

# CHAPTER 8

## STANDARD PLANS - WATER

### **List of Standard Plans - Water**

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## NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO CITY OF KEIZER STANDARDS.
2. THE CITY OF KEIZER REQUIRES A PRE-CONSTRUCTION CONFERENCE. CALL ALL AFFECTED UTILITIES 48 HOURS PRIOR TO START OF CONSTRUCTION TO REQUEST FIELD LOCATES. NOTIFY ENGINEER & CITY OF KEIZER 24 HOURS PRIOR TO START OF CONSTRUCTION.
3. USE GRANULAR BACKFILL ABOVE THE PIPE ZONE IN ALL AREAS WHICH ARE OR ARE PLANNED TO BE PAVED, & ELSEWHERE AS NOTED OR DIRECTED.
4. WATER MAIN TO BE DUCTILE IRON PIPE (AWWA C 151), PRESSURE CLASS 350. SERVICES TO BE 3/4", TYPE "K" COPPER (AWWA C 800), UNLESS OTHERWISE NOTED.
5. MAINTAIN 36" COVER OVER MAIN LINES, MEASURED FROM EXISTING OR PROPOSED FINISHED GRADE. IF APPROVED BY THE ENGINEER, COVER MAY BE REDUCED TO 30" WHERE CROSSING THE CURB LINE OF NEWLY CONSTRUCTED STREETS.
6. MAIN LINE VALVES TO BE :
 

MAIN SIZE	TYPE	SPEC.
3-INCH TO 10-INCH	GATE VALVE RESILIENT SEAT NRS	AWWA C 509
12-INCH AND LARGER	BUTTERFLY RUBBER GASKETED	AWWA C 504
7. ANCHOR & THRUST BLOCKS, TIE RODS & APPROVED JOINT RESTRAINTS ARE CONSIDERED INCIDENTAL TO THE CONSTRUCTION.
8. FLUSH, PRESSURE TEST & DISINFECT NEW MAIN PRIOR TO ACTIVATING OR RECONNECTING SERVICES, PRESSURE TEST TO BE WITNESSED BY CITY OF KEIZER. COORDINATE CHLORINATION WITH CITY & PROVIDE TEMPORARY WATER SERVICE IN ANY CASE WHERE SHUTDOWN MAY EXCEED FOUR (4) HOURS. ALL VALVES UNDER PRESSURE TO BE OPERATED ONLY BY CITY OF KEIZER WATER DEPARTMENT.
9. WHERE NOTED, PROVIDE POLYWARP ON MAINS IN ACCORDANCE WITH ANSI/AWWA C-105.
10. SAW CUT ALL EXISTING PAVED AREAS.
11. ALL LIVE TAPS TO BE FURNISHED BY CITY OF KEIZER. CALL 390-3700 TO OBTAIN COSTS & ARRANGE SCHEDULING.
12. INSTALL METERS LARGER THAN 2-INCH IN APPROVED METER VAULTS. SUBMIT PLANS & DETAILS TO CITY FOR APPROVAL PRIOR TO INSTALLATION.
13. PRIOR TO FINAL PAYMENT, SUBMIT COMPLETE "AS-BUILT" PLANS TO THE ENGINEER SHOWING SERVICE LOCATIONS, LENGTHS, DEPTHS, SIZES, DISTANCES BETWEEN STRUCTURES & CORP. STOPS.

2. REVISED AS PER CITY OF KEIZER REVIEW. 3-05-00.  
 1. REVISED AS PER CITY OF KEIZER REVIEW. 1-25-00.



**CITY OF KEIZER**

**STANDARD DETAIL DRAWING**

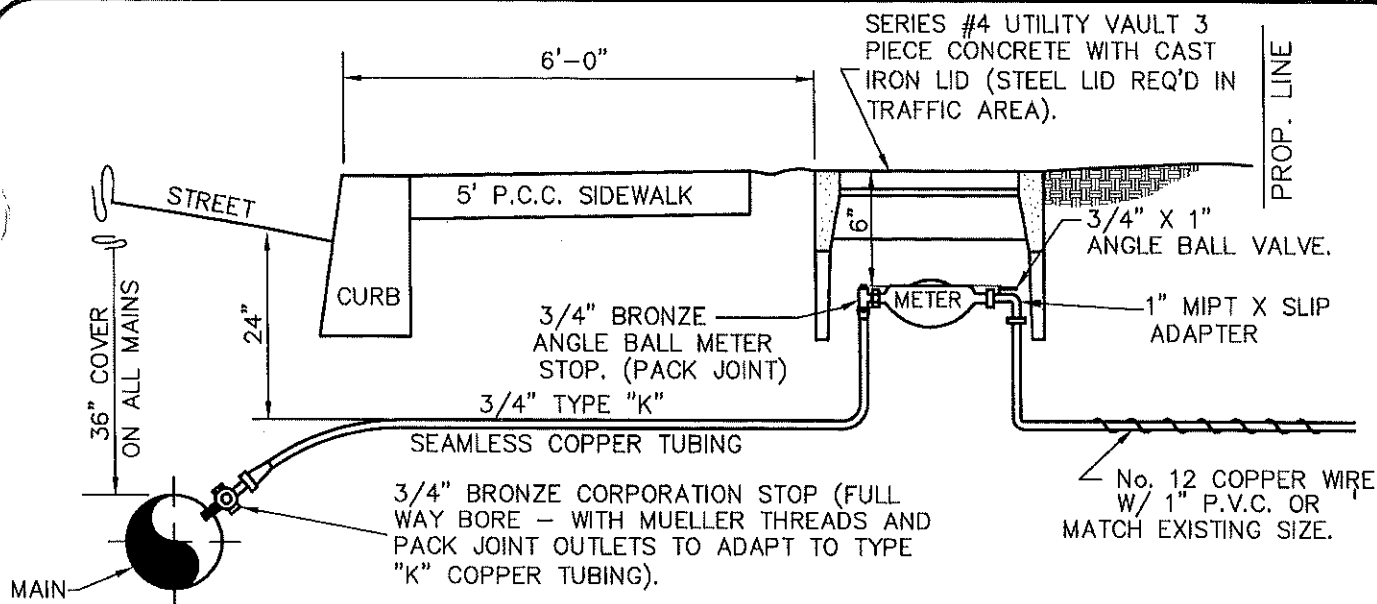
**STANDARD WATER NOTES**

DRAWN: J.M.M.

DATE: 10-29-99

APPROVED: W.I.P.

NUMBER: W-10

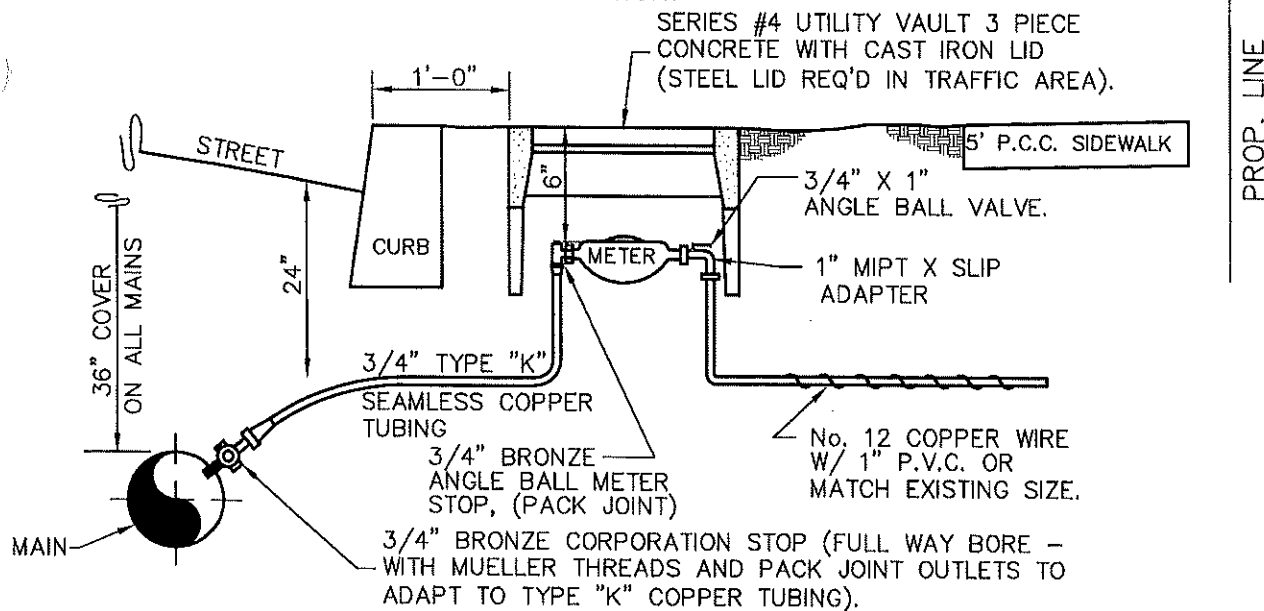


## CURB LINE SIDEWALK

### NOTES:

( N.T.S. )

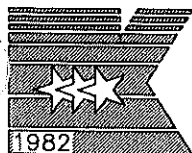
- 1.) SPECIFIED "BRONZE" OR "BRASS" FITTINGS TO BE 'FORD', 'MUELLER' OR 'McDONALD', CONFORMING TO A.S.T.M. SPEC. B-62.
- 2.) ALL BRASS THREADED FITTINGS WILL BE USED WITH THE AID OF TEFLON PASTE; NO PASTE TO COME IN CONTACT WITH ANY PLASTIC.
- 3.) USE TEFLON TAPE FOR P.V.C. OR PLASTIC TO BRASS.
- 4.) FINAL CONNECTIONS TO METER SHALL BE MADE BY CONTRACTOR AFTER TESTING AND DISINFECTION.



## PROPERTY LINE SIDEWALK

( N.T.S. )

REVISOR'S NAME  
DATE  
BY  
CHECKED  
APPROVED  
1. 10-11-96  
2. 1-25-00  
3. 09-23-08  
KEIZER REVIEW



CITY OF KEIZER

### STANDARD DETAIL DRAWING

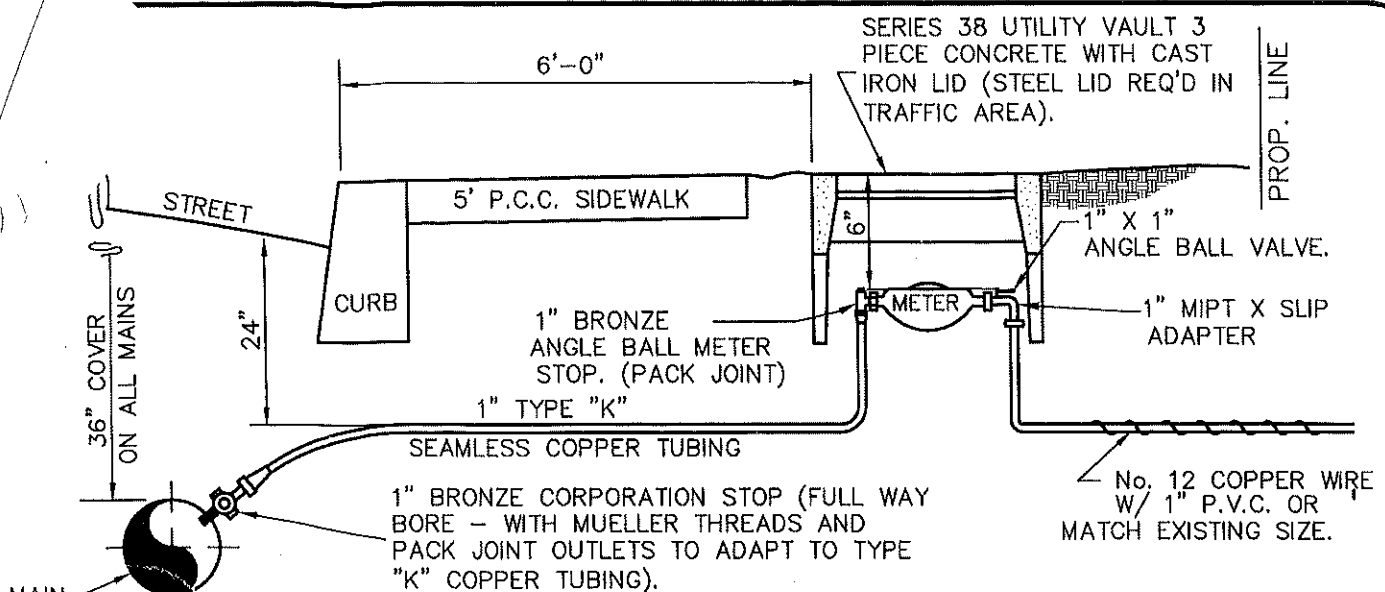
### 3/4" DOMESTIC WATER SERVICE

DRAWN: D.G.G.

