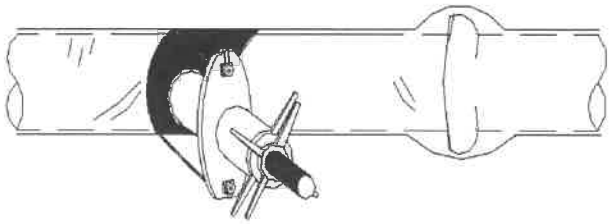
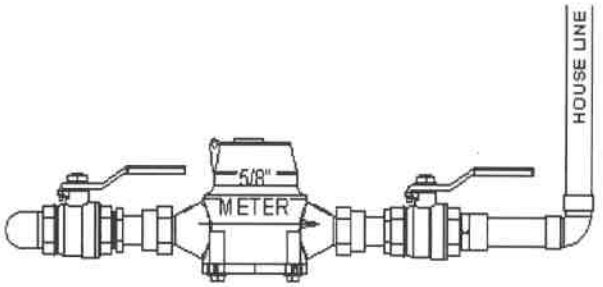
GREATER CINCINNATI

WATER WORKS

A Service of The City of Cincinnati

STANDARD DRAWINGS





ENGINEERING DIVISION

JEFF PIEPER , P.E. CHIEF ENGINEER

CINCINNATI WATER WORKS
STANDARD DRAWINGS INDEX

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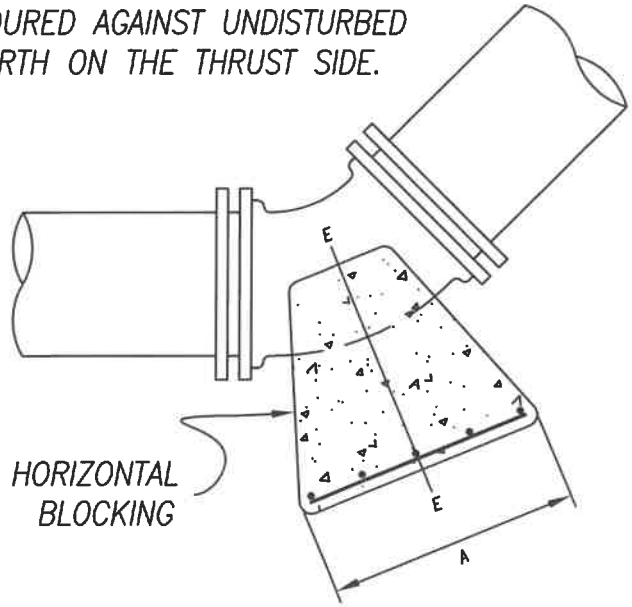
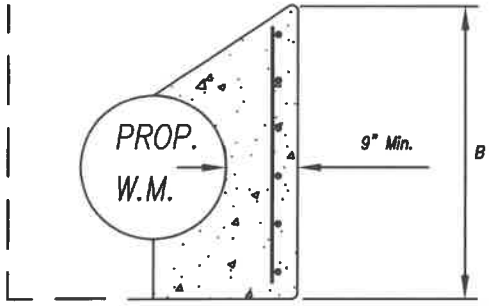
NOTE:
PRESSURE RANGES AS SHOWN ARE OPERATING PRESSURES. CONCRETE AND STEEL QUANTITIES ARE CALCULATED USING OPERATING PRESSURE PLUS 50 P.S.I.

NOTE:
CONCRETE BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH ON THE THRUST SIDE.



3/4" REINFORCING BARS TO BE PLACED ON THRUST SIDE 6" O.C.



HORIZONTAL
SECTION E – E

SIZE		75 P.S.I. & UNDER				75 P.S.I. TO 125 P.S.I.				125 P.S.I. TO 200 P.S.I.			
	BEND ANGLE	A	B	CU. YDS. CONC.	LBS. STEEL	A	B	CU. YDS. CONC.	LBS. STEEL	A	B	CU. YDS. CONC.	LBS. STEEL
4	11 1/4	1'6"	1'6"	0.1	–	1'6"	1'6"	0.1	14	1'6"	1'6"	0.1	14
	22 1/2	1'6"	1'6"	0.1	–	1'6"	1'6"	0.1	14	1'6"	1'6"	0.1	14
	45	1'6"	1'6"	0.1	–	1'6"	1'6"	0.1	14	1'6"	1'6"	0.1	14
6	11 1/4	1'6"	1'6"	0.1	–	1'6"	1'6"	0.1	14	1'6"	1'6"	0.1	14
	22 1/2	1'6"	1'6"	0.1	–	1'6"	1'6"	0.1	14	1'6"	1'6"	0.1	14
	45	1'6"	1'6"	0.1	–	1'6"	1'6"	0.1	14	2'0"	1'6"	0.1	16
8	11 1/4	1'6"	1'6"	0.1	–	1'6"	1'9"	0.1	17	1'6"	1'9"	0.1	17
	22 1/2	1'6"	1'6"	0.1	–	1'6"	1'9"	0.1	17	1'6"	1'9"	0.1	17
	45	2'0"	1'6"	0.2	–	2'0"	1'9"	0.2	20	2'6"	2'0"	0.2	24
10	11 1/4	1'6"	1'6"	0.1	–	1'6"	1'6"	0.1	14	1'6"	1'6"	0.1	14
	22 1/2	1'6"	1'6"	0.1	–	2'0"	1'6"	0.2	18	2'0"	2'0"	0.2	24
	45	2'6"	1'6"	0.2	–	3'0"	2'0"	0.3	36	3'0"	2'6"	0.4	40
12	11 1/4	1'6"	1'6"	0.1	–	1'6"	2'0"	0.2	20	1'6"	2'0"	0.2	18
	22 1/2	1'6"	2'0"	0.2	–	2'0"	2'0"	0.2	24	2'6"	2'6"	0.3	30
	45	2'6"	2'0"	0.3	–	3'6"	2'6"	0.4	45	3'6"	3'6"	0.6	63
16	11 1/4	1'6"	2'0"	0.2	16	2'0"	2'0"	0.2	21	2'0"	2'6"	0.3	30
	22 1/2	2'6"	2'6"	0.3	24	3'0"	2'6"	0.4	38	3'0"	3'6"	0.6	63
	45	3'6"	3'0"	0.6	54	4'0"	3'6"	0.8	68	4'0"	5'0"	1.2	120
20	11 1/4	2'0"	2'6"	0.3	21	2'6"	2'6"	0.4	30	3'0"	2'6"	0.5	45
	22 1/2	3'6"	2'6"	0.6	45	3'6"	3'6"	0.8	63	4'0"	4'0"	1.2	96
	45	4'6"	3'6"	1.0	74	5'0"	4'6"	1.4	108	6'0"	5'0"	2.2	180

IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12X12–W5.8XW5.8) @ 42 LBS. PER 100 S.F.

GREATER CINCINNATI WATER WORKS

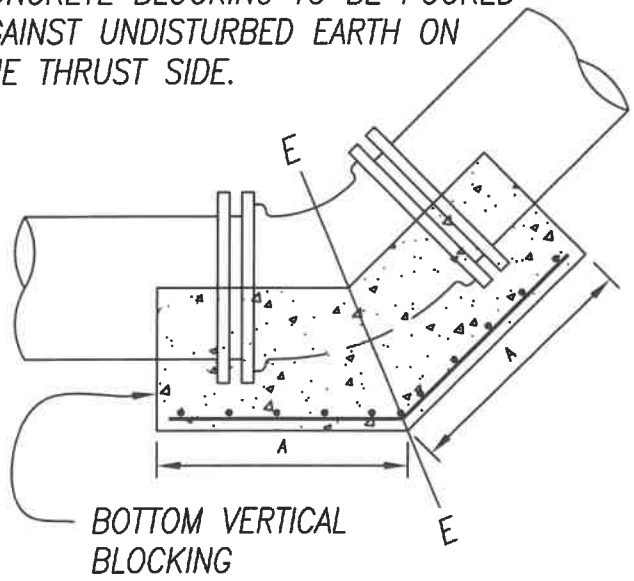
CONCRETE BLOCKING FOR FITTINGS

HORIZONTAL BENDS

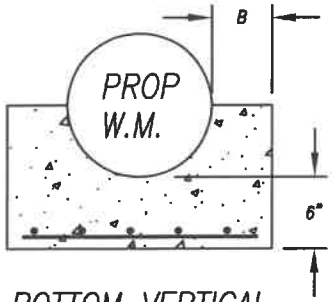
APPROVED	DATE	STANDARD DRAWING
	1/4/13	101- 1

NOTE:
PRESSURE RANGES AS SHOWN ARE OPERATING PRESSURES. CONCRETE AND STEEL QUANTITIES ARE CALCULATED USING OPERATING PRESSURE PLUS 50 P.S.I.

NOTE:
CONCRETE BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH ON THE THRUST SIDE.



3/4" REINFORCING BARS TO BE PLACED ON THRUST SIDE 6" O.C.



BOTTOM VERTICAL
SECTION E – E

SIZE		75 P.S.I. & UNDER				75 P.S.I. TO 125 P.S.I.				125 P.S.I. TO 200 P.S.I.			
	BEND ANGLE	A	B	CU. YDS. CONC.	LBS. STEEL	A	B	CU. YDS. CONC.	LBS. STEEL	A	B	CU. YDS. CONC.	LBS. STEEL
4	11 1/4	1'0"	0'6"	0.1	NA	1'0"	0'6"	0.1	15	1'0"	0'6"	0.1	15
	22 1/2	1'0"	0'6"	0.1	NA	1'0"	0'6"	0.1	15	1'0"	0'6"	0.1	15
	45	1'0"	0'6"	0.1	NA	1'0"	0'6"	0.1	15	1'0"	0'6"	0.1	15
6	11 1/4	1'0"	0'6"	0.1	–	1'0"	0'6"	0.1	16	1'0"	0'6"	0.1	16
	22 1/2	1'0"	0'6"	0.1	–	1'0"	0'6"	0.1	16	1'0"	0'6"	0.1	16
	45	1'0"	0'6"	0.1	–	1'0"	0'6"	0.1	16	1'0"	0'6"	0.1	16
8	11 1/4	1'0"	0'6"	0.1	–	1'0"	0'6"	0.1	20	1'0"	0'6"	0.1	20
	22 1/2	1'0"	0'6"	0.1	–	1'0"	0'6"	0.1	20	1'0"	0'6"	0.1	20
	45	1'0"	0'6"	0.1	–	1'0"	0'6"	0.1	20	1'0"	0'6"	0.2	30
10	11 1/4	1'0"	0'6"	0.2	–	1'0"	0'6"	0.2	21	1'0"	0'6"	0.2	21
	22 1/2	1'0"	0'6"	0.2	–	1'0"	0'6"	0.2	21	1'0"	0'6"	0.2	21
	45	1'0"	0'6"	0.2	–	1'6"	0'6"	0.2	30	2'0"	0'6"	0.3	39
12	11 1/4	1'0"	0'6"	0.2	–	1'0"	0'6"	0.2	25	1'0"	0'6"	0.2	22
	22 1/2	1'0"	0'6"	0.2	–	1'0"	0'6"	0.2	25	1'6"	0'6"	0.3	31
	45	1'6"	0'6"	0.3	–	2'0"	0'6"	0.4	46	3'0"	0'6"	0.5	58
16	11 1/4	1'0"	0'6"	0.3	27	1'0"	0'6"	0.3	27	1'0"	0'6"	0.3	27
	22 1/2	1'0"	0'6"	0.3	27	1'6"	0'6"	0.4	38	2'0"	0'6"	0.5	49
	45	2'0"	0'6"	0.5	49	3'0"	0'6"	0.7	71	4'0"	0'6"	0.9	94
20	11 1/4	1'0"	0'6"	0.3	31	1'0"	0'6"	0.3	31	1'6"	0'6"	0.5	44
	22 1/2	1'6"	0'6"	0.5	44	2'0"	0'6"	0.6	58	3'0"	0'6"	0.9	84
	45	3'0"	0'6"	0.9	80	4'0"	0'6"	1.2	110	5'6"	0'6"	1.6	150

SPECIAL REQUIREMENTS

1. WHERE THE DISTANCE BETWEEN CONCRETE BLOCKING FOR A TOP VERTICAL BEND AND BLOCKING FOR A BOTTOM VERTICAL BEND IS LESS THAN 3 FEET APART, STANDARD DRAWING NO. 101–4 SHALL APPLY.

2. THIS STANDARD DRAWING DOES NOT APPLY TO CREEK CROSSING, SEE STANDARD DRAWING NO. 105–1.

3. IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12X12–W5.8XW5.8) @ 42 LBS. PER 100 S.F.

GREATER CINCINNATI WATER WORKS

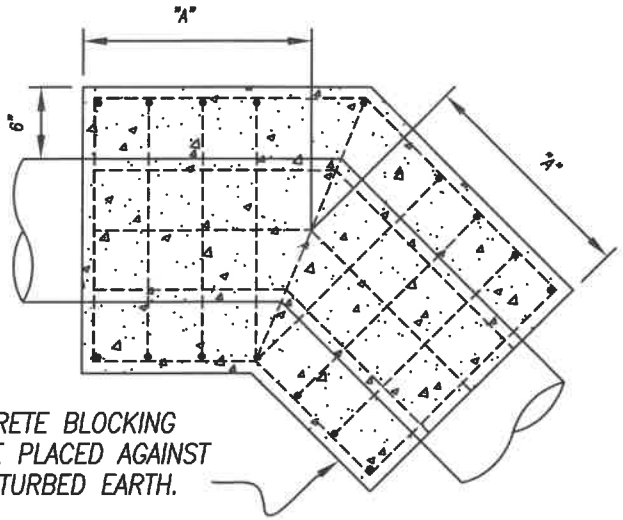
CONCRETE BLOCKING FOR FITTINGS

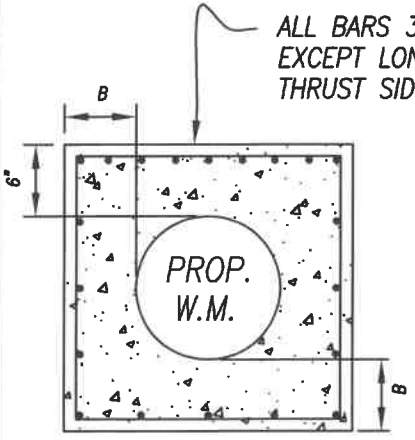
BOTTOM VERTICAL BENDS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	101- 2

NOTE:

1. PRESSURE RANGES AS SHOWN ARE OPERATING PRESSURES. CONCRETE AND STEEL QUANTITIES ARE CALCULATED USING OPERATING PRESSURE PLUS 50 P.S.I.
2. CONCRETE AND STEEL QUANTITIES ARE FOR ESTIMATING PURPOSES ONLY.





SIZE		75 P.S.I. & UNDER				75 P.S.I. TO 125 P.S.I.				125 P.S.I. TO 200 P.S.I.			
	BEND ANGLE	A	B	CU. YDS. CONC.	LBS. STEEL	A	B	CU. YDS. CONC.	LBS. STEEL	A	B	CU. YDS. CONC.	LBS. STEEL
4"	11-1/4°	1'0"	0'9"	0.2	36	1'0"	0'9"	0.2	36	1'0"	0'9"	0.2	36
	22-1/2°	1'0"	0'9"	0.2	36	1'0"	0'9"	0.2	36	1'6"	0'9"	0.3	55
	45°	1'6"	0'9"	0.3	55	1'6"	0'9"	0.3	55	2'0"	1'0"	0.7	100
6"	11-1/4°	1'0"	0'9"	0.3	44	1'0"	0'9"	0.3	44	1'6"	0'9"	0.4	67
	22-1/2°	1'6"	0'9"	0.4	67	1'6"	0'9"	0.4	67	2'0"	0'9"	0.5	89
	45°	2'0"	0'9"	0.5	89	2'0"	1'0"	0.8	116	3'0"	1'0"	1.1	174
8"	11-1/4°	1'6"	0'9"	0.5	79	1'6"	0'9"	0.5	79	1'6"	0'9"	0.5	79
	22-1/2°	1'6"	0'9"	0.5	79	2'0"	0'9"	0.6	105	2'6"	1'0"	1.1	150
	45°	2'0"	1'0"	0.9	120	3'6"	1'0"	1.5	210	5'0"	1'0"	2.1	300
10"	11-1/4°	1'6"	0'9"	0.5	86	1'6"	0'9"	0.5	86	2'0"	0'9"	0.7	115
	22-1/2°	1'6"	0'9"	0.5	86	2'0"	1'0"	1.0	124	3'0"	1'0"	1.4	186
	45°	3'0"	1'0"	1.4	186	4'6"	1'0"	2.2	279	7'0"	1'0"	3.4	435
12"	11-1/4°	1'6"	0'9"	0.6	90	1'6"	0'9"	0.6	90	2'0"	0'9"	0.8	119
	22-1/2°	2'0"	0'9"	0.8	119	2'6"	1'0"	1.3	168	4'0"	1'0"	2.1	240
	45°	4'0"	1'0"	2.1	240	6'0"	1'0'	3.2	403	9'0"	1'0"	4.7	605
16"	11-1/4°	1'6"	0'9"	0.7	100	1'6"	0'9"	0.7	100	2'0"	1'0"	1.3	155
	22-1/2°	2'0"	1'0"	1.3	155	3'6"	1'0"	2.2	271	6'6"	1'0"	4.1	503
	45°	6'0"	1'0"	3.8	464	10'0"	1'0"	6.3	774	9'6"	1'6"	9.6	963

SPECIAL REQUIREMENTS

1. WHERE THE DIMENSIONS INDICATED WILL NOT PERMIT THE BLOCKING TO BEAR AGAINST UNDISTURBED EARTH, WATER MAIN SHALL BE ENCASED AS SHOWN ON STANDARD DRAWING NO. 101-4.
2. WHERE THE DISTANCE BETWEEN CONCRETE BLOCKING FOR A TOP VERTICAL BEND AND BLOCKING FOR A BOTTOM VERTICAL BENDS IS LESS THAN 3 FEET APART, STANDARD DRAWING NO. 101-4 SHALL APPLY.
3. THIS STANDARD DRAWING DOES NOT APPLY TO CREEK CROSSING, SEE STANDARD DRAWING NO. 105-1.

NOTE:

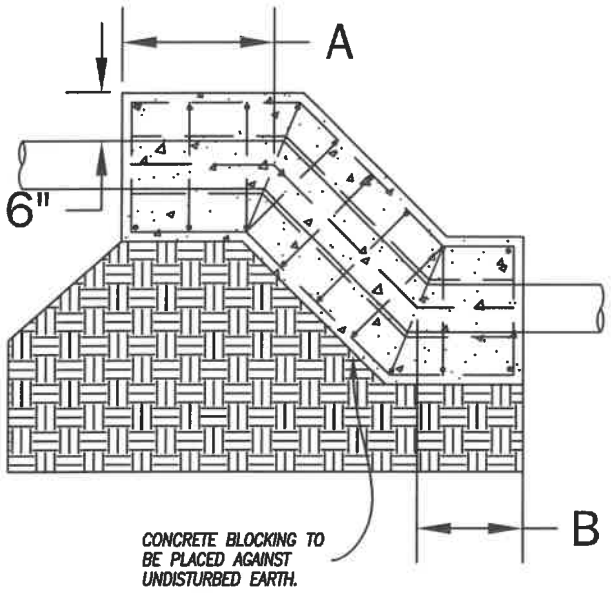
IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12 x 12 – W 5.8 x W 5.8) @ 42 LBS PER. 100 S.F.

GREATER CINCINNATI WATER WORKS

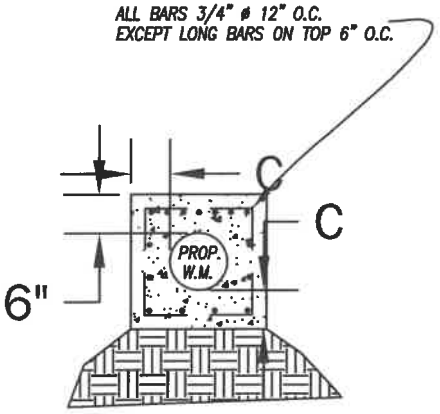
CONCRETE BLOCKING FOR FITTINGS

TOP VERTICAL BENDS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	101-3



SIZE	BEND ANGLE	75 P.S.I. & UNDER					75 P.S.I. TO 125 P.S.I.					125 P.S.I. TO 200 P.S.I.				
		A	B	C	CONC. C.Y. PER LIN. FT.	STEEL LBS. PER LIN. FT.	A	B	C	CONC. C.Y. PER LIN. FT.	STEEL LBS. PER LIN. FT.	A	B	C	CONC. C.Y. PER LIN. FT.	STEEL LBS. PER LIN. FT.
4"	11-1/4	1'-0"	1'-0"	0'-9"	.10	18	1'-0"	1'-0"	0'-9"	.10	18	1'-0"	1'-0"	0'-9"	.10	18
	22-1/2	1'-0"	1'-0"	0'-9"	.10	18	1'-0"	1'-0"	0'-9"	.10	18	1'-6"	1'-0"	0'-9"	.10	18
	45	1'-6"	1'-0"	0'-9"	.10	18	1'-6"	1'-0"	0'-9"	.10	18	2'-0"	1'-0"	1'-0"	.18	25
6"	11-1/4	1'-0"	1'-0"	0'-9"	.15	22	1'-0"	1'-0"	0'-9"	.15	22	1'-6"	1'-0"	0'-9"	.15	22
	22-1/2	1'-6"	1'-0"	0'-9"	.15	22	1'-6"	1'-0"	0'-9"	.15	22	2'-0"	1'-0"	0'-9"	.15	22
	45	2'-0"	1'-0"	0'-9"	.15	22	2'-0"	1'-0"	1'-0"	.20	29	3'-0"	1'-0"	1'-0"	.20	29
8"	11-1/4	1'-6"	1'-0"	0'-9"	.17	26	1'-6"	1'-0"	0'-9"	.17	26	1'-6"	1'-0"	0'-9"	.17	26
	22-1/2	1'-6"	1'-0"	0'-9"	.17	26	2'-0"	1'-0"	0'-9"	.17	26	2'-6"	1'-0"	1'-0"	.23	30
	45	2'-0"	1'-0"	1'-0"	.23	30	3'-6"	1'-0"	1'-0"	.23	30	5'-0"	1'-6"	1'-0"	.23	30
10"	11-1/4	1'-6"	1'-0"	0'-9"	.17	29	1'-6"	1'-0"	0'-9"	.17	29	2'-0"	1'-0"	0'-9"	.17	29
	22-1/2	1'-6"	1'-0"	0'-9"	.17	29	2'-0"	1'-0"	1'-0"	.23	31	3'-0"	1'-0"	1'-0"	.23	31
	45	3'-0"	1'-0"	1'-0"	.23	31	4'-6"	1'-6"	1'-0"	.23	31	7'-0"	2'-0"	1'-0"	.23	31
12"	11-1/4	1'-6"	1'-0"	0'-9"	.20	30	1'-6"	1'-0"	0'-9"	.20	30	2'-0"	1'-0"	0'-9"	.20	30
	22-1/2	2'-0"	1'-0"	0'-9"	.20	30	2'-6"	1'-0"	1'-0"	.26	40	4'-0"	1'-6"	1'-0"	.26	40
	45	4'-0"	1'-0"	1'-0"	.26	40	6'-0"	2'-0"	1'-0"	.26	40	9'-0"	3'-0"	1'-0"	.26	40
16"	11-1/4	1'-6"	1'-0"	0'-9"	.24	34	1'-6"	1'-0"	0'-9"	.24	34	2'-0"	1'-0"	1'-0"	.32	39
	22-1/2	2'-0"	1'-0"	1'-0"	.32	39	3'-6"	1'-6"	1'-0"	.32	39	6'-6"	2'-0"	1'-0"	.32	39
	45	6'-0"	2'-0"	1'-0"	.32	39	10'-0"	3'-0"	1'-0"	.32	39	9'-6"	4'-0"	1'-6"	.51	51



NOTE: 1. PRESSURE RANGES AS SHOWN ARE OPERATING PRESSURES. CONCRETE AND STEEL QUANTITIES ARE CALCULATED USING OPERATING PRESSURE PLUS 50 P.S.I.

