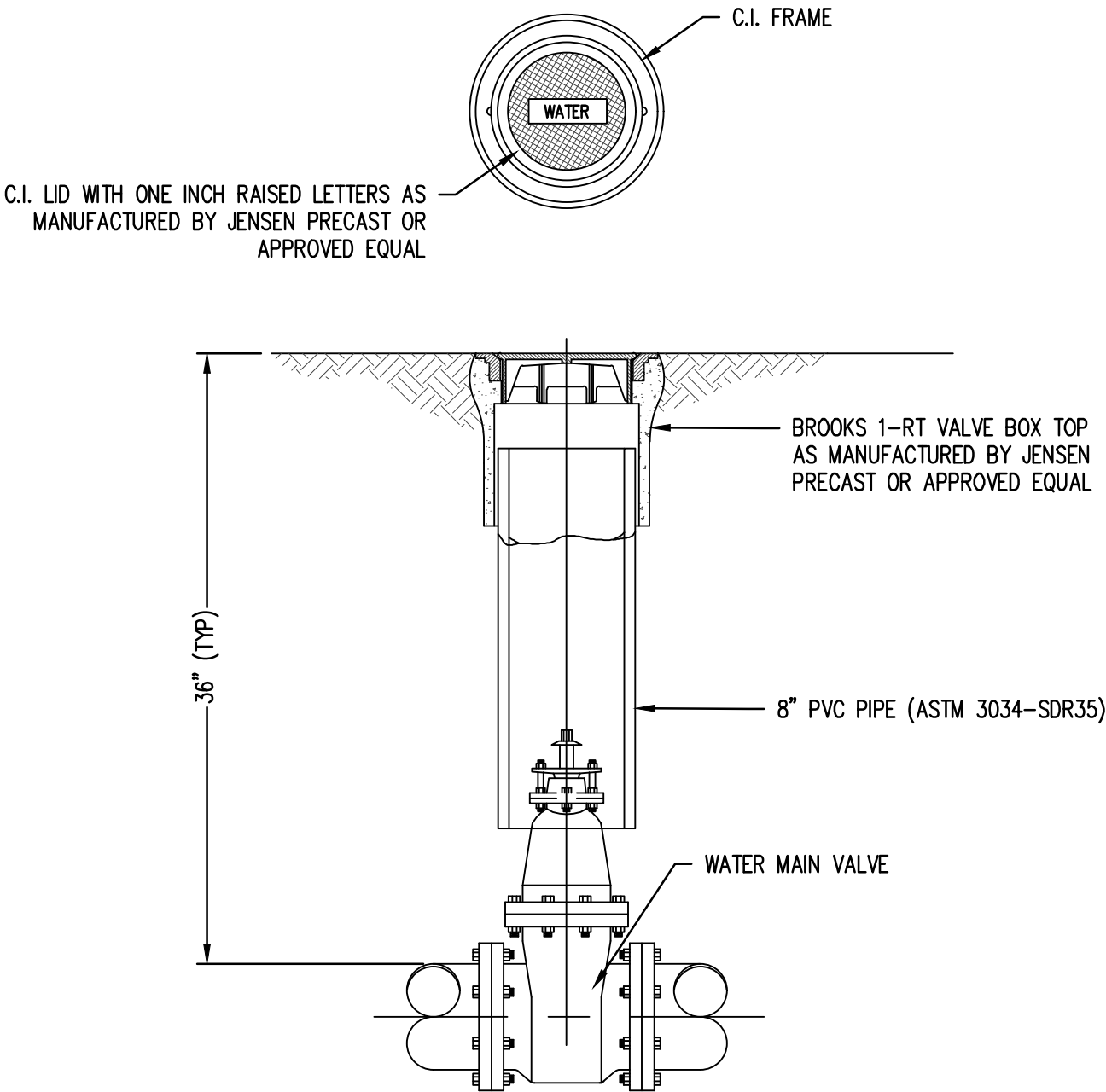
ISSUED: 08/09/2024

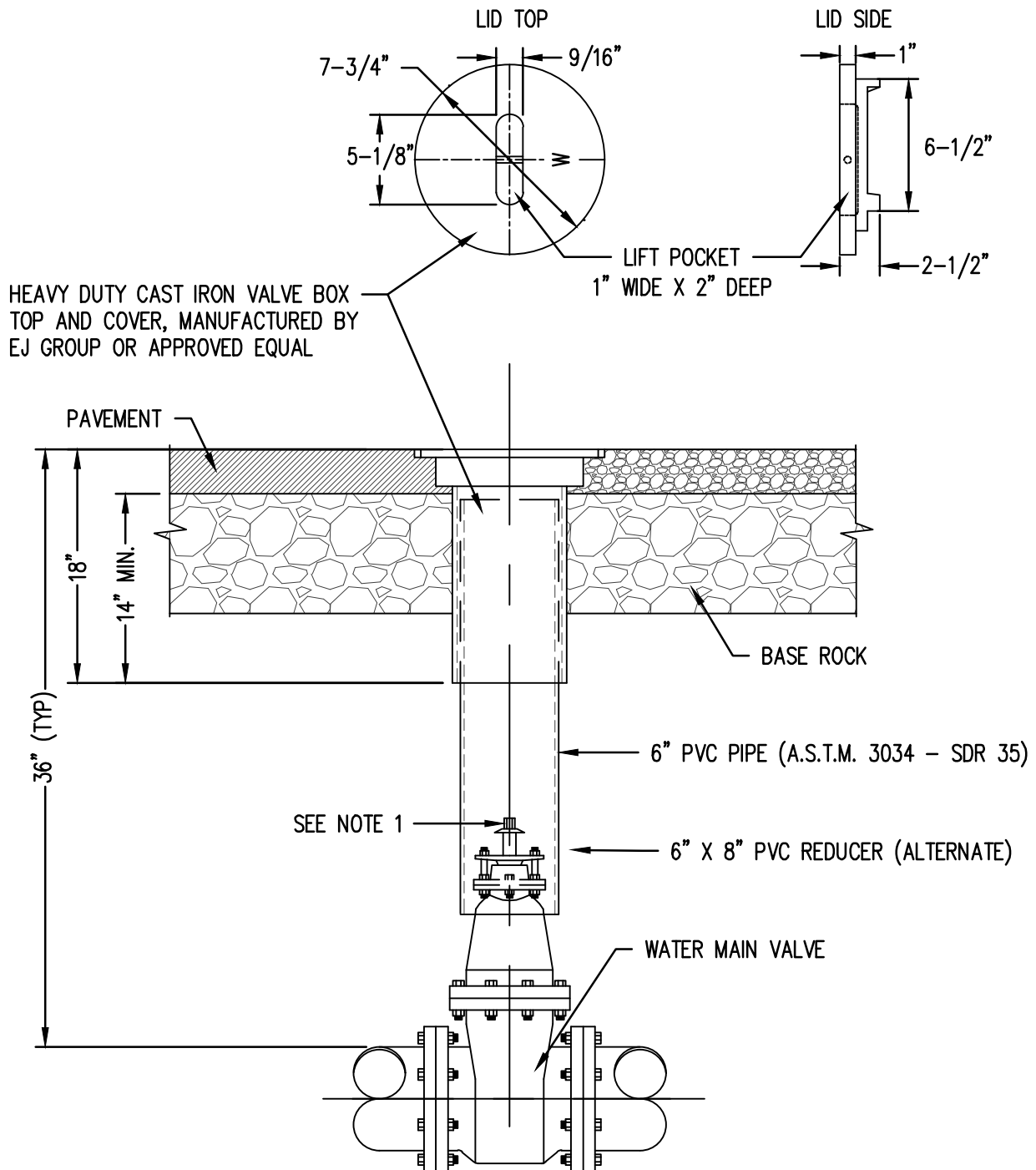
REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE







## NOTES:

1. PROVIDE VALVE OPERATOR EXTENSION WHEN OPERATING NUT DEPTH EXCEEDS 48 INCHES. SEE STD. DETAIL 508.
2. CENTER VALVE BOX ASSEMBLY AND ALIGN VERTICALLY OVER VALVE OPERATING NUT.
3. ADJUST VALVE BOX TO FINISH PAVING GRADE.
4. PVC PIPE SHALL BE ONE CONTINUOUS PIECE WITH BELL END ORIENTED DOWNWARD. ALTERNATIVELY, GLUE PVC REDUCER ON PLAIN END OF PIPE.

