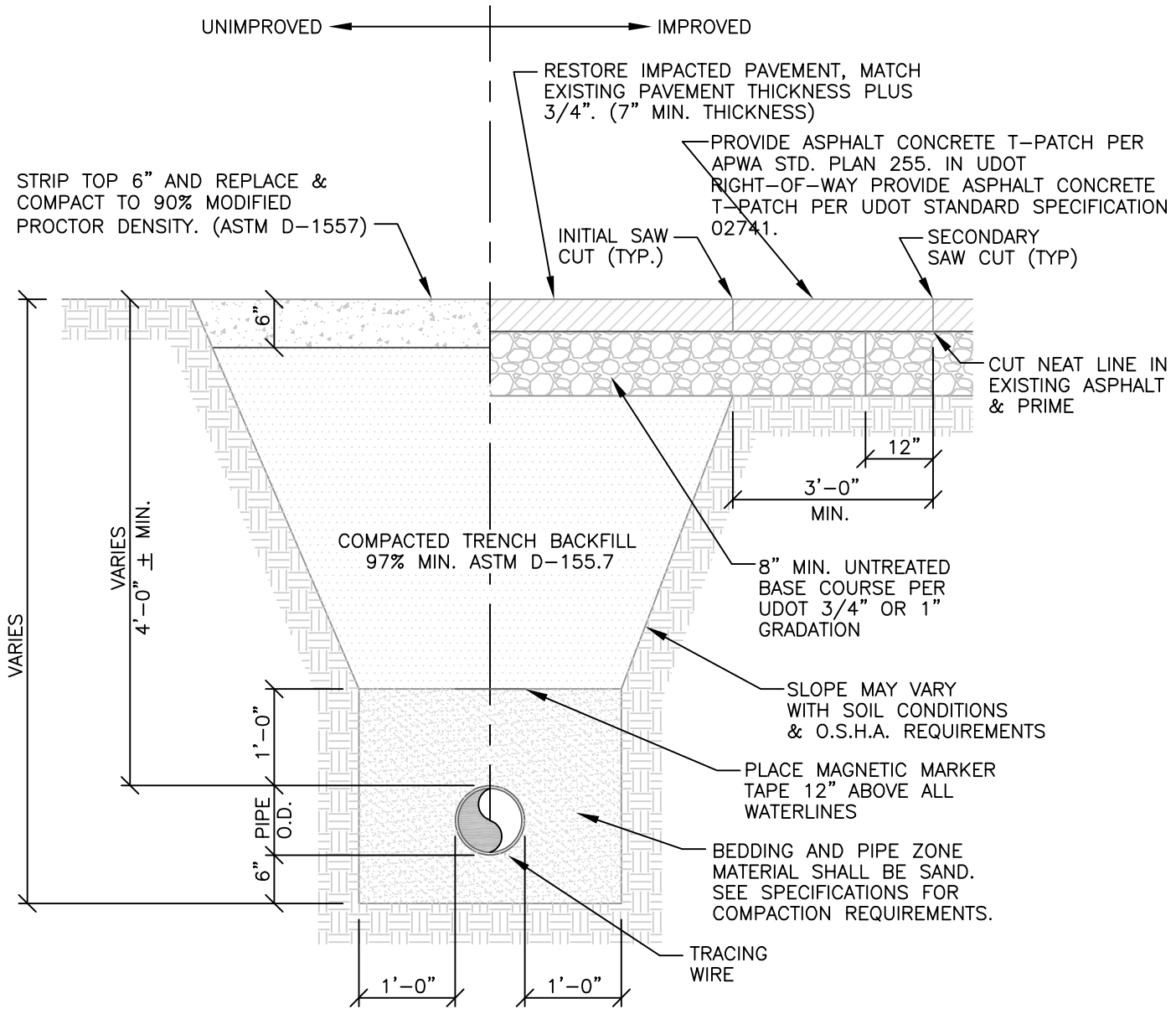
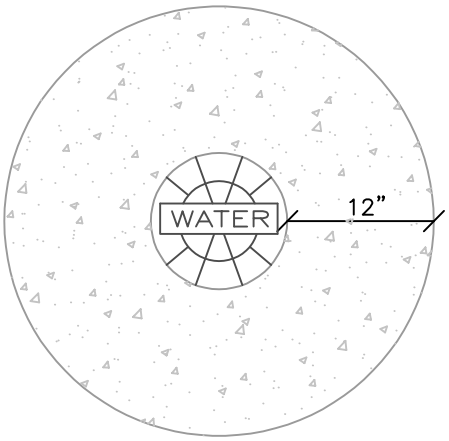


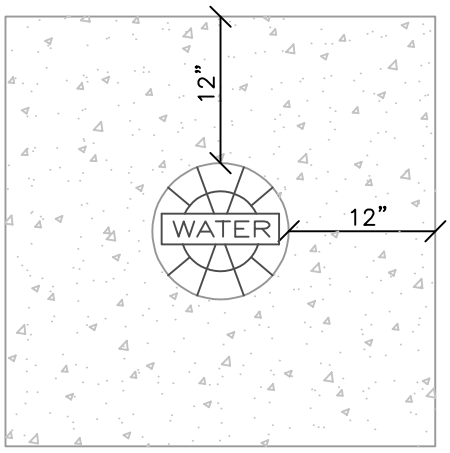
Notes:

1. KID recommends contractor meet all of the requirements established for safe trenching. (See OSHA and UOSHA requirements, latest additions.)
2. Contractor shall locate all underground utilities before laying pipe within 50' of said utilities which may be exposed, damaged or crossed as shown on the drawings or as "Blue Staked". The contractor will make arrangements with the Utility Company to move the Utility if necessary or obtain permission from the District Engineer to modify grade of pipeline in order to go around existing utilities.
3. Water pipe shall be laid on 6" sand. KID Inspector is required to determine the acceptability of the pipe bedding before backfilling of the pipe zone. Contractor is responsible for scheduling of the pipe bedding inspection.
4. All water lines to be installed in acceptable Public right-of-way or acceptable recorded easements unless otherwise approved by the Kearns Improvement District.
5. KID inspection of pipe bedding placement and pipe zone backfill is required prior to placement of trench backfill.
6. Backfill above the pipe zone is as per the prevailing authority.
7. Pipe Location: Install pipe in the center of the trench.

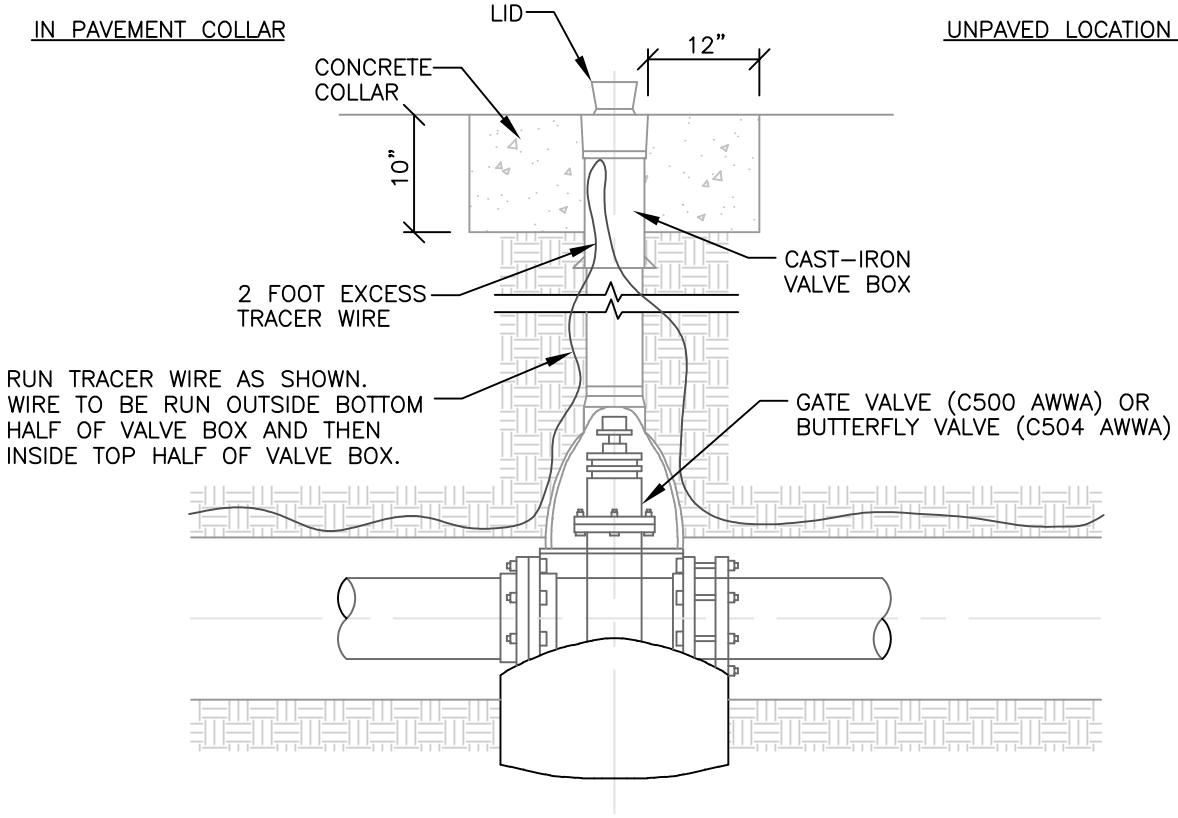
DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	# Typical Water Line Trench Detail	DATE: 09-06-16
CHECKED:			DRWG NO.: CW1
CHECKED:			