2. CONCRETE AND STEEL QUANTITIES ARE FOR ESTIMATING PURPOSES ONLY.

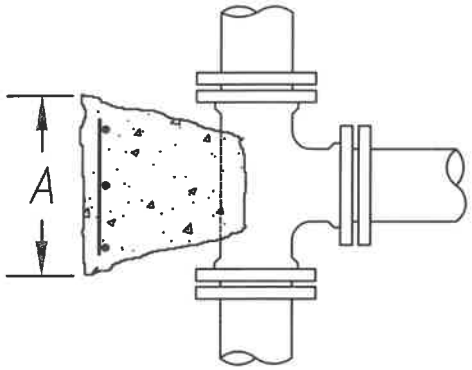
3. IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12 X 12 – W5.8 X W5.8) @ 42 LBS. PER 100 S.F.

GREATER CINCINNATI WATER WORKS

CONCRETE BLOCKING FOR FITTINGS

TOP AND BOTTOM VERTICAL BENDS - FULL ENCASEMENT

APPROVED	DATE	STANDARD DRAWING
	1/4/13	101-4



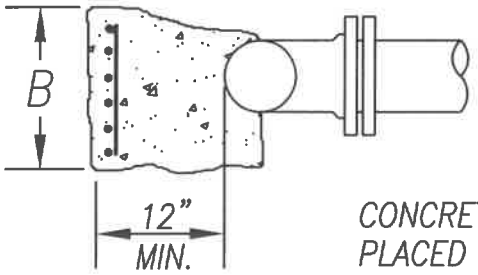
3/4" REINFORCING BARS TO BE PLACED ON THRUST SIDE 6" O.C.

SIZE		75 P.S.I. & UNDER				75 P.S.I. TO 125 P.S.I.				125 P.S.I. TO 200 P.S.I.			
RUN	BRANCH	A	B	CU. YDS. CONC.	LBS. STEEL	A	B	CU. YDS. CONC.	LBS. STEEL	A	B	CU. YDS. CONC.	LBS. STEEL
6"	6"	1'9"	1'6"	0.1	17	2'6"	1'6"	0.1	23	2'6"	2'0"	0.2	30
8"	6"	1'6"	1'9"	0.1	17	2'0"	1'9"	0.1	23	2'6"	2'0"	0.2	30
12"	6"	1'6"	2'0"	0.2	18	2'0"	2'0"	0.2	24	2'6"	2'0"	0.2	30
16"	6"	1'6"	2'6"	0.2	23	1'6"	2'6"	0.2	23	2'0"	2'6"	0.2	30
20"	6"	1'6"	2'9"	0.2	26	1'6"	2'9"	0.2	26	1'9"	2'9"	0.2	33
8"	8"	2'0"	2'0"	0.2	24	2'6"	2'0"	0.2	28	3'0"	2'3"	0.2	32
10"	8"	2'0"	2'0"	0.2	24	2'6"	2'0"	0.2	28	3'0"	2'3"	0.2	32
12"	8"	2'0"	2'0"	0.2	24	2'6"	2'0"	0.2	28	3'0"	2'3"	0.2	32
16"	8"	2'0"	2'0"	0.2	24	2'6"	2'6"	0.3	35	3'0"	2'4"	0.3	32
20"	8"	2'0"	2'0"	0.2	24	2'6"	2'9"	0.4	35	3'0"	2'9"	0.4	39
12"	12"	3'0"	3'0"	0.5	54	4'0"	2'6"	0.4	55	4'6"	3'6"	0.7	95
16"	12"	3'0"	3'0"	0.5	54	4'0"	2'6"	0.4	55	4'6"	3'9"	0.7	98
20"	12"	3'0"	3'0"	0.5	54	4'0"	2'9"	0.6	60	4'6"	4'0"	1.0	108
20"	16"	4'0"	3'6"	0.8	84	4'6"	4'0"	1.0	108	6'0"	5'0"	1.5	180
20"	20"	4'6"	4'6"	1.1	122	5'6"	5'0"	1.4	165	7'0"	6'0"	2.0	252

NOTE: 1. PRESSURE RANGES AS SHOWN ARE OPERATING PRESSURES. CONCRETE AND STEEL QUANTITIES ARE CALCULATED USING OPERATING PRESSURE PLUS 50 P.S.I.

2. CONCRETE AND STEEL QUANTITIES ARE FOR ESTIMATING PURPOSES ONLY.

3. IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12 X 12 – W5.8 X W5.8) @ 42 LBS. PER 100 S.F.



CONCRETE BLOCKING TO BE PLACED AGAINST UNDISTURBED EARTH.

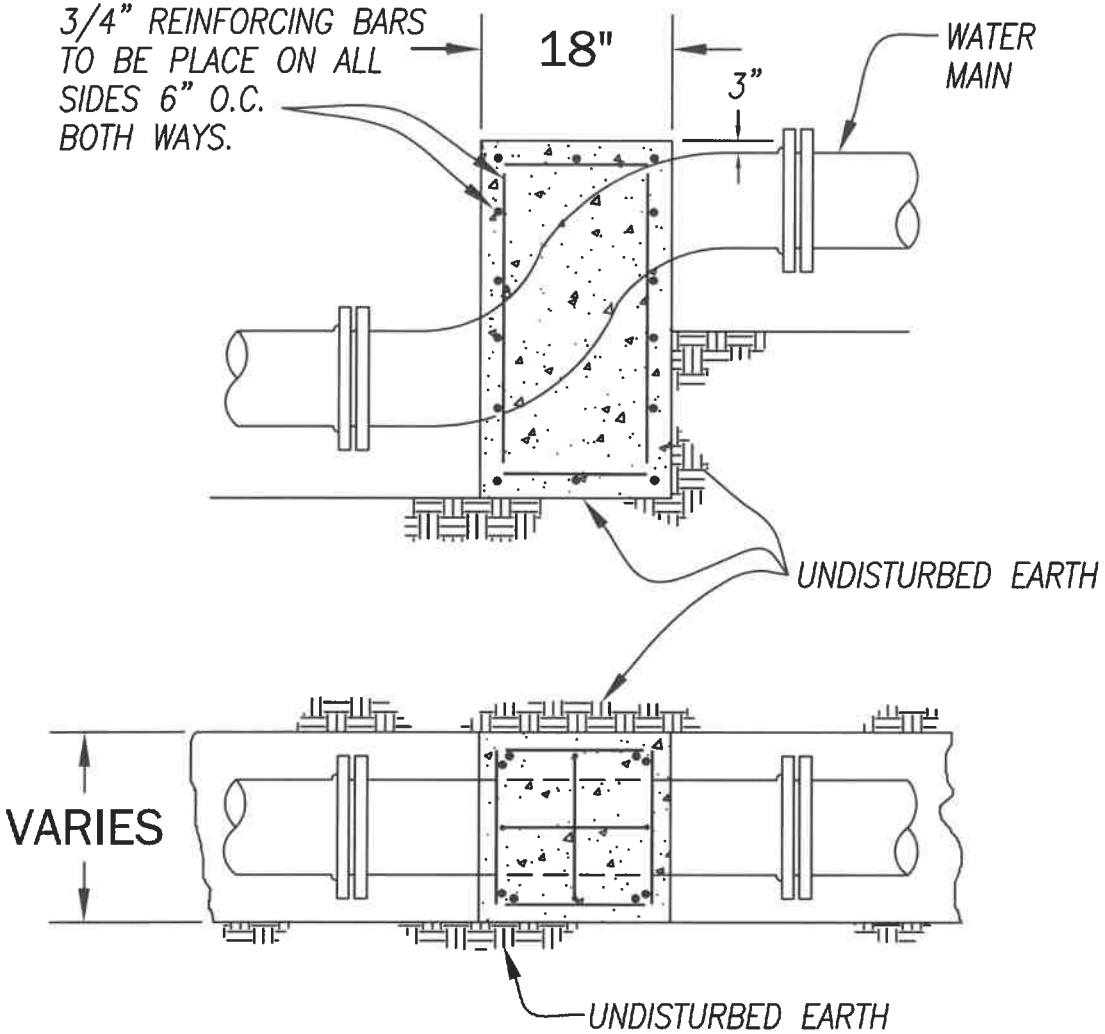
NOTE:
THIS STD. DWG. SHALL BE UTILIZED FOR BLOCKING OF TEES, 90° BENDS, FIRE HYDRANTS, AND PLUGS

GREATER CINCINNATI WATER WORKS

CONCRETE BLOCKING FOR FITTINGS

TEES

APPROVED	DATE	STANDARD DRAWING
	1/4/13	101-5



FOR ESTIMATING ONLY

PIPE SIZE	CU. YD. CONC.	LBS. STEEL
4"	.2	69
6"	.2	69
8"	.2	69
10"	.25	83
12"	.3	88

NOTE:
CONCRETE BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH.

CONCRETE BLOCKING FOR OFFSET BENDS IN A HORIZONTAL POSITION REFER TO STANDARD DRAWING 101-1

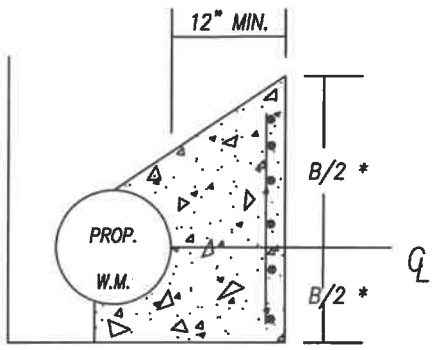
IN LIEU OF STEEL REINFORCING BARS. THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12 X 12 – W5.8 X W5.8) @ 42 LBS PER S.F.

GREATER CINCINNATI WATER WORKS

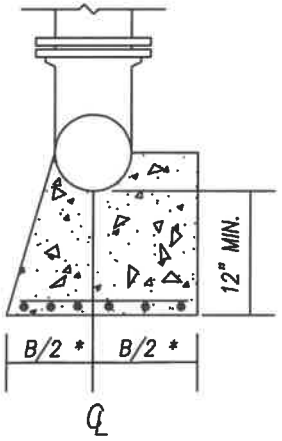
CONCRETE BLOCKING FOR FITTINGS

OFFSET BENDS

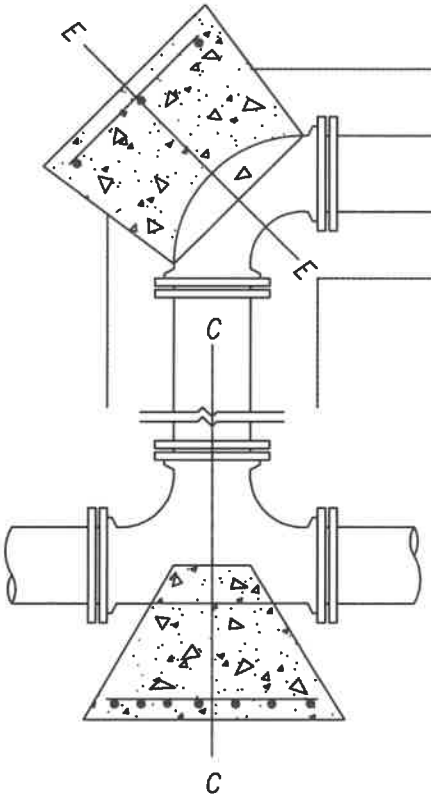
APPROVED	DATE	STANDARD DRAWING
	1/4/13	101-6

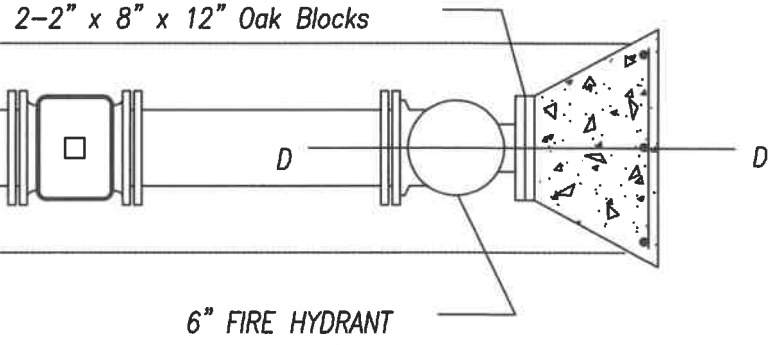


HORIZONTAL
SECTION E–E

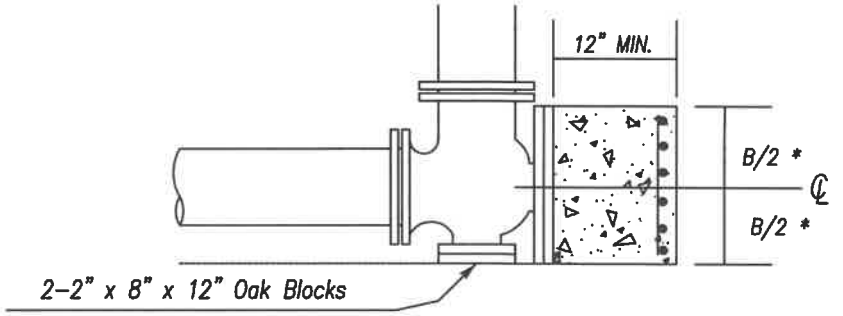


SECTION C–C





PLAN VIEW



SECTION D–D

* SEE NOTE ONE

NOTE:

1. REFER TO STANDARD DRAWING NO. 101–5 FOR PLACEMENT OF REINFORCING STEEL AND BLOCKING DETAILS.

2. CONCRETE BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH ON THE THRUST SIDE.

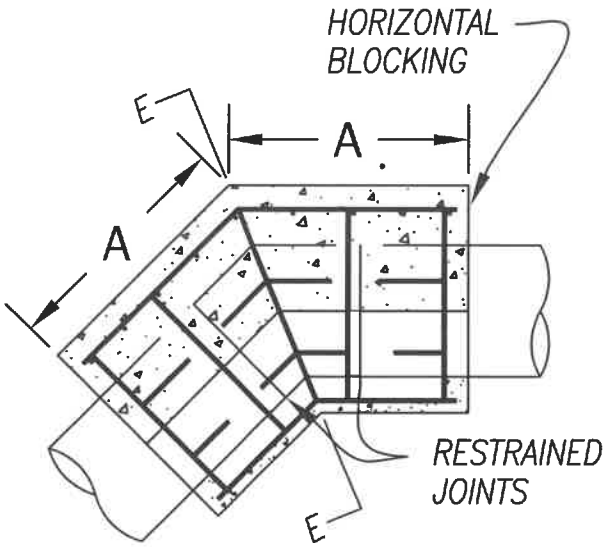
3. IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12 x 12 – W 5.8 x W 5.8) @ 42 LBS. PER 100 S.F.

GREATER CINCINNATI WATER WORKS

CONCRETE BLOCKING FOR FITTINGS

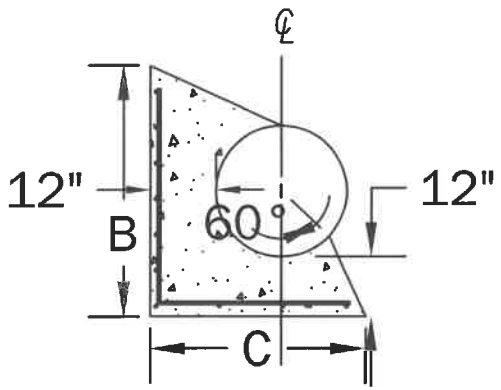
FIRE HYDRANT BLOCKING

APPROVED	DATE	STANDARD DRAWING
	1/4/13	101- 7



CONCRETE BLOCKING TO BE PLACED AGAINST UNDISTURBED EARTH.

SIZE		75 P.S.I. & UNDER					75 P.S.I. TO 125 P.S.I.					125 P.S.I. TO 200 P.S.I.				
	BEND ANGLE	A	B	C	CU. YDS. CONC.	LBS. STEEL	A	B	C	CU. YDS. CONC.	LBS. STEEL	A	B	C	CU. YDS. CONC.	LBS. STEEL
24"	5°–20°	2'–0"	4'–4"	3'–10"	1.1	120	2'–0"	4'–4"	3'–10"	1.1	120	2'–0"	4'–4"	3'–10"	1.1	120
	21°–35°	2'–9"	4'–4"	3'–10"	1.5	230	2'–9"	4'–4"	3'–10"	1.5	230	2'–9"	4'–4"	3'–10"	1.5	230
	36°–45°	3'–2"	4'–4"	3'–10"	1.6	255	3'–2"	4'–4"	3'–10"	1.6	255	3'–2"	4'–4"	3'–10"	1.6	255
30"	5°–20°	2'–3"	4'–11"	4'–5"	1.5	225	2'–3"	4'–11"	4'–5"	1.5	225	2'–3"	4'–11"	4'–5"	1.5	225
	21°–35°	2'–11"	4'–11"	4'–5"	1.8	290	2'–11"	4'–11"	4'–5"	1.8	290	3'–6"	4'–11"	4'–5"	2.4	330
	36°–45°	3'–5"	4'–11"	4'–5"	2.0	340	3'–5"	4'–11"	4'–5"	2.0	340	4'–6"	4'–11"	4'–5"	3.1	420
36"	5°–20°	2'–4"	5'–10"	5'–4"	2.3	280	2'–4"	5'–10"	5'–4"	2.3	280	2'–4"	5'–10"	5'–4"	2.3	280
	21°–35°	3'–0"	5'–10"	5'–4"	3.0	335	3'–0"	5'–10"	5'–4"	3.0	335	3'–11"	5'–10"	5'–4"	3.9	450
	36°–45°	3'–8"	5'–10'	5'–4"	3.2	415	3'–8"	5'–10'	5'–4"	3.2	415	4'–11"	5'–10'	5'–4"	4.9	610
42"	5°–20°	2'–6"	6'–3"	5'–9"	2.6	290	2'–6"	6'–3"	5'–9"	2.6	290	2'–9"	6'–3"	5'–9"	3.2	340
	21°–35°	3'–5"	6'–3"	5'–9"	3.8	380	3'–5"	6'–3"	5'–9"	3.8	380	4'–10"	6'–3"	5'–9"	5.5	565
	36°–45°	4'–0"	6'–3"	5'–9"	4.1	460	4'–3"	6'–3"	5'–9"	4.9	480	6'–1"	6'–3"	5'–9"	6.9	730
48"	5°–20°	2'–9"	6'–10"	6'–4"	3.4	300	2'–9"	6'–10"	6'–4"	3.4	300	3'–4"	6'–10"	6'–4"	4.7	440
	21°–35°	3'–8"	6'–10"	6'–4"	4.6	400	4'–0"	6'–10"	6'–4"	5.6	500	5'–9"	6'–10"	6'–4"	8.0	670
	36°–45°	4'–5"	6'–10"	6'–4"	5.6	495	5'–0"	6'–10"	6'–4"	7.2	625	7'–3"	6'–10"	6'–4"	10.2	895



HORIZONTAL SECTION E–E

3/4" REINFORCING BARS TO BE PLACED 6" O.C. ON THRUST SIDE AND 12" O.C. ON BOTTOM.

NOTE:
1. PRESSURE RANGES AS SHOWN ARE OPERATING PRESSURES. CONCRETE AND STEEL QUANTITIES ARE CALCULATED USING OPERATING PRESSURE PLUS 50 P.S.I.
2. CONCRETE AND STEEL QUANTITIES ARE FOR ESTIMATING PURPOSES.
3. THE "A" DIMENSION IS BASED ON A MINIMUM OF 12" FROM THE END OF THE CONCRETE BLOCK TO THE FACE OF THE BELL RING MEASURED ALONG THE CENTER LINE OF THE PIPE.
4. IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12 X 12 – W 5.8 X W 5.8) @ 42 LBS. PER. 100 S.F.

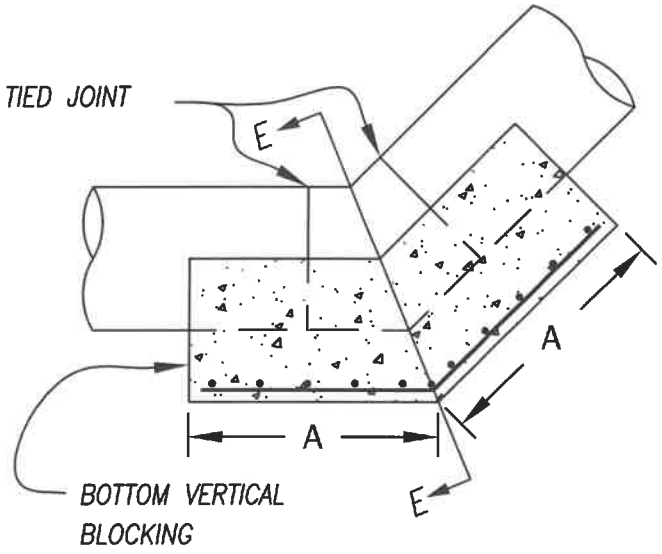
GREATER CINCINNATI WATER WORKS

CONCRETE BLOCKING FOR CONCRETE PIPE FITTINGS

CONCRETE PIPE HORIZONTAL BENDS

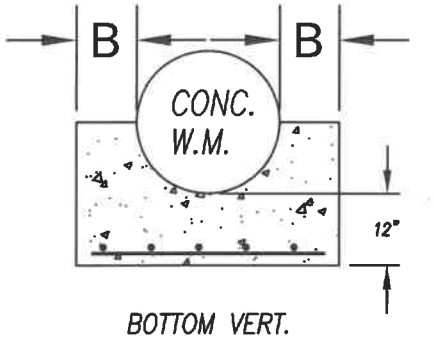
APPROVED	DATE	STANDARD DRAWING
	1/4/13	102- 1

NOTE:
PRESSURE RANGES AS SHOWN ARE OPERATING PRESSURES. CONCRETE AND STEEL QUANTITIES ARE CALCULATED USING OPERATING PRESSURE PLUS 50 P.S.I.



NOTE:
CONCRETE BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH ON THE THRUST SIDE.

SIZE		75 P.S.I. & UNDER				75 P.S.I. TO 125 P.S.I.				125 P.S.I. TO 200 P.S.I.			
	BEND ANGLE	A	B	CU. YDS. CONC.	LBS. STEEL	A	B	CU. YDS. CONC.	LBS. STEEL	A	B	CU. YDS. CONC.	LBS. STEEL
24	5° to 20°	2'-0"	1'-0"	1.1	120	2'-0"	1'-0"	1.1	120	2'-0"	1'-0"	1.1	120
	21° to 35°	2'-9"	1'-0"	1.4	160	2'-9"	1'-0"	1.4	160	2'-9"	1'-0"	1.4	160
	36° to 45°	3'-2"	1'-0"	1.5	180	3'-2"	1'-0"	1.5	180	3'-2"	1'-0"	1.5	180
30	5° to 20°	2'-3"	1'-0"	1.3	150	2'-3"	1'-0"	1.3	150	2'-3"	1'-0"	1.3	150
	21° to 35°	2'-11"	1'-0"	1.6	190	2'-11"	1'-0"	1.6	190	3'-6"	1'-0"	2.2	225
	36° to 45°	3'-5"	1'-0"	1.8	225	3'-5"	1'-0"	1.8	225	4'-6"	1'-0"	2.8	290
36	5° to 20°	2'-4"	1'-0"	2.0	190	2'-4"	1'-0"	2.0	190	2'-4"	1'-0"	2.0	190
	21° to 35°	3'-0"	1'-0"	2.5	230	3'-0"	1'-0"	2.5	230	3'-11"	1'-0"	3.3	300
	36° to 45°	3'-8"	1'-0"	2.7	275	3'-8"	1'-0"	2.7	275	4'-11"	1'-0"	4.2	375
42	5° to 20°	2'-6"	1'-0"	2.0	190	2'-6"	1'-0"	2.0	190	2'-9"	1'-0"	2.5	230
	21° to 35°	3'-5"	1'-0"	3.1	260	3'-5"	1'-0"	3.1	260	4'-10"	1'-0"	4.4	390
	36° to 45°	4'-0"	1'-0"	3.3	300	4'-3"	1'-0"	3.9	350	6'-1"	1'-0"	5.6	490
48	5° to 20°	2'-9"	1'-0"	2.7	210	2'-9"	1'-0"	2.7	210	3'-4"	1'-0"	3.8	295
	21° to 35°	3'-8"	1'-0"	3.8	275	4'-0"	1'-0"	4.6	345	5'-9"	1'-0"	6.5	455
	36° to 45°	4'-5"	1'-0"	4.5	335	5'-0"	1'-0"	5.8	430	7'-3"	1'-0"	8.2	600



BOTTOM VERT.
SECTION E – E

3/4" REINFORCING BARS, TO BE PLACED ON THRUST SIDE 6" O.C.