DATE: 10-11-90

APPROVED: W.I.P.

NUMBER: W-11

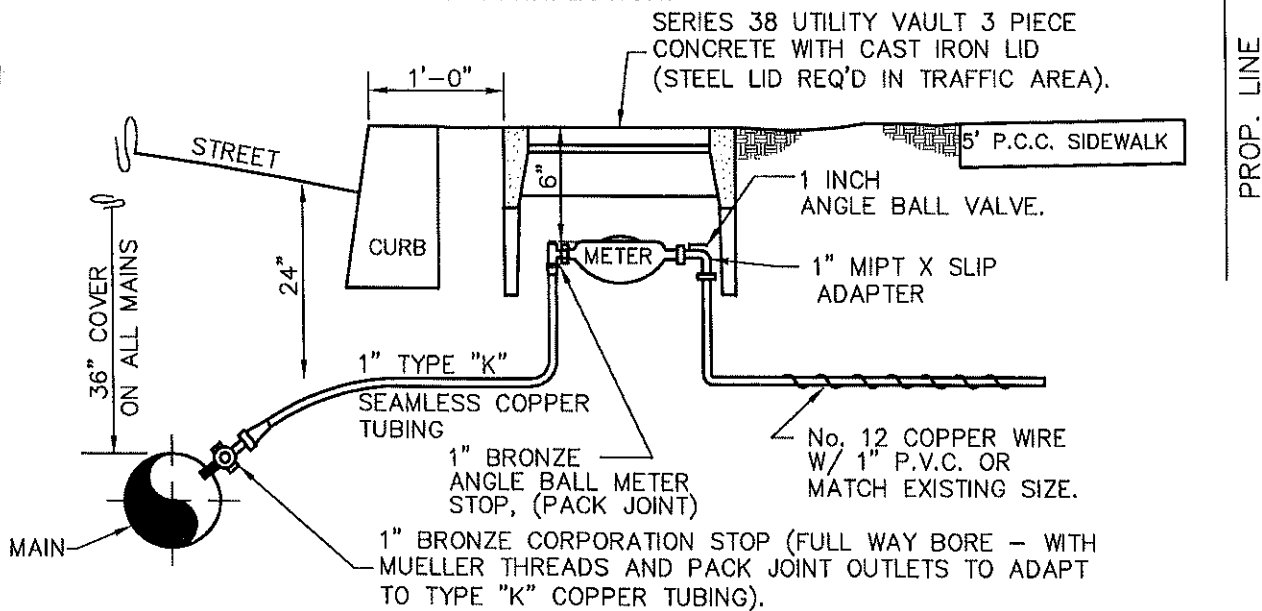


## CURB LINE SIDEWALK

### NOTES:

( N.T.S. )

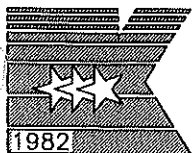
- 1.) SPECIFIED "BRONZE" OR "BRASS" FITTINGS TO BE 'FORD', 'MUELLER' OR 'McDONALD', CONFORMING TO A.S.T.M. SPEC. B-62.
- 2.) ALL BRASS THREADED FITTINGS WILL BE USED WITH THE AID OF TEFLON PASTE; NO PASTE TO COME IN CONTACT WITH ANY PLASTIC.
- 3.) USE TEFLON TAPE FOR P.V.C. OR PLASTIC TO BRASS.
- 4.) FINAL CONNECTIONS TO METER SHALL BE MADE BY CONTRACTOR AFTER TESTING AND DISINFECTION.



## PROPERTY LINE SIDEWALK

( N.T.S. )

3. REVISED AS PER CITY OF KEIZER REVIEW 09-23-08.  
2. REVISED AS PER CITY OF KEIZER REVIEW 1-25-00.  
1. REVISED AS PER CITY OF KEIZER REVIEW 10-11-96.



CITY OF KEIZER

### STANDARD DETAIL DRAWING

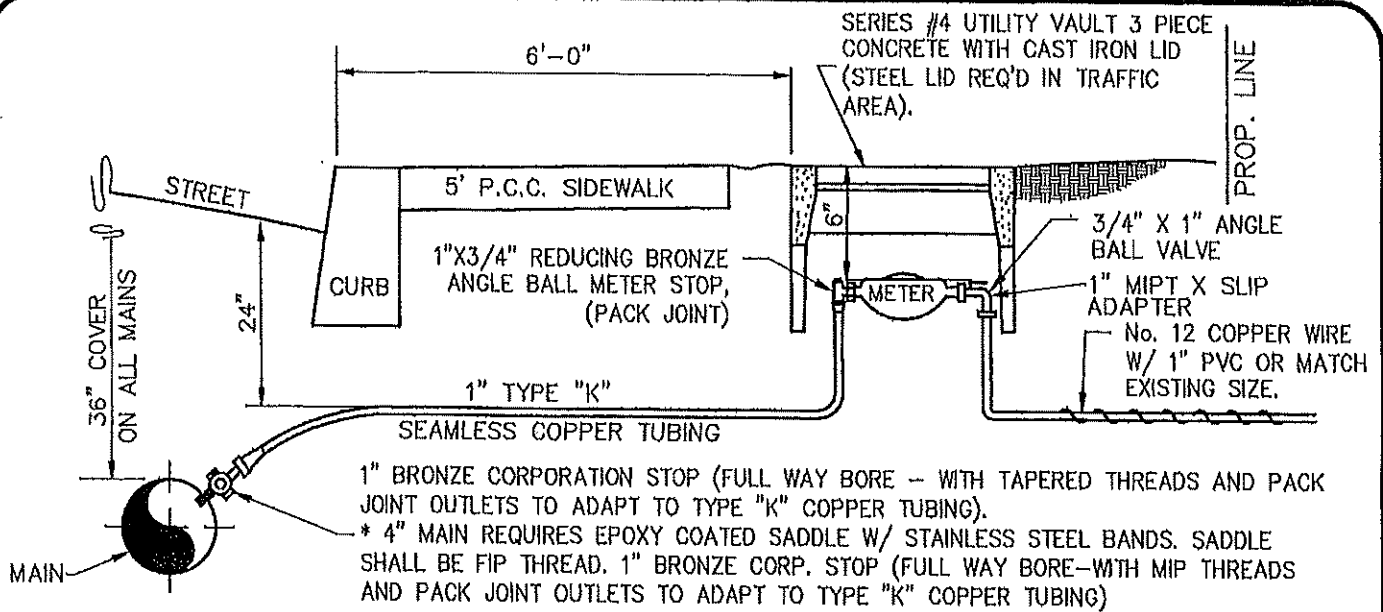
### 1" DOMESTIC WATER SERVICE

DRAWN: D.G.G.

DATE: 10-11-90

APPROVED: W.I.P.

NUMBER: W-12

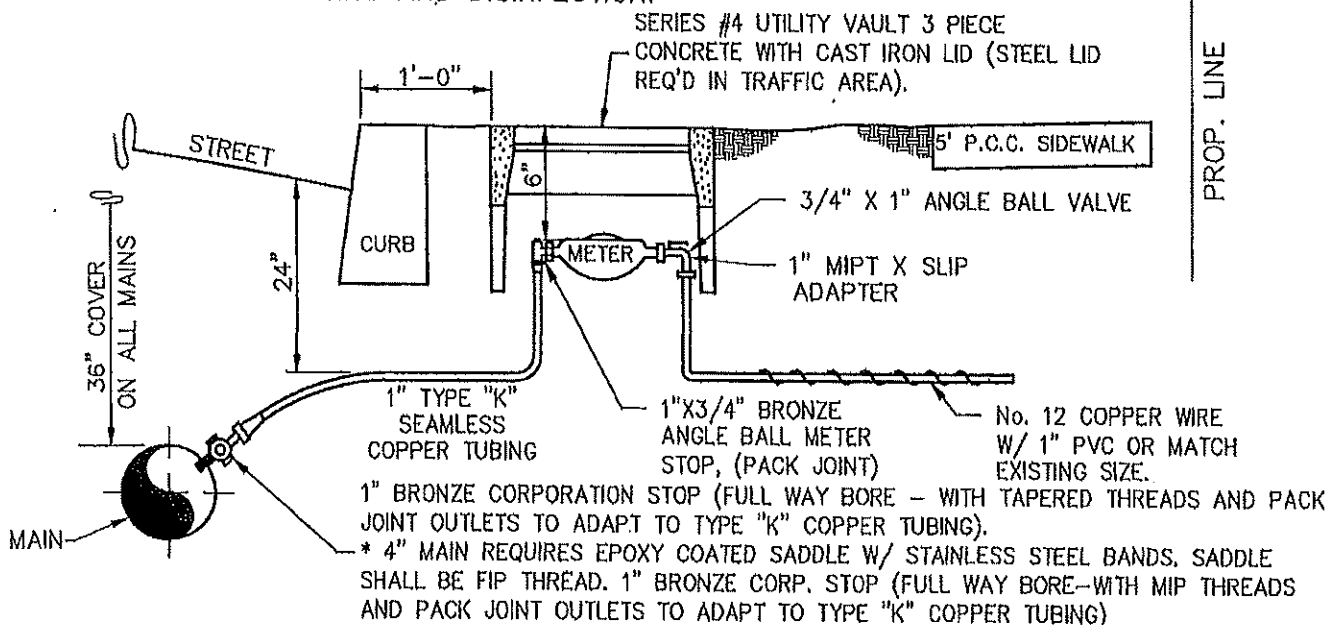


### CURB LINE SIDEWALK

#### NOTES:

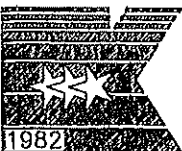
( N.T.S. )

- 1.) SPECIFIED "BRONZE" OR "BRASS" FITTINGS TO BE 'FORD', 'MUELLER' OR 'McDONALD', CONFORMING TO A.S.T.M. SPEC. B-62.
- 2.) ALL BRASS THREADED FITTINGS WILL BE USED WITH THE AID OF TEFLON PASTE; NO PASTE TO COME IN CONTACT WITH ANY PLASTIC.
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- 4.) FINAL CONNECTIONS TO METER SHALL BE MADE BY CONTRACTOR AFTER TESTING AND DISINFECTION.



### PROPERTY LINE SIDEWALK

( N.T.S. )



**CITY OF KEIZER**

#### STANDARD DETAIL DRAWING

1" DOMESTIC WATER SERVICE W/  
REDUCING ANGLE METER STOP

DRAWN: D.G.G.

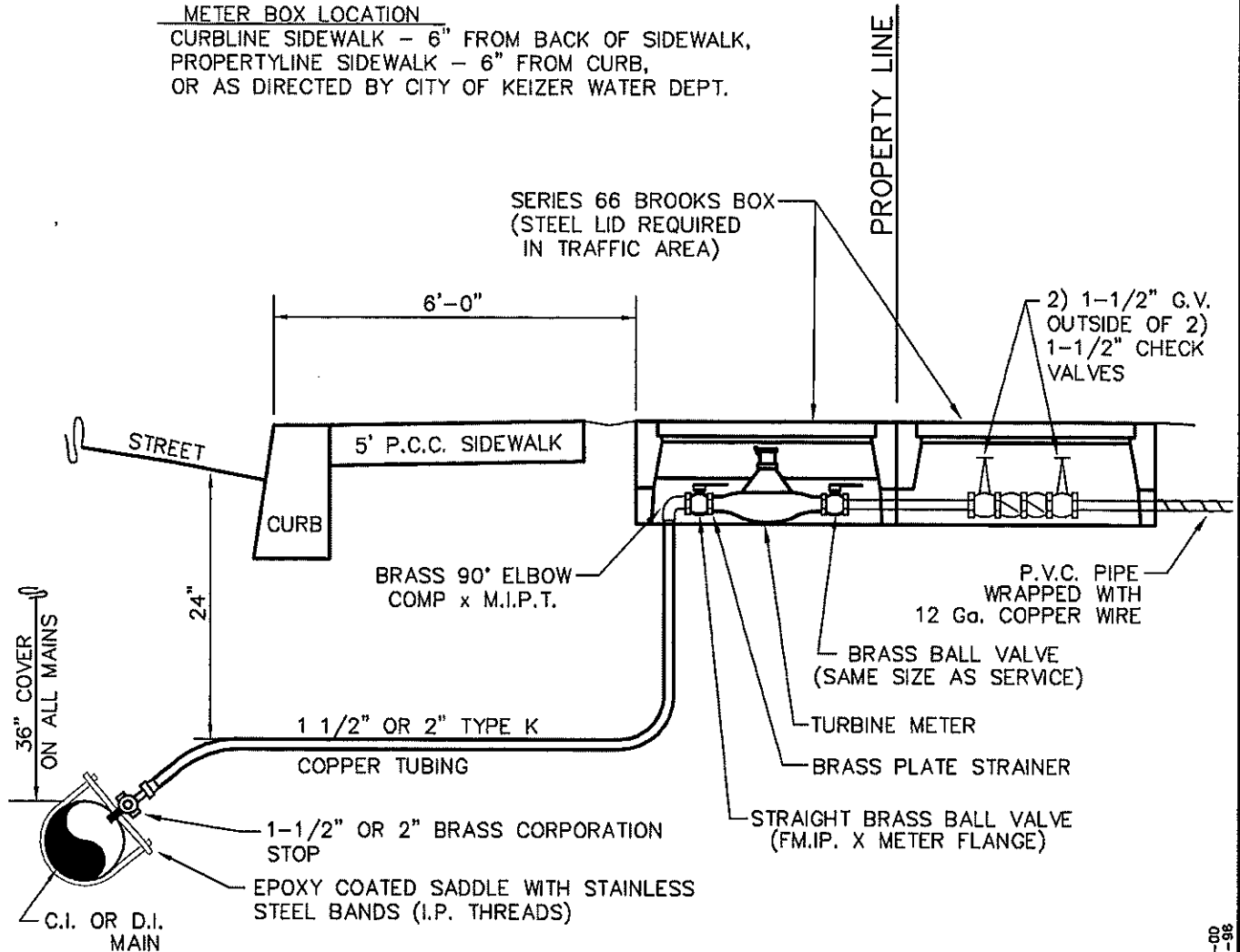
DATE: 10-11-90

APPROVED: W.I.P.