IN PAVEMENT COLLAR



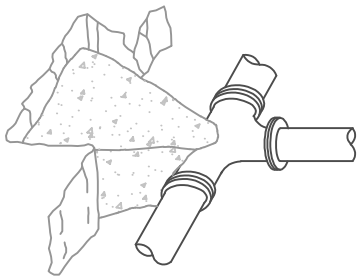
UNPAVED LOCATION PAD



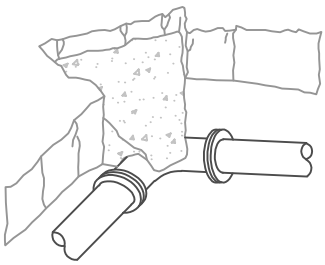
NOTES:

1. INSPECTION: Prior to backfilling around valve, secure inspection of installation by district inspector.
2. BACKFILLING: Install all backfill material per specification requirements.
3. GREASE: Apply poly–fm grease to all bolts. Wrap with 8 mil thick polyethylene sheet and tape wrap.
4. CONCRETE COLLAR: Concrete per city or county specifications.
5. Valve Box must be vertical to allow for valve key access.
6. Provide valve stem extensions for valves deeper than 4 feet.

DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	Typical Gate Valve Detail	DATE: 09–06–16
CHECKED:			DRWG NO.: CW2
CHECKED:			



CONDITION I



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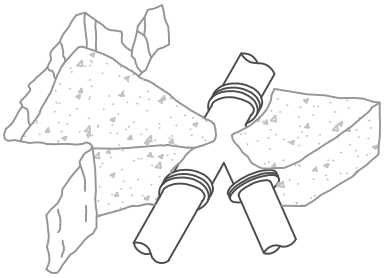

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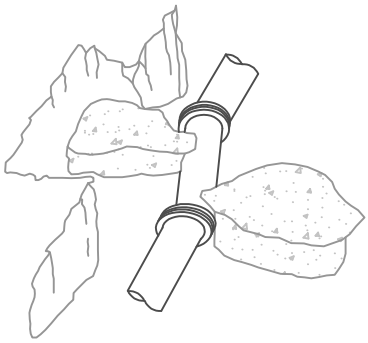
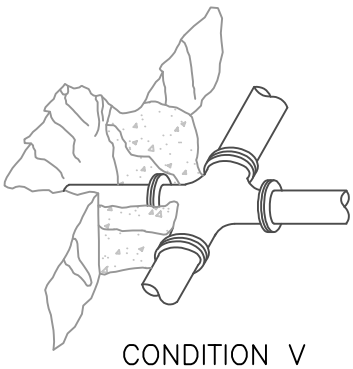
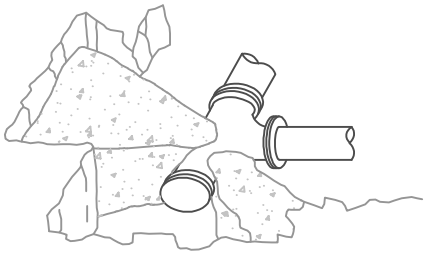


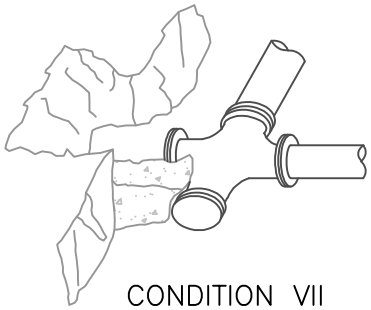
CONDITION IV



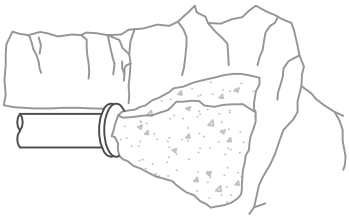
CONDITION V



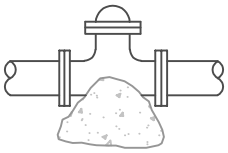
CONDITION VI



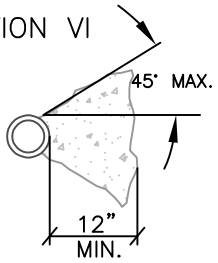
CONDITION VII



CONDITION VIII



VALVE ANCHOR REQUIRED FOR VALVES 12" OR LARGER



TYPICAL SECTION THROUGH THRUST BLOCKS

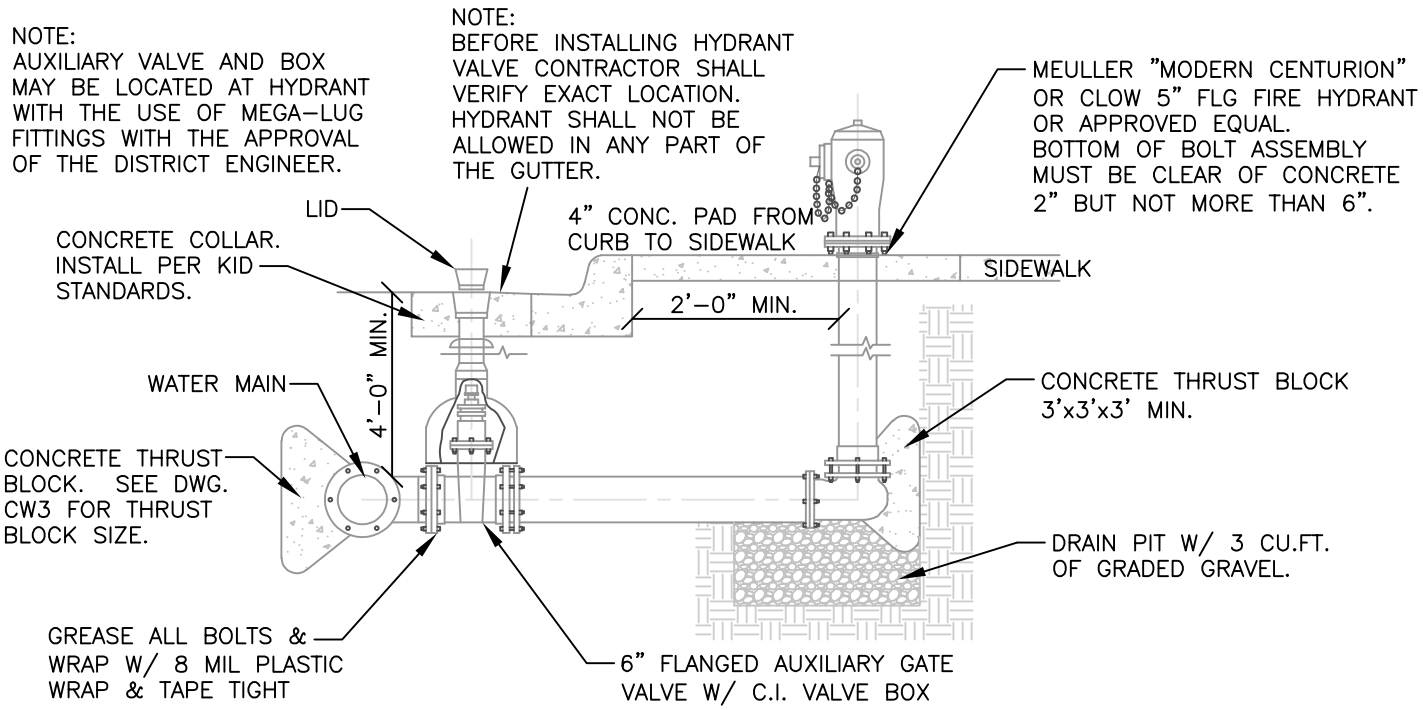
Typical Thrust Block Details

THRUST BLOCK BEARING AREA IN SQ. FEET									
NOMINAL PIPE SIZE (IN.)	DIP I.D. (IN.)	CONDITION							
		I	II	III	IV	V	VI	VII	VIII
4	4.3	2.2	3.1	1.5	1.7	1.1	2.2	3.1	2.2
6	6.4	4.8	6.8	3.4	3.7	2.4	4.8	6.8	4.8
8	8.6	8.6	12.2	6.1	6.6	4.3	8.6	12.2	8.6
10	10.6	13.2	18.6	9.3	10.1	6.6	13.2	18.6	13.2
12	12.6	18.8	26.6	13.3	14.4	9.4	18.8	26.6	18.8
14	14.7	25.6	36.2	18.1	19.6	12.8	25.6	36.2	25.6
16	16.8	33.3	47.0	23.5	25.4	16.7	33.3	47.0	33.3
18	18.9	42.0	59.4	29.7	32.1	21.0	42.0	59.4	42.0
20	20.9	51.7	73.1	36.5	39.5	25.9	51.7	73.1	51.7
24	25.1	74.0	104.6	52.3	56.6	37.0	74.0	104.6	74.0
30	31.2	114.4	161.8	80.9	87.5	57.2	114.4	161.8	114.4
36	37.5	164.4	232.5	116.3	125.9	82.2	164.4	232.5	164.4