ISSUED: 08/09/2024

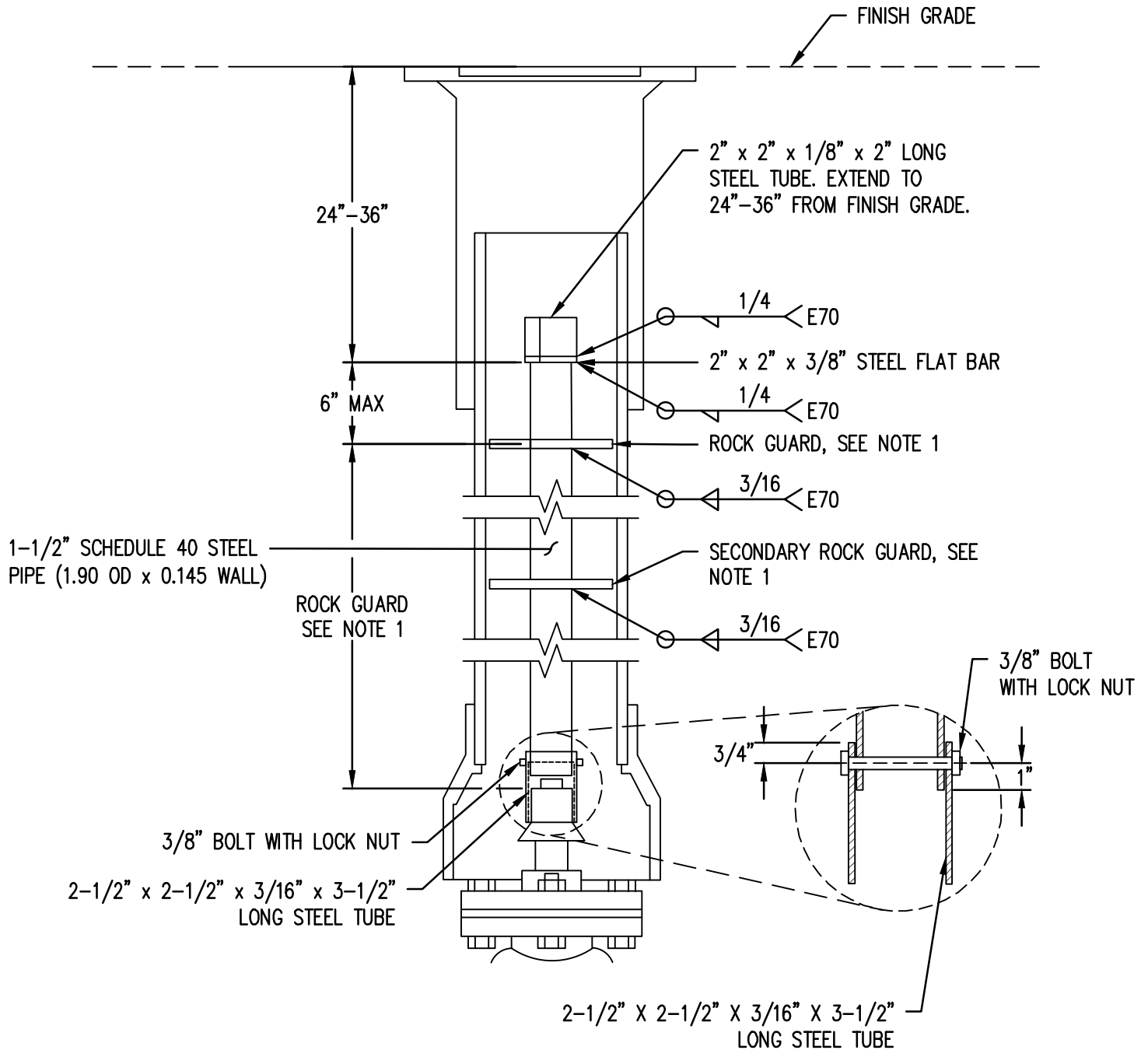
REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE







NOTES:

1. 1/8" STEEL PLATE WELDED TO STEEL PIPE. INSTALL 6" MAX BELOW OPERATOR NUT. ROCK GUARD DIAMETER SHALL BE 5-1/2". SECONDARY ROCK GUARD IS REQUIRED IF DISTANCE FROM UPPER ROCK GUARD TO VALVE NUT EXCEEDS 72". INSTALL SECONDARY ROCK GUARD HALFWAY BETWEEN UPPER GUARD AND VALVE NUT.

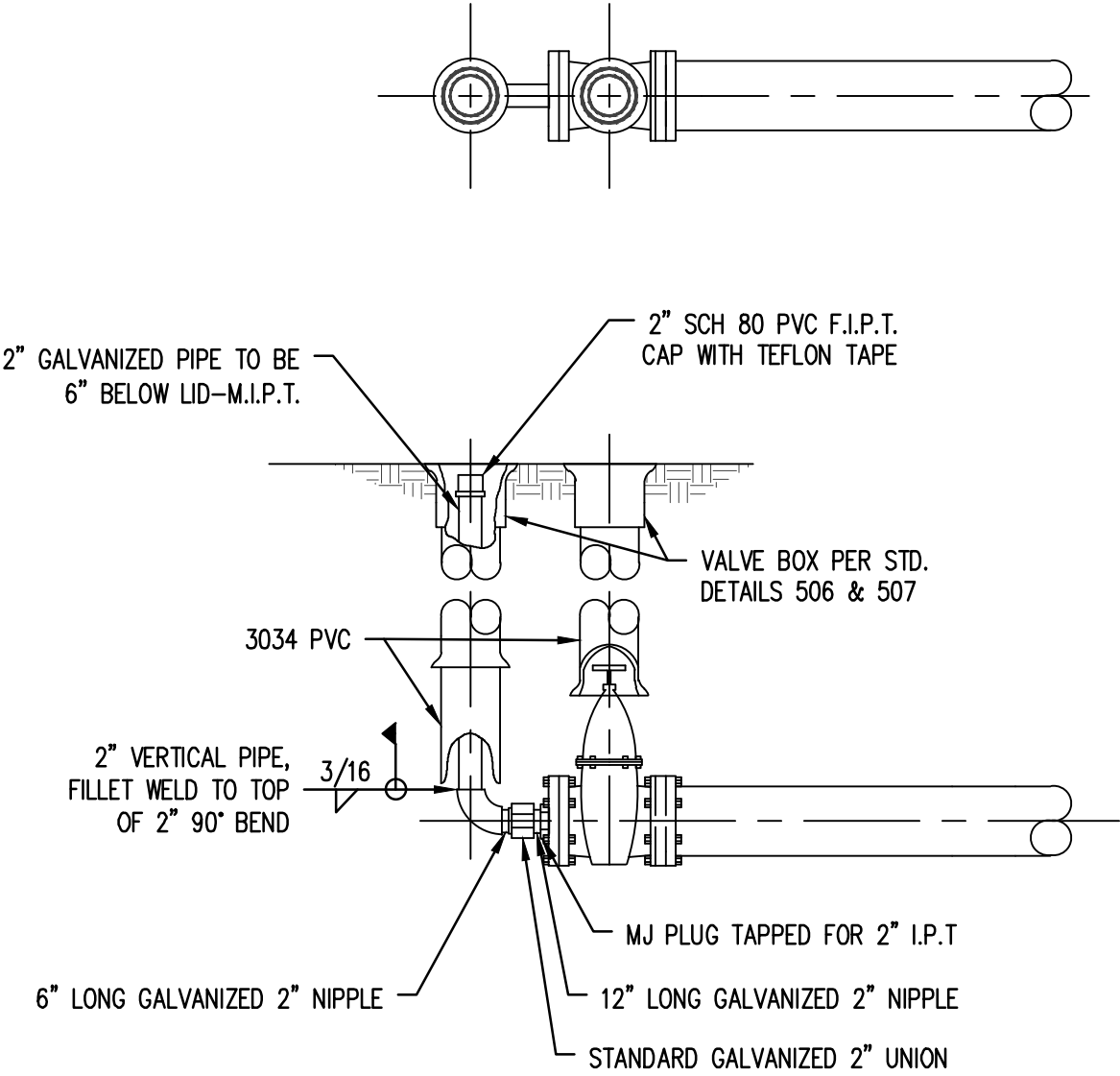
ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE

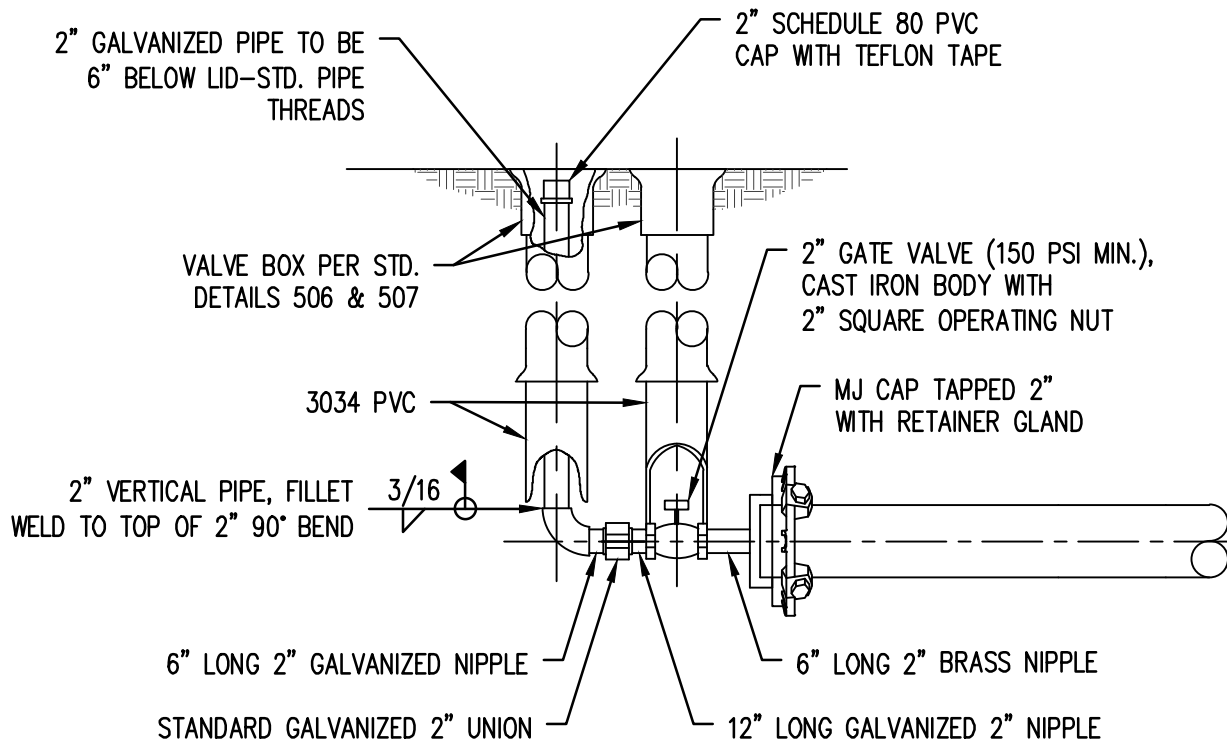
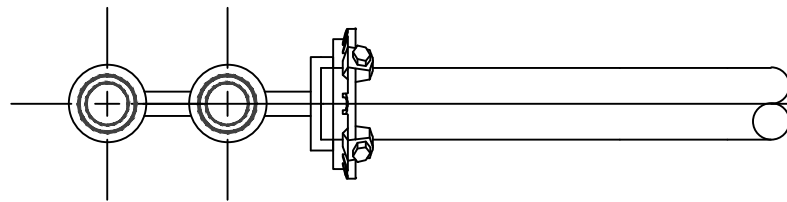




NOTES:

1. ALL NEW INSTALLATIONS TO BE RESTRAINED PER STD. DETAILS 517 OR 518. EXISTING PIPES SHALL BE RESTRAINED WITH A STRADDLE BLOCK (STD. DETAIL 514) OR TIED BACK (STD. DETAIL 516). RESTRAINT TO BE SPECIFIED BY THE ENGINEER.

ISSUED:08/09/2024	CITY OF KEIZER   Public Works Department STANDARD DETAILS WATER INFRASTRUCTURE	
REVISED:_____		
DRAWING NOT TO SCALE		

**NOTES:**

1. ALL NEW INSTALLATIONS TO BE RESTRAINED PER STD. DTLs. 517 OR 518. EXISTING PIPES WILL BE RESTRAINED WITH A STRADDLE BLOCK (STD. DTL. 514) OR TIED BACK (STD. DTL. 516). RESTRAINT TO BE SPECIFIED BY THE ENGINEER.

ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

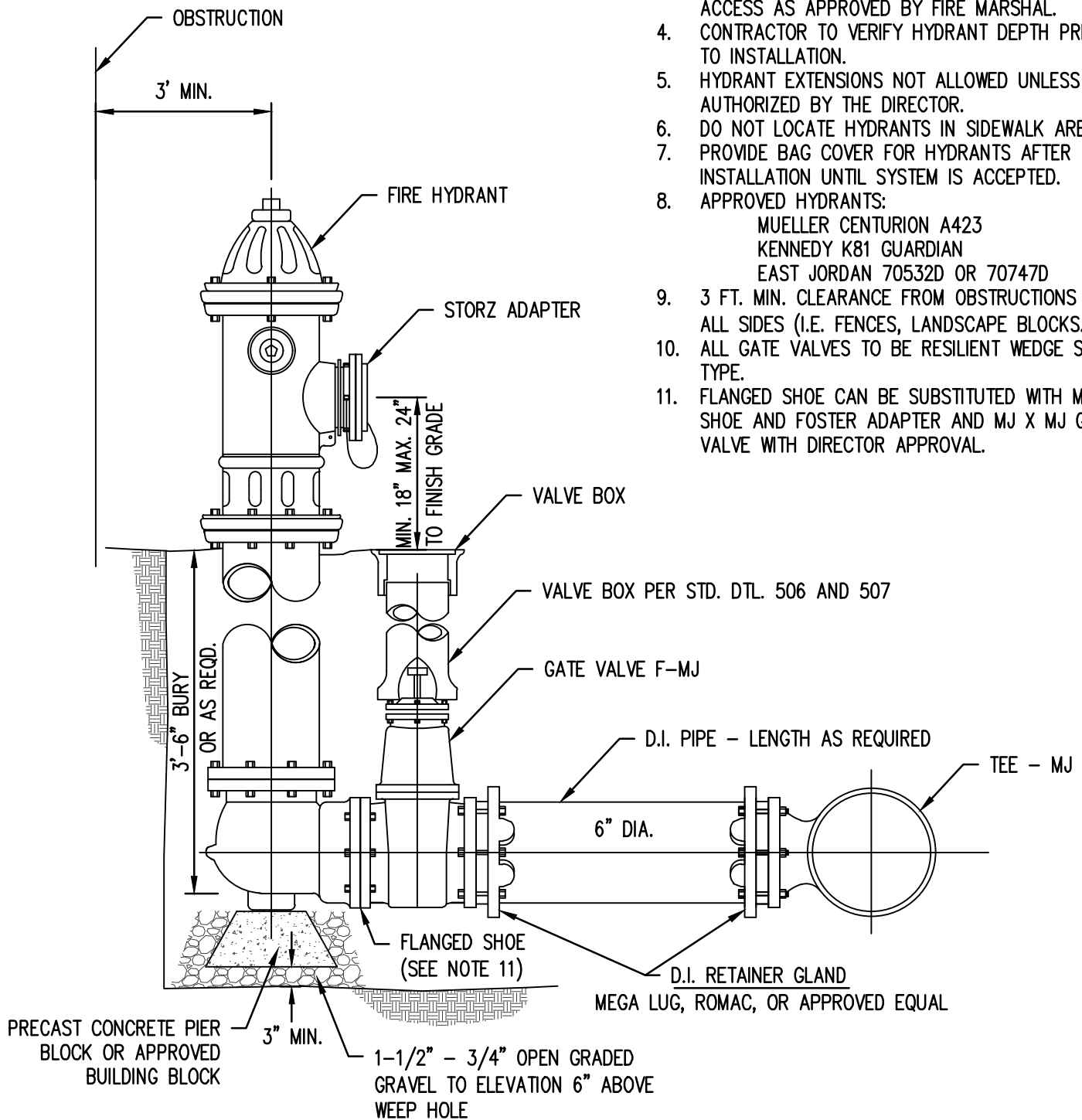
DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE



## NOTES:

1. STORZ ADAPTER REQUIRED.
2. DO NOT PLACE THRUST BLOCKS BEHIND HYDRANT, OR BEHIND TEE UNLESS EXISTING MAIN.
3. PUMPER OUTLET TO FACE THE DIRECTION OF ACCESS AS APPROVED BY FIRE MARSHAL.
4. CONTRACTOR TO VERIFY HYDRANT DEPTH PRIOR TO INSTALLATION.
5. HYDRANT EXTENSIONS NOT ALLOWED UNLESS AUTHORIZED BY THE DIRECTOR.
6. DO NOT LOCATE HYDRANTS IN SIDEWALK AREAS.
7. PROVIDE BAG COVER FOR HYDRANTS AFTER INSTALLATION UNTIL SYSTEM IS ACCEPTED.
8. APPROVED HYDRANTS:  
MUELLER CENTURION A423  
KENNEDY K81 GUARDIAN  
EAST JORDAN 70532D OR 70747D
9. 3 FT. MIN. CLEARANCE FROM OBSTRUCTIONS ON ALL SIDES (I.E. FENCES, LANDSCAPE BLOCKS.)
10. ALL GATE VALVES TO BE RESILIENT WEDGE SEAT TYPE.
11. FLANGED SHOE CAN BE SUBSTITUTED WITH MJ SHOE AND FOSTER ADAPTER AND MJ X MJ GATE VALVE WITH DIRECTOR APPROVAL.



ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

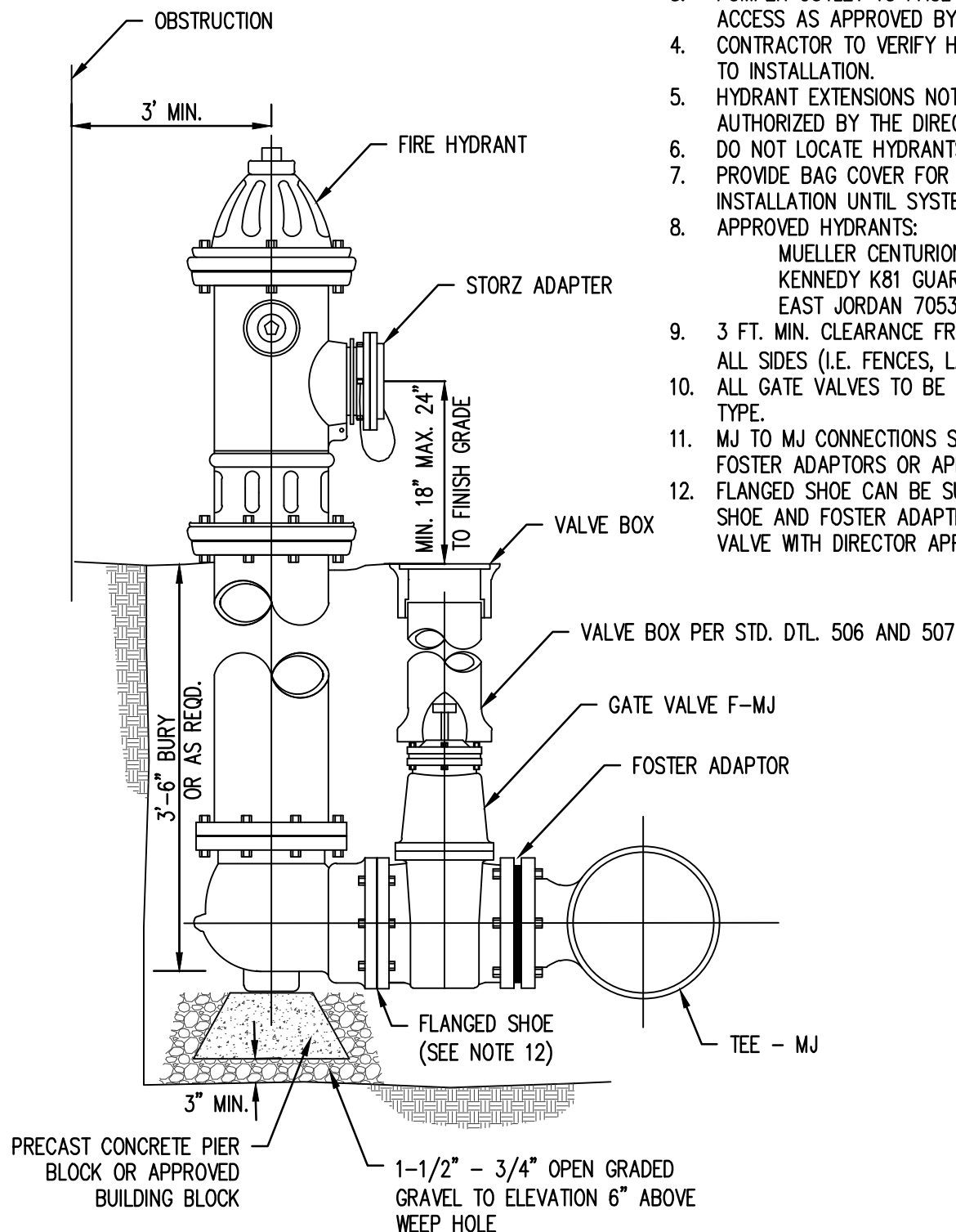
DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE



## NOTES:

1. STORZ ADAPTER REQUIRED.
2. DO NOT PLACE THRUST BLOCKS BEHIND HYDRANT, OR BEHIND TEE UNLESS EXISTING MAIN.
3. PUMPER OUTLET TO FACE THE DIRECTION OF ACCESS AS APPROVED BY FIRE MARSHAL.
4. CONTRACTOR TO VERIFY HYDRANT DEPTH PRIOR TO INSTALLATION.
5. HYDRANT EXTENSIONS NOT ALLOWED UNLESS AUTHORIZED BY THE DIRECTOR.
6. DO NOT LOCATE HYDRANTS IN SIDEWALK AREAS.
7. PROVIDE BAG COVER FOR HYDRANTS AFTER INSTALLATION UNTIL SYSTEM IS ACCEPTED.
8. APPROVED HYDRANTS:  
MUELLER CENTURION A423  
KENNEDY K81 GUARDIAN  
EAST JORDAN 70532D OR 70747D
9. 3 FT. MIN. CLEARANCE FROM OBSTRUCTIONS ON ALL SIDES (I.E. FENCES, LANDSCAPE BLOCKS.)
10. ALL GATE VALVES TO BE RESILIENT WEDGE SEAT TYPE.
11. MJ TO MJ CONNECTIONS SHALL BE MADE WITH FOSTER ADAPTORS OR APPROVED EQUAL.
12. FLANGED SHOE CAN BE SUBSTITUTED WITH MJ SHOE AND FOSTER ADAPTER AND MJ X MJ GATE VALVE WITH DIRECTOR APPROVAL.



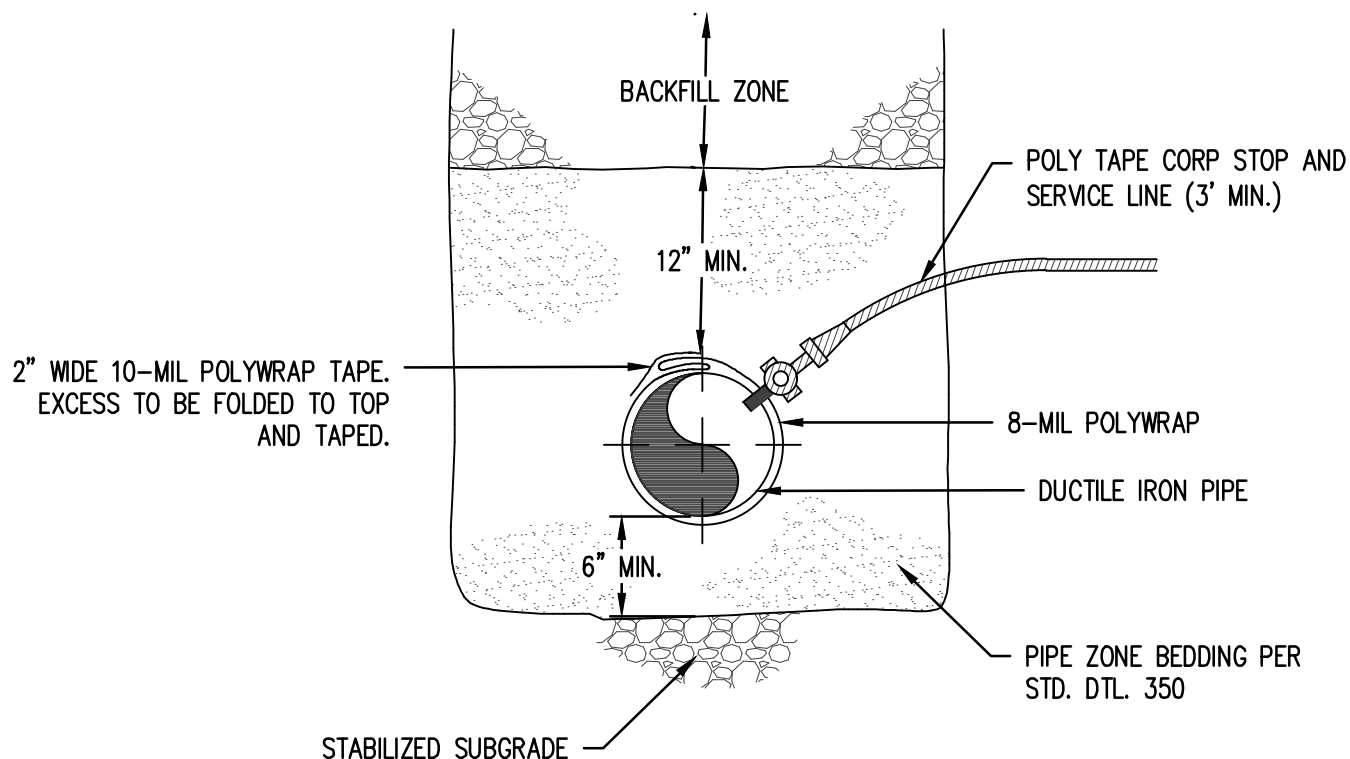
ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