NUMBER: W-12A

METER BOX LOCATION

CURBLINE SIDEWALK - 6" FROM BACK OF SIDEWALK,  
PROPERTYLINE SIDEWALK - 6" FROM CURB,  
OR AS DIRECTED BY CITY OF KEIZER WATER DEPT.



NOTES:

- 1.) SPECIFIED "BRONZE" or "BRASS" FITTINGS TO BE 'FORD' or 'MUELLER' CONFORMING TO A.S.T.M. SPEC. B-62.
- 2.) ALL BRASS THREADED FITTINGS WILL BE USED WITH THE AID OF TEFLON PASTE; NO PASTE TO COME IN CONTACT WITH ANY PLASTIC.

2. REVISED AS PER CITY OF KEIZER REVIEW. 1-25-00  
1. REVISED AS PER CITY OF KEIZER REVIEW. 10-11-98



**CITY OF KEIZER**

**STANDARD DETAIL DRAWING**

**1-1/2" AND 2" DOMESTIC  
WATER SERVICE**

DRAWN: T.A.K.

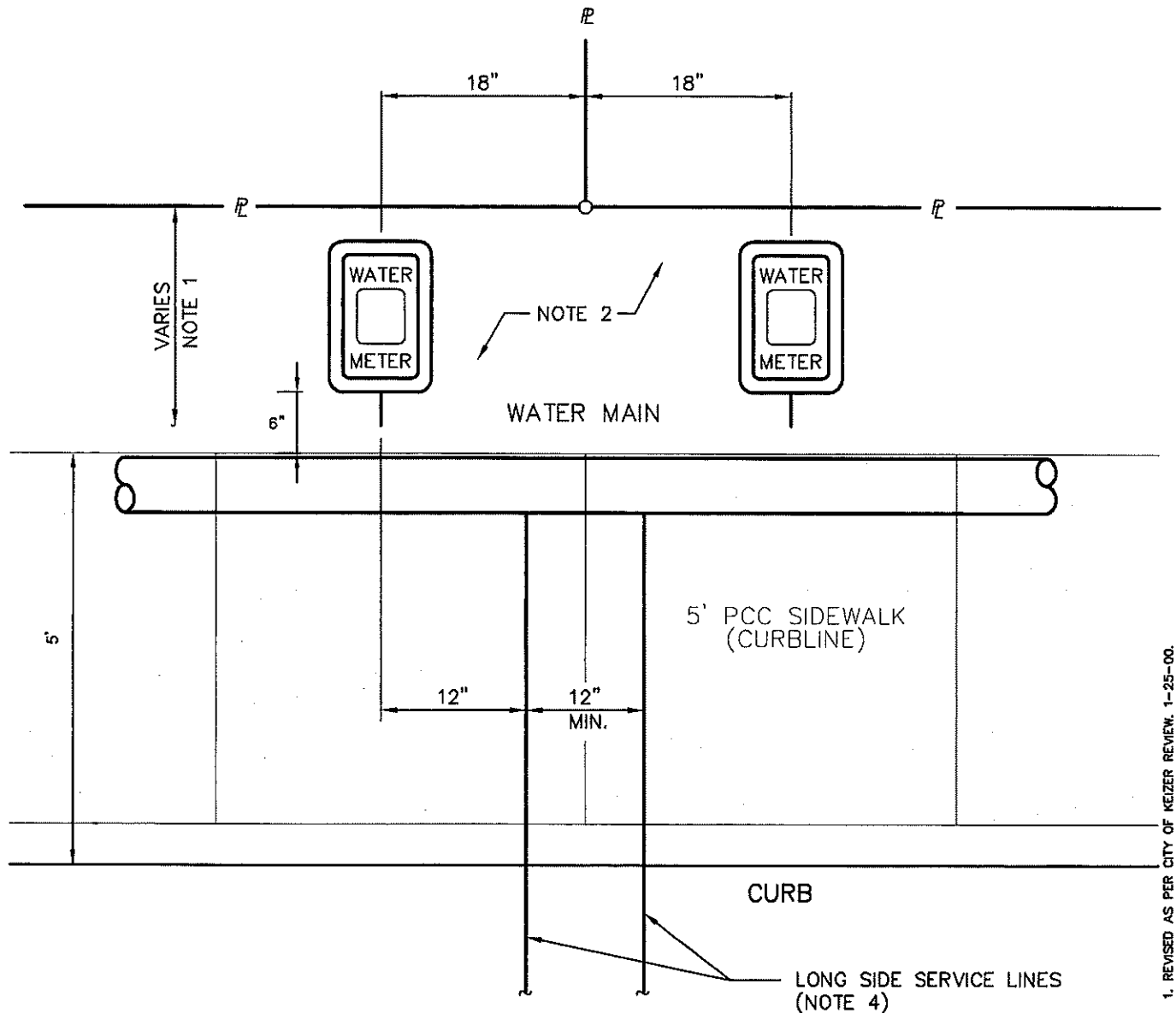
DATE: 10-11-90

APPROVED: W.I.P.

NUMBER: W-13

**NOTES:**

1. WATER MAIN LOCATION ON STREETS WITH D.I. SIDEWALKS TBD ON CASE BY CASE BASIS.
2. AREA BETWEEN METERS TO REMAIN CLEAR TO PERMIT INSTALLATION OF STREET LIGHT POLES.
3. WATER MAIN LOCATION MAY VARY.
4. TAP LONG SIDE SERVICE INSIDE SHORT SIDE SERVICES AS SHOWN.
5. SEE STANDARD DRAWING W-11 ,W-12, W-13 FOR SERVICE DETAILS.



1. REVISED AS PER CITY OF KEIZER REVIEW. 1-25-00.



**CITY OF KEIZER**

# STANDARD DETAIL DRAWING

### TYPICAL WATER SERVICE TAP LOCATION

DRAWN: T.A.K.

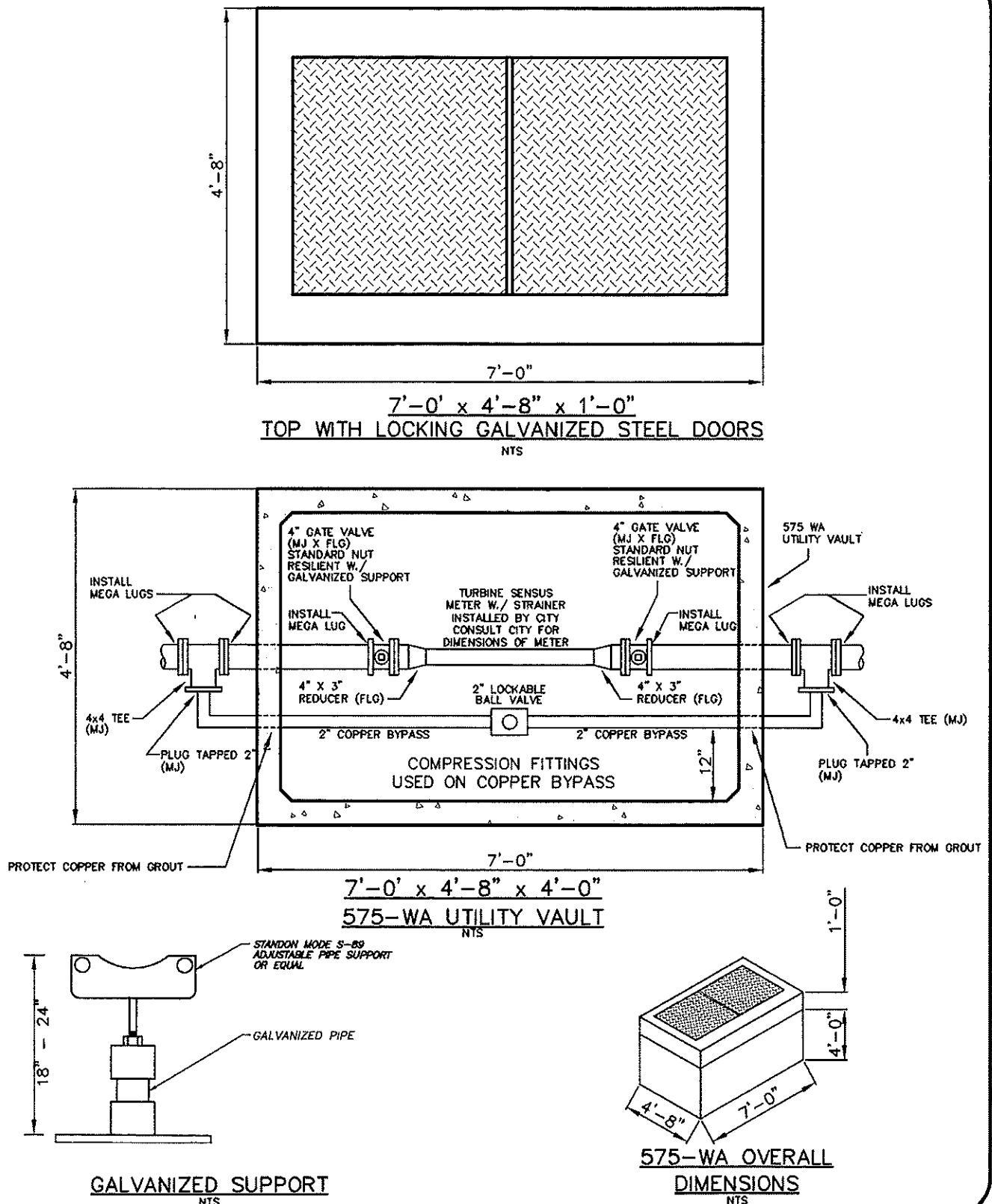
DATE: 12-11-91

APPROVED: W.I.P.

W-14



Attn: John S. 503-682-2657



**CITY OF KEIZER**

**STANDARD DETAIL DRAWING**

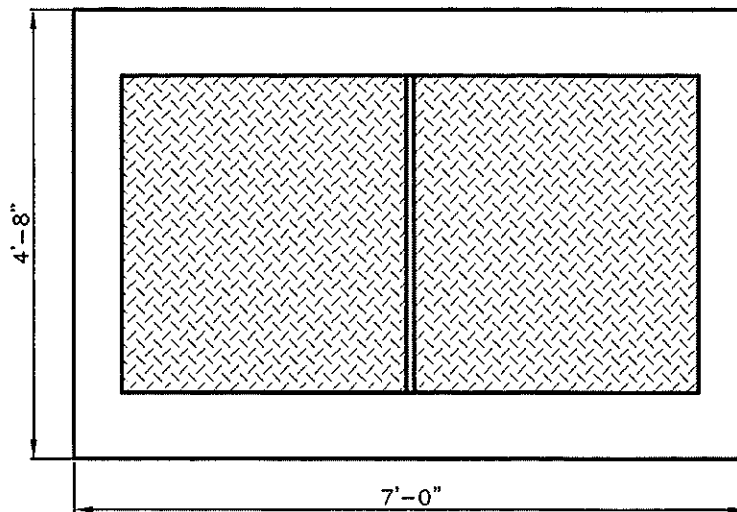
**3" WATER METER**

DRAWN: S.G.S.