NOTE:
THE "A" DIMENSION IS BASED ON A MINIMUM OF 12" FROM THE END OF THE CONCRETE BLOCK TO THE FACE OF THE BELL RING MEASURED ALONG THE CENTER OF THE PIPE.

IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12 X 12 – W 5.8 X W 5.8) @ 42 LBS. PER 100 S.F.

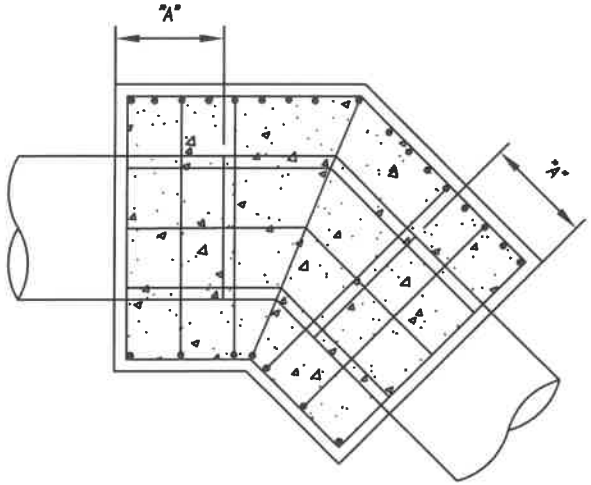
GREATER CINCINNATI WATER WORKS

CONCRETE BLOCKING FOR CONCRETE PIPE FITTINGS

CONCRETE PIPE BOTTOM VERTICAL BENDS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	102- 2

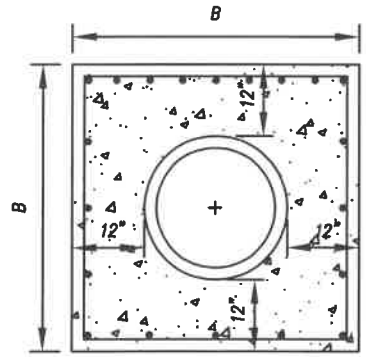
NOTE:
"A" DISTANCE IS THE DIMENSION FROM THE END OF THE CONCRETE BLOCK TO THE FACE OF THE BELL RING.



SIZE	75 P.S.I. & UNDER				75 P.S.I. TO 125 P.S.I.				125 P.S.I. TO 200 P.S.I.			
	A	B	CONC. C.Y./Lin. Ft.	STEEL LBS./Lin. Ft.	A	B	CONC. C.Y./Lin. Ft.	STEEL LBS./Lin. Ft.	A	B	CONC. C.Y./Lin. Ft.	STEEL LBS./Lin. Ft.
24	1'-6"	4'-4"	0.53	65	1'-6"	4'-4"	0.53	65	1'-6"	4'-4"	0.53	65
30	1'-6"	4'-11"	0.65	75	1'-6"	4'-11"	0.65	75	1'-6"	4'-11"	0.65	75
36	1'-6"	5'-10"	0.85	85	1'-6"	5'-10"	0.85	85	1'-6"	5'-10"	0.85	85
42	1'-6"	6'-3"	0.95	95	1'-6"	6'-3"	0.95	95	1'-6"	6'-3"	0.95	95
48	1'-6"	6'-10"	1.14	105	1'-6"	6'-10"	1.14	105	1'-6"	6'-10"	1.14	105

1. THE CONCRETE BLOCKING, FOR A GIVEN PIPE SIZE, HAS THE SAME DIMENSIONS FOR ANY BEND DEFLECTION TO 45° IN EACH OF THE PRESSURE RANGES.
2. IN CASES WHERE THE DISTANCE BETWEEN TOP AND BOTTOM BENDS IS SUCH THAT THE CONCRETE BLOCKING DIMENSIONS SHOWN ON THIS DRAWING AND DRAWING 102-2 OVERLAP ON THE RUN BETWEEN THE TWO BENDS, BOTH BENDS AND THE PIPE BETWEEN THEM SHALL BE FULLY ENCASED WITH CONCRETE TO THE CROSS SECTION SHOWN ON THIS DRAWING.
3. IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12X12-W5.8XW5.8) @ 42 LBS. PER 100 S.F.
4. PRESSURE RANGES AS SHOWN ARE OPERATING PRESSURES. CONCRETE AND STEEL QUANTITIES ARE CALCULATED USING OPERATING PRESSURE PLUS 50 P.S.I.

NOTE:
CONCRETE BLOCKING SHALL NOT BE PLACED ON TOP VERTICAL BENDS UNLESS SPECIFICALLY DESIGNED FOR ON THE CONTRACT PLANS.



Cross-section

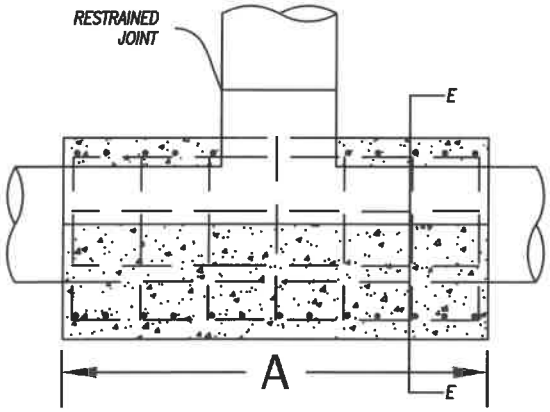
3/4" REINFORCING BARS, TO BE PLACED 6" O.C. ON THRUST SIDE AND 12" O.C. ON REMAINING SIDES.

GREATER CINCINNATI WATER WORKS

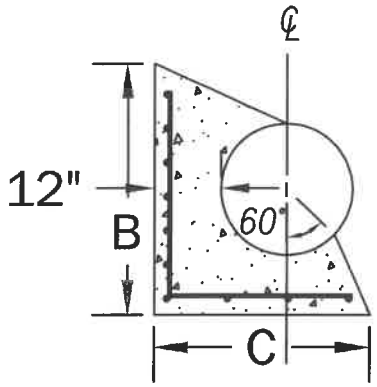
CONCRETE BLOCKING FOR CONCRETE PIPE FITTINGS

CONCRETE PIPE TOP VERTICAL BENDS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	102-3



CONCRETE BLOCKING TO BE PLACED AGAINST UNDISTURBED EARTH



SECTION E–E

3/4" REINFORCING BARS TO BE PLACED 6" O.C. ON THRUST SIDE AND 12" O.C. ON BOTTOM.

SIZE		75 P.S.I. & UNDER					75 to 125 P.S.I.					125 to 200 P.S.I.				
RUN	BRANCH	A	B	C	CU. YDS. CONCRETE	LBS. STEEL	A	B	C	CU. YDS. CONCRETE	LBS. STEEL	A	B	C	CU. YDS. CONCRETE	LBS. STEEL
24"	24"	7'5"	4'4"	3'10"	2.1	300	7'5"	4'4"	3'10"	2.1	300	8'7"	4'4"	3'10"	2.4	480
30"	24"	7'5"	4'11"	4'5"	2.6	375	7'5"	4'11"	4'5"	2.6	375	7'7"	4'11"	4'5"	2.6	375
30"	30"	7'5"	4'11"	4'5"	2.6	375	8'3"	4'11"	4'5"	2.8	400	11'9"	4'11"	4'5"	4.0	580
36"	24"	7'5"	5'10"	5'4"	3.7	420	7'5"	5'10"	5'4"	3.7	420	7'5"	5'10"	5'4"	3.7	420
36"	30"	7'5"	5'10"	5'4"	3.7	420	7'5"	5'10"	5'4"	3.7	420	9'11"	5'10"	5'4"	4.9	540
36"	36"	8'5"	5'10"	5'4"	4.2	430	9'0"	5'10"	5'4"	4.5	460	12'11"	5'10"	5'4"	6.4	700
42"	24"	7'6"	6'3"	5'9"	4.1	445	7'6"	6'3"	5'9"	4.1	445	7'6"	6'3"	5'9"	4.1	445
42"	30"	7'6"	6'3"	5'9"	4.1	445	7'6"	6'3"	5'9"	4.1	445	9'3"	6'3"	5'9"	5.3	550
42"	36"	8'6"	6'3"	5'9"	4.9	500	8'6"	6'3"	5'9"	4.9	500	12'0"	6'3"	5'9"	6.9	710
42"	42"	8'6"	6'3"	5'9"	4.9	500	11'2"	6'3"	5'9"	6.4	640	15'10"	6'3"	5'9"	9.1	930
48"	24"	7'6"	6'10"	6'4"	5.3	490	7'6"	6'10"	6'4"	5.3	490	7'6"	6'10"	6'4"	5.3	490
48"	30"	7'6"	6'10"	6'4"	5.3	490	7'6"	6'10"	6'4"	5.3	490	8'6"	6'10"	6'4"	6.0	560
48"	36"	8'6"	6'10"	6'4"	6.0	560	8'6"	6'10"	6'4"	6.0	560	11'0"	6'10"	6'4"	7.8	710
48"	42"	8'6"	6'10"	6'4"	6.0	560	10'3"	6'10"	6'4"	7.2	660	14'7"	6'10"	6'4"	10.3	940
48"	48"	9'6"	6'10"	6'4"	6.7	610	13'3"	6'10"	6'4"	9.3	850	18'11"	6'10"	6'4"	13.3	1100

NOTE: 1. PRESSURE RANGES AS SHOWN ARE OPERATING PRESSURES. CONCRETE AND STEEL QUANTITIES ARE CALCULATED USING OPERATING PRESSURE PLUS 50 P.S.I.
2. CONCRETE AND STEEL QUANTITIES ARE FOR ESTIMATING PURPOSES ONLY.
3. IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12 X 12 – W5.8 X W5.8) @ 42 LBS. PER. 100 S.F.

GREATER CINCINNATI WATER WORKS

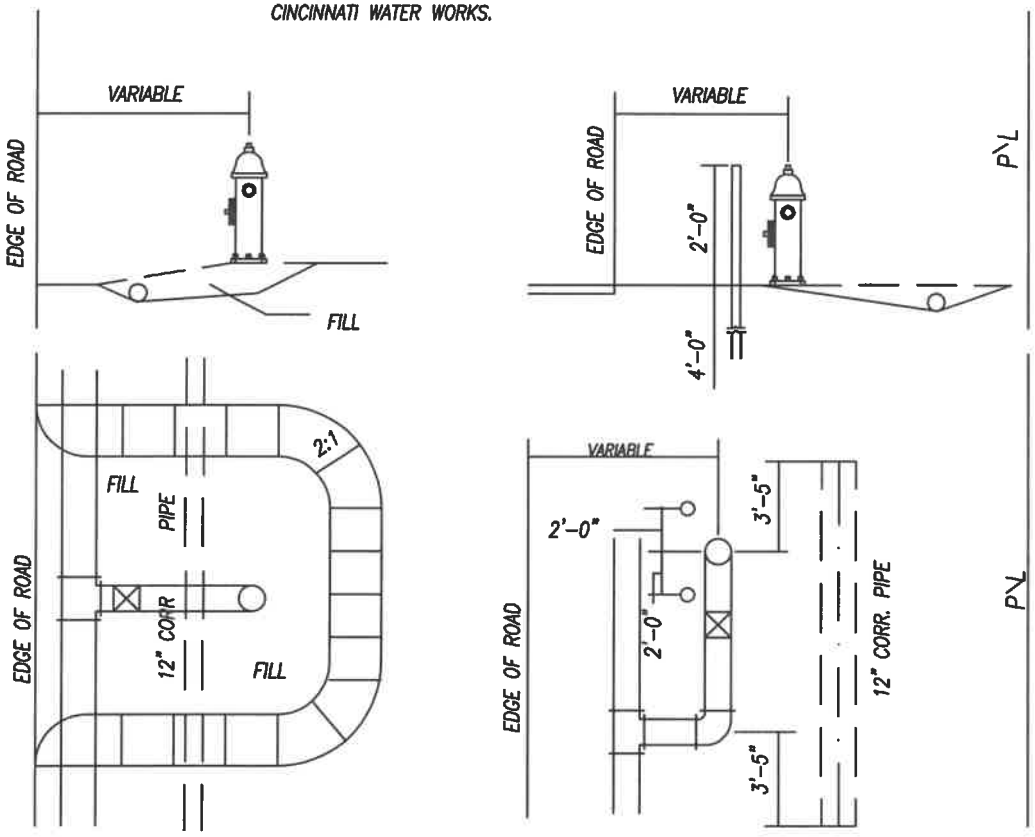
CONCRETE BLOCKING FOR CONCRETE PIPE FITTINGS

CONCRETE PIPE TEES

APPROVED	DATE	STANDARD DRAWING
	1/4/13	102- 4

SETTING ON ROADWAYS WITHOUT CURBS

4" I.D. CAST IRON PIPE, 6' LONG, TO BE FILLED WITH CONCRETE WITH EXPOSED PART TO BE MARKED WITH BLACK AND WHITE PAINTED STRIPES. GUARD POSTS TO BE INSTALLED AS INDICATED ON THE PLANS OR AS DIRECTED BY THE CINCINNATI WATER WORKS.

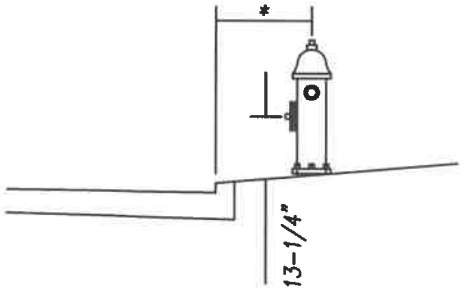


DRAIN PIPE WILL BE INSTALLED AT ALL TIMES WHEN HYDRANT LEAD IS WITHIN EXISTING OR PROPOSED DRAINAGE DITCH.

NOTE:

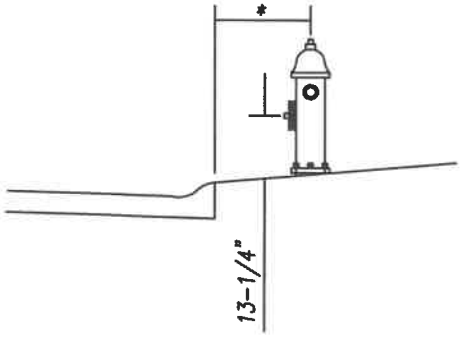
1. NO PART OF ANY FIRE HYDRANT SETTING SHALL BE CLOSER THAN 5'-0" TO ANY DRIVEWAY, SEWER INLET, UTILITY POLE, ANCHOR WIRE, OR SIDEWALK ENTRANCE.
2. THERE SHALL BE NO ADDITIONAL COMPENSATION FOR GUARD POST, DRAIN PIPE, OR GRADING WORK.

BATTERED OR STRAIGHT CURB



* AS INDICATED ON PLANS

ROLLED CURB

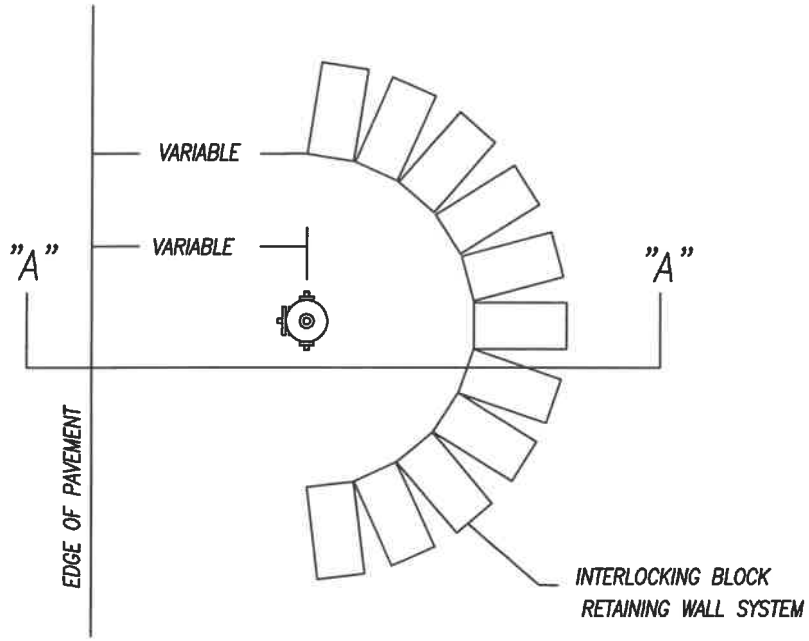


GREATER CINCINNATI WATER WORKS

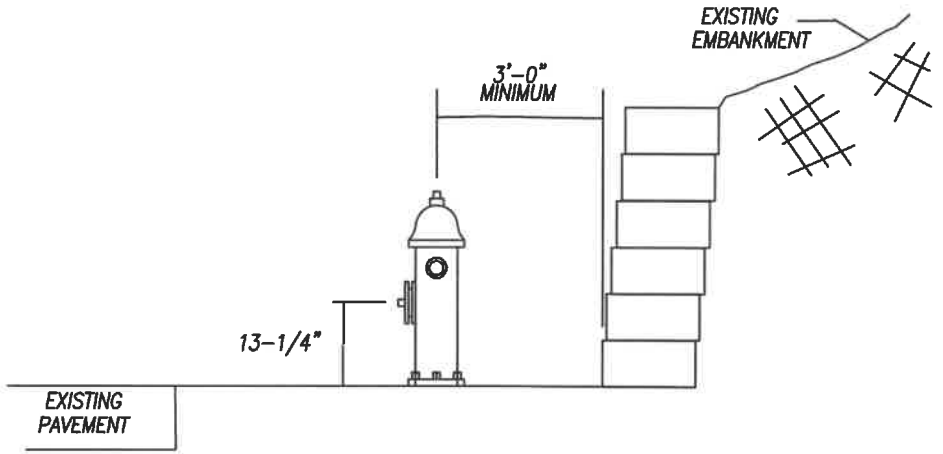
FIRE HYDRANT SETTINGS

GENERAL LAYOUT

APPROVED	DATE	STANDARD DRAWING
	1/4/13	103- 1



PLAN VIEW



SECTION A-A

NOTE:

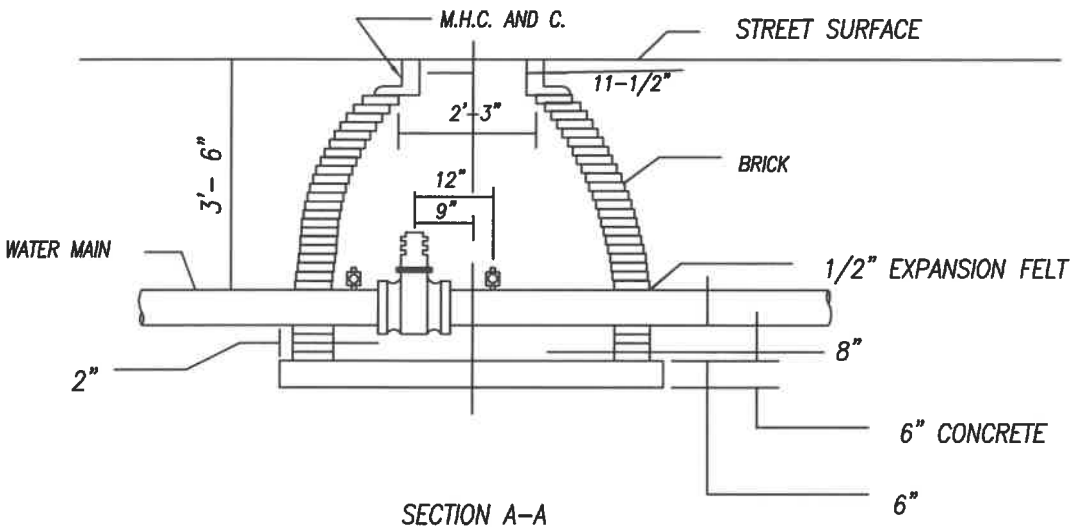
1. RETAINING WALL TO BE PROVIDED WHEN FIRE HYDRANT SETTING REQUIRES EXCAVATION INTO EXISTING EMBANKMENT
2. NO PART OF ANY FIRE HYDRANT SETTING SHALL BE CLOSER THAN 5'-0" TO ANY DRIVEWAY, SEWER INLET, UTILITY POLE, OR ANCHOR WIRE
3. KEYSTONE RETAINING WALL SYSTEM – STD. UNIT OR CINCINNATI WATER WORKS APPROVED EQUAL

GREATER CINCINNATI WATER WORKS

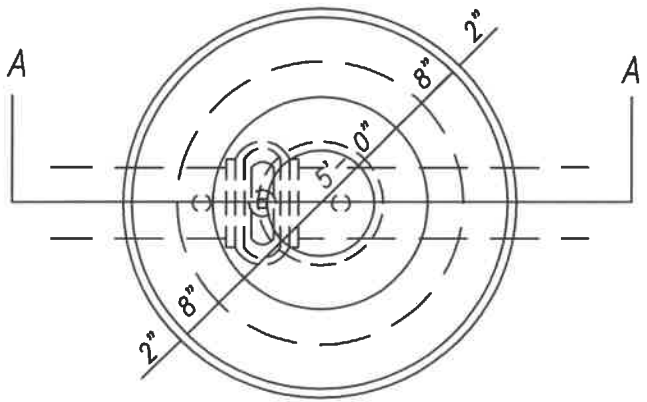
FIRE HYDRANT SETTINGS

RETAINING WALL

APPROVED	DATE	STANDARD DRAWING
	1/4/13	103- 1A



SECTION A–A



PLAN

NOTE:

1. WHERE WATER PRESSURE IS OVER 100 P.S.I., REFER TO STANDARD DRAWING 104–6 & 104–6A FOR CONSTRUCTION OF 12" VALVE CHAMBER.
2. OHSHA APPROVED STEPS @ 15" O.C. SHALL BE INSTALLED IN ALL CHAMBERS/VAULTS WHERE THE DEPTH OF COVER ON THE WATER MAIN IS GREATER THAN 6.0'.
3. 1/2" EXPANSION FELT AROUND MAIN THE FULL THICKNESS OF CHAMBER WALL.
4. 1" FERRULES FURNISHED AND INSTALLED BY CONTRACTOR.
5. ALL OPENINGS AROUND PIPE AND WALL SHALL BE FULLY GROUTED WITH CEMENT GROUT.
6. CONCRETE BASE SHALL HAVE #5 BARS @ 12" O.C.