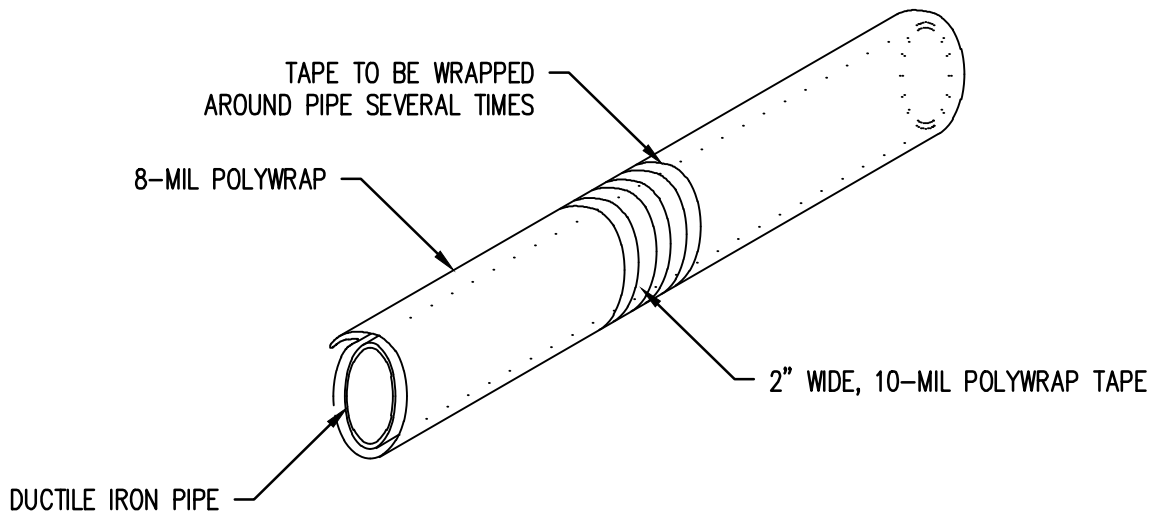
DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE





POLYWRAP DETAIL  
NTS



NOTES:

1. ALL POLYWRAP AND TAPE MATERIALS SHALL MEET AWWA C105 REQUIREMENTS.
2. ALL VALVES, FITTINGS, JOINTS, AND BOLTS TO BE WRAPPED WITH 8-MIL POLYWRAP AND SEALED WITH 10-MIL POLYWRAP TAPE.
3. CLASS "C" OR SAND BACKFILL MUST BE APPROVED BY THE DIRECTOR PRIOR TO INSTALLATION.

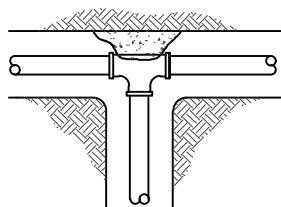
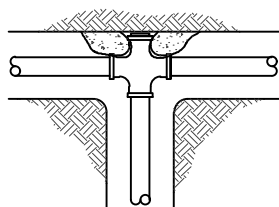
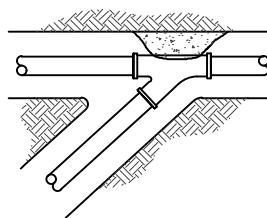
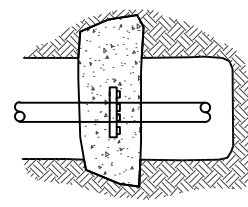
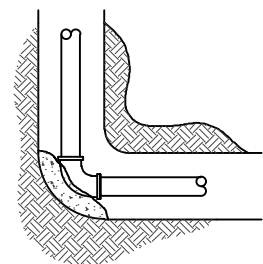
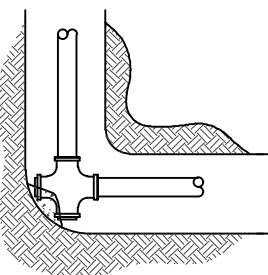
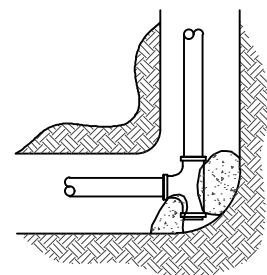
ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE



TEEPLUGGED CROSS FOR TEEWYESTRADDLE BLOCKBENDPLUGGED CROSS FOR BENDPLUGGED TEE

## BEARING AREA OF THRUST BLOCKS (SQ. FT.)

FITTING SIZE	TEE, WYE	STRADDLE BLOCK	90° BEND PLUGGED CROSS	TEE PLUGGED ON RUN		45° BEND	22-1/2° BEND	11-1/4° BEND
				A-1	A-2			
4	1.0	1.6	1.4	1.9	1.4	1.0	--	--
6	2.1	3.7	3.0	4.3	3.0	1.6	1.0	--
8	3.8	6.5	5.3	7.6	5.4	2.9	1.5	1.0
10	5.9	10.2	8.4	11.8	8.4	4.6	2.4	1.2
12	8.5	14.7	12.0	17.0	12.0	6.6	3.4	1.7
14	11.5	--	16.3	23.0	16.3	8.9	4.6	2.3
16	15.0	26.1	21.3	30.0	21.3	11.6	6.0	3.0
18	19.0	--	27.0	38.0	27.0	14.6	7.6	3.8
20	23.5	40.8	33.3	47.0	33.3	18.1	9.4	4.7
24	34.0	58.8	48.0	68.0	48.0	26.2	13.6	6.8

NOTE: BEARING AREAS BASED ON TEST PRESSURE OF 150 PSI AND AN ALLOWABLE SOIL BEARING STRESS OF 2,000 POUNDS PER SQUARE FOOT.

NOTES:

1. ALL NEW INSTALLATIONS TO BE RESTRAINED PER STD. DETAILS 517 OR 518. THRUST BLOCKS ALLOWED ON EXISTING PIPES ONLY.
2. BEARING AREAS AND SPECIAL BLOCKING DETAILS SHOWN ON PLANS TAKE PRECEDENCE OVER BEARING AREAS AND BLOCKING DETAILS SHOWN ON THIS STANDARD DETAIL.
3. CONCRETE THRUST BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH. KEEP CONCRETE CLEAR OF JOINT AND ACCESSORIES.
4. IF NOT SHOWN ON PLANS, REQUIRED BEARING AREAS AT FITTING SHALL BE AS INDICATED ABOVE, ADJUSTED IF NECESSARY, TO CONFORM TO THE TEST PRESSURE(S) AND ALLOWABLE SOIL BEARING STRESS(ES) STATED IN THE SPECIAL SPECIFICATIONS.
5. CONCRETE TO BE 3300 PSI, 2 DAY STRENGTH.

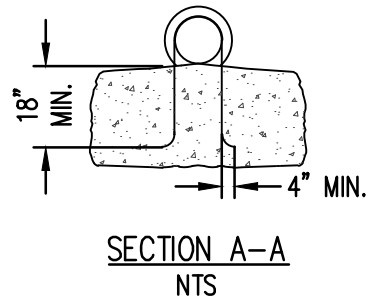
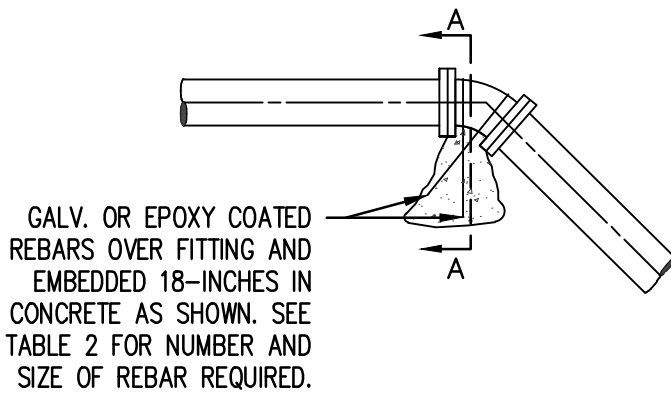
ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE





## NOTES:

1. ALL NEW INSTALLATIONS TO BE RESTRAINED PER STD. DETAILS 517 OR 518. THRUST BLOCKS ALLOWED ON EXISTING PIPES ONLY.
2. KEEP CONCRETE CLEAR OF JOINT AND ACCESSORIES.
3. IF NOT SHOWN ON PLANS, REQUIRED VOLUMES AT FITTINGS SHALL BE AS INDICATED BELOW, ADJUST IF NECESSARY, TO CONFORM TO THE 150 PSI TEST PRESSURE.
4. VOLUMES AND SPECIAL BLOCKING DETAILS SHOWN ON PLANS TAKE PRECEDENCE OVER VOLUMES AND BLOCKING DETAIL SHOWN ON THIS STANDARD DETAIL.
5. THRUST BLOCKS FOR VERTICAL "UP" BENDS SHALL BE THE SAME AS FOR HORIZONTAL BENDS.