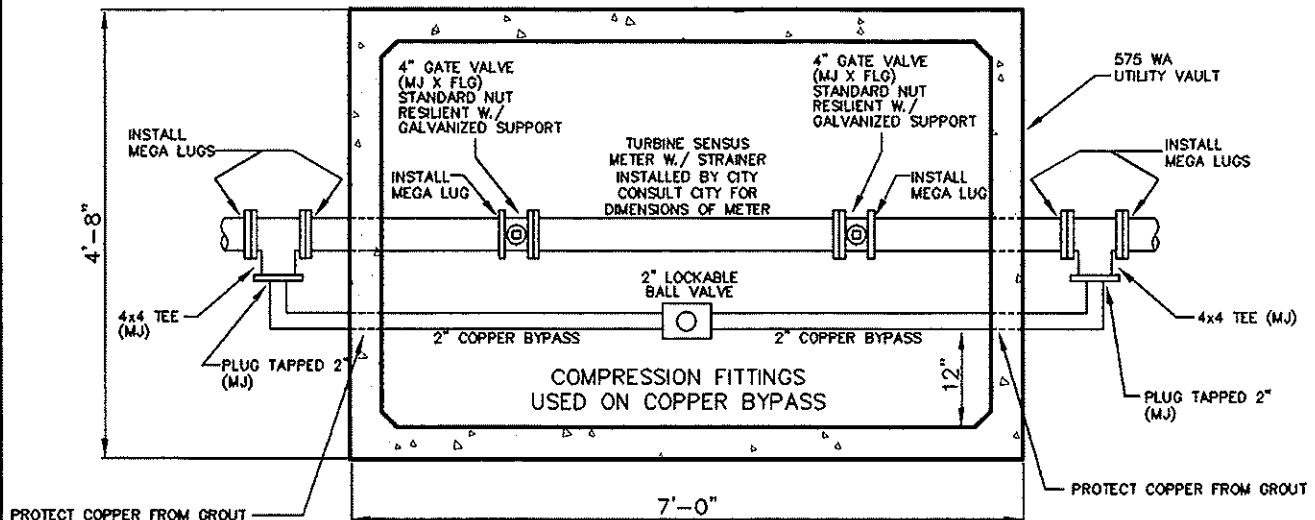
DATE: 09-25-00

APPROVED: W.I.P.

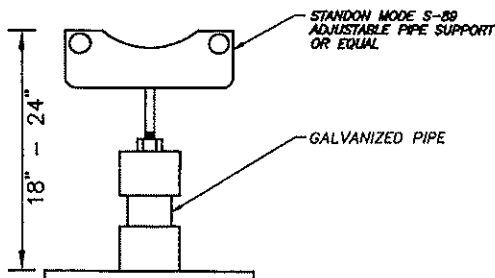
NUMBER: W-15



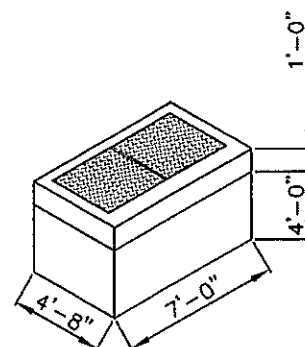
7'-0' x 4'-8" x 1'-0"  
TOP WITH LOCKING GALVANIZED STEEL DOORS  
NTS



7'-0' x 4'-8" x 4'-0"  
575-WA UTILITY VAULT  
NTS



GALVANIZED SUPPORT  
NTS



575-WA OVERALL DIMENSIONS  
NTS



**CITY OF KEIZER**

## STANDARD DETAIL DRAWING

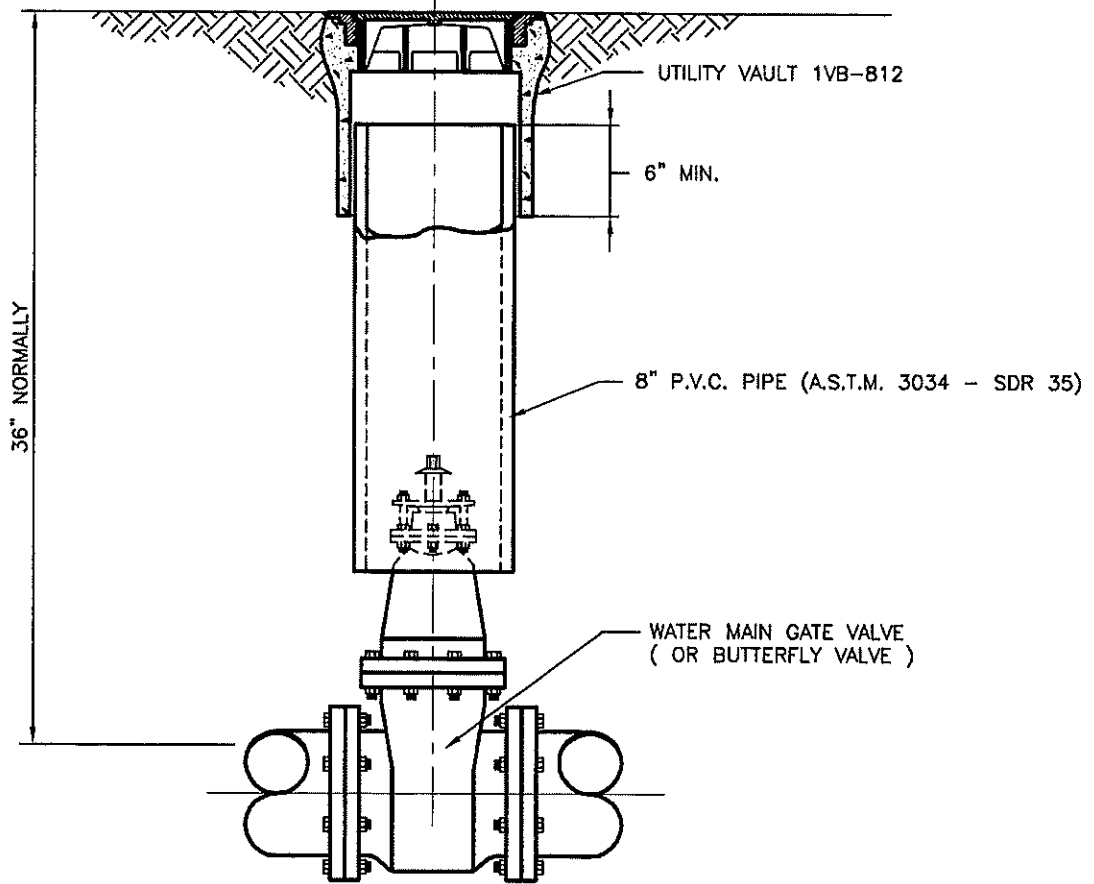
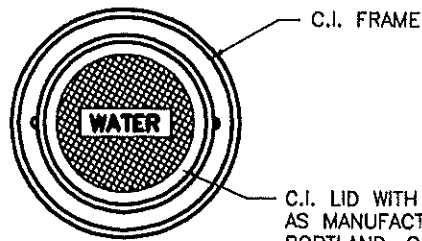
### 4" WATER METER

DRAWN: S.G.S.

DATE: 09-25-00

APPROVED: W.I.P.

NUMBER: W-16



**NON-TRAFFIC AREAS**  
N.T.S.

1. REVISED AS PER CITY OF KEIZER REVIEW. 1-25-00.



**CITY OF KEIZER**

**STANDARD DETAIL DRAWING**

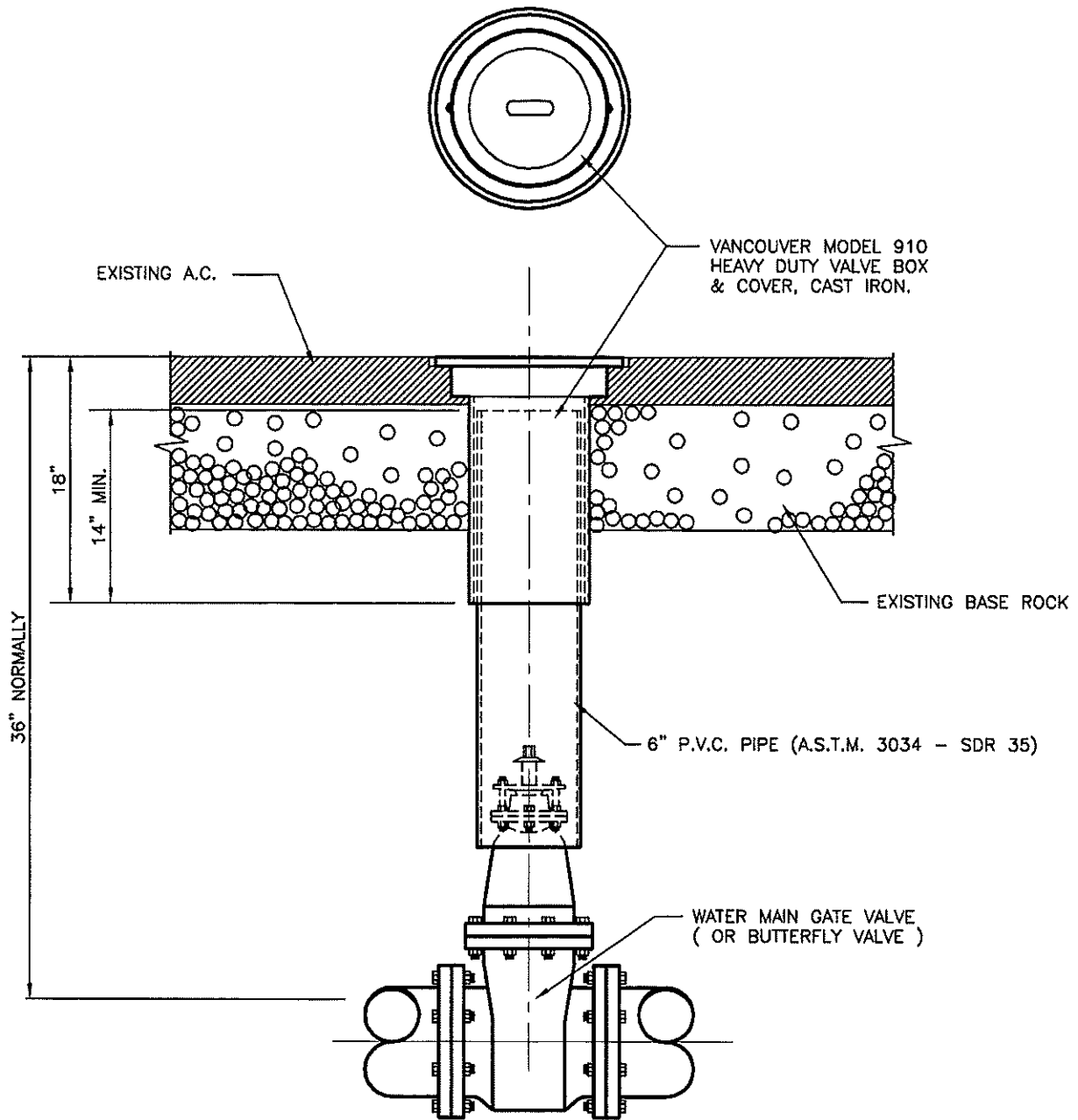
**WATER VALVE BOX  
IN NON-TRAFFIC AREAS**

DRAWN: J.M.M.

DATE: 10-29-99

APPROVED: W.I.P.

NUMBER: W-20



**TRAFFIC AREAS**  
N.T.S.

1. REVISED AS PER CITY OF KEIZER REVIEW. 1-25-00.



**CITY OF KEIZER**

**STANDARD DETAIL DRAWING**

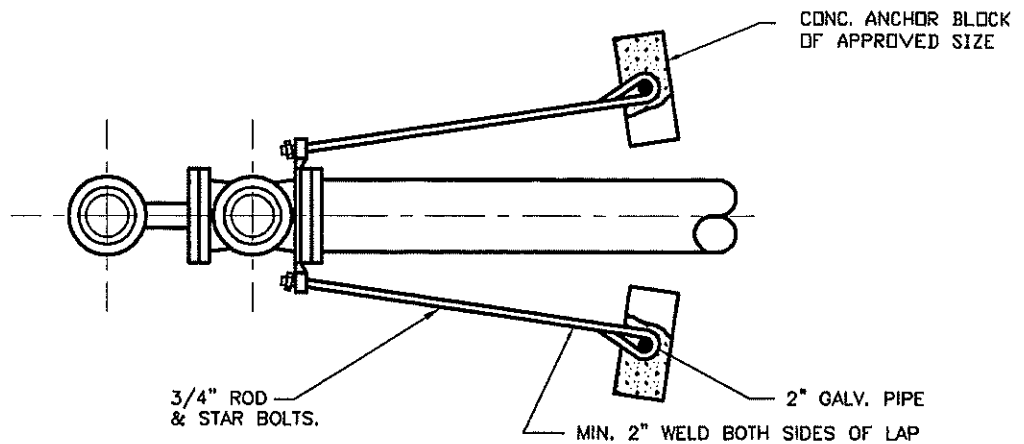
**WATER VALVE BOX  
IN TRAFFIC AREAS**

DRAWN: T.A.K.