NOTES:

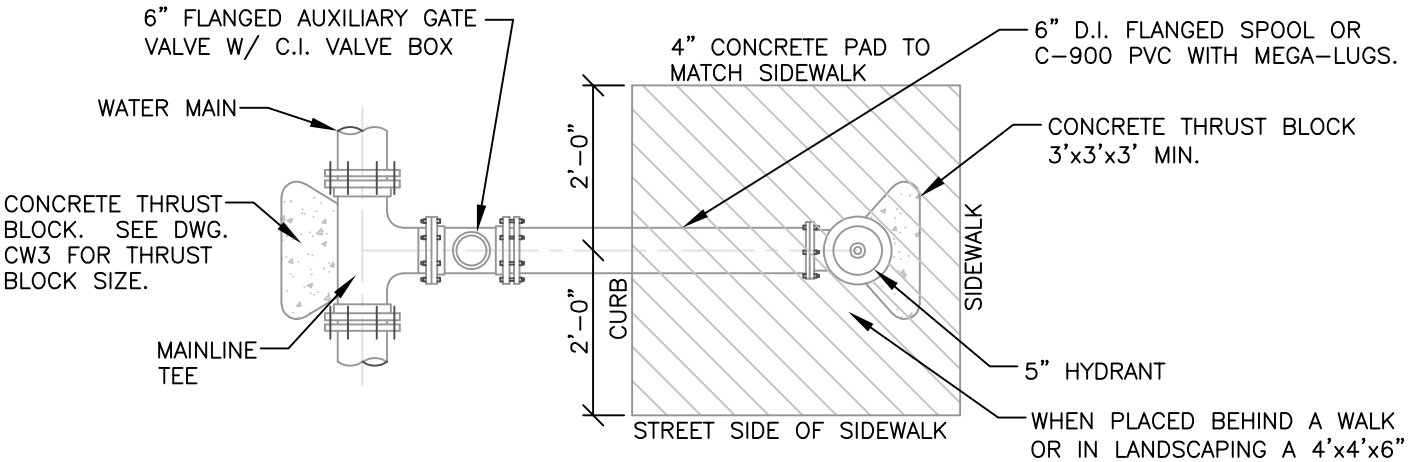
1. ALL THRUST BLOCK BEARING FACES SHALL BE POURED AGAINST UNDISTURBED SOIL OR APPROVED COMPACTED BACKFILL.
2. CONCRETE SHALL BE CLASS 6.0–B–3000.
3. ALL THRUST BLOCK SIDES SHALL BE FORMED.
4. CALCULATED ON 200 LB TEST PRESSURE AND ALLOWABLE BEARING PRESSURE OF 2000 LBS PER SQUARE FOOT.
5. IN POORER SOILS SPECIAL DESIGN IS REQUIRED.
6. THRUST RESTRAINT TO INCLUDE THRUST BLOCK AND JOINT RESTRAINT AT ALL BENDS.

DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	Thrust Block Details	DATE: 09–06–16
CHECKED:			DRWG NO.: CW3
CHECKED:			



Typical Hydrant Installation

PROFILE VIEW

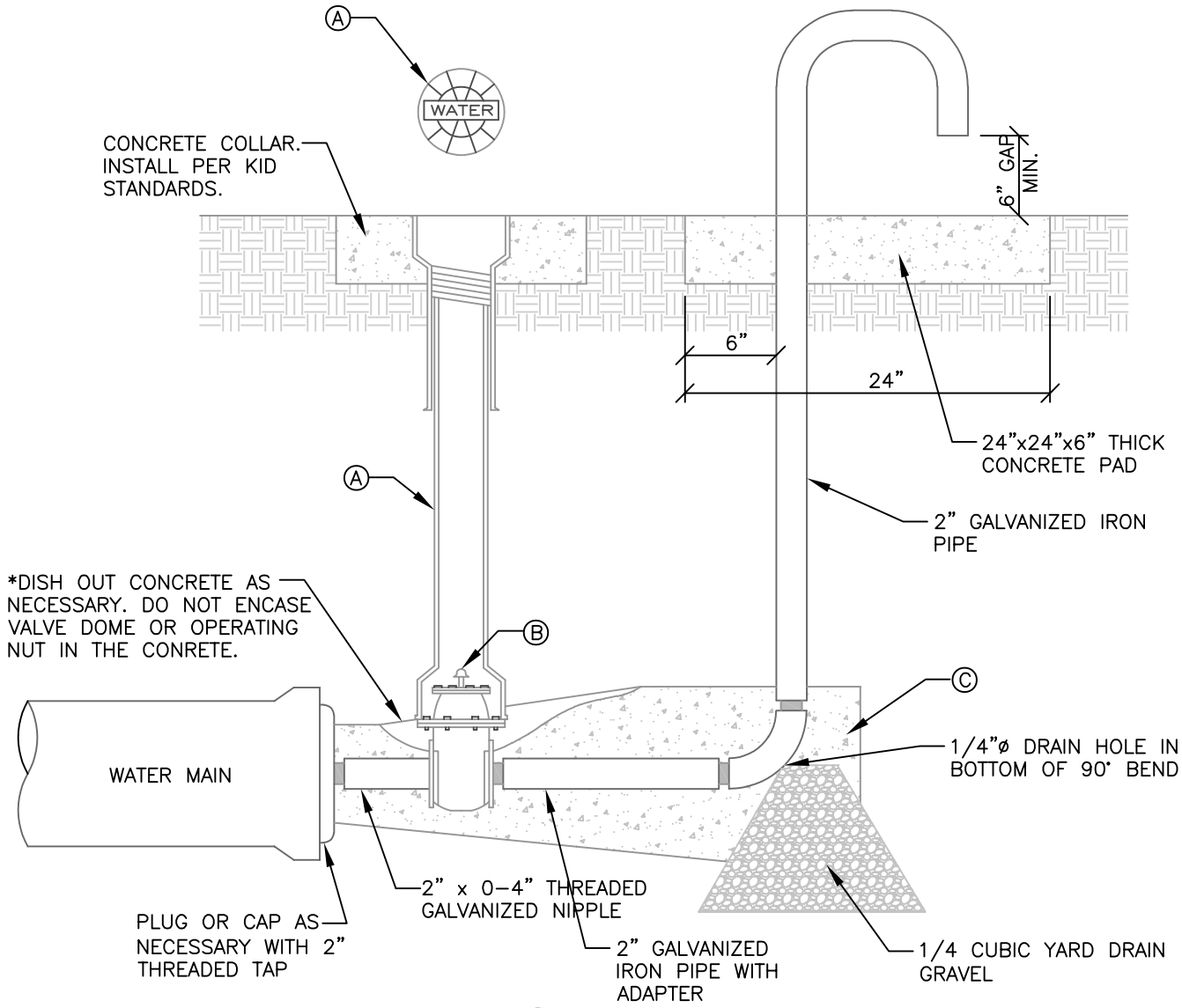


Typical Hydrant and Pad Detail

PLAN VIEW

1. AVERAGE SPACING BETWEEN HYDRANTS MUST NOT BE GREATER THAN 500'.
2. SELECT SAND BEDDING AND BACKFILL IS REQUIRED 6" UNDER, 12" ON SIDES, AND 12" OVER FIRE LINE.
3. MINIMUM TRENCH WIDTH SHALL BE EQUAL TO OUTSIDE PIPE DIAMETER PLUS 1' ON EACH SIDE OF PIPE.
4. IF DAMAGE IS CAUSED TO WATER MAIN, DUE TO FIRE HYDRANT INSTALLATION AND/OR OTHER MEANS, CONTRACTOR WILL BE HELD RESPONSIBLE FOR REPAIRS.
5. FIRE HYDRANT SHALL BE SET THAT THE BARREL OR STANDPIPE FLANGE IS 3" TO 6" ABOVE FINISHED GRADE.
6. GREASE AND WRAP ALL EXTERNAL FITTINGS AND BOLTS WITH FM GREASE AND 8-MIL POLYETHYLENE AND DUCT TAPE TIGHT.
7. WRAP D.I. PIPE WITH 8-MIL POLYETHYLENE TUBE WRAP AND DUCT TAPE TIGHT.
8. DRAINAGE PIT MUST HAVE 3 CUBIC FEET (MINIMUM) OF $\frac{3}{4}$" MINUS GRAVEL.
9. ALL THRUST BLOCKING MUST BE REINFORCED BY A SECURE BANK.

DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	Hydrant Installation	DATE: 09-06-16
CHECKED:			DRWG NO.: CW4
CHECKED:			



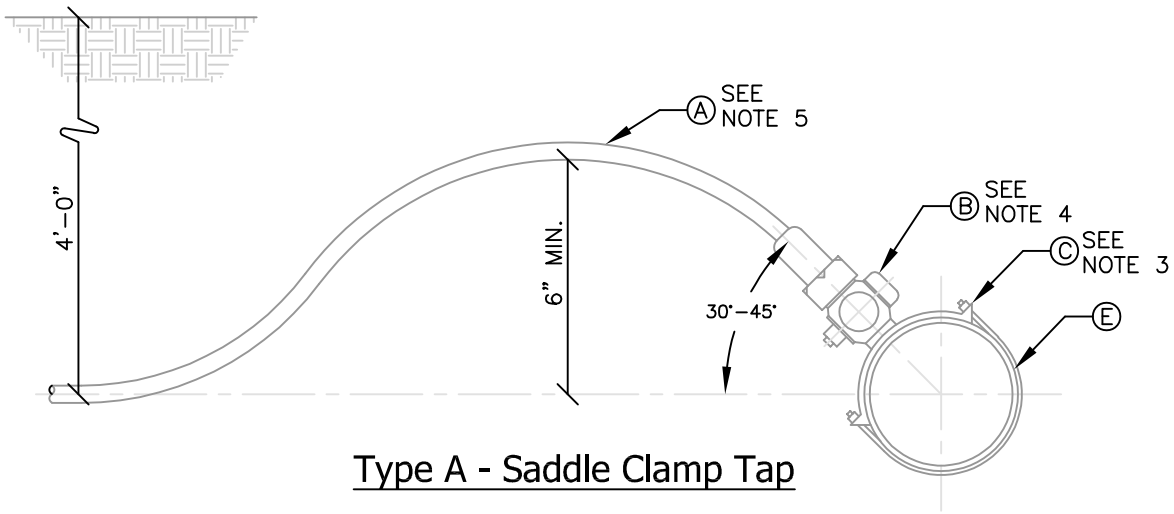
Section

LEGEND		
NO.	ITEM	DESCRIPTION
Ⓐ	VALVE BOX WITH LID	2 PIECE CAST IRON
Ⓑ	2" GATE VALVE WITH SCREW ENDS	2"x2" OPERATING NUT
Ⓒ	CONCRETE THRUST BLOCK	

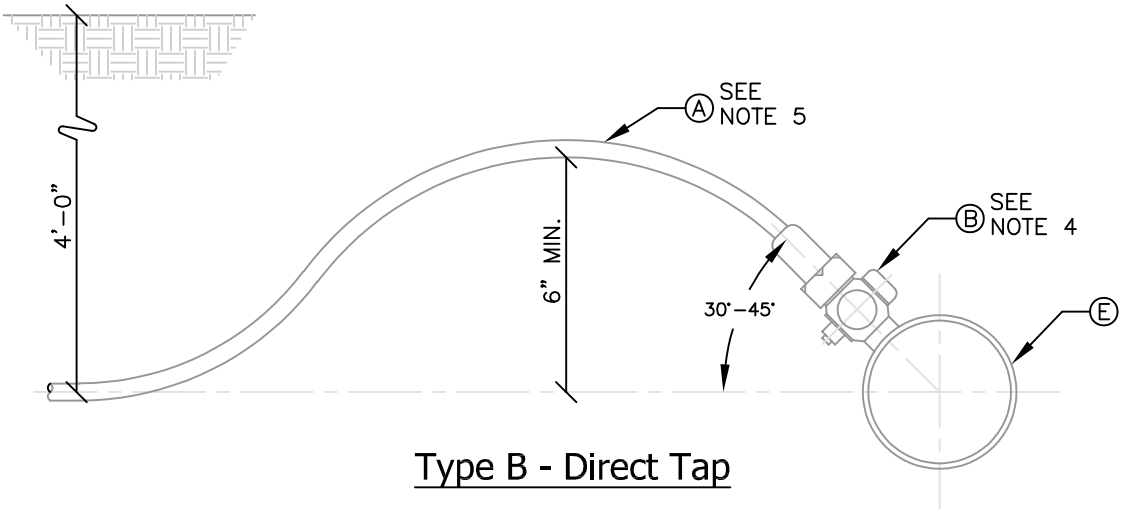
NOTES:

1. INSPECTION: PRIOR TO BACKFILLING AROUND THRUST BLOCK, SECURE INSPECTION OF INSTALLATION BY DISTRICT INSPECTOR.
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER SPECIFICATIONS.
3. CONCRETE: TO BE PER SPECIFICATIONS. POUR CONCRETE AGAINST UNDISTURBED SOIL.
4. SPECIAL DESIGN: WATER MAINS 12" AND LARGER REQUIRE SPECIAL WASH OUT ASSEMBLY DESIGN.
5. VALVE BOX MUST BE VERTICAL TO ALLOW FOR VALVE KEY ACCESS.

DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	Typical Wash Out Valve Detail	DATE: 09-06-16
CHECKED:			DRWG NO.: CW5
CHECKED:			



Type A - Saddle Clamp Tap



Type B - Direct Tap

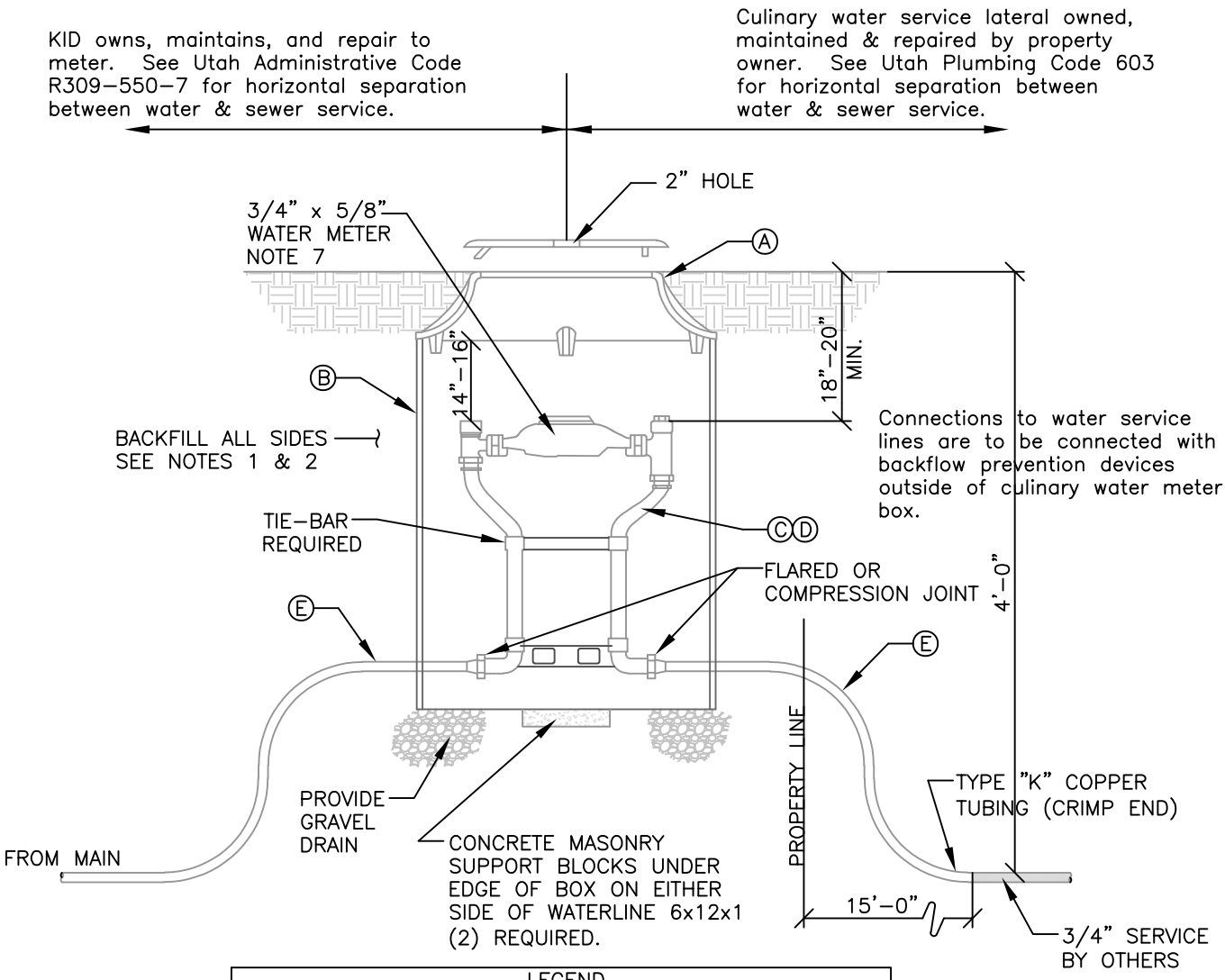
LEGEND		
NO.	ITEM	DESCRIPTION
Ⓐ	COPPER PIPE	TYPE K – SOFT (NOTE 5)
Ⓑ	CORPORATION STOP	BRASS (NOTE 4)
Ⓒ	SERVICE SADDLE CLAMP	(D.I., P.V.C.) ** (NOTE 3)
Ⓔ	WATER MAIN PIPE	(D.I., P.V.C.)