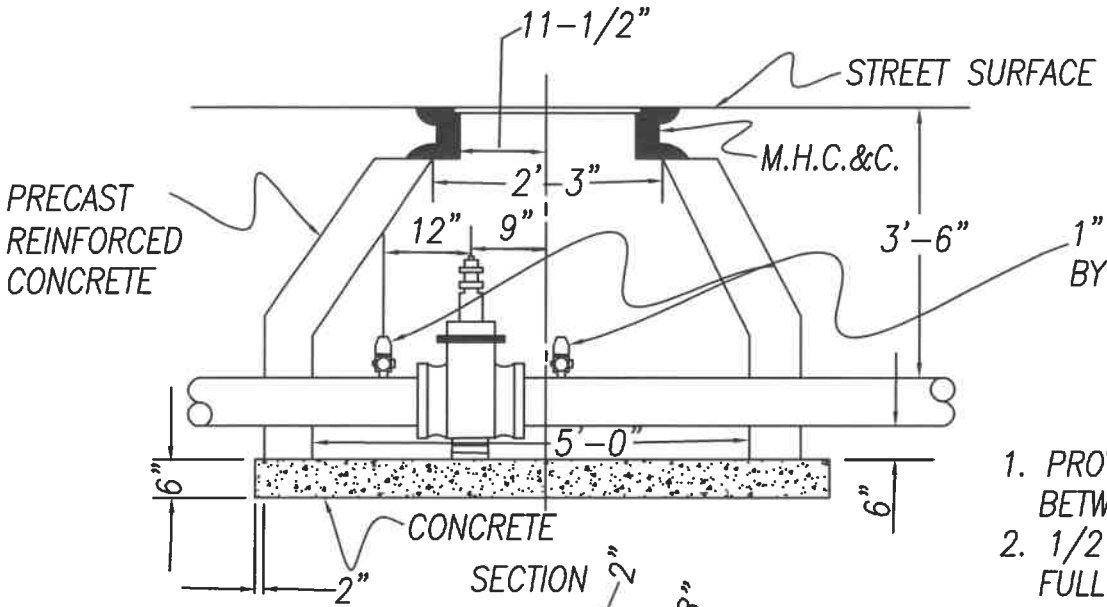
GREATER CINCINNATI WATER WORKS

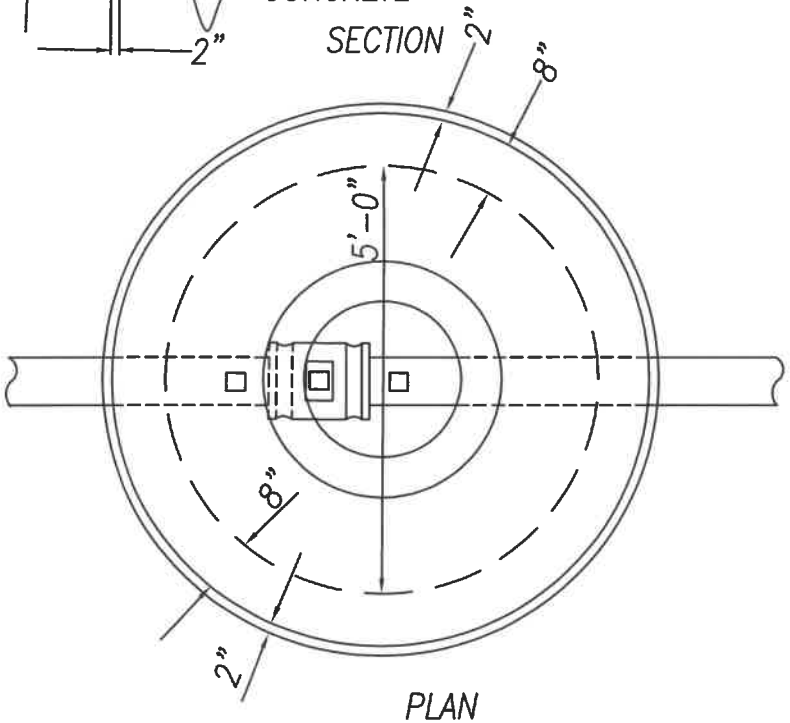
VALVE BOXES & CHAMBERS

4" THRU 12" VALVE CHAMBERS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 1

NOTE: PRECAST REINFORCED CONCRETE CHAMBER SHALL MEET ODOT SPECIFICATION 706.13 AND ASTM SPECIFICATION C-478.





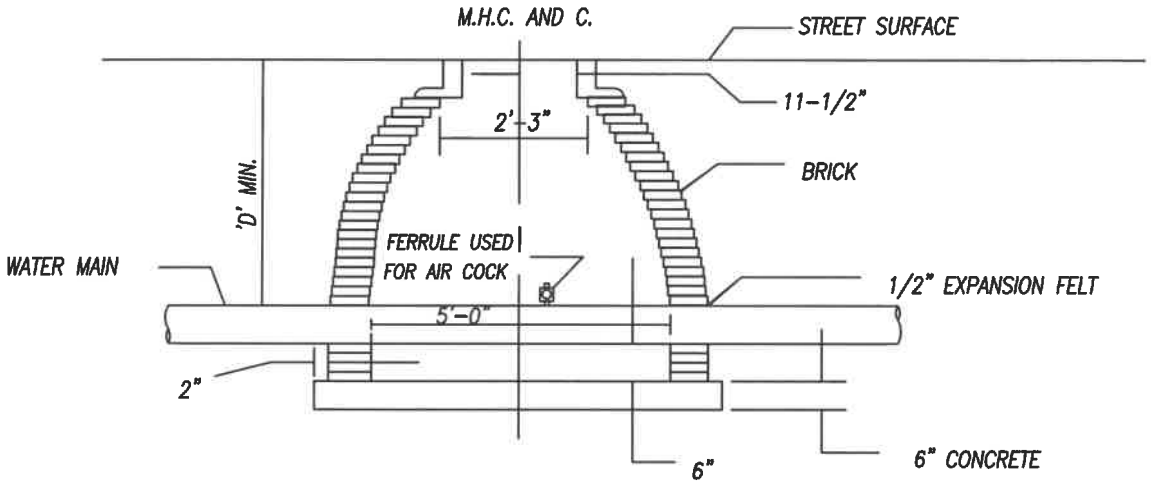
1. PROVIDE A MINIMUM OF 2-1/2" CLEARANCE BETWEEN PRECAST CHAMBER AND PIPE.
2. 1/2" EXPANSION FELT AROUND PIPE THE FULL THICKNESS OF THE CHAMBER WALL.
3. ALL OPENINGS AROUND PIPE SHALL BE THOROUGHLY GROUTED WITH CEMENT MORTAR.

GREATER CINCINNATI WATER WORKS

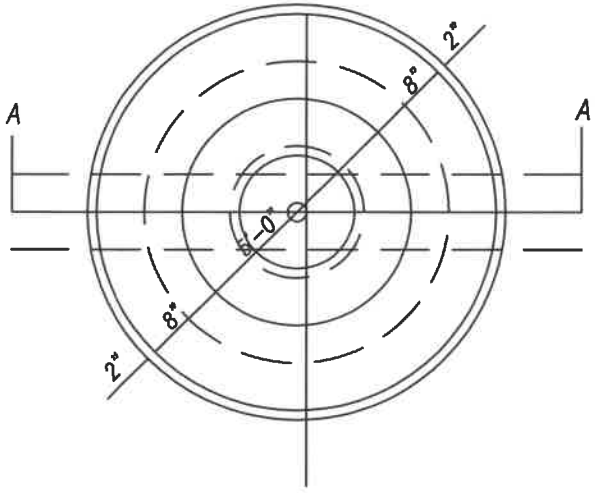
VALVE BOXES & CHAMBERS

4" THRU 12" VALVE CHAMBERS (PRECAST CONCRETE)

APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 1A



SECTION A–A



PLAN

1. SEE STD. DWG. 104–1 FOR CHAMBER NOTES.

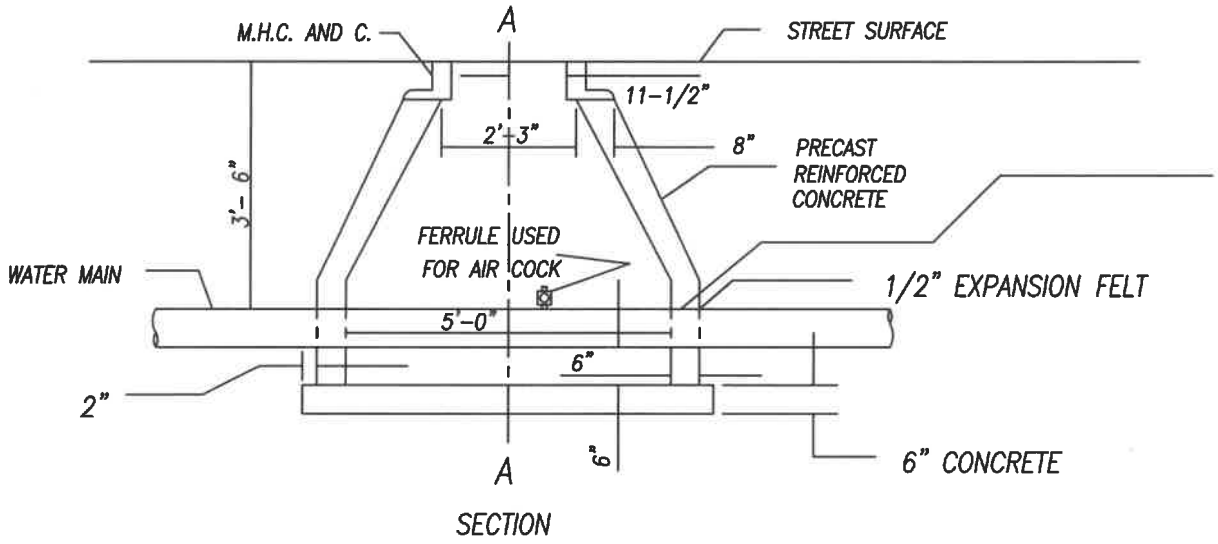
WATER MAIN SIZE	SIZE OF FERRULE	'D' MIN
12" W.M. & UNDER	1"	3'–6"
LARGER THAN 12"	2"	4'–0"

GREATER CINCINNATI WATER WORKS

VALVE BOXES & CHAMBERS

AIR COCK CHAMBERS

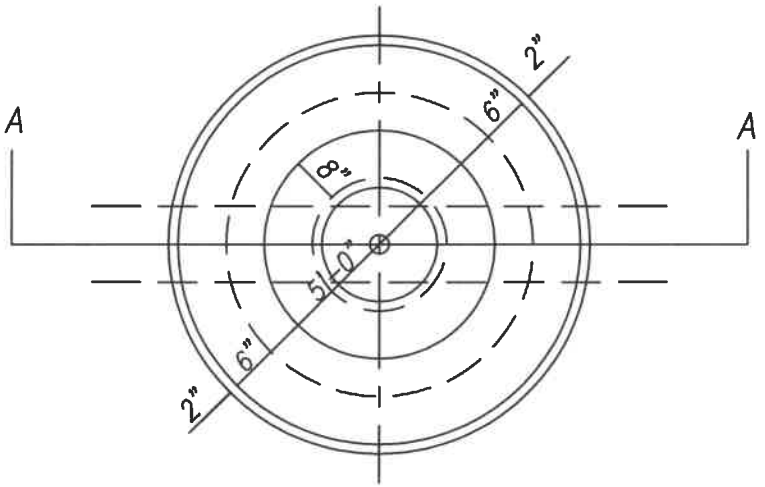
APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 2



SECTION

1. PROVIDE A MINIMUM OF 2-1/2" CLEARANCE BETWEEN PRECAST CHAMBER AND PIPE.
2. 1/2" EXPANSION FELT AROUND PIPE THE FULL THICKNESS OF THE CHAMBER WALL.
3. ALL OPENINGS AROUND PIPE SHALL BE THOROUGHLY GROUTED WITH CEMENT MORTAR.

NOTE : PRECAST REINFORCED CONCRETE CHAMBER SHALL MEET ODOT SPECIFICATION 706.13 AND ASTM SPECIFICATION C-478.



PLAN

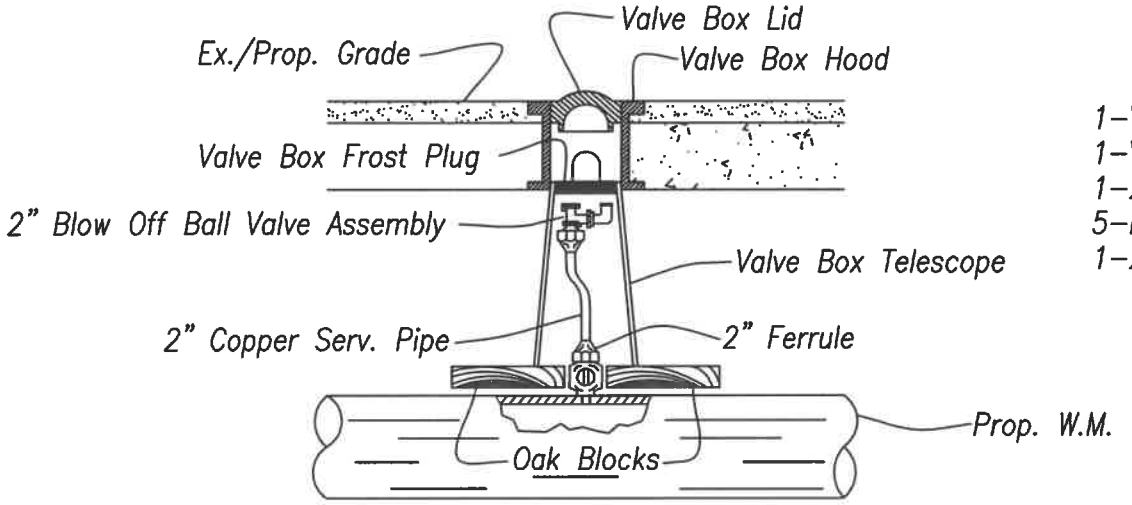
WATER MAIN SIZE	SIZE OF FERRULE
12" W.M. & UNDER	1"
LARGER THAN 12"	2"

GREATER CINCINNATI WATER WORKS

VALVE BOXES & CHAMBERS

AIR COCK CHAMBERS (PRECAST CONCRETE)

APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 2A



1–Valve Box Complete (Iron)
1–Valve Box Frost Plug
1–2" Ferrule
5–Lin. Ft. 2" Copper Service Pipe
1–2" x 1 1/2" x 2" Blow Off Ball Valve Assembly
(AY McDonald Part #76109BCAP)

Note: Air Release Must Be 15" to 19" Below Final Grade

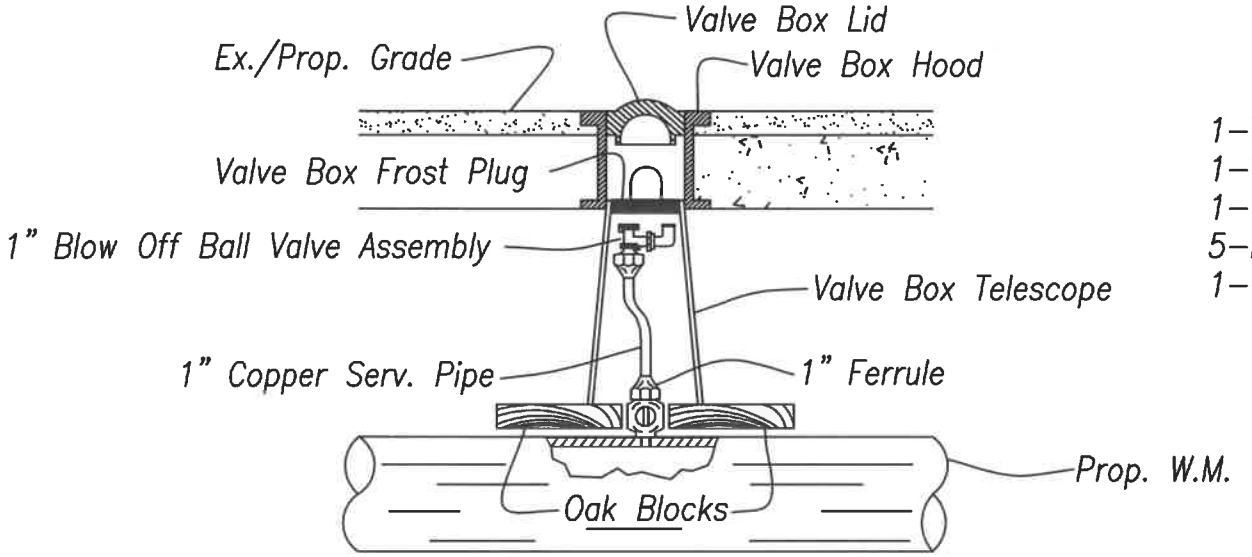
Air Release In Valve Box
16" Dia. or Larger Water Main

GREATER CINCINNATI WATER WORKS

VALVE BOXES & CHAMBERS

AIR RELEASE IN VALVE BOX 16" DIA. OR LARGER WATER MAIN

APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 2B



1–Valve Box Complete (Iron)
1–Valve Box Frost Plug
1–1" Ferrule
5–Lin. Ft. 1" Copper Service Pipe
1–1" x 1" x 3/4" Blow Off Ball Valve Assembly
(AY McDonald Part #76109BCAP)

Note: Air Release Must Be 15" to 19" Below Final Grade

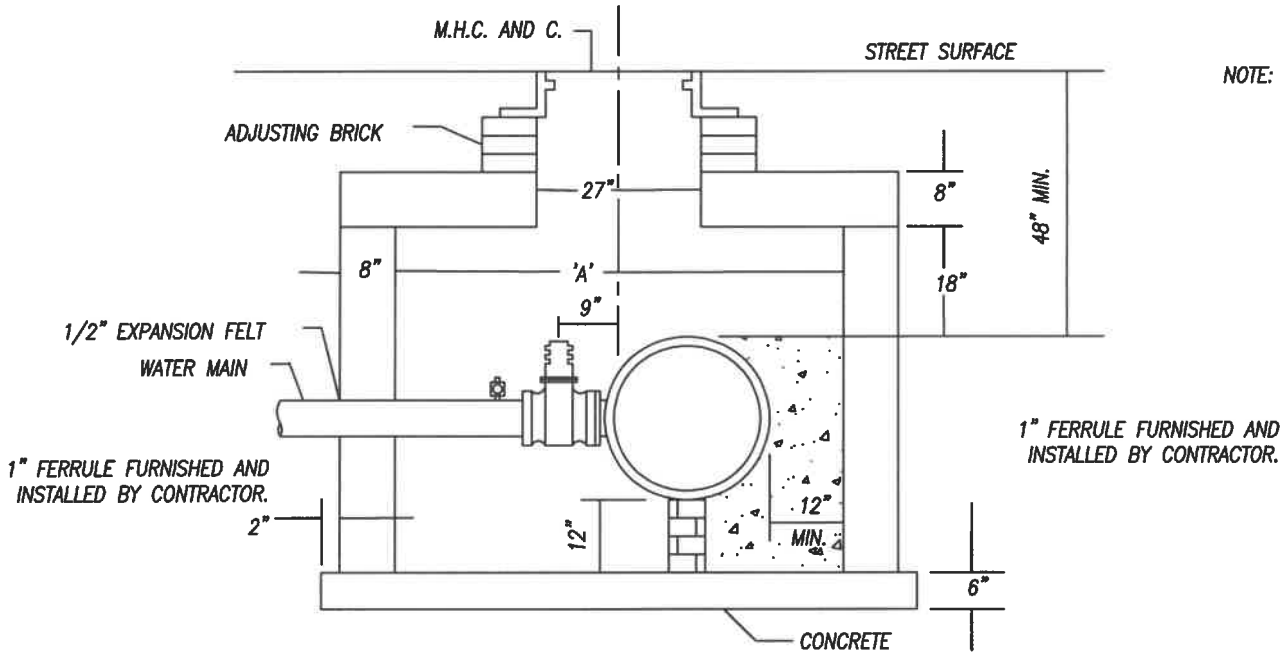
Air Release In Valve Box
12" Dia. or Smaller Water Main

GREATER CINCINNATI WATER WORKS

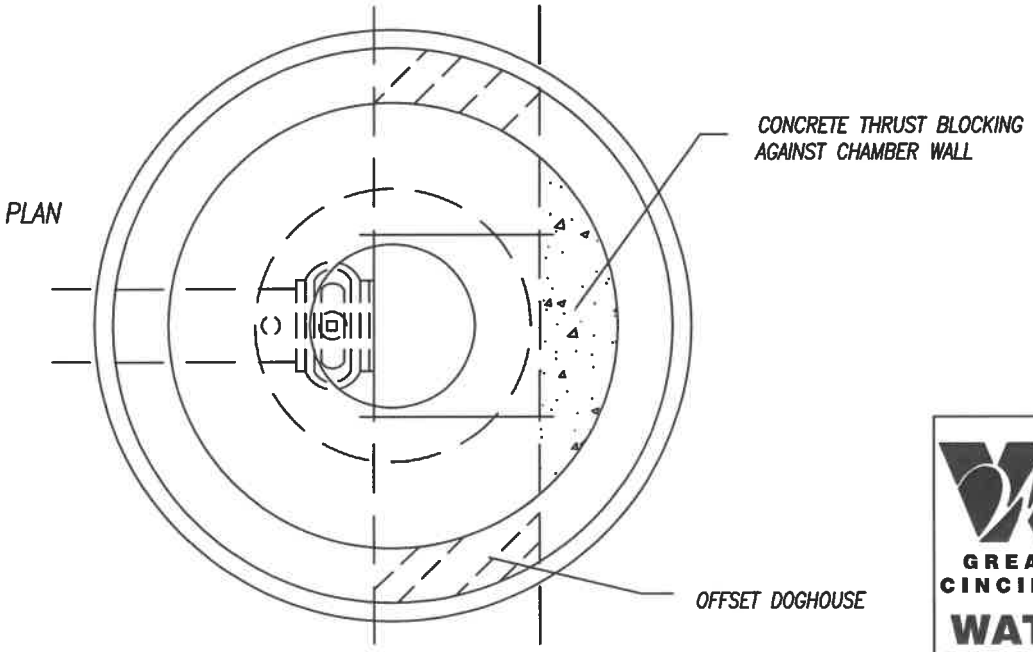
VALVE BOXES & CHAMBERS

AIR RELEASE IN VALVE BOX
12" DIA. OR SMALLER WATER MAIN

APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 2C



SECTION



NOTE:

1. PRECAST REINFORCED CONCRETE CHAMBER SHALL MEET ODOT SPECIFICATION 706.13 AND ASTM SPECIFICATION C-478.
2. AT LEAST 1/2" THICK EXPANSION FELT AROUND ALL PIPES THRU CHAMBER WALL FOR THE FULL THICKNESS OF THE WALL
3. ALL OPENINGS AROUND PIPE SHALL BE THOROUGHLY GROUTED WITH CEMENT GROUT.