DATE: 12-11-91

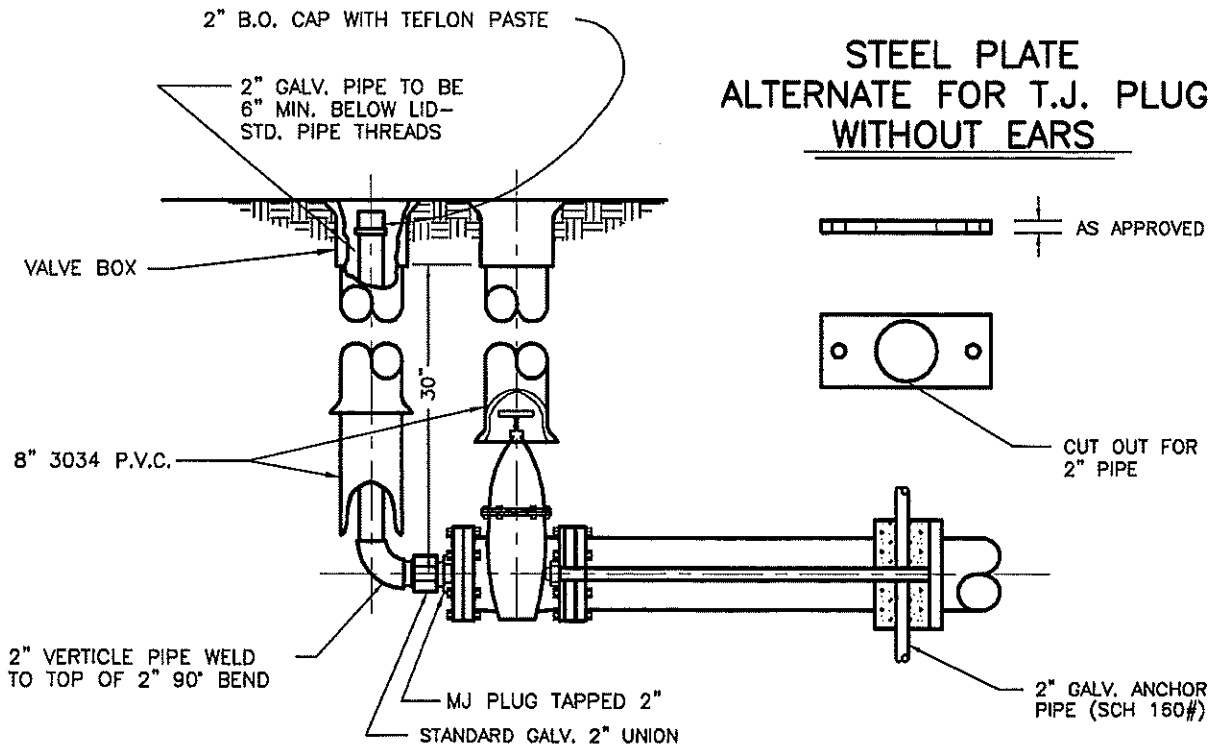
APPROVED: W.I.P.

W-21



**NOTES:**

1. ANCHOR BLOCK SIZE TO BE SPECIFIED OR APPROVED BY THE ENGINEER.
2. THE RODS TO BE 3/4" A 307 STEEL BOLT STOCK WITH 14,000 P.S.I. TENSILE STRENGTH OR APPROVED EQUAL NUMBER OF RODS AND SIZE TO BE APPROVED BY THE ENGINEER.
3. ALTERNATE FOR STRADDLE BLOCK.



1. REVISED AS PER CITY OF KEIZER REVIEW. 1-25-00.



**CITY OF KEIZER**

**STANDARD DETAIL DRAWING**

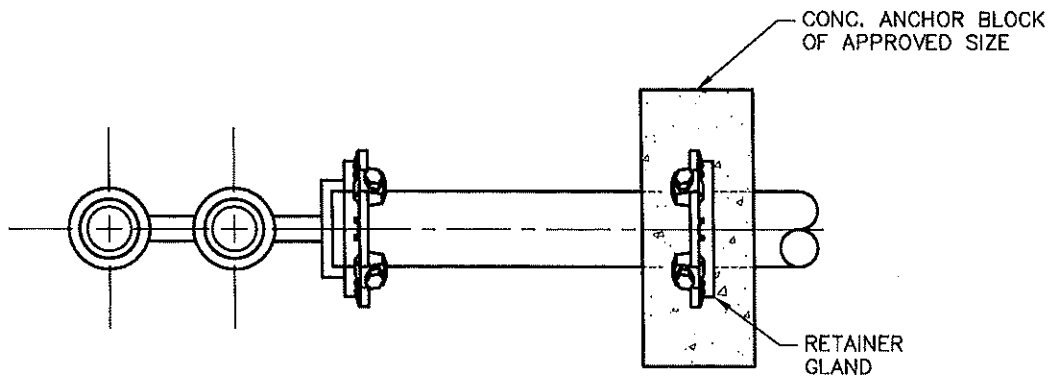
**STANDARD BLOWOFF  
WITH IN-LINE VALVE**

DRAWN: T.A.K.

DATE: 10-11-90

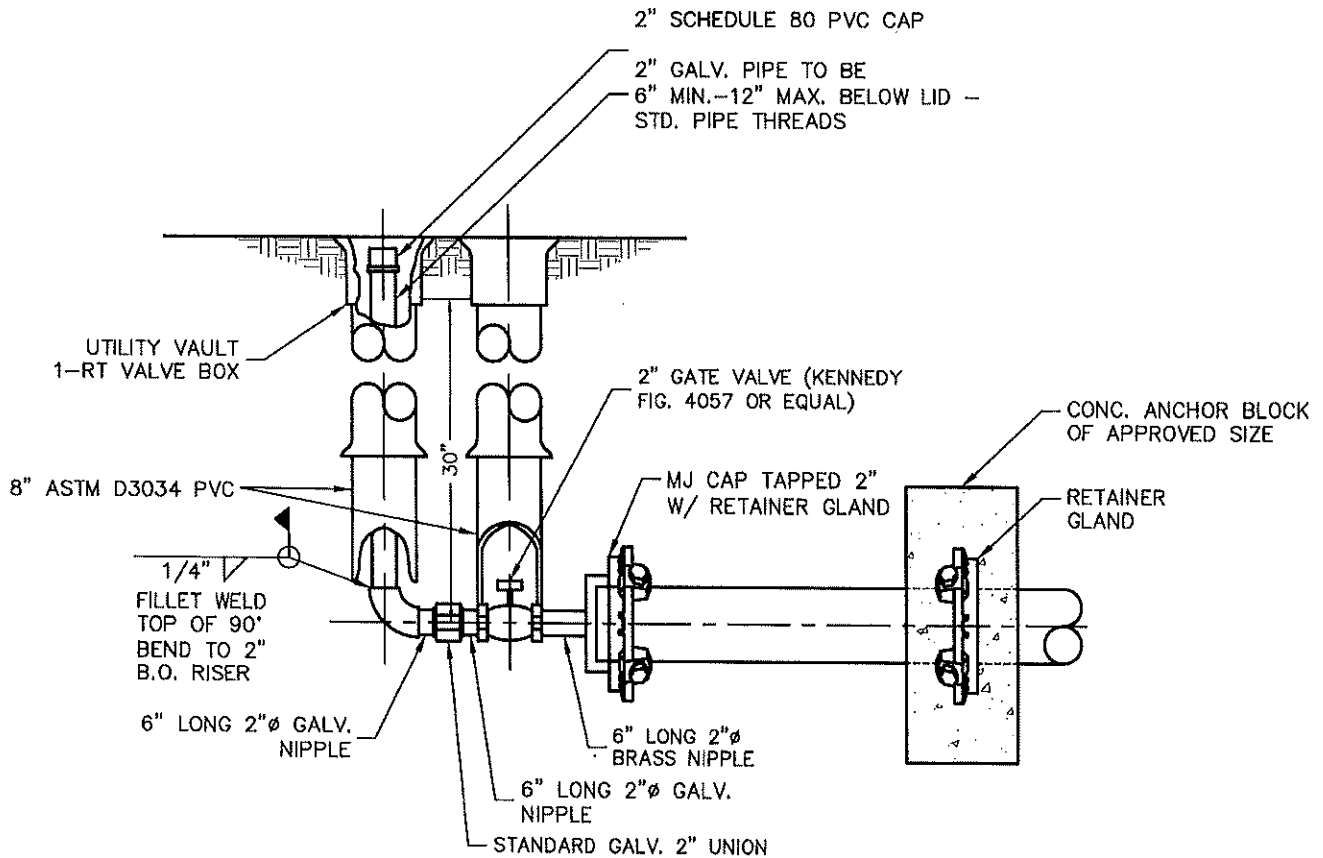
APPROVED: W.I.P.

NUMBER: W-22

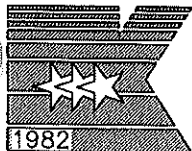


**NOTES:**

1. ANCHOR BLOCK SIZE TO BE SPECIFIED OR APPROVED BY THE ENGINEER.



2. REVISED AS PER CITY OF KEIZER REVIEW 09-23-08.  
1. REVISED AS PER CITY OF KEIZER REVIEW 1-25-00.



CITY OF KEIZER

**STANDARD DETAIL DRAWING**

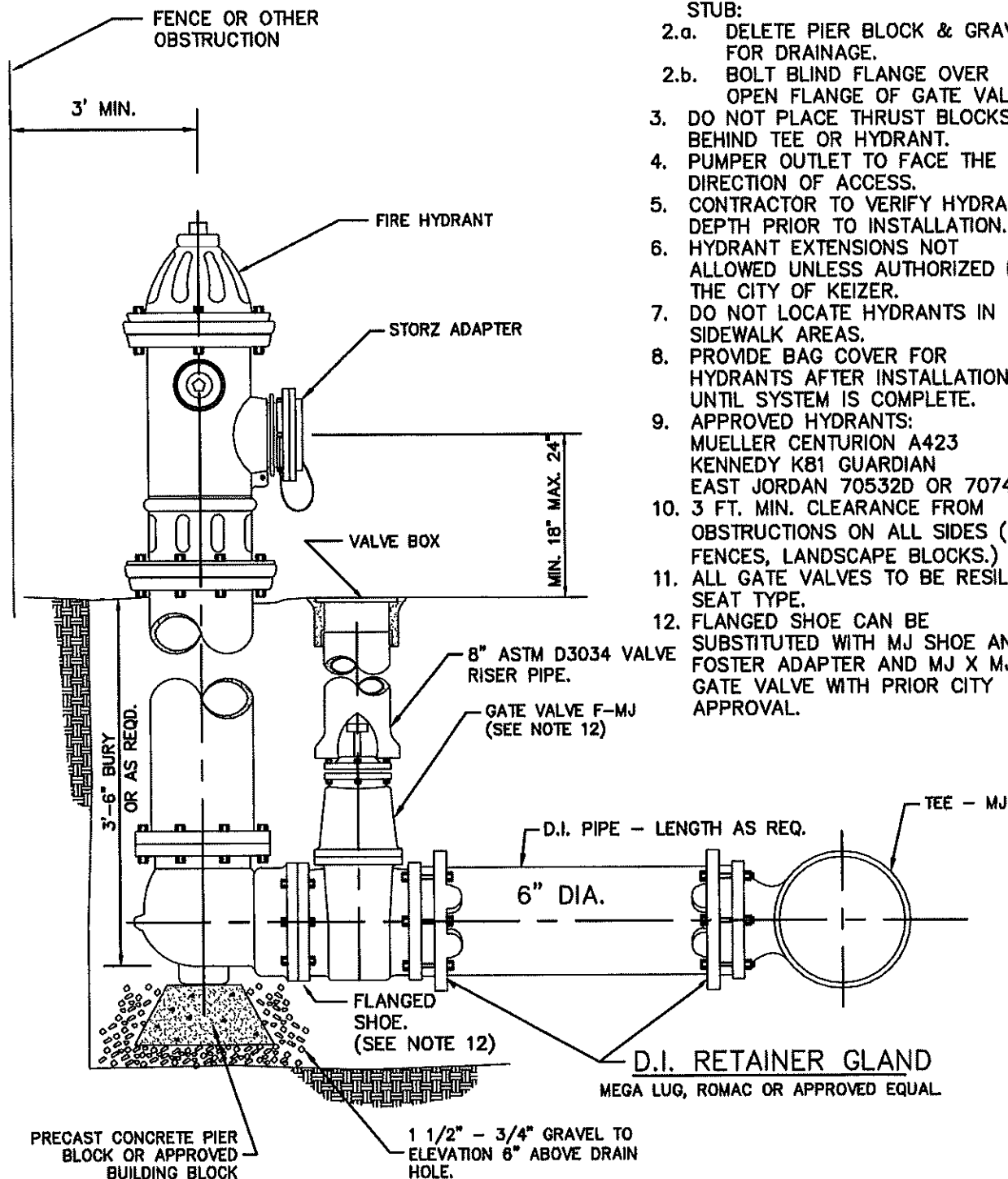
**STANDARD BLOWOFF  
WITH PLUGGED END**

DRAWN: T.A.K.