TABLE 1

FITTING SIZE	VOLUME OF CONCRETE ANCHOR BLOCK IN C.Y.			
	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND
4	1.0	0.5	0.3	N.R
6	2.0	1.1	0.5	0.3
8	3.4	1.8	0.9	0.5
10	5.1	2.7	1.4	0.7
12	7.2	3.9	2.0	1.0
14	9.6	5.2	2.7	1.3
16	12.5	6.7	3.4	1.7
18	15.6	8.5	4.3	2.2
20	19.2	10.4	5.3	2.7
24	27.4	14.8	7.6	3.8

TABLE 2

FITTING SIZE	NUMBER AND SIZE OF STEEL REBAR REQUIRED			
	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND
4	2-#5	2-#5	2-#5	2-#5
6	2-#5	2-#5	2-#5	2-#5
8	2-#5	2-#5	2-#5	2-#5
10	3-#5	2-#5	2-#5	2-#5
12	4-#5	2-#5	2-#5	2-#5
14	4-#6	3-#5	2-#5	2-#5
16	4-#7	4-#5	2-#5	2-#5
18	4-#7	3-#6	3-#5	2-#5
20	4-#8	4-#6	3-#5	2-#5
24	6-#8	4-#7	2-#7	2-#5

## TABLE NOTES:

1. THE VOLUMES SHOWN IN TABLE 1 ARE BASED ON A TEST PRESSURE OF 150 PSI AND THE WEIGHT OF CONCRETE (4050 LBS/C.Y.) TO COMPUTE VOLUME FOR DIFFERENT PRESSURES, USE THE FOLLOWING EQUATION:  
VOLUME = (TEST PRESSURE/150) X (TABLE VALUE).
2. THE NUMBER AND SIZE OF REBAR SHOWN IN TABLE 2 ARE BASED UPON GRADE 40 REBAR WITH A TENSILE STRENGTH OF 20,000 PSI AND A FS OF 1.5.

ISSUED:08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE





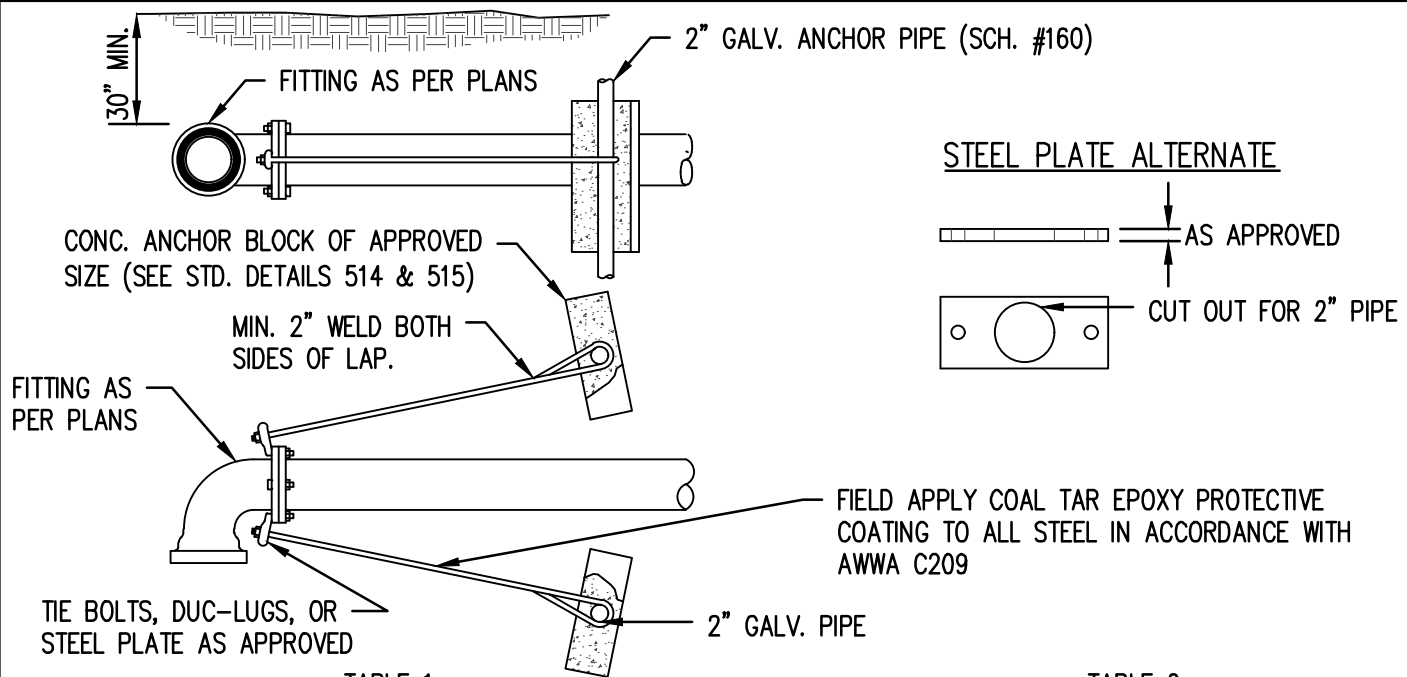


TABLE 1  
BEARING AREA OF THRUST BLOCK

FITTING SIZE	1/2 BEARING AREA (SQ. FT.) (EACH SIDE)				
	DEAD END WYE, TEE, OR BLOW-OFF	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND
4	1.4	1.9	1.0	0.5	0.3
6	2.8	3.9	2.1	1.1	0.5
8	4.8	6.8	3.7	1.9	0.9
10	7.3	10.3	5.6	2.8	1.4
12	10.3	14.5	7.9	4.0	2.0
14	13.8	19.5	10.6	5.4	2.7
16	17.8	25.2	13.6	7.0	3.5

TABLE 2  
NUMBER & SIZE OF STEEL TIE RODS REQ'D

SIZE	NO. OF FULL DIA. RODS WELDED TO PLATES			NO. OF THREADED RODS		
	5/8"	3/4"	1"	5/8"	3/4"	1"
4	2	DUC-LUGS NOT ALLOWED		2	DUC-LUGS NOT ALLOWED	
6	2			3		
8	3	2	2	5	3	2
10	5	3	2	7	5	3
12	7	5	3	10	7	4
14	10	7	4	13	9	5
16	12	9	5	17	11	6

- NOTES:**
- ALL NEW INSTALLATIONS TO BE RESTRAINED PER STD. DETAILS 517 OR 518. THRUST BLOCKS ALLOWED ON EXISTING PIPES ONLY.
  - CONCRETE THRUST BLOCK TO BE POURED AGAINST UNDISTURBED EARTH. KEEP CONCRETE CLEAR OF JOINT AND ACCESSORIES.
  - IF NOT SHOWN ON PLANS, REQUIRED BEARING AREAS AT FITTING SHALL BE AS INDICATED ABOVE.
  - TIE RODS, NUTS, AND WASHERS USED FOR THRUST RESTRAINT SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM A307.
  - THE AREAS SHOWN IN TABLE 1 ARE BASED ON TEST PRESSURES OF 150 PSI AND AN ALLOWABLE SOIL BEARING STRESS OF 2,000 POUNDS PER SQUARE FOOT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES, USE THE FOLLOWING EQUATION: BEARING AREA = (TEST PRESSURE/150) X (2,000/SOIL BEARING STRESS).
  - MULTIPLY THE AREAS LISTED IN TABLE 1 BY 2 IN ORDER TO DETERMINE THE TOTAL BEARING AREA REQUIRED.
  - THE NUMBER AND SIZE OF TIE RODS REQUIRED SHOWN IN TABLE 2 ARE BASED UPON ASTM A307 STEEL BOLT STOCK WITH A TENSILE STRENGTH OF 20,000 PSI AND A FS OF 1.5, BASED ON TEST PRESSURE OF 150 PSI.
  - MAKE CONNECTIONS AS FOLLOWS:
    - 5/8" RODS - THRU BOLT HOLES, DUCTILE IRON LUGS, STARR TIE BOLTS, STEEL PLATES.
    - 3/4" RODS - THRU BOLT HOLES, STARR TIE BOLTS, STEEL PLATES.
    - 1" RODS - CONNECT TO STEEL PLATE, STRAPS, OR "EARS".
  - CONCRETE TO BE 3300 PSI, 2-DAY STRENGTH.

ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

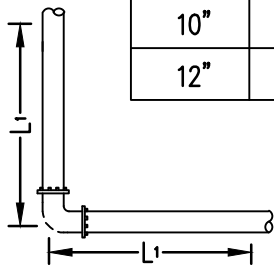
DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE



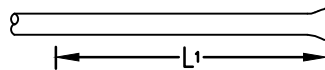
LENGTH (L<sub>1</sub>) OF PIPE REQUIRED FOR RESTRAINT (FEET)

DIAMETER	HORIZONTAL BEND				DEAD END	REDUCER (INCREASER) (RESTRAINED LENGTH FOR LARGER DIAMETER SIDE)				
	90°	45°	22-1/2°	11-1/4°		4"	6"	8"	10"	12"
4"	25	19	19	19	100	--	73	132	178	223
6"	34	19	19	19	141	--	--	77	135	187
8"	44	19	19	19	183	--	--	--	74	136
10"	52	22	19	19	219	--	--	--	--	76
12"	61	25	19	19	257	--	--	--	--	--

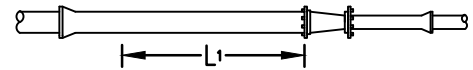


BEND

90°, 45°, 22-1/2°, 11-1/4°



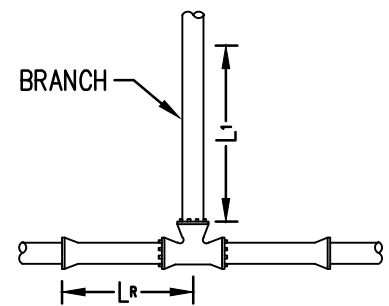
DEAD END



REDUCER

LENGTH (L<sub>1</sub>) OF PIPE REQUIRED FOR RESTRAINT WHEN USING TEES (FEET)

TEE CONFIGURATIONS (RESTRAINT LENGTH FOR BRANCH)										
BRANCH DIA.	L <sub>R</sub> =0	L <sub>R</sub> =2	L <sub>R</sub> =4	L <sub>R</sub> =6	L <sub>R</sub> =8	L <sub>R</sub> =10	L <sub>R</sub> =12	L <sub>R</sub> =14	L <sub>R</sub> =16	L <sub>R</sub> =18
4"	100	76	51	26	19	19	19	19	19	19
6"	141	115	90	65	40	19	19	19	19	19
8"	183	158	132	107	81	56	30	19	19	19
10"	219	193	167	141	115	89	64	38	19	19
12"	257	231	205	178	152	126	100	74	47	21



TEE CONFIGURATION

L<sub>R</sub> IS THE MINIMUM LENGTH IN EITHER DIRECTION FROM TEE TO NEAREST ADJACENT JOINT, ASSUMING MAIN PIPE IS EQUAL TO OR LARGER THAN THE BRANCH DIAMETER.

## NOTES:

- ALL JOINTS WITHIN THE LENGTH "L<sub>1</sub>" FROM THE ABOVE TABLE SHALL BE RESTRAINED.
- THE JOINT RESTRAINT LENGTHS CALCULATED ARE FOR FITTINGS USED TO CHANGE PIPE HORIZONTAL ALIGNMENT ONLY.
- IF AN UNANTICIPATED NEED FOR JOINT RESTRAINT ARISES TO CHANGE THE SLOPE OF THE PIPE, THE CONTRACTOR SHALL CONTACT THE DESIGN ENGINEER FOR JOINT RESTRAINT REQUIREMENTS.
- THE SMALL DIAMETER SIDE OF A REDUCER DOES NOT REQUIRE RESTRAINT IF THE LARGE DIAMETER SIDE IS PROPERLY RESTRAINED.
- ABOVE RESTRAINED LENGTHS ARE BASED ON:
  - TEST PRESSURE OF 150 POUNDS PER SQUARE INCH
  - MINIMUM OF 30 INCHES OF COVER
  - SAND OR GRANULAR BEDDING AND PIPE ZONE MATERIAL WITH CRUSHED ROCK BACKFILL
  - A FACTOR OF SAFETY OF TWO (2)
  - THIS TABLE IS APPLICABLE ONLY TO PIPE ENCASED IN POLYETHYLENE
- ANY ADJUSTMENT OF THESE VALUES AS A RESULT OF OTHER CONDITIONS ENCOUNTERED SHALL BE BASED ON THE APPROPRIATE EVALUATION AND RECOMMENDATION BY A QUALIFIED, REGISTERED ENGINEER.
- WATERLINES EXCEEDING 12-INCH DIAMETER REQUIRE INDIVIDUAL DESIGN BY A QUALIFIED REGISTERED ENGINEER.
- NOT FOR USE ON PRIVATE SYSTEMS OR C900 PIPE.

ISSUED: 08/09/2024

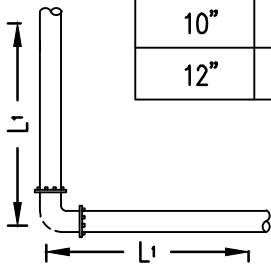
REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE

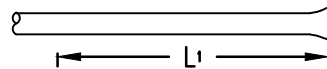

LENGTH (L<sub>1</sub>) OF PIPE REQUIRED FOR RESTRAINT (FEET)

	HORIZONTAL BEND				DEAD END	REDUCER (INCREASER) (RESTRAINED LENGTH FOR LARGER DIAMETER SIDE)				
DIAMETER	90°	45°	22-1/2°	11-1/4°		4"	6"	8"	10"	12"
4"	19	19	19	19	42	--	31	55	74	93
6"	26	19	19	19	59	--	--	32	56	78
8"	33	19	19	19	76	--	--	--	31	57
10"	39	19	19	19	91	--	--	--	--	32
12"	46	19	19	19	107	--	--	--	--	--

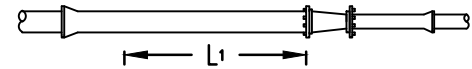


BEND

90°, 45°, 22-1/2°, 11-1/4°



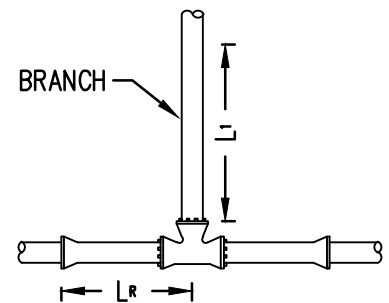
DEAD END



REDUCER

LENGTH (L<sub>1</sub>) OF PIPE REQUIRED FOR RESTRAINT WHEN USING TEES (FEET)

TEE CONFIGURATIONS (RESTRAINT LENGTH FOR BRANCH)										
BRANCH DIA.	LR=0	LR=2	LR=4	LR=6	LR=8	LR=10	LR=12	LR=14	LR=16	LR=18
4"	42	32	21	19	19	19	19	19	19	19
6"	59	48	38	27	19	19	19	19	19	19
8"	76	66	55	45	34	23	19	19	19	19
10"	91	81	70	59	48	37	27	19	19	19
12"	107	96	85	74	63	53	42	31	20	19



TEE CONFIGURATION

L<sub>R</sub> IS THE MINIMUM LENGTH IN EITHER DIRECTION FROM TEE TO NEAREST ADJACENT JOINT, ASSUMING MAIN PIPE IS EQUAL TO OR LARGER THAN THE BRANCH DIAMETER.

## NOTES:

- ALL JOINTS WITHIN THE LENGTH "L<sub>1</sub>" FROM THE ABOVE TABLE SHALL BE RESTRAINED.
- THE JOINT RESTRAINT LENGTHS CALCULATED ARE FOR FITTINGS USED TO CHANGE PIPE HORIZONTAL ALIGNMENT ONLY.
- IF AN UNANTICIPATED NEED FOR JOINT RESTRAINT ARISES TO CHANGE THE SLOPE OF THE PIPE, THE CONTRACTOR SHALL CONTACT THE DESIGN ENGINEER FOR JOINT RESTRAINT REQUIREMENTS.
- THE SMALL DIAMETER SIDE OF A REDUCER DOES NOT REQUIRE RESTRAINT IF THE LARGE DIAMETER SIDE IS PROPERLY RESTRAINED.
- ABOVE RESTRAINED LENGTHS ARE BASED ON:
  - TEST PRESSURE OF 150 POUNDS PER SQUARE INCH
  - MINIMUM OF 30 INCHES OF COVER
  - SAND OR GRANULAR BEDDING AND PIPE ZONE MATERIAL WITH CRUSHED ROCK BACKFILL
  - A FACTOR OF SAFETY OF TWO (2)
  - UN-ENCASED PIPE, THIS TABLE IS NOT APPLICABLE FOR PIPE ENCASED IN POLYETHYLENE.
- ANY ADJUSTMENT OF THESE VALUES AS A RESULT OF OTHER CONDITIONS ENCOUNTERED SHALL BE BASED ON THE APPROPRIATE EVALUATION AND RECOMMENDATION BY A QUALIFIED, REGISTERED ENGINEER.
- WATERLINES EXCEEDING 12-INCH DIAMETER REQUIRE INDIVIDUAL DESIGN BY A QUALIFIED REGISTERED ENGINEER.