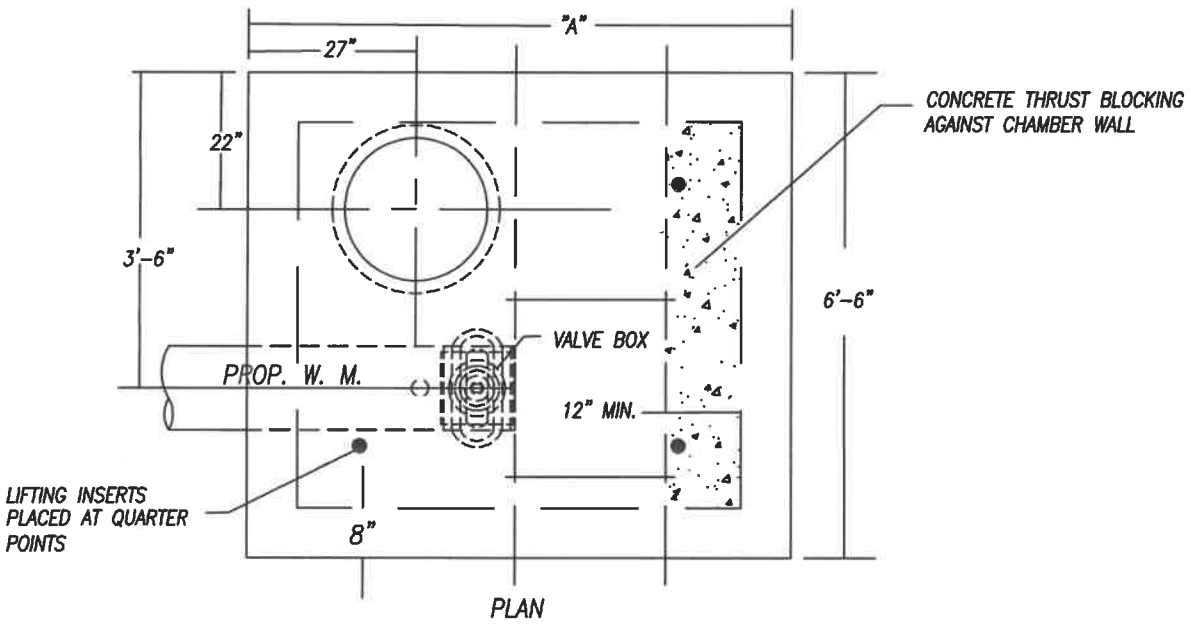
SIZE OF CONNECTION	'A'
6"x 4" TO 6"x 6"	5'-0"
8"x 4" TO 8"x 8"	5'-0"
10"x 4" TO 10"x 10"	5'-0"
12"x 4" TO 12"x 12"	6'-0"
16"x 4" TO 16" TO 12"	6'-0"

GREATER CINCINNATI WATER WORKS

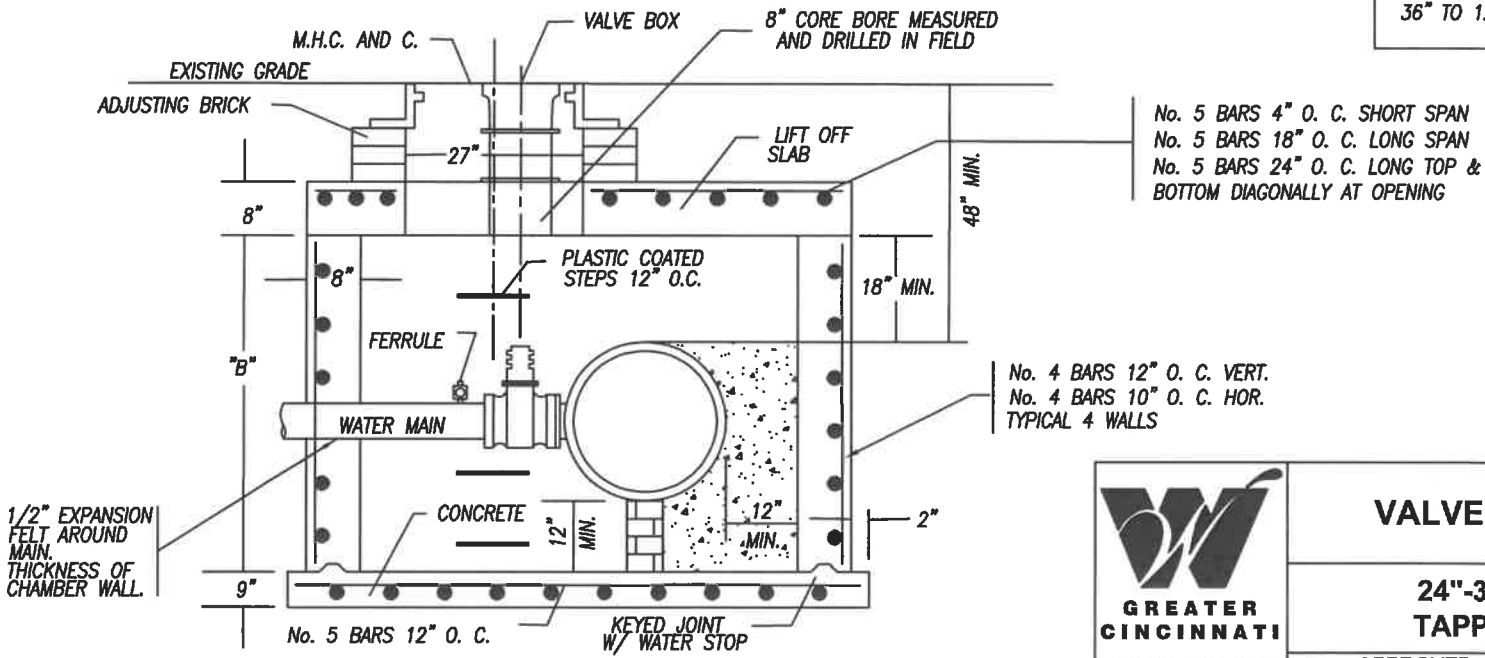
VALVE BOXES & CHAMBERS

6"-16" FLANGE OUTLET & TAPPING VALVE CHAMBER

APPROVED	DATE	STANDARD DRAWING
[signature]	1/4/13	104-3



PLAN



SECTION

NOTE:

1. PRECAST REINFORCED CONCRETE CHAMBER SHALL MEET ODOT SPECIFICATION 706.13 AND ASTM SPECIFICATION C-478.
2. AT LEAST 1/2" THICK EXPANSION FELT AROUND ALL PIPES THRU CHAMBER WALL FOR THE FULL THICKNESS OF THE WALL

1" FERRULE FURNISHED AND INSTALLED BY CONTRACTOR.

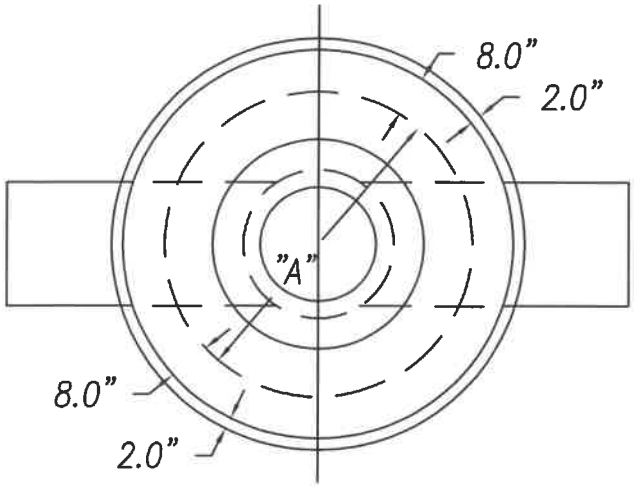
SIZE OF CONNECTION	"A"	"B"
24"x 8" TO 24"x 12"	7'-3"	5'-0"
30"x 12"	7'-9"	5'-6"
36" TO 12"	8'-3"	6'-2"

GREATER CINCINNATI WATER WORKS

VALVE BOXES & CHAMBERS

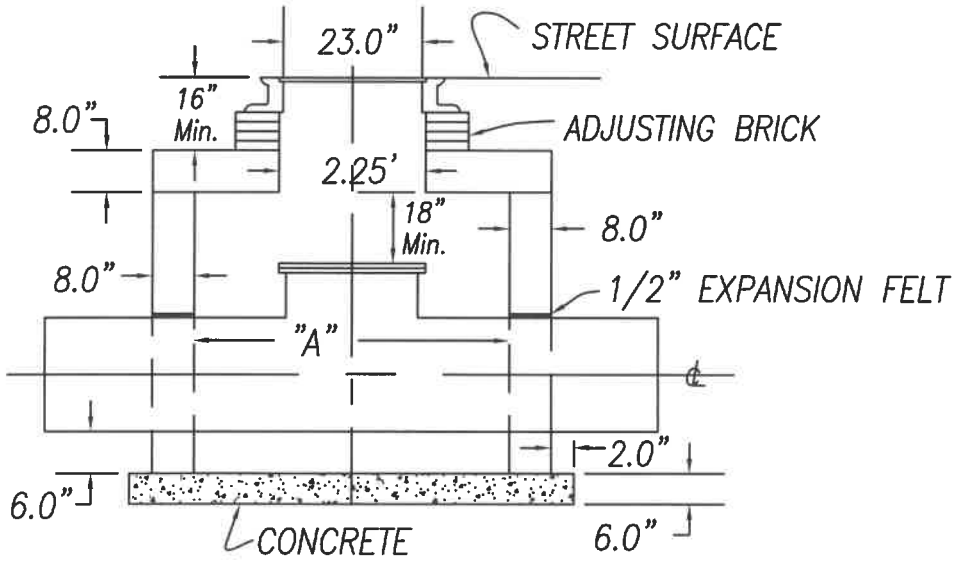
24"-36" FLANGE OUTLET & TAPPING VALVE CHAMBER

APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 3A



PLAN

SIZE	A
24"	5.0'
30"	6.0'
36"	6.0'
42"	7.0'
48"	7.0'



SECTION

NOTES:

1. WATER MAIN MUST BE DESIGNED AND INSTALLED AT A DEPTH THAT WILL ALLOW THE INSTALLATION OF THE PROPOSED MAN HEAD CHAMBER AT THE MINIMUM DEPTHS AS SHOWN ON THE DETAIL

2. PRECAST REINFORCED CONCRETE CHAMBER SHALL MEET ODOT SPECIFICATION 706.13 AND ASTM SPECIFICATION C-478

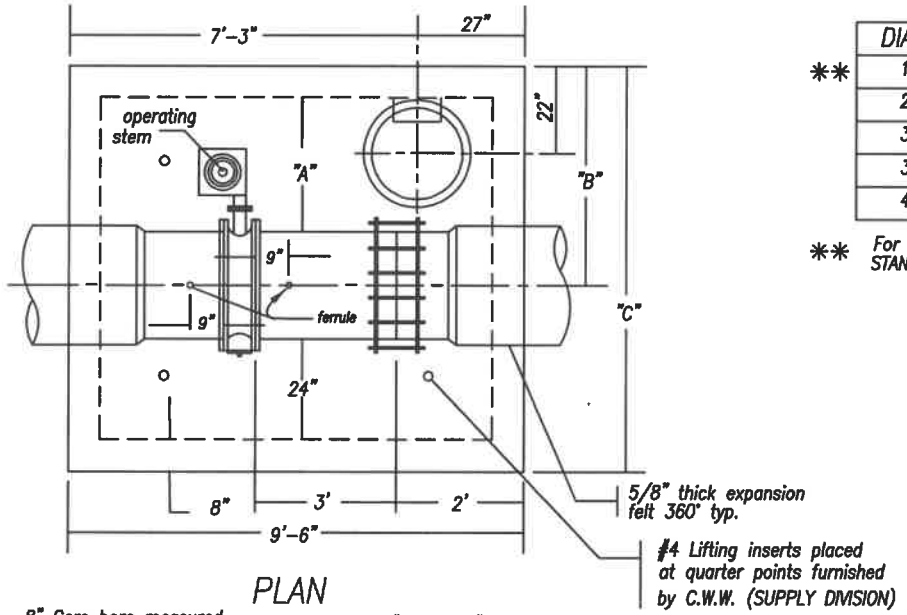
3. IF USED SOLEY FOR AN AIR RELEASE, MANHEAD WILL BE BURIED W/A VALVE BOX COMPLETE. ALL EXPOSED BOLTS, NUTS AND PLATE SHALL BE EPOXY COATED AND WRAPPED IN POLYETHELENE AS PER GCWW STANDARDS.

GREATER CINCINNATI WATER WORKS

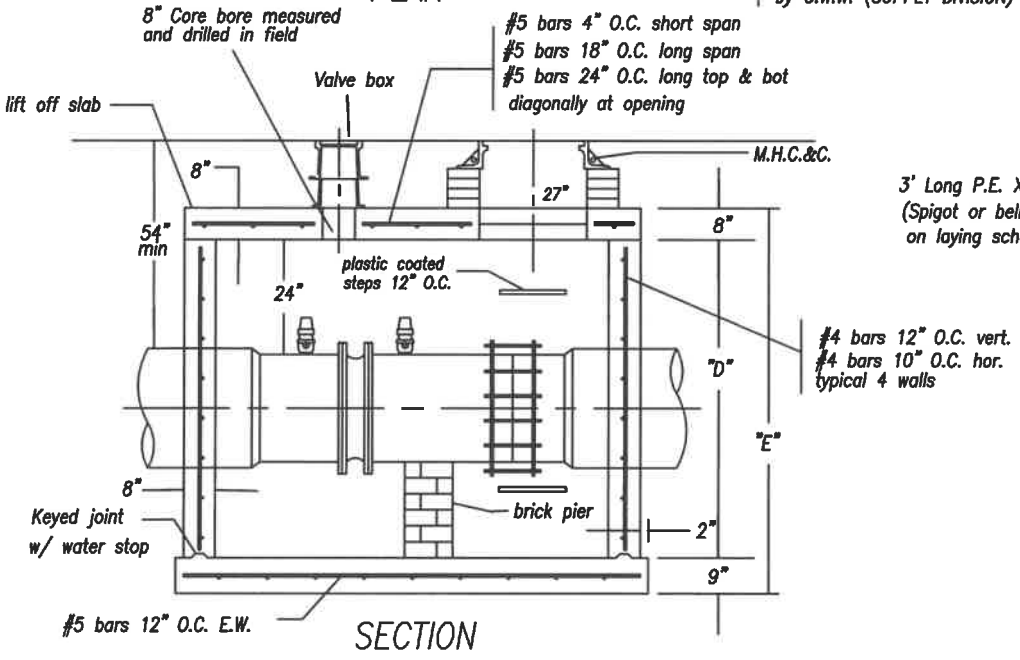
VALVE BOXES & CHAMBERS

MANHEAD CHAMBERS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 4



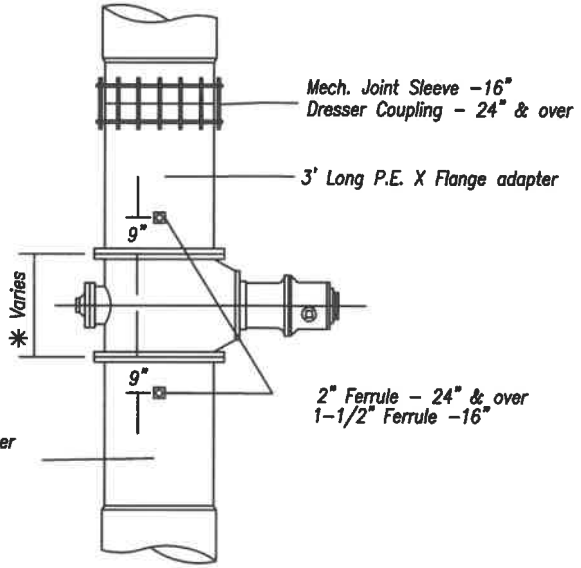
PLAN



SECTION

DIAMETER	"A"	"B"	"C"	"D"	"E"
** 16 inch	30"	3'-11"	7'-4"	5'-6"	6'-11"
24 inch	30"	4'-3"	8'-0"	6'-2"	7'-7"
30 inch	30"	4'-6"	8'-6"	6'-8"	8'-1"
36 inch	36"	5'-3"	9'-6"	7'-2"	8'-7"
42 inch	36"	5'-6"	10'-0"	7'-8"	9'-1"

** For 16" Precast Butterfly Chamber see STANDARD DRAWING 104-5B



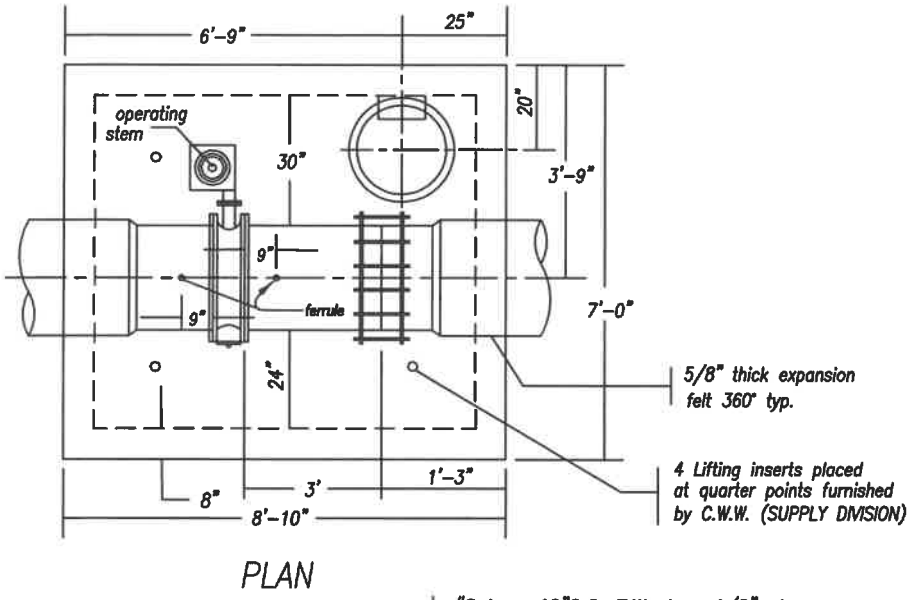
* Laying Length of Valve Depends Upon Manufacturer and Size

GREATER CINCINNATI WATER WORKS

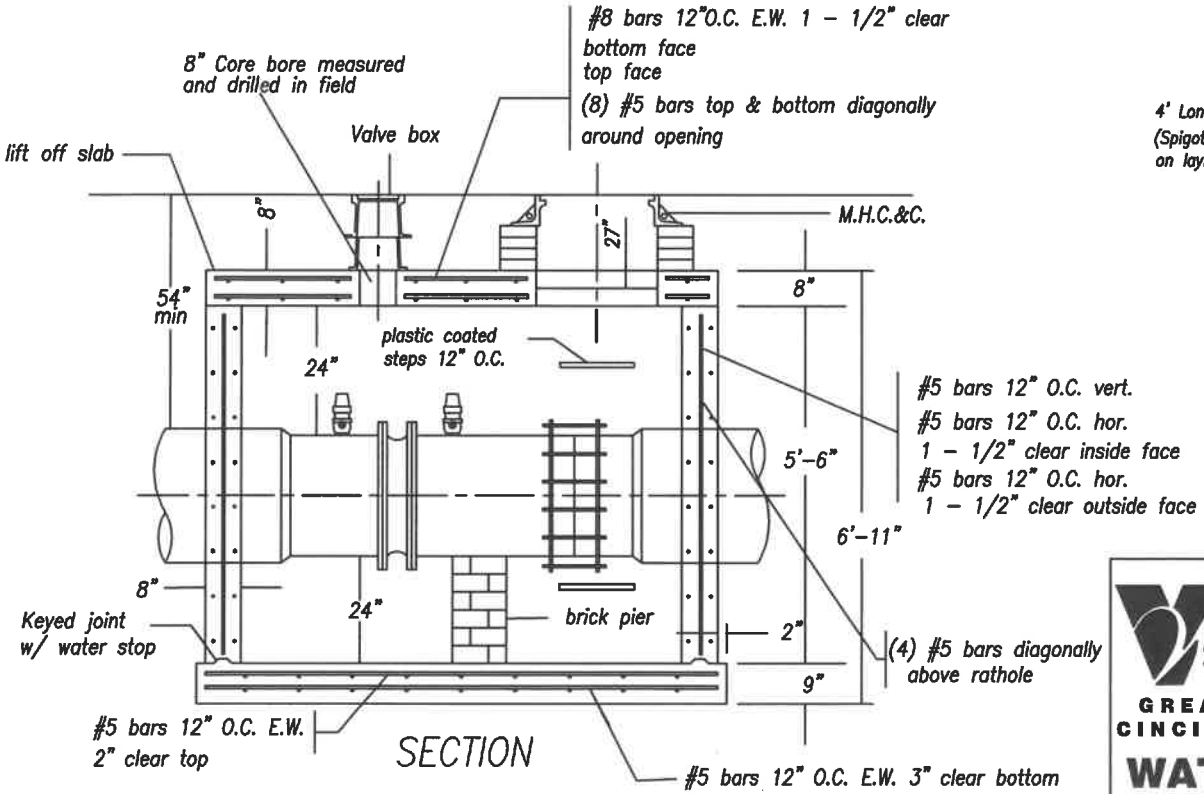
VALVE BOXES & CHAMBERS

BUTTERFLY VALVE CHAMBER POURED IN PLACE

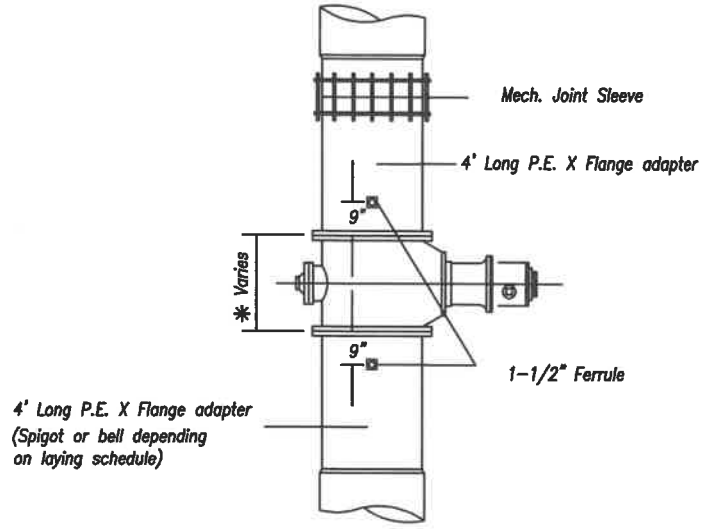
APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 5A



PLAN



SECTION



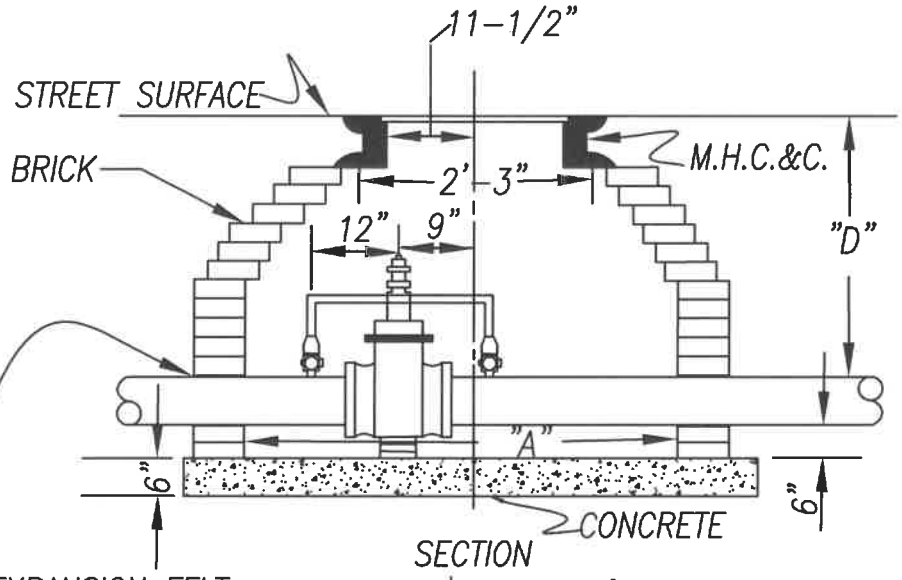
* Laying Length of Valve Depends Upon Manufacturer and Size

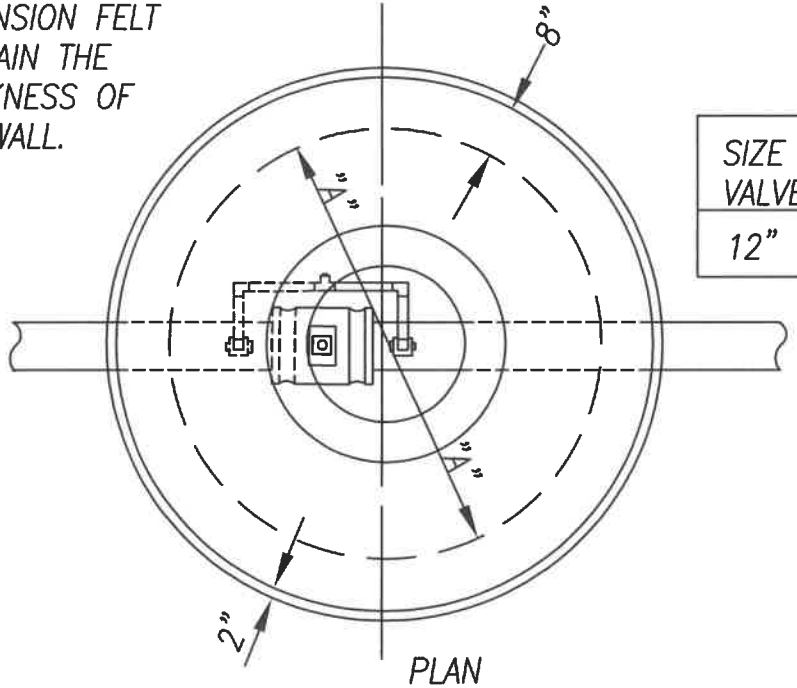
GREATER CINCINNATI WATER WORKS

VALVE BOXES & CHAMBERS

BUTTERFLY VALVE VAULT 16" PRECAST

APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 5B

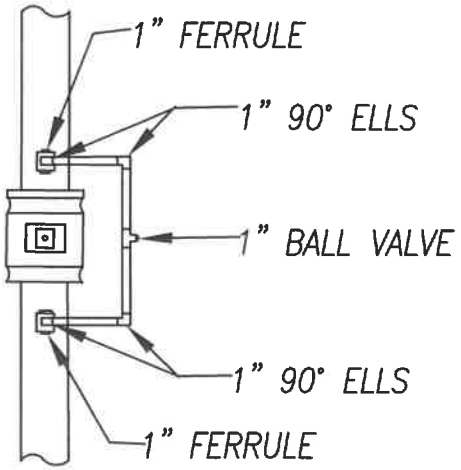




SIZE VALVE	"A"	"D"
12"	5'-0"	3'-6"