DATE: 10-11-90

APPROVED: W.I.P.

NUMBER: W-23



# NOTES:

1. STORZ ADAPTER REQUIRED.
2. IF HYDRANT IS NOT INSTALLED ON STUB:
  - 2.a. DELETE PIER BLOCK & GRAVEL FOR DRAINAGE.
  - 2.b. BOLT BLIND FLANGE OVER OPEN FLANGE OF GATE VALVE.
3. DO NOT PLACE THRUST BLOCKS BEHIND TEE OR HYDRANT.
4. PUMPER OUTLET TO FACE THE DIRECTION OF ACCESS.
5. CONTRACTOR TO VERIFY HYDRANT DEPTH PRIOR TO INSTALLATION.
6. HYDRANT EXTENSIONS NOT ALLOWED UNLESS AUTHORIZED BY THE CITY OF KEIZER.
7. DO NOT LOCATE HYDRANTS IN SIDEWALK AREAS.
8. PROVIDE BAG COVER FOR HYDRANTS AFTER INSTALLATION UNTIL SYSTEM IS COMPLETE.
9. APPROVED HYDRANTS:  
MUELLER CENTURION A423  
KENNEDY K81 GUARDIAN  
EAST JORDAN 70532D OR 70747D
10. 3 FT. MIN. CLEARANCE FROM OBSTRUCTIONS ON ALL SIDES (I.E. FENCES, LANDSCAPE BLOCKS.)
11. ALL GATE VALVES TO BE RESILIENT SEAT TYPE.
12. FLANGED SHOE CAN BE SUBSTITUTED WITH MJ SHOE AND FOSTER ADAPTER AND MJ X MJ GATE VALVE WITH PRIOR CITY APPROVAL.



CITY OF KEIZER

## STANDARD DETAIL DRAWING

## FIRE HYDRANT ASSEMBLY OFF LINE

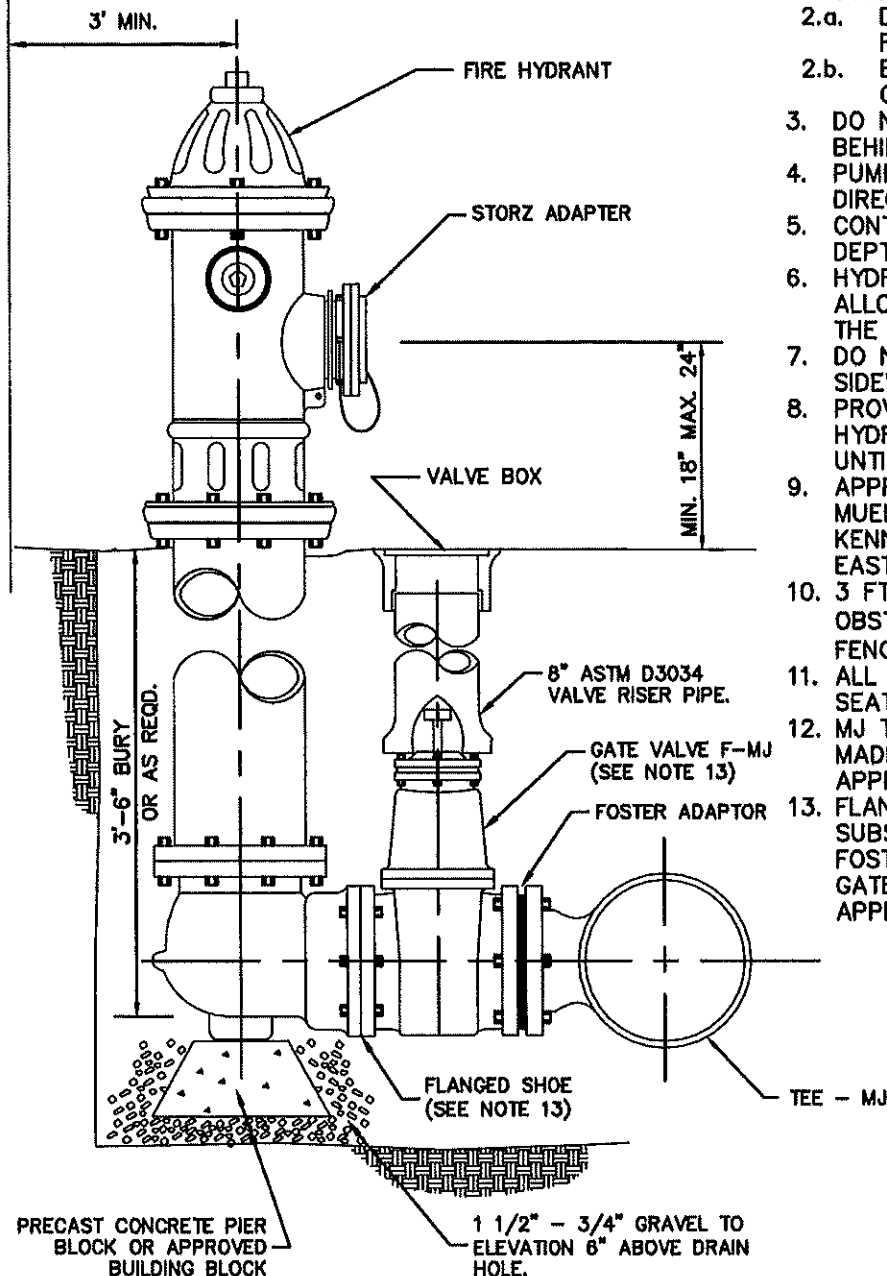
DRAWN: A.D.M.

DATE: 01-04-23

APPROVED: W.I.P.

NUMBER: W-24

FENCE OR OTHER  
OBSTRUCTION



NOTES:

1. STORZ ADAPTER REQUIRED.
2. IF HYDRANT IS NOT INSTALLED ON STUB:
  - 2.a. DELETE PIER BLOCK & GRAVEL FOR DRAINAGE.
  - 2.b. BOLT BLIND FLANGE OVER OPEN FLANGE OF GATE VALVE.
3. DO NOT PLACE THRUST BLOCKS BEHIND TEE OR HYDRANT.
4. PUMPER OUTLET TO FACE THE DIRECTION OF ACCESS.
5. CONTRACTOR TO VERIFY HYDRANT DEPTH PRIOR TO INSTALLATION.
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KENNEDY K81 GUARDIAN  
EAST JORDAN 70532D OR 70747D
10. 3 FT. MIN. CLEARANCE FROM OBSTRUCTIONS ON ALL SIDES (I.E. FENCES, LANDSCAPE BLOCKS.)
11. ALL GATE VALVES TO BE RESILIENT SEAT TYPE.
12. MJ TO MJ CONNECTIONS SHALL BE MADE WITH FOSTER ADAPTORS OR APPROVED EQUAL.
13. FLANGED SHOE CAN BE SUBSTITUTED WITH MJ SHOE AND FOSTER ADAPTER AND MJ X MJ GATE VALVE WITH PRIOR CITY APPROVAL.



CITY OF KEIZER

STANDARD DETAIL DRAWING

FIRE HYDRANT ASSEMBLY  
ON LINE

DRAWN: A.D.M.

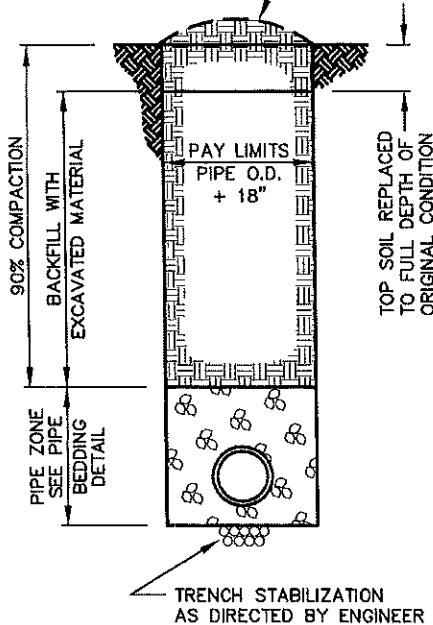
DATE: 01-04-23

APPROVED: W.I.P.

NUMBER: W-25

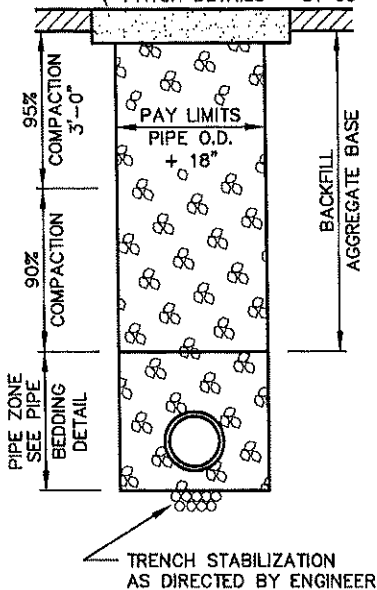


MOUND UNLESS OTHERWISE DIRECTED BY ENGINEER



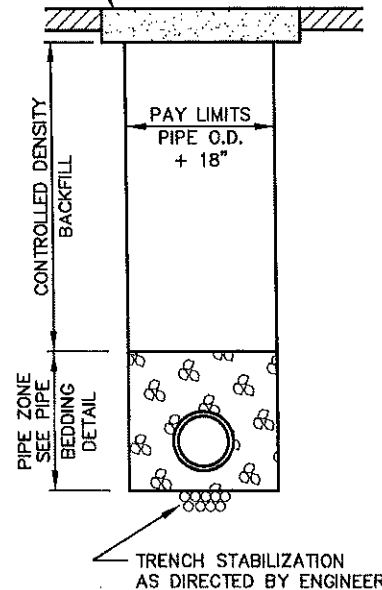
NATIVE BACKFILL

SEE TYPICAL STREET SECTION FOR NEW CONSTRUCTION OR TYPICAL PAVEMENT PATCH DETAILS - ST 56



GRANULAR BACKFILL

SEE TYPICAL PAVEMENT PATCH DETAILS - ST 56



CONTROLLED DENSITY BACKFILL

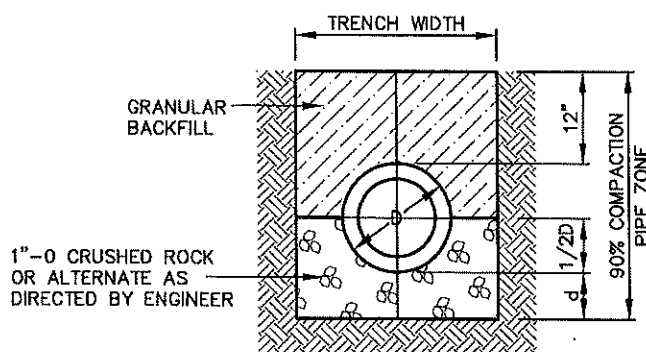
IF REQUIRED, POLYWRAP PIPE IN ACCORDANCE WITH POLYWRAP DETAIL W-32

CONTROLLED DENSITY BACKFILL SHALL BE USED IN ALL EXIST. PAVED STREETS IF THE TRENCH MEETS ONE OR MORE OF THE FOLLOWING CRITERIA:

1. TRENCH DEPTH IS 5' OR LESS (SURFACE TO INV.)
2. TRENCH WIDTH IS 12" OR LESS
3. TRENCH LENGTH IS 50' OR LESS

## TRENCH BACKFILL DETAIL

NTS



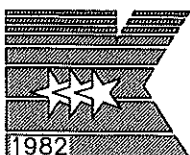
D = OUTSIDE DIAMETER  
d = DEPTH OF BEDDING MATERIAL BELOW PIPE

DEPTH OF BEDDING MATERIAL BELOW PIPE	
D	d
12" & SMALLER	6"
15" - 36"	8"
42" & LARGER	10"

### NOTE:

WHERE DIRECTED BY THE ENGINEER, TRENCH STABILIZATION SHALL BE PLACED PRIOR TO PLACEMENT OF BEDDING. SIZE & DEPTH ARE DEPENDENT ON SOIL CONDITIONS. FOR ROCK OR OTHER INCOMPRESSIBLE MATERIALS, TRENCH SHALL BE OVER EXCAVATED A MIN. OF 6" & REFILLED WITH GRANULAR MATERIAL AS DIRECTED BY THE ENGINEER. BEDDING & BACKFILL MATERIALS IN PIPE ZONE SHALL BE COMPACTED AS SPECIFIED PRIOR TO BACKFILLING THE REMAINDER OF THE TRENCH.