** D.I. PIPE MAY BE DIRECT TAPPED

NOTES:

1. INSPECTION: PRIOR TO BACKFILLING AROUND TAPS SECURE INSPECTION OF INSTALLATION BY KID INSPECTOR.
2. BACKFILL: AS PER SPECIFICATIONS.
3. PROVIDE BRASS DOUBLE STRAP TAPPING SADDLE FOR TAPPING DUCTILE IRON OR PVC PLASTIC PIPE, FORD SERIES OR EQUAL.
4. 3/4" FORD FB600 BALL CORP AWWA TAPER THREAD INLET, FLARE OR COMPRESSION FITTINGS ACCEPTED.
5. PROVIDE HORIZONTAL EXPANSION LOOP IN COPPER PIPE.
6. TAPPING: PLACE TAPS A MINIMUM OF 24 INCHES APART. USE A TAPPING TOOL WHICH IS SIZED CORRESPONDING TO THE SIZE OF THE SERVICE LINE TO BE INSTALLED. NO TAPS WITHIN 24 INCHES OF END OF PIPE.
7. TAPE: TEFLON TAPE IS REQUIRED ON ALL TAPS.
8. CONTRACTOR TO RETAIN ALL TAPPED PLUGS AND PROVIDE THE PLUGS TO DISTRICT INSPECTOR.
9. ALL DIRECT TAP TO UTILIZE "CC" THREADS.

DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	Typical Service Tap Detail 3/4" - 2"	DATE: 09-06-16
CHECKED:			DRWG NO.: CW6
CHECKED:			



LEGEND		
NO.	ITEM	DESCRIPTION
A	FRAME & COVER	NOTE 3
B	METER BOX (19"-21"ø)(30" DEEP)	NOTE 4
C	3/4" METER (18" BOX)	NOTE 5
D	1" METER (21" BOX)	NOTE 6
E	COPPER PIPE	TYPE K (SOFT)

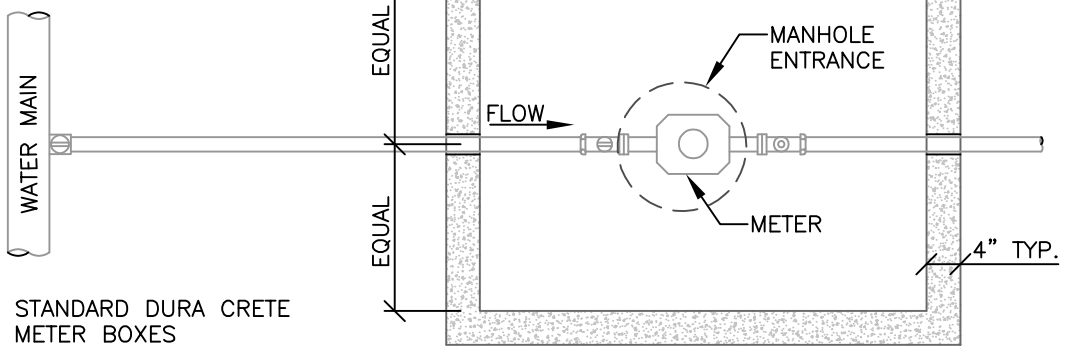
NOTES:

1. INSPECTION: PRIOR TO BACKFILLING AROUND METER BOX SECURE INSPECTION OF INSTALLATION BY DISTRICT INSPECTOR.
2. BACKFILLING: INSTALL ALL BACKFILL MATERIAL PER SPECIFICATION REQUIREMENTS IN LIFTS NOT EXCEEDING 5 INCHES AFTER COMPACTION. COMPACT EACH LIFT TO A MINIMUM RELATIVE DENSITY OF 95 PERCENT.
3. D&L FOUNDRY AND SUPPLY MODEL L-2240 METER BOX AND LID AND RIM WITH 2" HOLE FOR RADIO READ. BRANDED "WATER METER" CAST IN TOP.
4. METER BOX MAY BE ADS FURNISH SAMPLE BOX AND REVIEW WITH DISTRICT ENGINEER.
5. 3/4" COPPER WATER METER VOILE FORD 70 SERIES FULL 3/4" METER SETTER VBHC 72-21W-11-33-NL WITH RESIDENTIAL CHECK VALVE OR WATTS #JO2A-UNUM BVDC WITH 21" TUBING.
6. 1" SETTER VBHC 74-21W-11-44-NL OR EQUAL.
7. WATER METER FURNISHED AND INSTALLED BY KEARNS IMPROVEMENT DISTRICT.
8. PLACEMENT:
   A. DO NOT INSTALL METER BOXES UNDER DRIVEWAY APPROACHES, SIDEWALKS, OR CURB AND GUTTER.
   B. ALL METER BOXES TO BE INSTALLED IN PARK STRIP.
   C. SEE SPECIFICATIONS SEC. 1.2.1.2.

DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	# Typical Meter Box Detail 3/4" - 1"	DATE: 09-06-16
CHECKED:			DRWG NO.: CW7
CHECKED:			

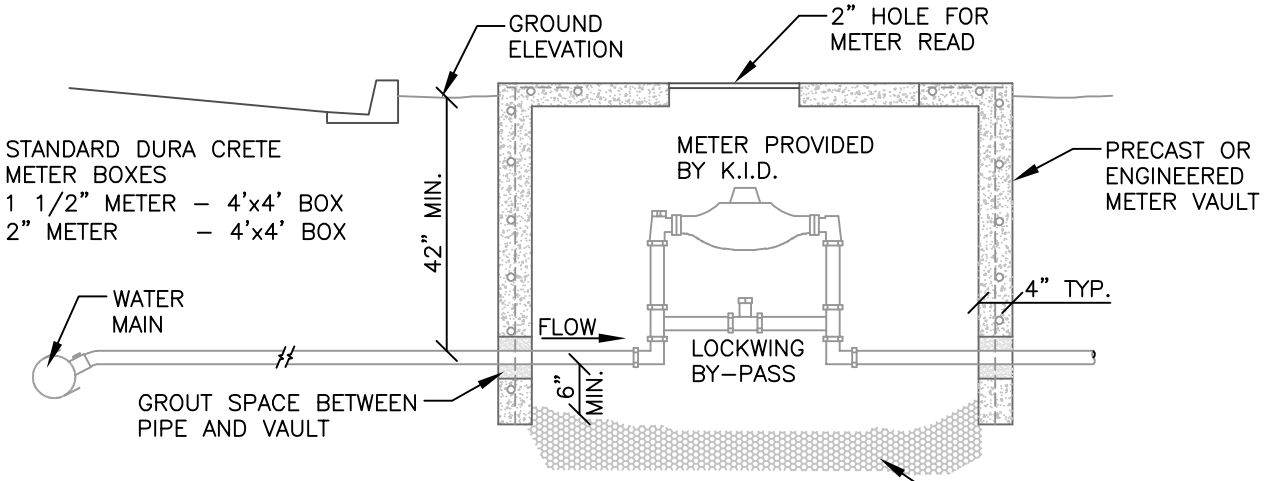
KID owns, maintains, and repair to meter. See Utah Administrative Code R309-550-7 for horizontal separation between water & sewer service.

Culinary water service lateral owned, maintained & repaired by property owner. See Utah Plumbing Code 603 for horizontal separation between water & sewer service.



STANDARD DURA CRETE METER BOXES
1 1/2" METER – 4'x4' BOX
2" METER – 4'x4' BOX

Plan View

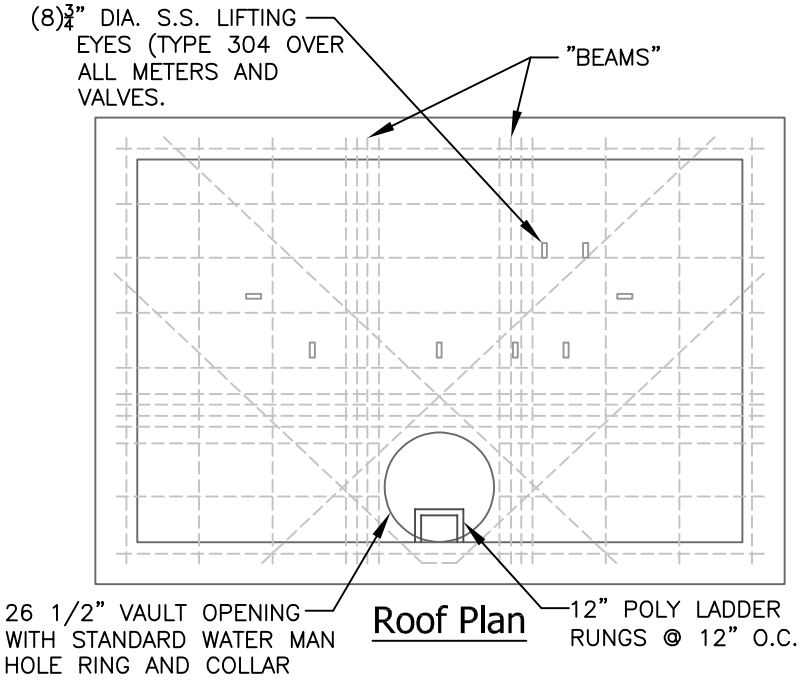


STANDARD DURA CRETE METER BOXES
1 1/2" METER – 4'x4' BOX
2" METER – 4'x4' BOX

Section View

1. LOCATE MANHOLE OPENINGS DOWN CENTER LINE OF METER VAULT.
2. METER BOX SHALL BE MIN. 4' DEEP WITH GRAVEL BOTTOM.
3. BACKFLOW ASSEMBLY IS TO BE LOCATED OUTSIDE OF THE METER BOX.
4. METER SETTER FOR 1 1/2" AND 2" METERS ARE AS FOLLOWES:
   FORD SERIES COPPERSETTERS FOR FLANGED METERS
   1 1/2" VBHC76-21B-11-66-NL
   2" VHB77-21B-11-77-NL
5. LID MUST HAVE 2" HOLE CENTERED FOR RADIO READ ASSEMBLY.