BY-PASS PIPING MATERIAL

8- LIN. FT. 1" COPPER SERVICE PIPE
2- 1" FERRULES
4- 1" 90. ELLS (SWEAT FITTING)
1- 1" BALL VALVE



BY-PASS ASSEMBLY DETAIL

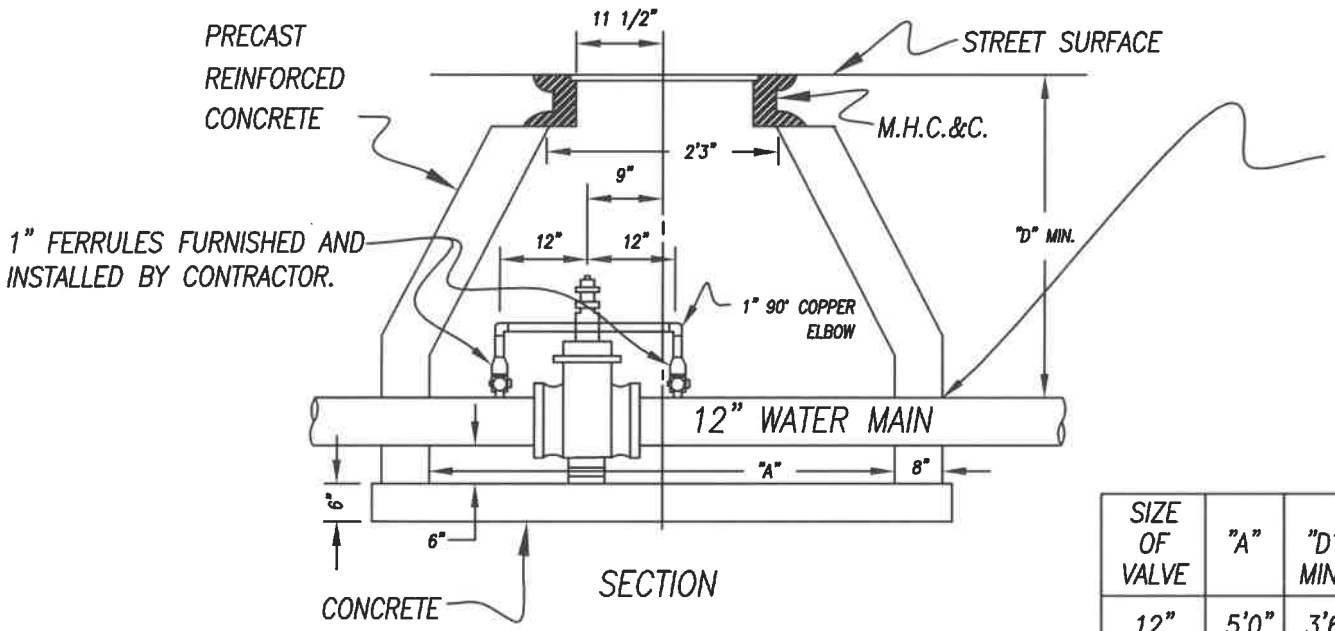
NOTE:
BY-PASS MATERIAL FURNISHED AND INSTALLED BY CONTRACTOR.

GREATER CINCINNATI WATER WORKS

VALVE BOXES & CHAMBERS

12" VALVE CHAMBER FOR WATER PRESSURE OVER 100 P.S.I.

APPROVED	DATE	STANDARD DRAWING
	1/4/13	104-6



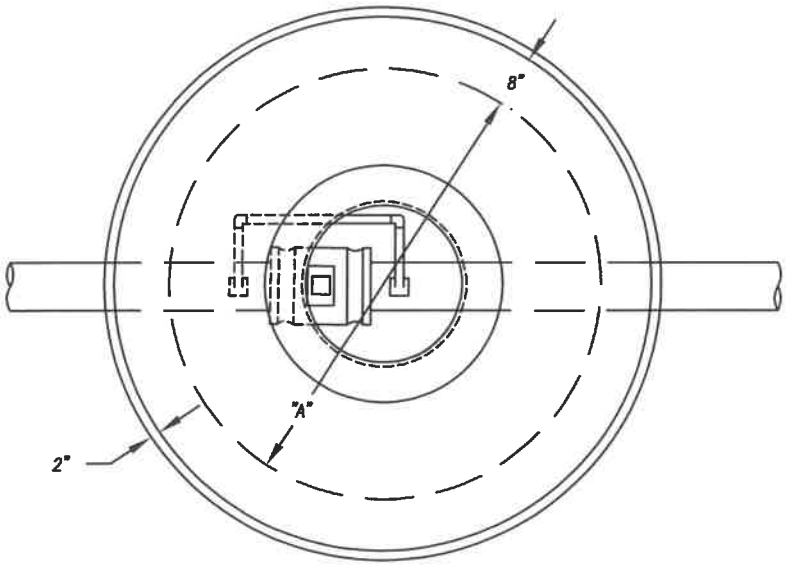
NOTE: PRECAST REINFORCED CONCRETE CHAMBER SHALL MEET ODOT SPECIFICATION 706.13 AND ASTM SPECIFICATION C-478

1. PROVIDE A MINIMUM OF 2 1/2" CLEARANCE BETWEEN PRECAST CHAMBER AND PIPE.
2. 1/2" EXPANSION FELT AROUND PIPE THE FULL THICKNESS OF THE CHAMBER WALL.
3. ALL OPENINGS AROUND PIPE SHALL BE THOROUGHLY GROUTED WITH CEMENT MORTAR.

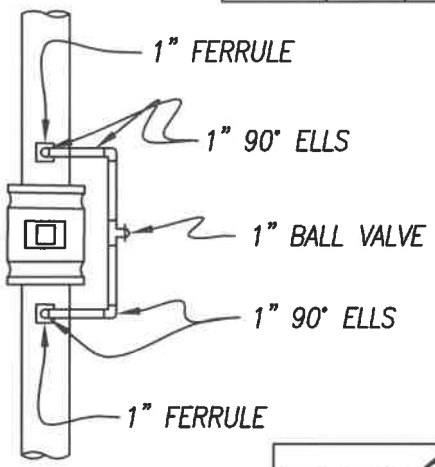
SIZE OF VALVE	"A"	"D" MIN.
12"	5'0"	3'6"

BY-PASS MATERIAL

8-LIN. FT. 1" COPPER SERVICE PIPING
2-1" FERRULES
4-1" 90° ELLS (SWEAT FITTINGS)
1-1" BALL VALVE



PLAN



BY-PASS ASSEMBLY DETAIL

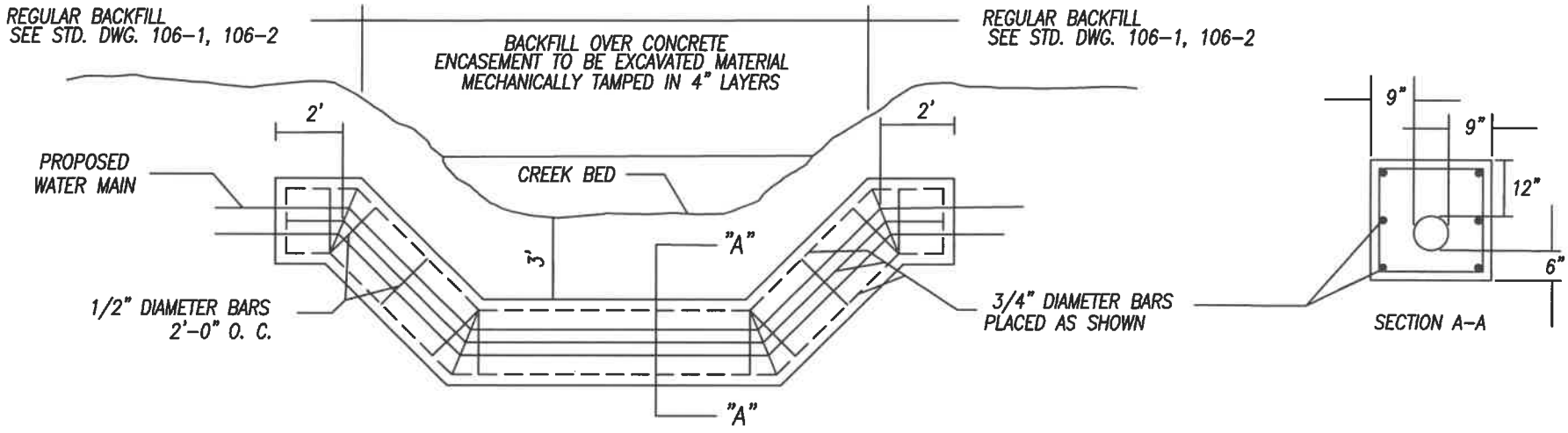
NOTE: MATERIALS FURNISHED AND INSTALLED BY CONTRACTOR.

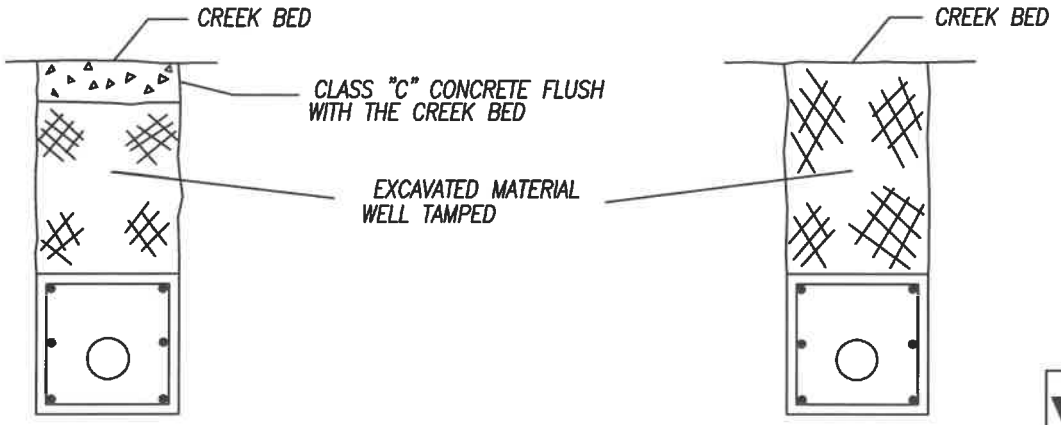
GREATER CINCINNATI WATER WORKS

VALVE BOXES & CHAMBERS

12" VALVE CHAMBER FOR WATER PRESSURE OVER 100 P.S.I. (PRECAST CONCRETE)

APPROVED	DATE	STANDARD DRAWING
	1/4/13	104- 6A





BACKFILL AND RESTORATION
IN ROCK EXCAVATION

BACKFILL AND RESTORATION
IN NORMAL EXCAVATION

NOTE: 6" CONCRETE PAD TO EXTEND
TO WIDTH OF CREEK BED ONLY

MATERIAL

CONCRETE CLASS "C" – ITEM 1110
STEEL REINFORCING – DEFORMED
INTERMEDIATE GRADE – ITEM 509

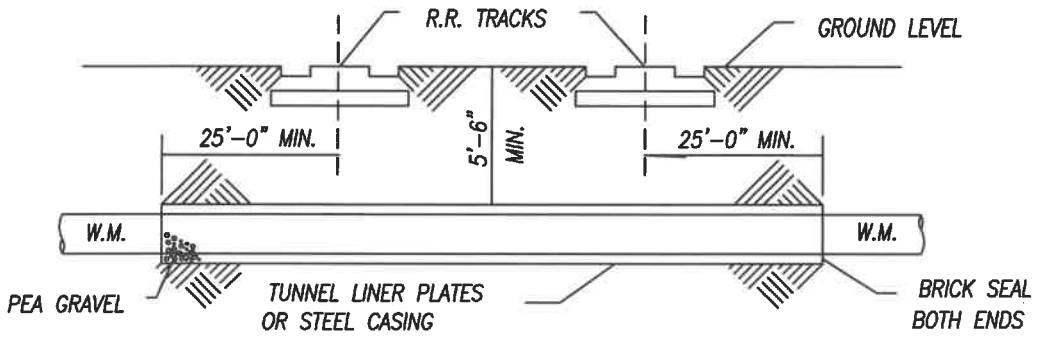
NOTE: IN LIEU OF STEEL REINFORCING BARS, THE CONTRACTOR HAS THE OPTION TO USE WELDED WIRE FABRIC SHEETS (12 X 12– W 5.8 X W 5.8) AT 42 LBS. PER 100 SQ. FT.

GREATER CINCINNATI WATER WORKS

CONSTRUCTION DETAILS

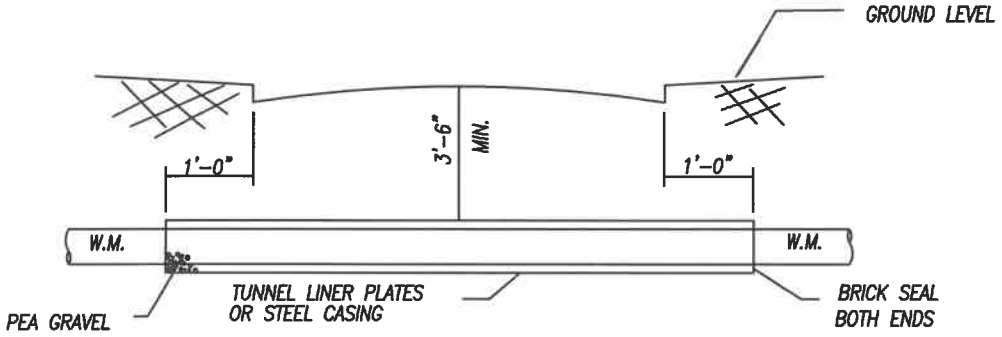
CREEK CROSSING / CONCRETE ENCASEMENT

APPROVED	DATE	STANDARD DRAWING
	1/4/13	105- 1



RAILROAD CROSSING

TUNNEL LINER PLATES FOR 16" W.M.'S AND LARGER	
PIPE SIZE	LINER PLATE DIA.
16"	60"
20"	66"
24"	72"
30"	78"
36"	84"
42"	90"
48"	96"



HIGHWAY CROSSING

CROSSING PROVISIONS

STEEL CASING FOR 24" W.M. & SMALLER & FOR BRANCHES 4" & LARGER				
PIPE SIZE	RAILROAD		HIGHWAY	
	CASING O.D.	PLATE THICKNESS	CASING O.D.	PLATE THICKNESS
4"	14"	3/8"	14"	5/16"
6"	18"	3/8"	16"	5/16"
8"	20"	3/8"	18"	5/16"
10"	22"	3/8"	20"	5/16"
12"	24"	3/8"	24"	5/16"
16"	30"	7/16"	30"	3/8"
24"	42"	7/16"	42"	7/16"
36"	60"	7/16"	60"	7/16"

CASING PIPE MAY HAVE A PLATE THICKNESS 1/16" LESS THAN AS LISTED ABOVE IF IT IS CATHODICALLY PROTECTED.

TUNNEL LINER PLATES (ITEM 1107) AND STEEL CASING (ITEM 1108) INSTALLATIONS TO BE IN ACCORDANCE WITH THE CITY OF CINCINNATI'S SUPPLEMENT TO STATE OF OHIO, DEPARTMENT OF HIGHWAY CONSTRUCTION AND MATERIAL SPECIFICATIONS. TUNNEL LINER GAGE SHALL BE DESIGNED AND SUBMITTED TO CINCINNATI WATER WORKS FOR APPROVAL ON A PROJECT BY PROJECT BASIS.

ALL WATER MAIN JOINTS WITHIN CASING OR TUNNEL LINER TO BE RESTRAINED.

ALL PIPE WITHIN CASING SHALL BE INSTALLED WITH CASING INSULATORS WITH 2" WIDE GLASS REINFORCED RUNNER (PSI MODEL A12 OR APPROVED EQUAL) WITH 2–INSULATORS PER PIPE SECTION. (ALL INSULATORS TO BE PRE APPROVED BY C.W.W.)

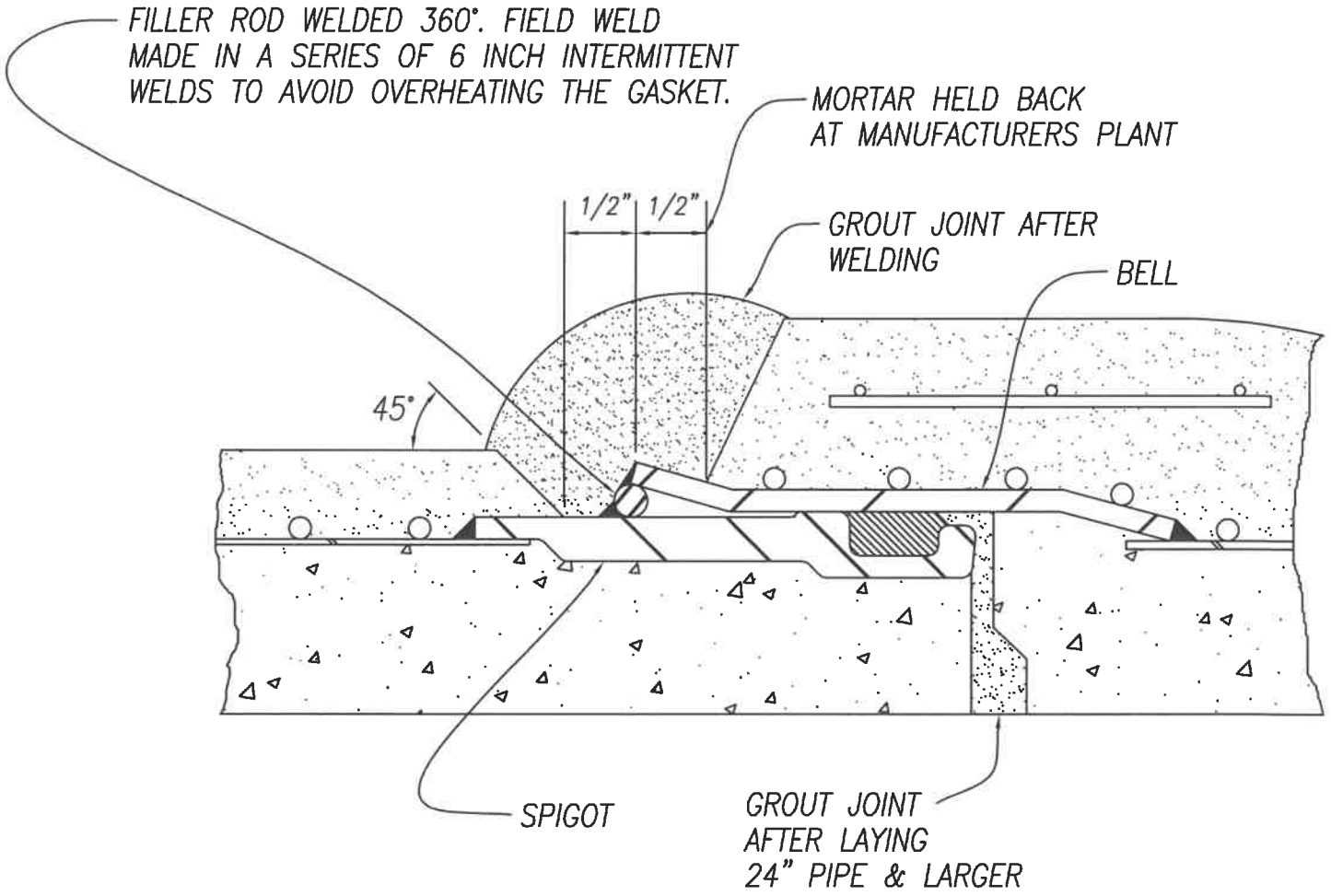
COMPLETELY FILL ALL VOIDS BETWEEN THE OUTSIDE OF THE PIPE AND THE CASING WITH PEA GRAVEL.