1. REVISED AS PER CITY OF KEIZER REVIEW. 09-23-08



CITY OF KEIZER

## STANDARD DETAIL DRAWING

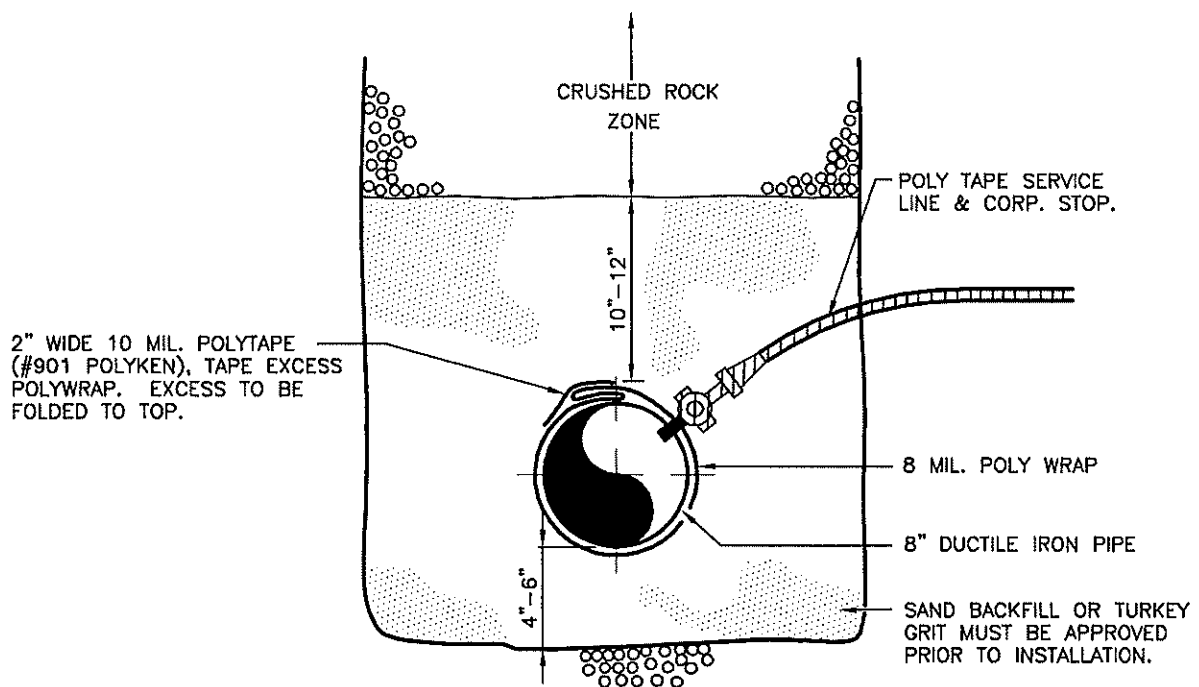
### TRENCH DETAILS FOR WATER MAINS

DRAWN: J.M.M.

DATE: 1-24-00

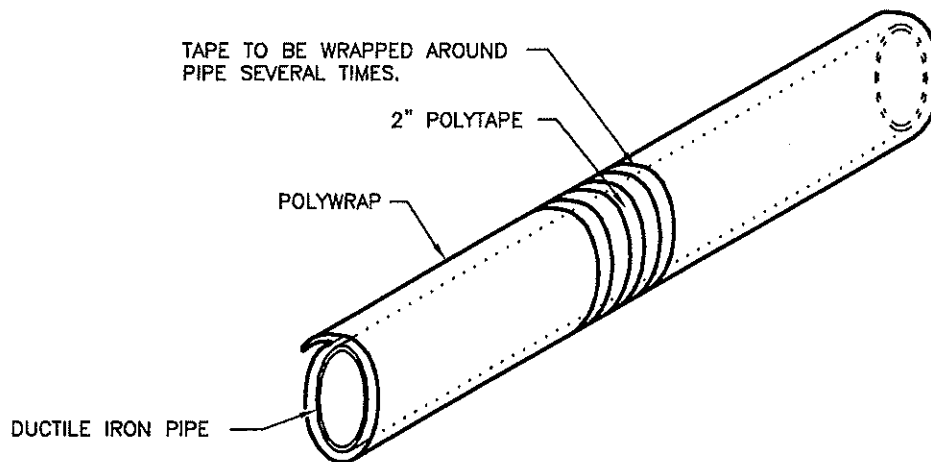
APPROVED: W.I.P.

NUMBER: W-30



## POLYWRAP DETAIL

N.T.S.



### NOTES:

1. ALL VALVES, FITTINGS, JOINTS, BOLTS TO BE WRAPPED WITH 8 MIL. POLY AND SEALED WITH POLYTAPE.
2. CONTRACTOR MUST HAVE APPROVAL FOR CLASS "C" BACKFILL PRIOR TO INSTALLATION.

1. REVISED AS PER CITY OF KEIZER REVIEW. 1-25-00.



**CITY OF KEIZER**

STANDARD DETAIL DRAWING

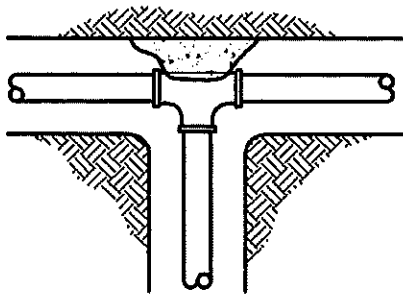
**POLYWRAP DETAIL**

DRAWN: D.G.G.

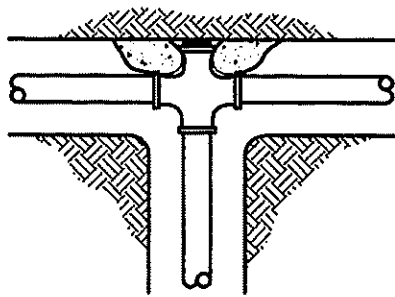
DATE: 10-11-90

APPROVED: W.I.P.

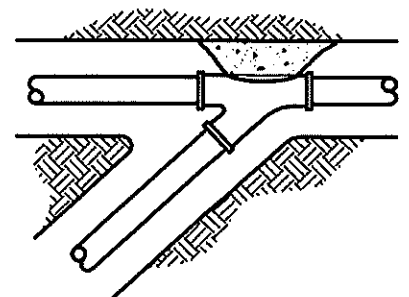
NUMBER: W-32



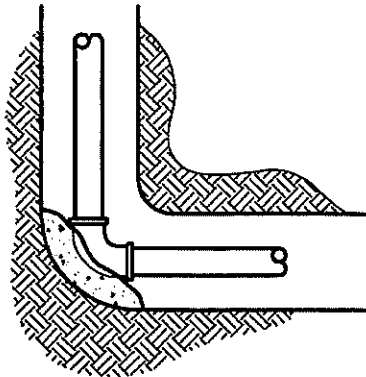
TEE



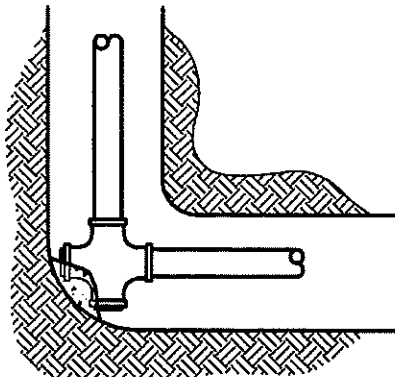
PLUGGED CROSS



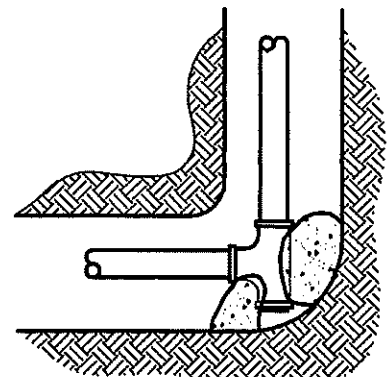
WYE



BEND



PLUGGED CROSS



TEE

**NOTES:**

1. Concrete thrust blocking to be poured against undisturbed earth.
2. Keep concrete clear of joint and accessories.
3. The required thrust bearing areas for special connections are shown encircled on the plans.
4. If not shown on plans required bearing areas at fitting shall be as indicated below, adjusted if necessary, to conform to the test pressure(s) and allowable soil bearing stress(es) stated in the special specifications.
5. Bearing areas and special blocking details shown on plans take precedence over bearing areas and blocking details shown on this standard detail.
6. Concrete to be 3300 psi, 28 day strength.

**BEARING AREA OF THRUST BLOCKS IN SQ. FT.**

Fitting Size	Tee, Wye	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	1.4	1.9	1.4	1.0	--	--
6	2.1	3.0	4.3	3.0	1.6	1.0	--
8	3.8	5.3	7.6	5.4	2.9	1.5	1.0
10	5.9	8.4	11.8	8.4	4.6	2.4	1.2
12	8.5	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	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	33.3	47.0	33.3	18.1	9.4	4.7
24	34.0	48.0	68.0	48.0	26.2	13.6	6.8

NOTE: Above bearing areas based on test pressure of 150 p.s.i. 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( 2000/Soil Bearing Stress)x(Table Value).



**CITY OF KEIZER**

**STANDARD DETAIL DRAWING**

**STANDARD THRUST  
BLOCKING DETAIL**

DRAWN: T.A.K.

DATE: 04-04-95

APPROVED: W.I.P.

W-33

Design for 150 psi with 1.5 safety factor = 225 psi.  
 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"

Size	Area Sq. in.	Thrust at 150 psi	Thrust at 225 psi	No of Full Dia. Bars Welded to plates			No. of Threaded Bars		
				5/8 in.	3/4 in.	1 in.	5/16 in.	3/4 in.	1 in.
2	3,1416	300	450	2	Warning Will hold	Duc-Lugs not	2	Warning Duc-	No Lugs
4	12,566	1,885	2,827	2			2		
6	28,274	4,241	6,362	2			3	2	2
8	50,265	7,540	11,310	3	2	2	4	3	2
10	78,540	11,781	17,672	5	3	2	6	4	2
12	113,10	16,985	25,448	6	5	3	6	4	2
14	153.94	23,091	34,636	9	6	4	11	8	4
16	201.06	30,159	45,238	11	8	5	15	10	6
18	254.47	38,170	57,056	14	10	6	19	13	7
20	314.16	47,124	70,686	17	12	7	23	16	9
24	452.39	67,858	101,788	24	17	10	33	22	12
30	706.86	106,029	159,044	38	26	15	51	34	19
36	1017.9	152,685	229,028	54	38	21	73	49	27

A307 Bolt Stock @ 14,000 psi

FULL DIAMETER BARS

Size	Tensile Area	Strength
5/8	.3068	4,295 lbs.
3/4	.4414	6,185 lbs.
1	.7854	10,996 lbs.

THREADED BARS

Size	Tensile Area	Strength
5/8	.2256	3,158 lb.
3/4	.3340	4,676 lb.
1	.6051	8,471 lb.