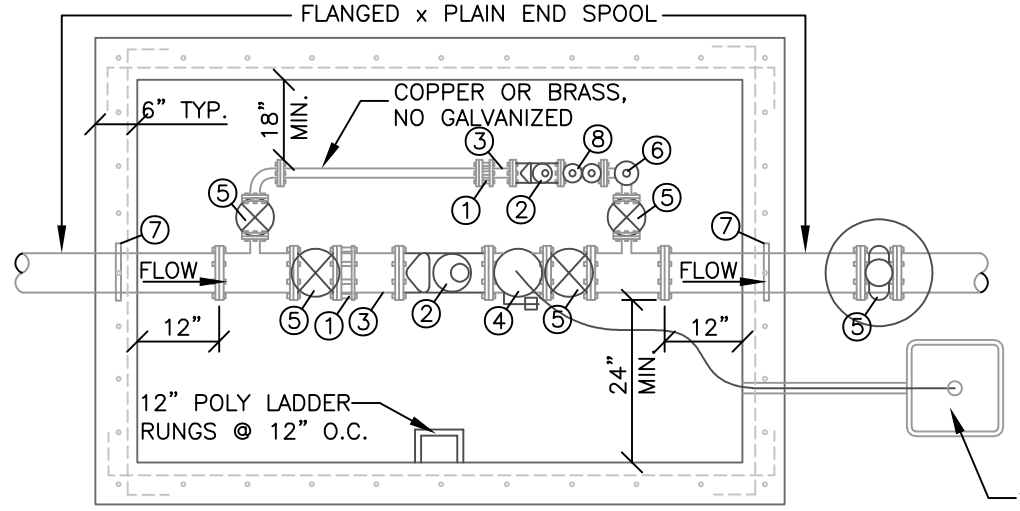
DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	# Water Meter Vault 1 1/2" - 2"	DATE: 09-06-16
CHECKED:			DRWG NO.: CW8
CHECKED:			



Roof Plan

NOTES:

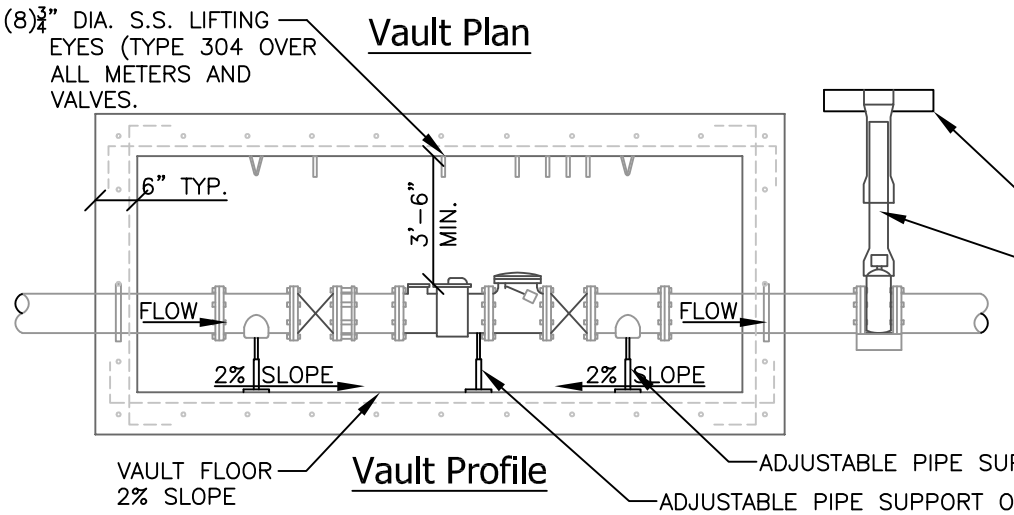
1. ALL MANHOLES SHALL HAVE A CONCRETE COLLAR PER A.P.W.A. PLAN 574.
2. VAULT AND PIPE BEDDING SHALL BE COMPACTED TO 95% MINIMUM ASTM D-1557.
3. IF DAMAGE IS CAUSED TO WATER MAIN, DUE TO VAULT INSTALLATION AND/OR OTHER MEANS, CONTRACTOR WILL BE HELD RESPONSIBLE FOR REPAIRS.
4. NO MORE THAN ONE GRADE RING (1' MAX.) ALLOWED PER LID AND COLLAR.
5. ALL FLANGED x PLAIN END SPOOLS TO BE PRE-CAST INTO VAULT WALLS BY VAULT MANUFACTURER.
6. FOR TRAFFIC USE, VAULT WALLS SHALL BE 8" THICK (MIN.) WITH #5 EPOXY COATED REBAR 6" ON CENTER EACH WAY AND 4" ON CENTER AT "BEAMS."
7. FOR NON-TRAFFIC USE, VAULT WALLS SHALL BE 6" THICK (MIN.) WITH #5 EPOXY COATED REBAR 9" ON CENTER EACH WAY AND 6" ON CENTER AT "BEAMS."
8. GREASE AND WRAP ALL EXTERNAL FITTINGS AND BOLTS WITH F.M. GREASE AND 8-MIL POLYETHYLENE AND DUCT TAPE TIGHT.
9. WRAP ALL DUCTILE IRON PIPE WITH 8-MIL POLYETHYLENE TUBE WRAP.
10. NO BYPASS ON LOOPED SYSTEMS WITH TWO OR MORE MASTER METERS.
11. VAULT SHALL BE SUITABLE FOR H-20 LOADINGS.
12. BYPASS SHALL BE 2" MINIMUM.



Vault Plan

1. FLANGED COUPLING ADAPTER
2. SENSUS OMNI METER
3. FLANGED x PLAIN END PIECE, CUT TO FIT
4. SWING CHECK VALVE
5. GATE VALVE
6. 2" TEST PLUG
7. PIPE RESTRAINT CAST INTO WALL. ALTERNATIVES AT DISCRETION OF ENGINEER
8. DUAL CHECK VALVE

12"x12" IRRIGATION BOX W/1¾" HOLE FOR TOUCH READ SENSOR. PLACE BOX IN LANDSCAPING. DRILL 2" HOLE IN VAULT TO RUN WIRE THROUGH. RUN 1½" CONDUIT FROM VAULT TO SENSOR BOX.



Vault Profile

12" CONCRETE APRON AROUND VALVE BOX.

ISOLATION GATE VALVE (MJ) WITH C.I. VALVE BOX AND TRACER WIRE.