GREATER CINCINNATI WATER WORKS

CONSTRUCTION DETAILS

STEEL CASING AND / OR TUNNEL LINER PLATES

APPROVED	DATE	STANDARD DRAWING
	1/4/13	105- 2

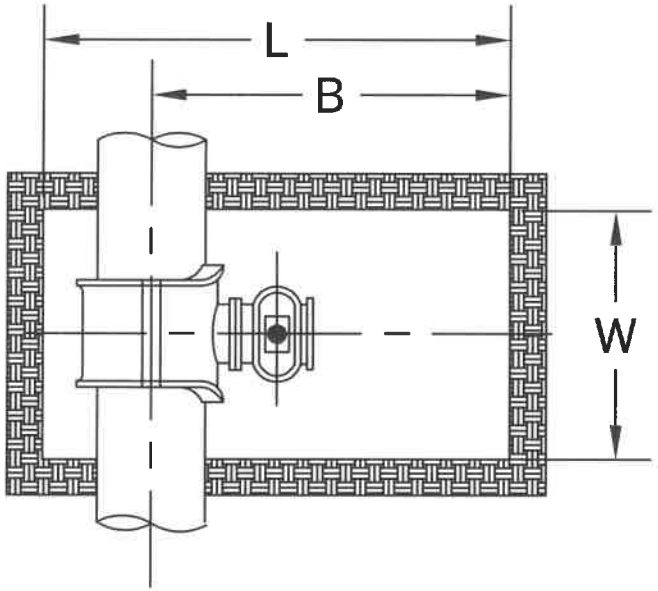


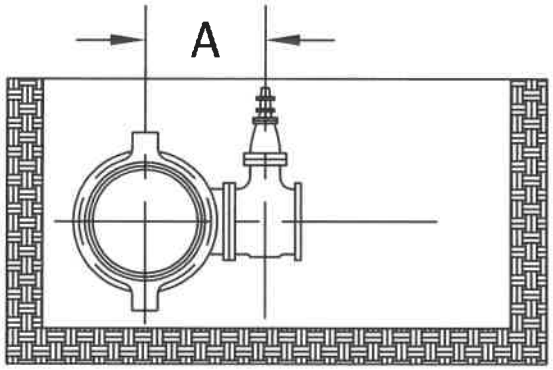
GREATER CINCINNATI WATER WORKS

CONSTRUCTION DETAILS

WELDED TYPE TIED JOINT CONCRETE PIPE

APPROVED	DATE	STANDARD DRAWING
	1/4/13	105-3





SIZE	A	B	W	L
6 X 4	13"	6'-8"	4'-11"	8'-8"
6 X 6	14- 1/16"	6'-10"	5'-1"	8'-10"
8 X 4	13- 7/8"	6'-9"	4'-11"	8'-10"
8 X 6	15- 7/16"	7'-0"	5'-1"	9'-1"
8 X 8	16- 11/16"	7'-2"	5'-3"	9'-4"
10 X 4	15	6'-10"	4'-11"	9'-0"
10 X 6	16- 9/16"	7'-1"	5'-1"	9'-3"
10 X 8	17- 9/16"	7'-3"	5'-3"	9'-6"
10 X 10	17- 13/16"	7'-4"	5'-5"	9'-7"
12 X 4	16- 1/4"	6'-11"	4'-11"	9'-2"
12 X 6	17- 15/16"	7'-2"	5'-1"	9'-6"
12 X 8	18- 13/16"	7'-4"	5'-3"	9'-7"
12 X 10	19- 3/16"	7'-5"	5'-5"	9'-8"
12 X 12	19- 5/16"	7'-6"	5'-7"	9'-9"
16 X 4	19- 5/16"	7'-3"	4'-11"	9'-8"
16 X 6	20- 3/4"	7'-6"	5'-1"	9'-11"
16 X 8	21- 7/8"	7'-8"	5'-3"	10'-1"
16 X 10	22- 1/4"	7'-7"	5'-5"	10'-2"
16 X 12	22- 9/16"	7'-9"	5'-7"	10'-4"

SIZE	A	B	W	L
20 X 4	21- 1/2"	7'-5"	4'-11"	10'-0"
20 X 6	22- 15/16"	7'-8"	5'-1"	10'-3"
20 X 8	24- 1/16"	7'-10"	5'-3"	10'-5"
20 X 10	24- 7/16"	7'-10"	5'-5"	10'-5"
20 X 12	24- 5/8"	7'-11"	5'-7"	10'-6"
24 X 4	23- 11/16"	7'-7"	4'-11"	10'-4"
24 X 6	25- 1/8"	7'-10"	5'-1"	10'-7"
24 X 8	26- 1/4"	8'-0"	5'-3"	10'-9"
24 X 10	26- 5/8"	8'-1"	5'-5"	10'-10"
24 X 12	26- 13/16"	8'-1"	5'-7"	10'-10"
30 X 4	27- 3/16"	7'-11"	4'-11"	10'-11"
30 X 6	28- 3/8"	8'-1"	5'-1"	11'-1"
30 X 8	29- 3/4"	8'-3"	5'-3"	11'-3"
30 X 10	30- 1/8"	8'-4"	5'-5"	11'-4"
30 X 12	30- 5/16"	8'-4"	5'-7"	11'-4"
36 X 4	30- 1/2"	8'-2"	4'-11"	11'-6"
36 X 6	31- 15/16"	8'-5"	5'-1"	11'-9"
36 X 8	33- 3/16"	8'-6"	5'-3"	11'-10"
36 X 10	33- 7/16"	8'-6"	5'-5"	11'-10"
36 X 12	33- 5/8"	8'-7"	5'-7"	11'-11"

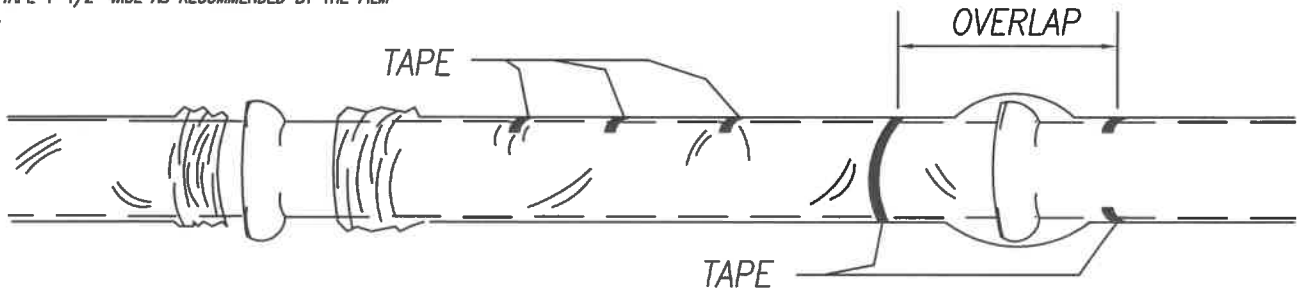
GREATER CINCINNATI WATER WORKS

CONSTRUCTION DETAILS

EXCAVATION FOR WATER WORKS CONNECTION

APPROVED	DATE	STANDARD DRAWING
	1/4/13	105- 4

TAPE MATERIAL
POLYETHYLENE TAPE 1-1/2" WIDE AS RECOMMENDED BY THE FILM MANUFACTURER.



MATERIAL SPECIFICATIONS
IN ACCORDANCE WITH ASTM D-1248 TYPE I, CLASS A OR C, GRADE E-1 FLOW RATE 0.4 MAX, DIELECTRIC STRENGTH VOLUME RESISTIVITY MIN. OHM-CM^3=10^16

POLYETHYLENE FILM THICKNESS 8 MILS	
TENSILE STRENGTH	1200 P.S.I. MIN
ELONGATION	300% MIN
DIELECTRIC STRENGTH	800 VOLTS/MIL

THE FOLLOWING METHOD ILLUSTRATES THE PROCEDURE FOR APPLYING POLYETHYLENE:

CUT POLYETHYLENE TUBE TO A LENGTH APPROXIMATELY TWO FEET LONGER THAN THE LENGTH OF THE PIPE SECTION, SLIP THE TUBE AROUND THE PIPE, CENTERING IT TO PROVIDE A ONE-FOOT OVERLAP ON EACH ADJACENT PIPE SECTION, AND BUNCHING IT ACCORDION FASHION LENGTHWISE UNTIL IT CLEARS THE PIPE ENDS.

LOWER THE PIPE INTO THE TRENCH AND MAKE THE PIPE JOINT WITH THE PRECEDING SECTION OF PIPE. A SHALLOW BELL HOLE MUST BE MADE AT THE JOINTS TO FACILITATE INSTALLATION OF THE POLYETHYLENE TUBE.

AFTER ASSEMBLING THE PIPE JOINT, MAKE THE OVERLAP OF THE POLYETHYLENE TUBE, PULL THE BUNCHED POLYETHYLENE FROM THE PRECEDING LENGTH OF PIPE, SLIP IT OVER THE END OF THE NEW LENGTH OF PIPE AND SECURE IT IN PLACE. THEN SLIP THE END OF THE POLYETHYLENE FROM THE NEW PIPE SECTION OVER THE END OF THE PRECEDING LENGTH OF PIPE, SECURE THE OVERLAP IN PLACE, TAKE UP THE SLACK WIDTH TO MAKE IT SNUG, BUT NOT TO TIGHT, FIT ALONG THIS BARREL OF PIPE, SECURING THE FOLD AT QUARTER POINTS.

REPAIR ANY RIPS, PUNCTURES, OR OTHER DAMAGE TO THE POLYETHYLENE WITH ADHESIVE TAPE OR WITH A SHORT LENGTH OF THE POLYETHYLENE TUBE CUT OPEN, WRAPPED AROUND THE PIPE, AND SECURED IN PLACE. PROCEED WITH INSTALLATION OF THE NEXT SECTION OF PIPE IN THE SAME MANNER.

PIPE-SHAPED APPURTENANCES:
BENDS, REDUCERS, OFFSETS AND OTHER PIPE-SHAPED APPURTENANCES SHALL BE COVERED WITH POLYETHYLENE IN THE SAME MANNER AS THE PIPE.

JUNCTIONS BETWEEN WRAPPED AND UNWRAPPED PIPE:
WHERE POLYETHYLENE WRAPPED PIPE JOINS A PIPE WHICH IS NOT WRAPPED, EXTEND THE POLYETHYLENE TUBE TO COVER THE UNWRAPPED PIPE A DISTANCE OF AT LEAST TWO FEET. SECURE THE END WITH CIRCUMFERENTIAL TURNS OF TAPE.

ODD SHAPED APPURTENANCES:
VALVES, TEES, CROSSES AND OTHER ODD-SHAPED PIECES WHICH CANNOT BE WRAPPED PRACTICALLY IN A TUBE SHALL BE WRAPPED WITH A FLAT SHEET OR SPLIT LENGTH OF POLYETHYLENE TUBE. THE SHEET SHALL BE PASSED UNDER THE APPURTENANCE AND BROUGHT UP AROUND THE BODY. SEAMS SHALL BE MADE BY BRINGING THE EDGES TOGETHER, FOLDING OVER TWICE, AND TAPPING DOWN. SLACK WIDTH AND OVERLAPS AT JOINTS SHALL BE HANDLED AS DESCRIBED ABOVE. TAPE POLYETHYLENE SECURELY IN PLACE AT VALVE STEM AND OTHER PENETRATIONS.

BACKFILL FOR POLYETHYLENE WRAPPED PIPE:
BACKFILL MATERIAL SHALL BE THE SAME AS SPECIFIED FOR PIPE WITHOUT POLYETHYLENE WRAPPING. SPECIAL CARE SHOULD BE TAKEN TO PREVENT DAMAGE TO THE POLYETHYLENE WRAPPING WHEN PLACING BACKFILL, BACKFILL MATERIAL SHOULD BE FREE FROM CINDERS, REFUSE, BOULDERS, ROCKS, STONES OR OTHER MATERIAL THAT COULD DAMAGE POLYETHYLENE.

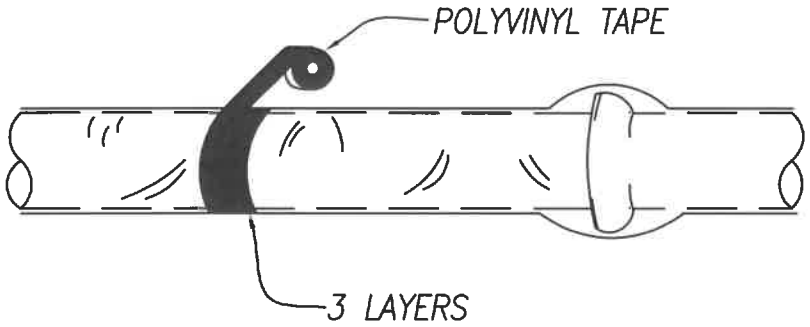
TUBE SIZE REQUIRED							
PIPE DIAMETER	4"	6"	8"	10"	12"	16"	20"
MIN. FLAT TUBE WIDTH (INCHES)	14	16	20	24	27	34	41

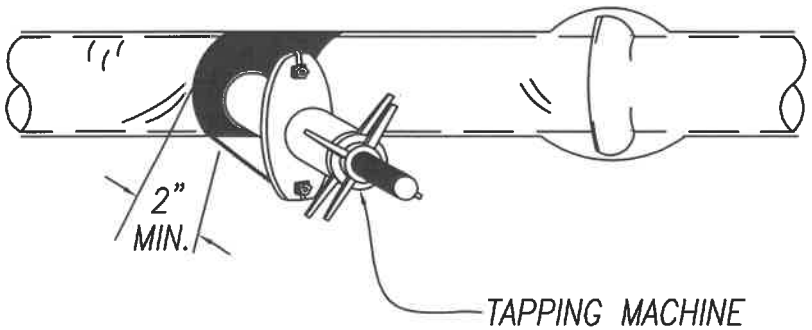
GREATER CINCINNATI WATER WORKS

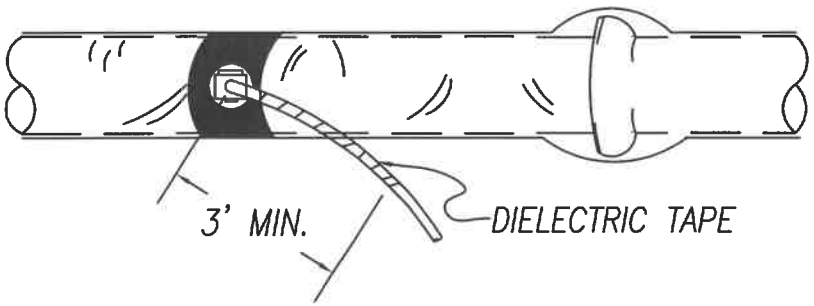
CONSTRUCTION DETAILS

POLYETHYLENE ENCASEMENT - GRAY AND DUCTILE IRON PIPE

APPROVED	DATE	STANDARD DRAWING
	1/4/13	105-5







OPENINGS FOR BRANCHES, SERVICE TAPS, BLOW-OFFS, AIR VALVES, AND SIMULAR APPURTENANCES SHALL BE MADE BY:

1.) WRAPPING (3) THREE LAYERS OF POLYVINYL – COMPATIBLE ADHESIVE TAPE COMPLETELY AROUND THE PIPE TO COVER THE AREA WHERE THE TAPPING MACHINE AND CHAIN WILL BE MOUNTED, EXTENDING A MINIMUM OF 2" BEYOND THE MOUNTING SURFACE.

2.) MOUNT THE TAPPING MACHINE ON THE PIPE AREA COVERED BY THE TAPE AND MAKE THE TAP AND INSTALL THE FERRULE DIRECTLY THROUGH THE TAPE AND POLYETHYLENE.

3.) INSPECT THE ENTIRE CIRCUMFERENTIAL AREA FOR DAMAGE AND MAKE ANY NECESSARY REPAIRS WITH TAPE.

4.) ON HOUSE SERVICES, TO MINIMIZE THE POSSIBILITY OF DISSIMILAR METAL CORROSION AT SERVICE CONNECTIONS, WRAP THE FERRULE AND A MINIMUM CLEAR DISTANCE OF THREE FEET OF THE COPPER SERVICE WITH POLYETHYLENE OR A SUITABLE DIELECTRIC TAPE.

GREATER CINCINNATI WATER WORKS

CONSTRUCTION DETAILS

TAPPING POLYETHYLENE ENCASED PIPE

APPROVED	DATE	STANDARD DRAWING
	1/4/13	105- 5A

THE CINCINNATI WATER WORKS WILL DETERMINE THE LENGTH OF ALL WATER MAINS AND THE MINIMUM NUMBER OF PANHANDLE LOTS TO BE SERVED ALONG PRIVATE DRIVE EASEMENTS ON AN INDIVIDUAL BASIS.

A FULL TIME SOIL TECHNICIAN WILL BE REQUIRED THROUGHOUT ALL PHASES OF THE EARTHWORK CONSTRUCTION FOR THE PRIVATE DRIVE IN ORDER TO PERFORM ALL THE NECESSARY SOIL TESTING AND INSPECTION. THE ENGINEER WILL BE RESPONSIBLE FOR FURNISHING THE CINCINNATI WATER WORKS A COMPLETE SET OF INSPECTION AND TESTING LOG NOTES AND/OR CERTIFICATIONS PRIOR TO INSTALLING ANY WATER MAIN IN THE PUBLIC DRIVE.

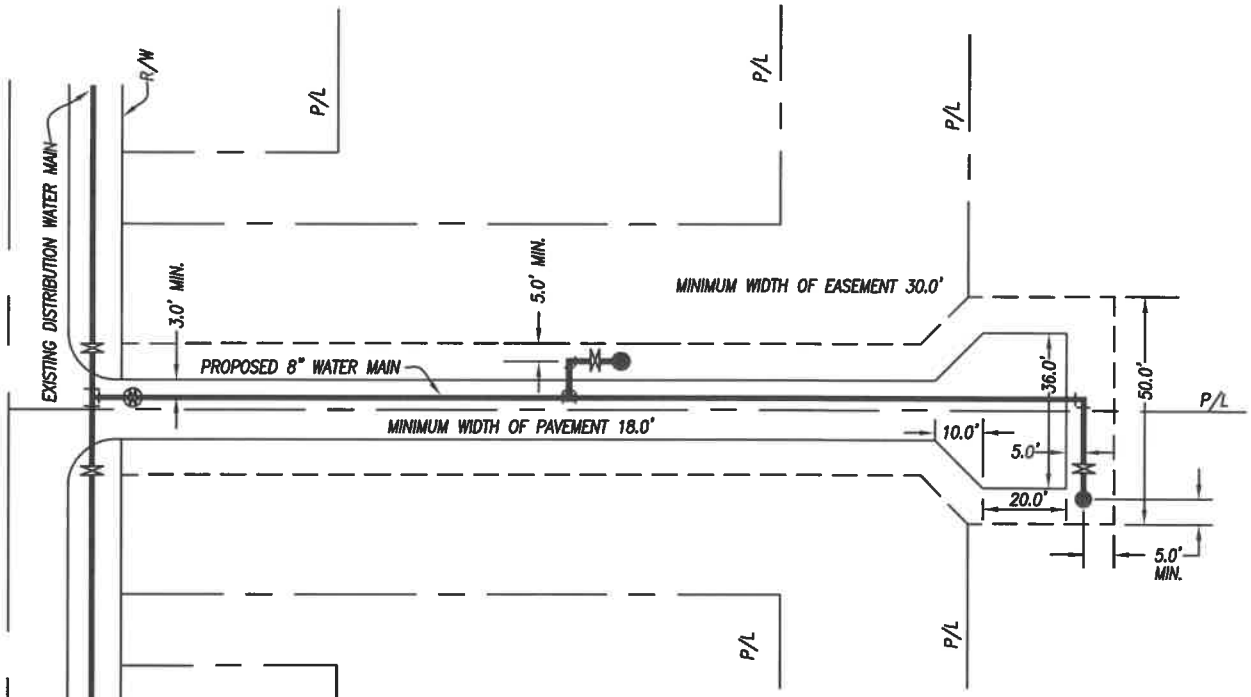
ALL PUBLIC WATER MAINS TO SERVE PANHANDLE LOTS MUST BE INSTALLED WITHIN A 30' MINIMUM WIDTH WATER MAIN EASEMENT. THE WATER WORKS STANDARD EASEMENT RESTRICTIONS WILL APPLY. THE WIDTH OF THE EASEMENT MUST COINCIDE WITH THE WIDTH OF THE PRIVATE DRIVEWAY EASEMENT AND BE SUBJECT TO THE APPROVAL OF THE CINCINNATI WATER WORKS. ALL EASEMENT LINES WILL BE CONSIDERED THE SAME AS A RIGHT-OF-WAY LINE WITH REGARDS TO THE INSTALLATION OF THE WATER MAINS AND APPURTENANCES. THE ENGINEER WILL BE RESPONSIBLE FOR PREPARING AND RECORDING THE NECESSARY EASEMENT PLAT. THE CITY OF CINCINNATI WILL PASS LEGISLATION FOR ACCEPTANCE OF ALL EASEMENTS FOR THE CINCINNATI WATER WORKS.

THE LOCATION OF ALL STOPS, METER SETTINGS, WATER MAIN VALVES AND FIRE HYDRANTS MUST BE IN CONFORMANCE WITH THE APPROPRIATE CINCINNATI WATER WORKS STANDARD DRAWINGS OR AS NOTED ON THE PLANS. ALL STANDARD WATER WORKS NOTES MUST APPEAR ON THE APPROVED CITY OR COUNTY WATER SUPPLY LINE PLANS.

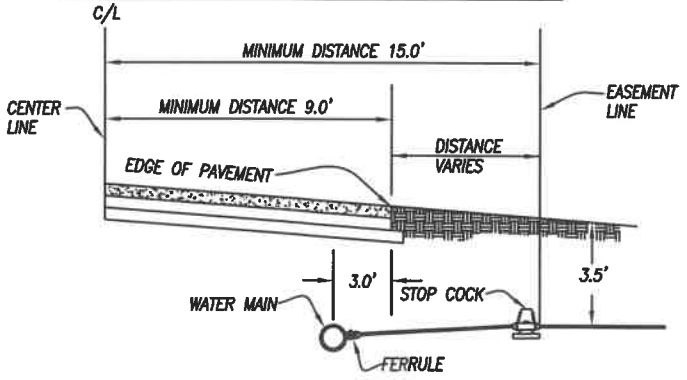
OWNERS OF PROPERTY SERVED FROM A PUBLIC WATER MAIN IN A PRIVATE DRIVE EASEMENT FOR PANHANDLE LOTS WILL BE REQUIRED TO ENTER INTO A DRIVEWAY MAINTENANCE AGREEMENT AS REQUIRED BY THE APPROPRIATE PLANNING COMMISSION AUTHORITY OR SUCH OTHER PUBLIC AUTHORITY HAVING JURISDICTION.

ACCESS DRIVE PAVEMENT TO BE BUILT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, LATEST REVISION.

THE DEVELOPER WILL BE REQUIRED TO INSTALL ALL WATER MAINS AND APPURTENANCES, INCLUDING TAPS, PRIOR TO RECORDING ON THE APPROPRIATE RECORD PLATS.



TYPICAL ACCESS DRIVE SECTION

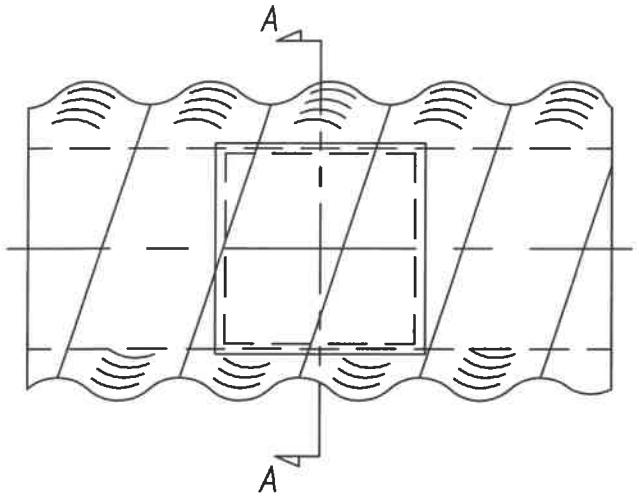


GREATER CINCINNATI WATER WORKS

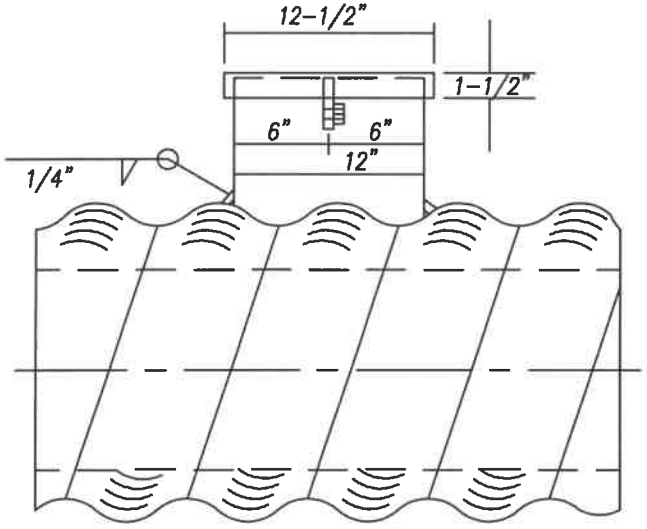
CONSTRUCTION DETAILS

PRIVATE DEVELOPMENTS ON PANHANDLE LOTS

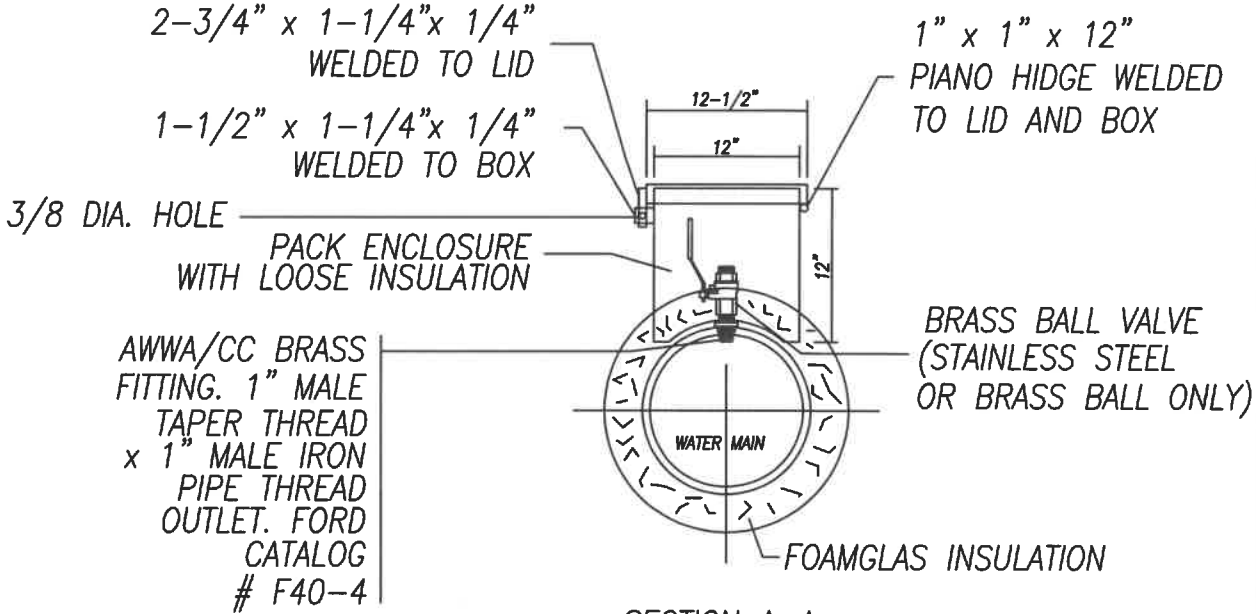
APPROVED	DATE	STANDARD DRAWING
	1/4/13	105- 6



PLAN



PROFILE



SECTION A–A

ALL MATERIAL FOR
BOX – 12 GA. MILD STEEL
A-36 HOT ROLLED.
ALL MATERIALS TO BE
HOT DIPPED GALVANIZED.