1. REVISED AS PER CITY OF KEIZER REVIEW. 1-25-00.



**CITY OF KEIZER**

**STANDARD DETAIL DRAWING**

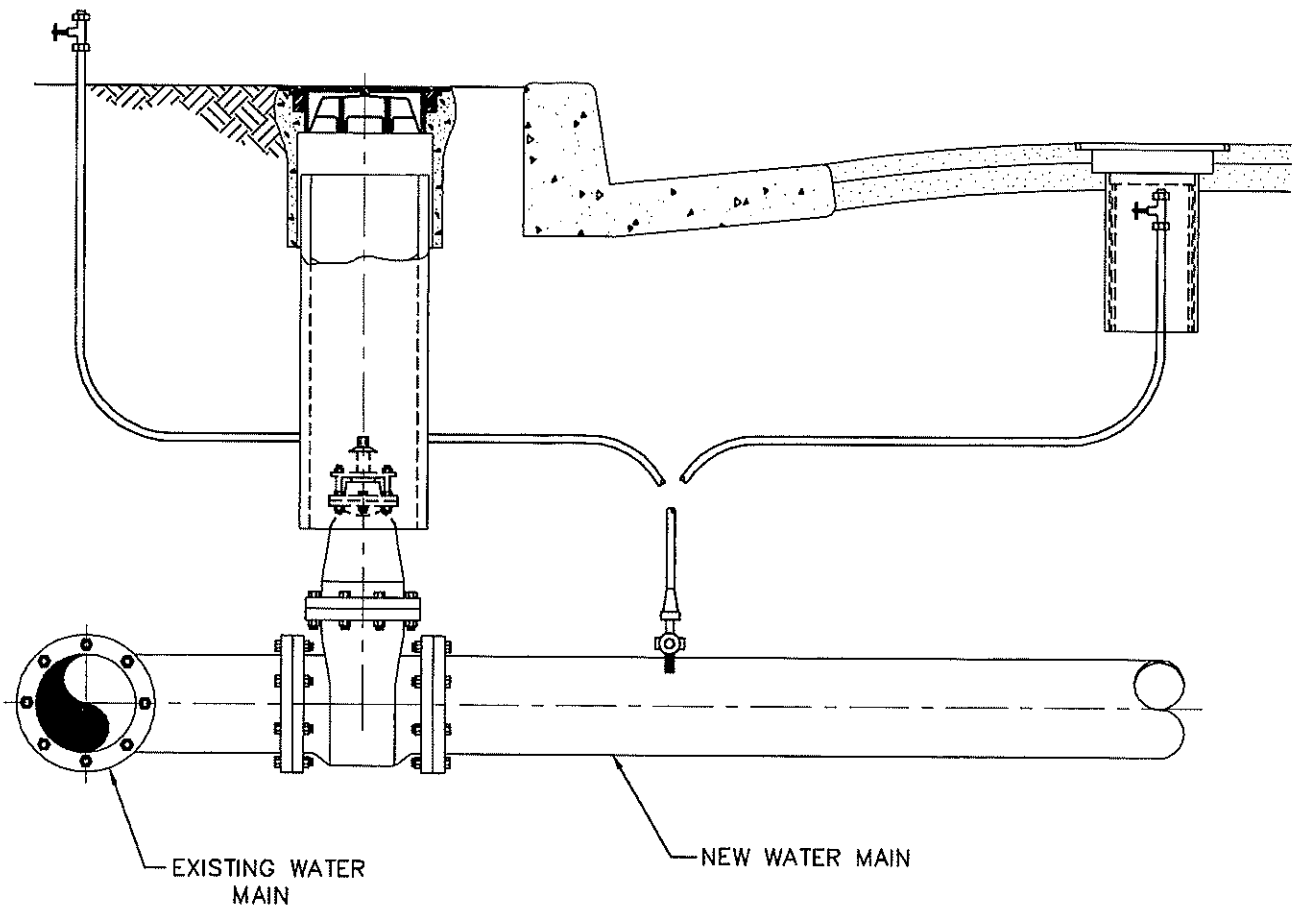
**STANDARD TIE ROD REQUIREMENTS**

DRAWN: T.A.K.

DATE: 04-04-95

APPROVED: W.I.P.

**W-34**



1. VALVE BOX OVER 3/4" CHLORINE LINE DOES NOT NEED TO BE INSTALLED IF CHLORINE LINE IS BEHIND THE CURB. VALVE BOX IS TO BE INSTALLED ONLY WHEN CHLORINE LINE IS IN AREA COVERED BY TRAFFIC.
2. CHLORINE LINE PLACED IN AN AREA NOT COVERED BY TRAFFIC WILL BE 6" ABOVE NATURAL GROUND LEVEL, WITH ANGLE CURB STOP WITH METER COUPLING FOR 5/8" METER.
3. DISTANCE FROM GATE VALVE TO CHLORINE TAP WILL NOT BE MORE THAN 12"
4. UPON RETURN AN ACCEPTABLE BACTERIOLOGICAL REPORT CONTRACTOR, UNDER CITY SUPERVISION, WILL REMOVE THE TAPS, & PLUG THE MAIN PRIOR TO PAVING, UNLESS OTHERWISE SHOWN OR SPECIFIED.

1. REVISED AS PER CITY OF KEIZER REVIEW. 1-25-00.



**CITY OF KEIZER**

STANDARD DETAIL DRAWING

**STANDARD FOR MAIN  
LINE CHLORINATION**

DRAWN: T.A.K.

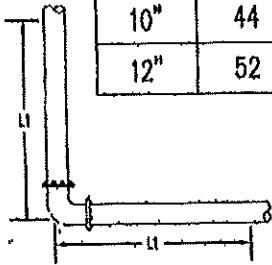
DATE: 04-04-95

APPROVED: W.I.P.

W-40

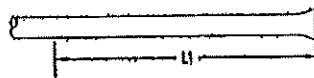
# LENGTH (L<sub>1</sub>) OF PIPE REQUIRED FOR RESTRAINT (FEET)

Diameter	Horizontal Bend				Dead End	Reducer (Increaser) (Restrained Length for Large Diameter Side)				
	90°	45°	22 1/2°	11 1/4°		4"	6"	8"	10"	12"
4"	21	19	19	19	85	---	62	112	151	189
6"	29	19	19	19	119	---	---	65	114	159
8"	38	19	19	19	155	---	---	---	63	116
10"	44	19	19	19	186	---	---	---	---	64
12"	52	22	19	19	218	---	---	---	---	---

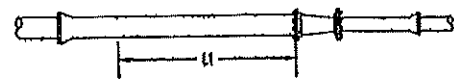


**BEND**

90°, 45°, 22½°, 11¼°



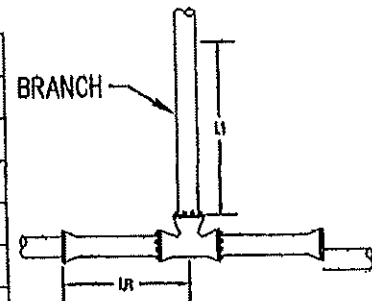
**DEAD END**



**REDUCER**

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

Tee Configurations (Restrained 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"	85	60	35	19	19	19	19	19	19	19
6"	119	94	69	19	19	19	19	19	19	19
8"	155	130	105	79	54	28	19	19	19	19
10"	186	160	134	109	83	57	32	19	19	19
12"	218	192	167	141	115	89	63	37	19	19



**TEE CONFIGURATION**

L<sub>R</sub> is the minimum length in either direction from tee to nearest adjacent joint.

### 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 3 FEET COVER
  - SAND 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



**CITY OF KEIZER**

DEPARTMENT OF PUBLIC WORKS

RESTRAINED JOINT DETAIL  
(POLYETHYLENE ENCASED PIPES)

DRAWN: G.H.B.

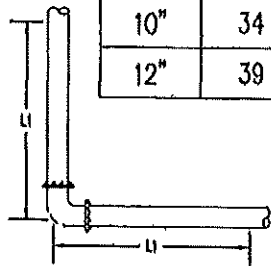
DATE: 06-08-2021

APPROVED: W.I.P.

NUMBER: W-41

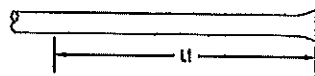
# LENGTH (L<sub>1</sub>) OF PIPE REQUIRED FOR RESTRAINT (FEET)

Diameter	Horizontal Bend				Dead End	Reducer (Incraser) (Restrained Length for Large Diameter Side)				
	90°	45°	22 1/2°	11 1/4°		4"	6"	8"	10"	12"
4"	19	19	19	19	36	--	26	47	63	79
6"	22	19	19	19	50	--	--	28	48	67
8"	28	19	19	19	65	--	--	--	26	49
10"	34	19	19	19	78	--	--	--	--	27
12"	39	19	19	19	91	--	--	--	--	--

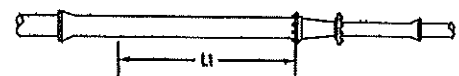


**BEND**

90°, 45°, 22½°, 11¼°



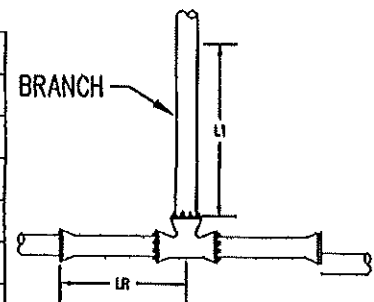
**DEAD END**



**REDUCER**

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

Tee Configurations (Restrained 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"	36	25	19	19	19	19	19	19	19	19
6"	50	39	29	19	19	19	19	19	19	19
8"	65	54	44	33	23	19	19	19	19	19
10"	78	67	56	46	35	24	19	19	19	19
12"	91	81	70	59	48	37	27	19	19	19



**TEE CONFIGURATION**

L<sub>R</sub> is the minimum length in either direction from tee to nearest adjacent joint.

### 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 3 FEET COVER
  - SAND BEDDING AND PIPE ZONE MATERIAL WITH CRUSHED ROCK BACKFILL
  - A FACTOR OF SAFETY OF TWO (2)
  - UNCOATED 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



**CITY OF KEIZER**

DEPARTMENT OF PUBLIC WORKS

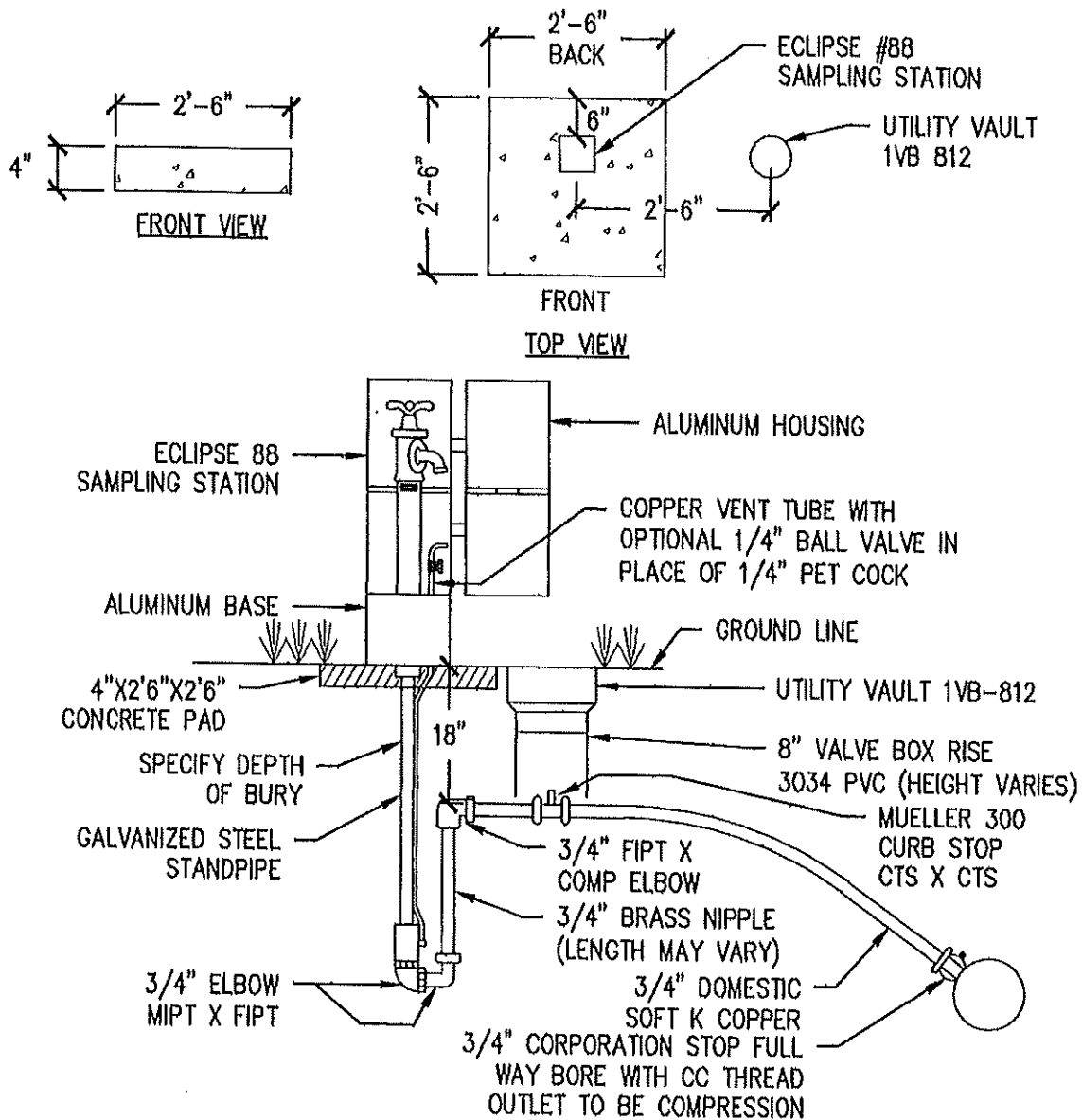
RESTRAINED JOINT DETAIL  
(NON-ENCASED PIPES)

DRAWN: G.H.B.

DATE: 06-08-2021

APPROVED: W.I.P.

NUMBER: W-42



**NOTES:**

1. IF SAMPLE STATION IS TO BE LOCATED IN UNIMPROVED AREA, ALL EFFORTS SHALL BE MADE TO PLACE SAMPLE STATION IN PROPER LOCATION. (IE. FUTURE CURBS, SIDEWALKS, PLANTER, OR SWALE). SAMPLE STATION IN UNIMPROVED AREA SHALL BE PROTECTED BY BOLLARDS.
2. IF SAMPLE STATION IS TO BE LOCATED IN AREA WITH PROPERTY LINE SIDEWALK, 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.



**CITY OF KEIZER**

DEPARTMENT OF PUBLIC WORKS

SAMPLING STATION

DRAWN: G.H.B.

DATE: 06-08-2021

APPROVED: W.I.P.

NUMBER: W-43