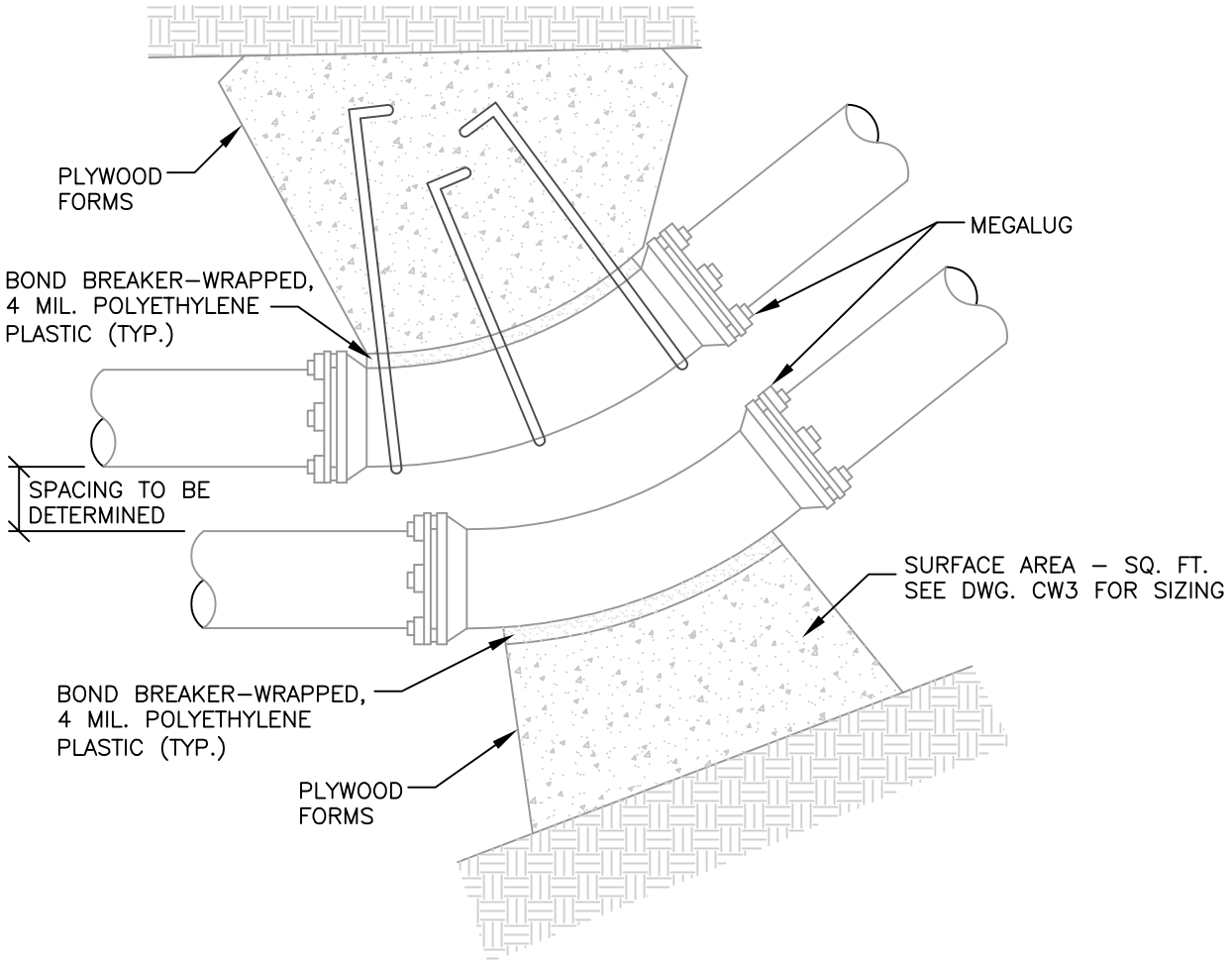
DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	Typical Large Meter Vault	DATE: 09-06-16
CHECKED:			DRWG NO.: CW9
CHECKED:			

NOTE:
LARGER THAN 12" TO BE SPECIFICALLY DESIGNED BY ENGINEER. FORMS SHALL BE 3/8" PLYWOOD OR DISTRICT APPROVED EQUIVALENT.

MINIMUM CUBIC YARDS OF CONCRETE

PIPE SIZE	BENDS			
	11-1/4°	22-1/2°	45°	90°
4"	0.2	0.4	1.3	N/A
6"	0.2	0.5	1.8	N/A
8"	0.2	0.5	1.8	N/A
10"	0.2	0.8	2.7	N/A
12"	0.3	1.0	3.8	N/A

N/A = NOT ALLOWED

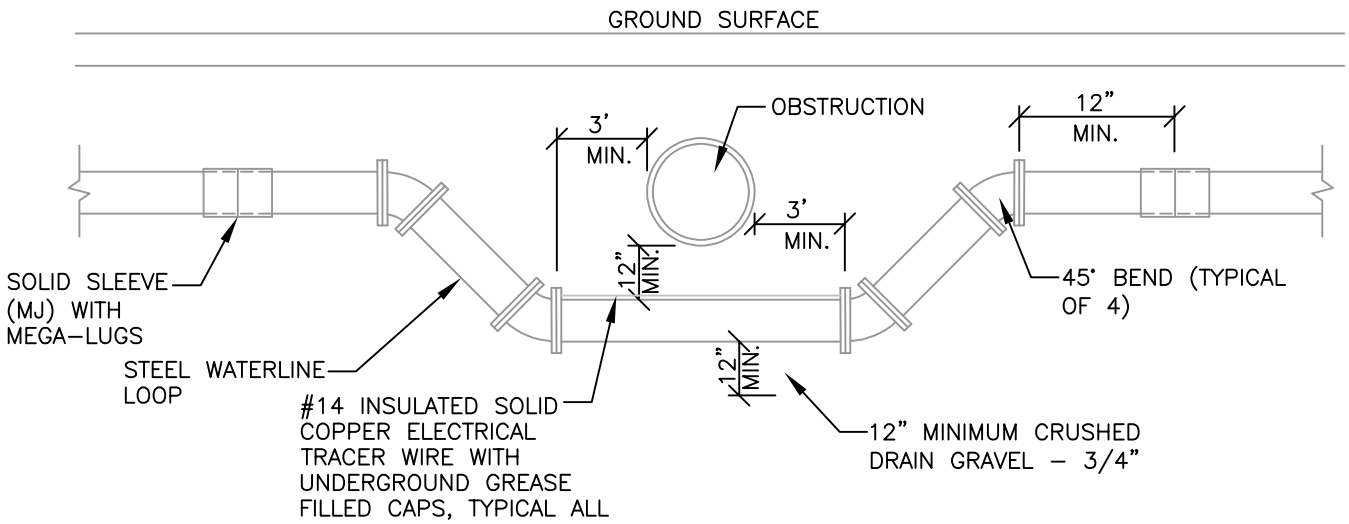


Top View
Horizontal Parallel Bends

GENERAL NOTES:

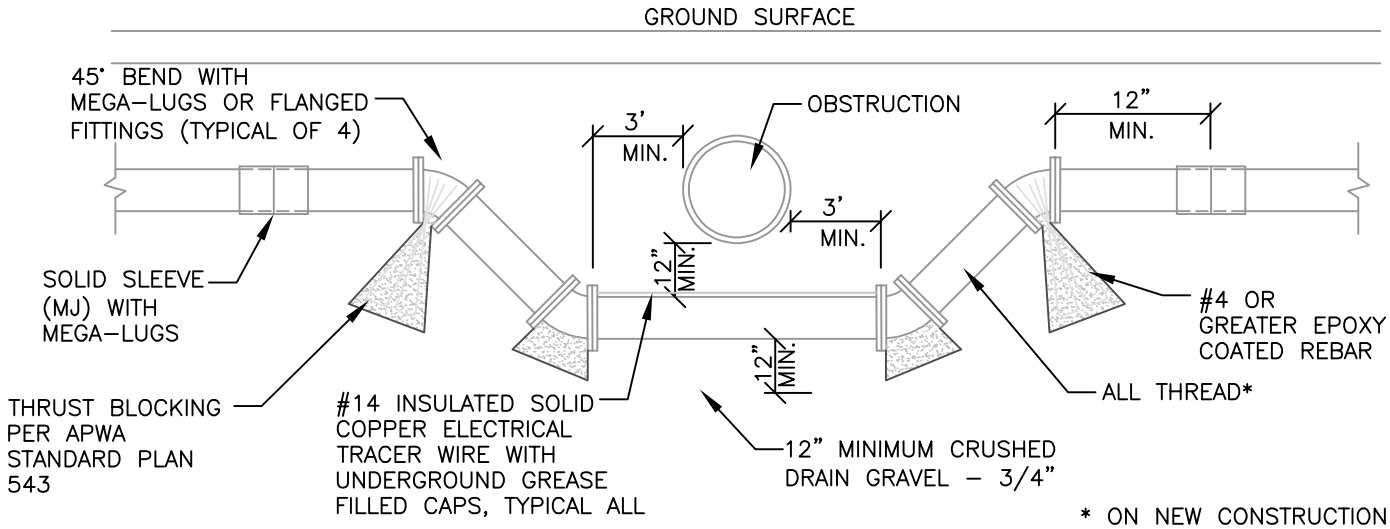
1. USE MEGALUG JOINT RESTRAINT DEVICES OR SIMILAR UPON PRIOR DISTRICT APPROVAL - POLY-WRAPPED PIPE TO SERVE AS BOND BREAKER (NOT TO INTERFERE WITH RESTRAINED JOINTS). ALL SURFACES OF THE RESTRAINED JOINTS SHALL BE ACCESSIBLE AND FREE FROM INTERFERENCE DUE TO THRUST BLOCK CONSTRUCTION.
2. MINIMUM AREA REQUIRED WILL BE THAT OF AN 8-INCH MAIN.
3. ALL THRUST BLOCKS SHALL BE FORMED. THE MINIMUM THICKNESS FORM MATERIAL SHALL BE 3/8" PLYWOOD OR DISTRICT APPROVED EQUIVALENT.
4. BEARING AREA BASED ON SOIL BEARING PRESSURE OF 2000 LB/SF.
5. EMBED THREE (3) NO. 4 EPOXY-COATED REBAR 18" INTO CONCRETE W/ ENDS BENT 90 DEGREES AS SHOWN.

DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	# Parallel Bends w/ Thrust Blocks	DATE: 09-06-16
CHECKED:			DRWG NO.: CW10
CHECKED:			



PRE-FABRICATED LOOP

STANDARD LOOP



WATERLINE LOOP

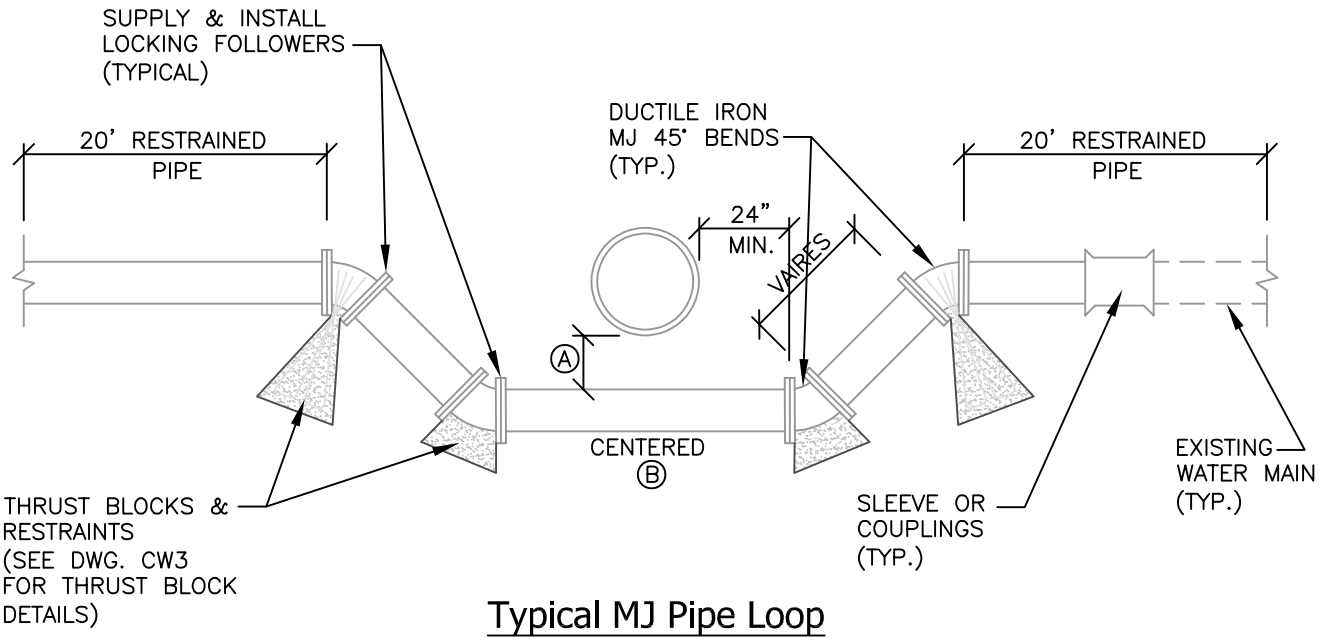
MAY BE USED AT DISCRETION OF DISTRICT ENGINEER

* ON NEW CONSTRUCTION USE BELL RESTRAINTS IN PLACE OF ALL THREAD

NOTES:

1. SELECT SAND SHALL BE USED AS BEDDING AND BACKFILL 12" UNDER, ON SIDES AND OVER WATERLINE LOOP.
2. BEDDING SHALL BE COMPACTED TO 95% MIN. ASTM D-1557.
3. MINIMUM TRENCH WIDTH SHALL BE EQUAL TO OUTSIDE PIPE DIAMETER PLUS 1' EACH SIDE OF PIPE.
4. IF DAMAGE IS CAUSED TO WATER MAIN CONTRACTOR WILL BE HELD RESPONSIBLE FOR REPAIRS.
5. PRE-FAB WATERLINE PIPE AND FITTINGS SHALL BE BUTT WELDED A53 GRADE B SCH 80 STEEL FOR PIPES LESS THAN 12" DIAMETER AND COPPER ELECTRICAL TRACER WIRE WITH UNDERGROUND GREASE FILLED CAPS.
6. REFER TO APWA SECTION 33 05 09 FOR EPOXY LINING AND COATING DETAILS.
7. GREASE AND WRAP ALL EXTERNAL FITTINGS AND BOLTS WITH F.M. GREASE AND 8-MIL POLYETHYLENE AND DUCT TAPE TIGHT.
8. ALL THRUST BLOCKING MUST BE REINFORCED BY SECURE BANK.

DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	# Typical Waterline Loop	DATE: 09-06-16
CHECKED:			DRWG NO.: CW11
CHECKED:			



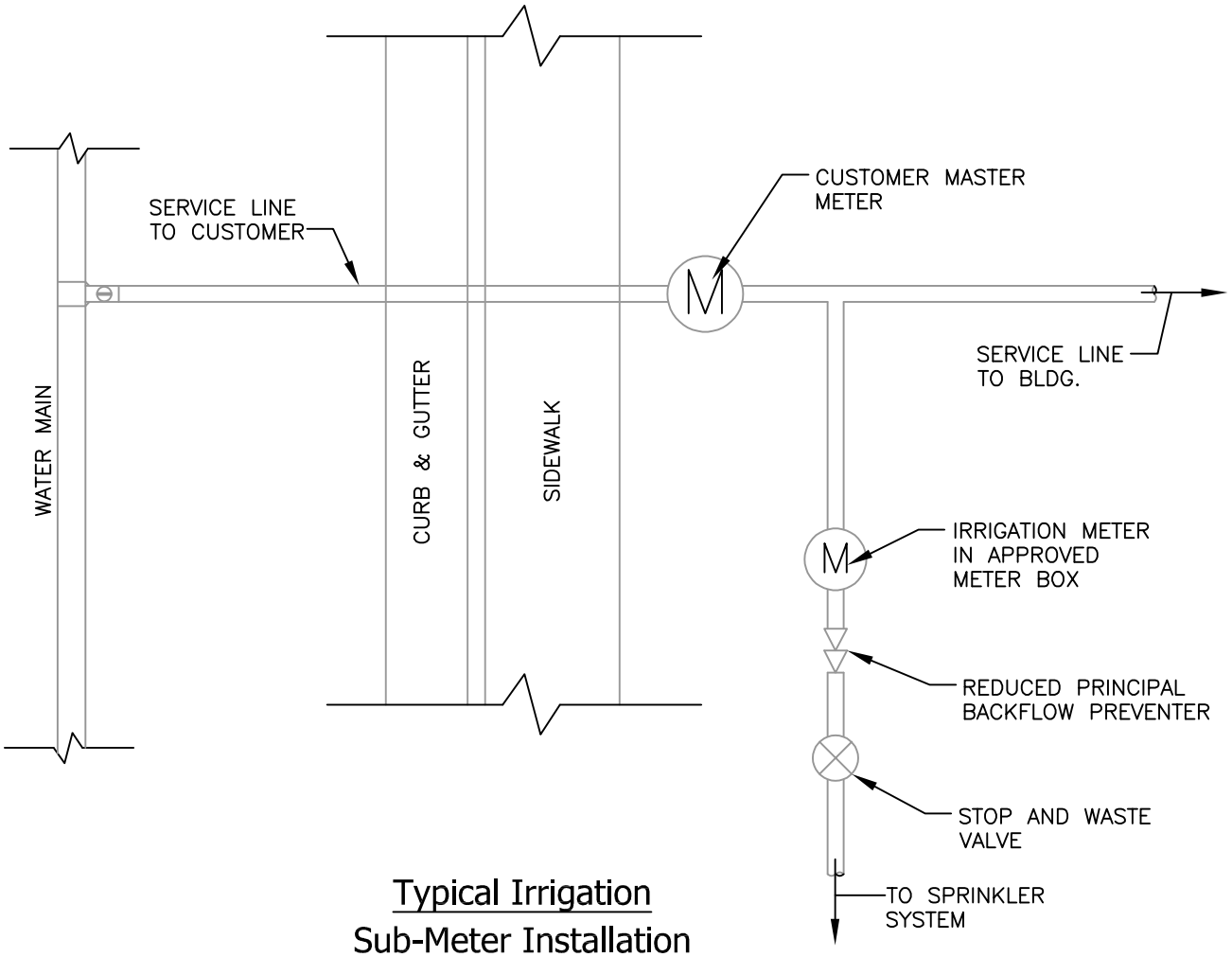
Typical MJ Pipe Loop

TABLE OF DIMENSIONS		
OBSTRUCTION	A	B
SEWER	18" MINIMUM	20' MINIMUM
OTHER	12" MINIMUM	O.D. + 48"

NOTES:

1. BEFORE BACKFILLING, SECURE INSPECTION FROM KID INSPECTOR.
2. ALL DUCTILE IRON PIPE IS TO BE POLY WRAPPED AND ALL FITTING GREASED (FM).
3. THRUST BLOCKS – CONCRETE CLASS 4000.
4. REINFORCEMENT: DEFORMED, 60 KSI YIELD GRADE STEEL. ASTM 615.
5. GREASE: NON–OXIDE POLY–FM.

DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	Typical Water Main MJ Loop Detail	DATE: 09–06–16
CHECKED:			DRWG NO.: CW12
CHECKED:			



Typical Irrigation
Sub-Meter Installation
SCHEMATIC DETAIL NO SCALE

DRAWN: R.H.	KEARNS IMPROVEMENT DISTRICT WATER AND SEWER SERVICES	Typical Irrigation Sub-Meter Installation	DATE: 09–06–16
CHECKED:			DRWG NO.: CW13
CHECKED:			