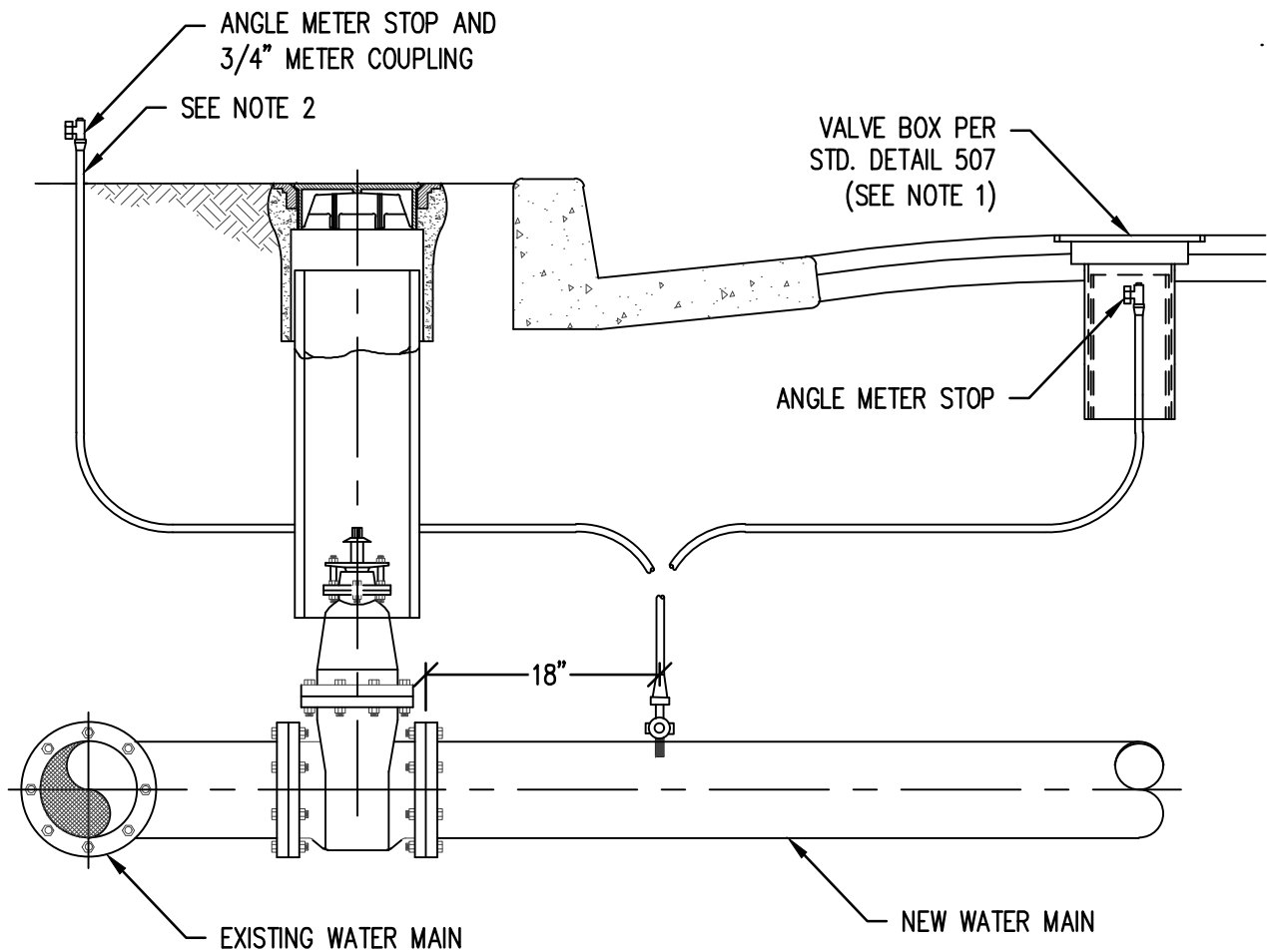
ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE



**NOTES:**

1. VALVE BOX OVER CHLORINATION METER STOP DOES NOT NEED TO BE INSTALLED IF END OF LINE IS BEHIND THE CURB. VALVE BOX IS TO BE INSTALLED ONLY WHEN IN A TRAFFIC AREA.
2. CHLORINATION METER STOP PLACED IN A NON TRAFFIC AREA SHALL BE LEFT 6" ABOVE NATURAL GROUND LEVEL.
3. UPON RETURN OF AN ACCEPTABLE BACTERIOLOGICAL REPORT, CITY SHALL SUPERVISE THE REMOVAL OF THE TAP AND PLUGGING OF THE MAIN BY THE CONTRACTOR PRIOR TO PAVING.

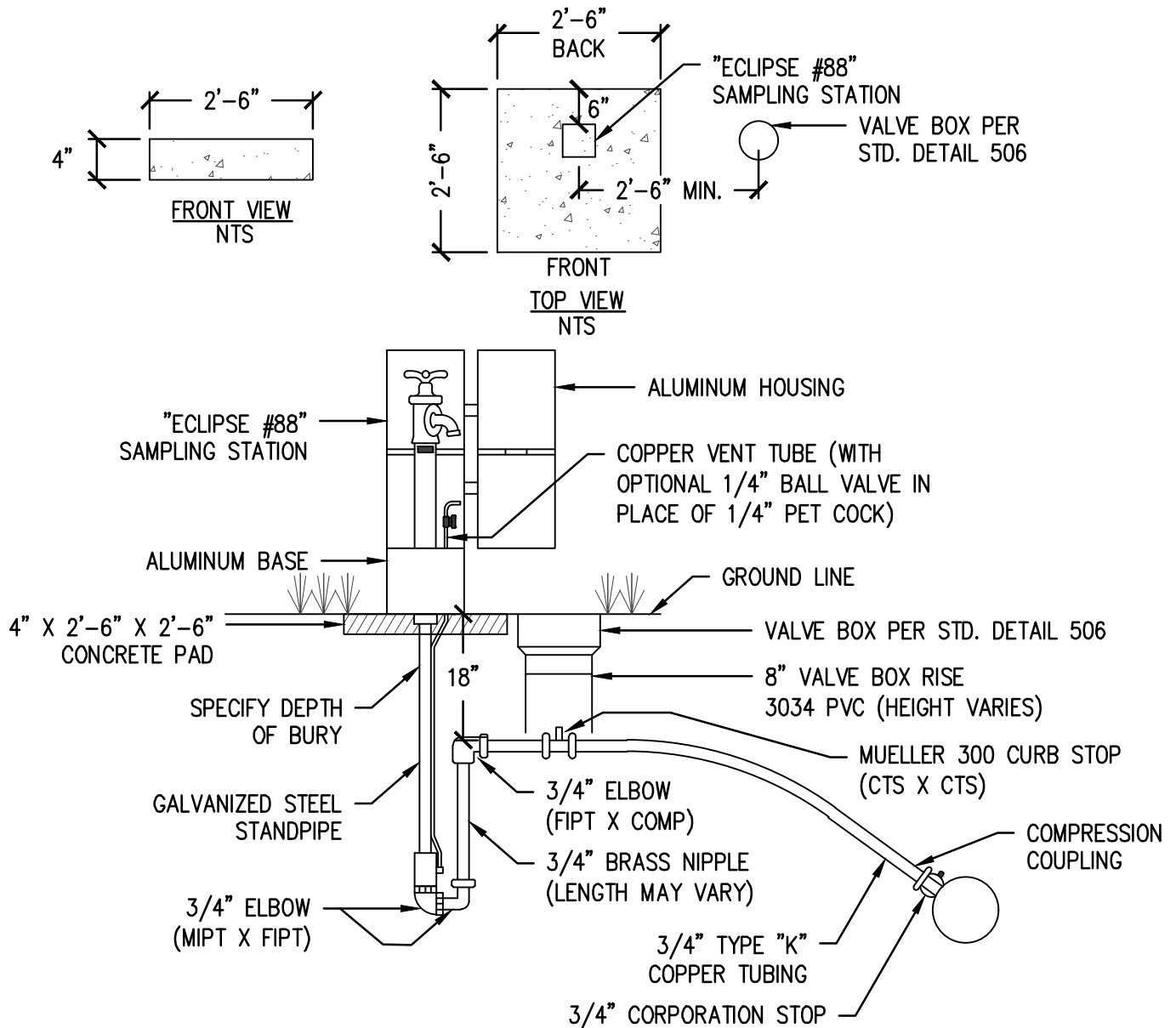
ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE





## NOTES:

1. IF SAMPLE STATION IS TO BE LOCATED IN AN UNIMPROVED AREA, IT SHALL BE PLACED TO ALLOW FUTURE IMPROVEMENTS (IE. FUTURE CURBS, SIDEWALKS, PLANTERS, OR SWALES). SAMPLE STATION IN UNIMPROVED AREA SHALL BE PROTECTED BY BOLLARDS OR OTHER VEHICLE PROTECTION.
2. IF SAMPLE STATION IS TO BE LOCATED IN AREA WITH PROPERTY LINE SIDEWALKS, SAMPLE STATION WILL BE SET 2 FEET FROM BACK OF CURB TO CENTER OF SAMPLE STATION.
3. IF SAMPLE STATION IS TO BE LOCATED IN AREA WITH CURB LINE SIDEWALK, SAMPLE STATION WILL BE SET 2 FEET FROM BACK OF WALK TO CENTER OF SAMPLE STATION.
4. IN ALL CASES, CONCRETE PAD SHALL MATCH EXISTING GROUND SURFACE ELEVATION, BOTTOM OF SAMPLE STATION SHALL SIT FLUSH TO CONCRETE PAD.

ISSUED: 08/09/2024

REVISED: \_\_\_\_\_

DRAWING NOT TO SCALE

CITY OF KEIZER | Public Works Department  
STANDARD DETAILS  
WATER INFRASTRUCTURE