NOTE:

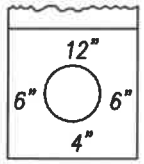
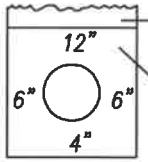
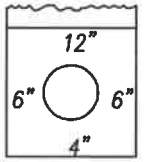
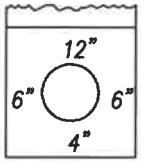
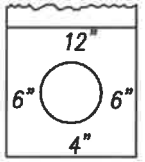
1. BOX TO BE WELDED TO NESTABLE CORRUGATED METAL PIPE PRIOR TO HOT DIP GALVANIZING.
2. BRASS BALL VALVES TO BE 150 lbs. S.W.P. WITH 3" HANDLES, STAINLESS STEEL OR BRASS BALL, BUNA-N-SEATS, CONFORMING TO ASTM 62.

GREATER CINCINNATI WATER WORKS

CONSTRUCTION DETAILS

AIR RELEASE ASSEMBLY FOR WATER MAINS ON BRIDGES

APPROVED	DATE	STANDARD DRAWING
	1/4/13	105- 7

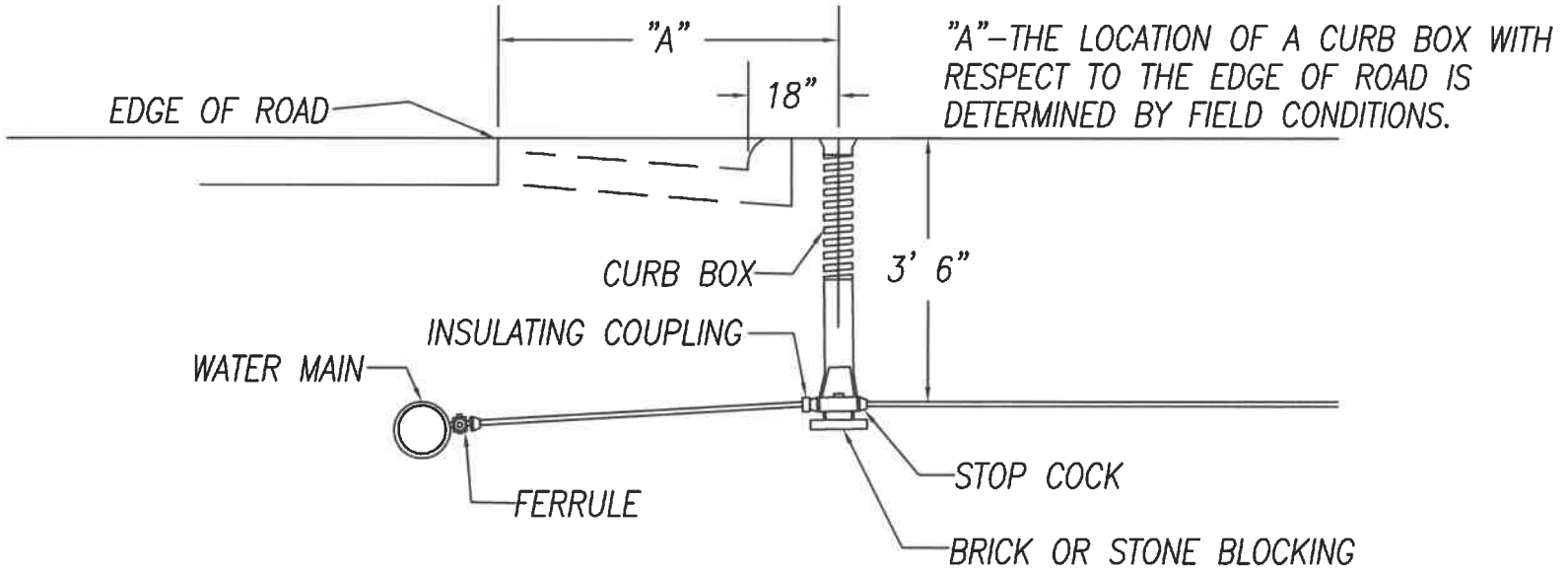
BACKFILL CROSS SECTION	METHOD DESIGNATION	FOR NOMINAL PIPE SIZES	PIPE AREA	BALANCE OF BACKFILL
	A	UNDER 12"	EMBEDMENT MATERIAL	GRANULAR MATERIAL
	B	UNDER 12"	EMBEDMENT MATERIAL	COARSE FILL
	A	12" & 16"	EMBEDMENT MATERIAL	GRANULAR MATERIAL
	B	12" & 16"	EMBEDMENT MATERIAL	COARSE FILL
	A	20" & OVER	EMBEDMENT MATERIAL	GRANULAR MATERIAL

GREATER CINCINNATI WATER WORKS

BACKFILL

TYPICAL BACKFILL REQUIREMENT

APPROVED	DATE	STANDARD DRAWING
	1/4/13	106- 1

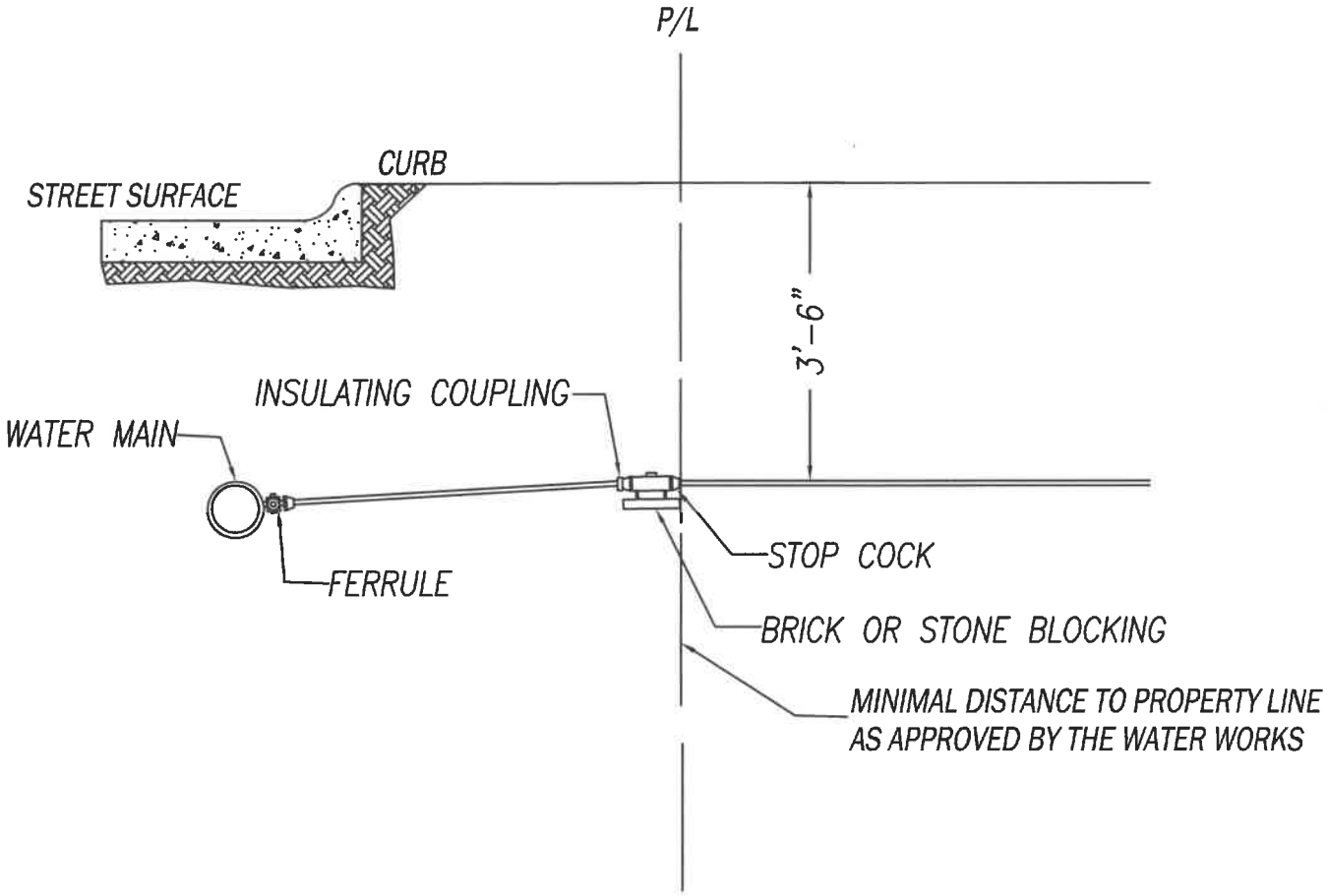


GREATER CINCINNATI WATER WORKS

SERVICE BRANCHES

INSTALLATION WITH CURB BOX

APPROVED	DATE	STANDARD DRAWING
	1/4/13	107-1



GREATER CINCINNATI WATER WORKS

SERVICE BRANCHES

INSTALLATION WITHOUT CURB BOX

APPROVED	DATE	STANDARD DRAWING
	1/4/13	107-2

CONSTRUCTION SPECIFICATIONS:
NO PRECAST PITS ALLOWED FOR BRANCHES 4" AND LARGER IN SIZE.

PIT CONSTRUCTION DETAILS:
A) METER PIT FLOOR SHALL BE 6" CONCRETE WITH 42 LB. ROAD MESH INSTALLED. THE FLOOR, AT ITS SHALLOWEST POINT MUST BE A MINIMUM OF 6", SLOPED TOWARD THE DRAIN OR SUMP PUMP LOCATION. FLOOR SLAB MUST ALSO HAVE WATER STOP INSTALLED.

B) METER PIT WALLS SHALL BE 8" CONCRETE WITH 5/8" DIAMETER STEEL REINFORCING RODS 18" CENTERED HORIZONTALLY AND VERTICALLY. REINFORCING STEEL TO BE ANGLED AND EXTEND 18" CENTERED INTO TOP SLAB.

C) METER PIT TOP SLAB SHALL BE A MINIMUM OF 8" CONCRETE WITH 5/8" DIAMETER REINFORCING RODS, 6" ON CENTER-SHORT SPAN AND 18" ON CENTER-LONG SPAN. REINFORCING STEEL IN TOP SLAB SHALL BE LOCATED IN THE BOTTOM PORTION OF THE SLAB, 2" FROM THE SURFACE. 5/8" REINFORCING STEEL TO BE 2' LONG IN TOP OF SLAB DIAGONALLY AT CORNER OF OPENINGS. TOP SLAB SHALL BE SET TO FINISHED GRADE.

CONCRETE CONSTRUCTION
ALL CONCRETE USED IN CONSTRUCTION OF METER PIT WALLS, FLOORS, AND REINFORCED SLABS SHALL BE COMPOSED OF ONE PART CEMENT, TWO PARTS SAND, AND THREE PARTS AGGREGATE BY WEIGHT AND A MAXIMUM WATER CEMENT RATIO OF 0.50. BEFORE CONCRETE IS PLACED, THE FORMS , REINFORCEMENT STEEL, WATER STOPS, AND ANCHOR BOLTS SHALL BE RIGIDLY SECURED IN PROPER POSITION. ALL DIRT, MUD, WATER, DEBRIS AND OTHER FOREIGN MATERIAL SHALL BE REMOVED FROM THE SPACE TO BE OCCUPIED BY THE CONCRETE. CONCRETE SHALL BE DEPOSITED AND COMPACTED IN THE WALL SLABS BEFORE ANY REINFORCING STEEL IS PLACED IN THE SLAB AREA AND SHALL SETTLE AT LEAST 2 HOURS BEFORE THE SLAB CONCRETE IS POURED. CONCRETE SHALL BE PROTECTED FROM LOSS OF MOISTURE FOR A CURING PERIOD OF AT LEAST 7 DAYS.

GREATER CINCINNATI WATER WORKS

BRANCH / METER ENCLOSURE - GENERAL INFORMATION

METER VAULT CONSTRUCTION

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-1A

REINFORCING STEEL

ALL REINFORCING STEEL SHALL BE FREE FROM DIRT, OIL, GREASE, OR AVOIDABLE, LOOSE RUST WHEN PLACED IN CONCRETE. REINFORCING STEEL SHALL BE SECURELY HELD IN PLACE DURING THE CONCRETE POURING OPERATION. IN NO CASE SHALL REINFORCING STEEL BE DRIVEN OR FORCED INTO CONCRETE AFTER IT HAS TAKEN ITS INITIAL SET.

WATERPROOFING

THE EXTERIOR SIDE OF PIT WALLS SHALL BE WATERPROOFED WITH TWO COATS OF WATER WORKS APPROVED WATER PROOFING SIMILAR TO ONE OF THE FOLLOWING MATERIALS APPLIED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS: THOROSEAL; U.S.S. CHEMICAL TARMASTIC #102; KOPPERS BITUMASTIC SUPER SERVICE BLACK; DAMCHEX; AMERCOAT #78; SEALTIGHT MEL-ROL AND MEL-PRIME PRIMER. VOIDS BETWEEN PIPE AND WALL SHALL BE GROUTED WITH A HYDRAULIC CEMENT.

DRAIN

EACH PIT SHALL BE DRAINED BY MEANS OF A 4" DRAIN LEADING TO A GRAVEL FILLED SUMP 3'X3'X3'. THE PIT SHALL BE SLOPED TO A FLOOR DRAIN PLACED IN A CORNER OPPOSITE THE LID. THE WATER WORKS APPROVED FLOOR DRAIN CASTING SHALL HAVE A 4" OUTLET AND A RAISED OR BEEHIVE DOME GRATE SIMILAR TO WADE #1634 OR JOSAM #7324.

PIT LIDS

PITS NOT SUBJECT TO PARKING OR TRAFFIC SHALL BE CONSTRUCTED USING A WATER WORKS APPROVED LID SIMILAR TO A BILCO J-1AL (24"X24") OR JD-2AL (48"X48") AND HAVE A FACTORY DRILLED 1-3/4" HOLE IN THE TOP.

PITS CONSTRUCTED IN PARKING AREAS SHALL HAVE A GUARD POST SET IN THE GROUND AT EACH CORNER OF THE ROOF SLAB, OR HAVE THE ROOF SLAB RAISED AT LEAST 6" ABOVE GROUND LEVEL TO PREVENT PARKING ON THE PIT.

PITS SUBJECT TO HEAVY TRAFFIC LOADS SHALL BE EQUIPPED WITH WATER WORKS APPROVED LIDS SIMILAR TO: BILCO -1AL-H-20(24"X24"), J-D-2AL-H-20 (48"X48") OR JD-3AL-H-20 (48"X72").

(CONTINUED ON NEXT PAGE)

GREATER CINCINNATI WATER WORKS

BRANCH / METER ENCLOSURE - GENERAL INFORMATION

METER VAULT CONSTRUCTION

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-1B

PIT LIDS (CONTINUED)

PIT TOP MUST BE CONSTRUCTED TO MEET REQUIREMENTS FOR H-20 LOADING.
ALL GCWW APPROVED LIDS SHALL BE EQUIPPED WITH STAINLESS STEEL HARDWARE AND MUST HAVE A 25 YEAR WARRANTY. LIDS SHALL BE CENTERED LENGTHWISE OVER THE DOMESTIC METER.

REMOVABLE METAL LADDER

THE REMOVABLE METAL LADDER SHALL BE AN APPROVED OSHA TYPE 1 INDUSTRIAL-HEAVY 250 POUND RATED LADDER THAT MEETS THE AMERICAN NATIONAL STANDARD SAFETY CODE FOR PORTABLE METAL LADDERS. ANSI A 14.2 - (LATEST REVISION). THE LADDER MUST REACH FROM THE PIT FLOOR AND EXTEND INTO THE PIT OPENING.

GREATER CINCINNATI WATER WORKS

BRANCH / METER ENCLOSURE - GENERAL INFORMATION

METER VAULT CONSTRUCTION

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-1C

PIPES, METERS AND FITTINGS

ALL METERS SHALL BE PURCHASED FROM THE GCWW. SERVICE BRANCHES 3/4" THROUGH 2" SHALL BE SOFT ANNEALED TYPE "K" COPPER CONFORMING TO ASTM-B88, FROM THE MAIN TO THE WATER METER. ONLY COMPLETE ROLLS OF 60' OR 100' TYPE "K" COPPER MAY BE USED ON 3/4" AND 1" BRANCHES. AT NO TIME SHALL COPPER BE RUN THROUGH ANY CONDUIT. CONNECTIONS BETWEEN PIPE 3/4" OR 1" SHALL BE BY FLARED FITTING. CONNECTIONS BETWEEN PIPE 1 1/2" AND 2" SHALL BE WITH SILVER SOLDER OR FLARED FITTING. VALVES, FITTINGS, TEST TEES AND DETECTOR CHECK TRIM SHALL BE "NO LEAD" GCWW APPROVED BRASS. SERVICE BRANCHES LARGER THAN 2" SHALL BE EITHER TYPE "K" COPPER OR DUCTILE IRON FROM THE MAIN TO THE METER SETTING OUTLET VALVE. DUCTILE IRON PIPE SHALL CONFORM TO CINCINNATI SPECIFICATION #40-110-11(CLASS 55) OR THE LATEST REVISION THEREOF AND SHALL BE INSPECTED BY THE CINCINNATI WATER WORKS ENGINEERING DIVISION.

INSULATING COUPLINGS

A NO LEAD INSULATING COUPLING MUST BE INSTALLED ON THE HOUSE SIDE OF THE CORPORATION STOP ON ALL WATER SERVICE BRANCHES 3/4" THROUGH AND INCLUDING 2".

CURB BOXES/ROADWAY BOXES AND TELESCOPES

A GCWW APPROVED CURB BOX MUST BE INSTALLED OVER THE CORPORATION STOP ON ALL 3/4" AND 1" SERVICE LINE INSTALLATIONS AND SET TO ROUGH GRADE. IN THE INSTANCE WHERE A CORPORATION STOP WILL BE UNDER A PAVED AREA, A ROADWAY BOX MUST BE INSTALLED ON A 3/4" AND 1" SERVICELINE INSTALLATION. ROADWAY BOXES MUST BE INSTALLED OVER THE CORPORATION STOP ON 1 1/2" AND 2" SERVICE LINE INSTALLATIONS AND SET TO ROUGH GRADE. (SEE E-476-M OR E-477-M FOR CURB BOX/ROADWAY BOX SPECIFICATIONS.)

GREATER CINCINNATI WATER WORKS

BRANCH / METER ENCLOSURE - GENERAL INFORMATION

PIPES, METERS, AND FITTINGS MATERIAL SPECIFICATIONS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-1D

VALVE BOXES:

A VALVE BOX MUST BE INSTALLED OVER THE CONTROL VALVE ON ALL 4" AND LARGER SERVICE LINE INSTALLATIONS. (SEE E-493-M OR E-494-M FOR VALVE BOX SPECIFICATIONS) IRON TELESCOPES MUST BE USED IN TRAFFIC AREAS. PLASTIC TELESCOPES MAY BE INSTALLED IN GRASS AREAS. CONCRETE BRICKS MUST BE USED UNDER THE IRON TELESCOPE AND IRON VALVE BOX. OAK BLOCKS MAY BE USED UNDER THE PLASTIC TELESCOPE AND PLASTIC VALVE BOX.

METER BOX ENCLOSURE/OUTSIDE SETTING

ALL WATER METER SETTINGS (5/8" - 2") IN AN OUTSIDE METER BOX MUST BE INSTALLED WITH A POLYMER METER BOX ENCLOSURE. WATER WORKS APPROVED METER BOX ENCLOSURE METAL COVER SIMILAR TO FORD #FW-3 OR AY MCDONALD 74-M3W ARE INDICATED ON SPECIFIC STANDARD DRAWINGS. SETTING MUST BE CENTERED IN BOX, 15" TO 19" BELOW GRADE.

GREATER CINCINNATI WATER WORKS

BRANCH / METER ENCLOSURE - GENERAL INFORMATION

PIPES, METERS, AND FITTINGS MATERIAL SPECIFICATIONS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-1E

EMR SYSTEM INSTALLATIONS ON ***NEW*** SERVICES:

METER PITS OR FROST PROOF BOXES SHALL BE SET AS CLOSE AS PRACTICAL TO THE PROPERTY LINE. IN THE INSTANCE WHERE A METER IS TO BE INSTALLED IN A FROST PROOF BOX, THE APPROPRIATE METER BOX ENCLOSURE AND COVER MUST BE INSTALLED. SEE SPECIFIC DRAWING PERTAINING TO METER SIZE. OUTER LIDS MUST BE GCWW APPROVED DEPENDING ON METER SIZE. GCWW PERSONNEL OR AUTHORIZED AGENT WILL INSTALL 5/8" THROUGH 1" METERS, WIRE AND METER INTERFACE UNIT IN THE APPROPRIATE METER BOX SETTINGS. GCWW PERSONNEL OR AUTHORIZED AGENT WILL INSTALL ALL MIU'S. IN THE UNUSUAL EVENT THAT A METER IS INSTALLED INSIDE A BUILDING, A HOLE MUST BE DRILLED THROUGH THE FOUNDATION OR WALL 36" TO 60" ABOVE THE FINISHED GRADE. MIU WILL BE INSTALLED AT THIS LOCATION.

GCWW PERSONNEL OR AUTHORIZED AGENT WILL CONNECT ALL CABLE.

GREATER CINCINNATI WATER WORKS

BRANCH / METER ENCLOSURE - GENERAL INFORMATION

ELECTRONIC METER READING SYSTEM (EMR) STANDARDS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-1F

BACKFLOW

ALL BACKFLOW DEVICES MUST BE:

- NO SMALLER THAN THE SIZE OF THE METER.
- ASSE, AWWA, OR USC APPROVED.
- TESTED AT THE TIME OF INSTALLATION AND ONCE A YEAR THEREAFTER.

ABOVE GROUND BACKFLOW DEVICE ENCLOSURE

IF FROST PROOF PROTECTION IS INSTALLED:

THE DEPTH OF WATER INSIDE THE ENCLOSURE SHALL NOT EXCEED 6" DURING FULL FLOW OF THE BACKFLOW RELIEF VALVE DISCHARGE, NOR SHALL WATER STAND TO ANY DEPTH GREATER THAN 1/4" AFTER COMPLETION OF FULL FLOW.

ALL TEST COCKS, VALVE HANDLES OR HAND WHEELS SHALL BE WITHIN A MAXIMUM OF 24" OF ACCESS OPENING.

HINGED ACCESS PANELS SHALL BE SECURELY RESTRAINED IN THE OPEN AND CLOSED POSITIONS SO AS TO AVOID INJURY. HINGED ACCESS TO THE BACKFLOW PREVENTER SHALL BE LOCKABLE.

GREATER CINCINNATI WATER WORKS	**BRANCH / METER ENCLOSURE - GENERAL INFORMATION**		
	BACKFLOW DEVICE SPECIFICATIONS		
	APPROVED	DATE	STANDARD DRAWING
		1/4/13	108-1G

METER SIZE (IN INCHES)	METER TYPE	LAYING LENGTH (IN INCHES)
5/8	POSITIVE DISPLACEMENT	7 1/2
3/4	POSITIVE DISPLACEMENT	9
1	POSITIVE DISPLACEMENT	10 3/4
1 1/2	POSITIVE DISPLACEMENT	13
2	POSITIVE DISPLACEMENT	17
2	TURBINE	17
3	COMPOUND	24
3	TURBINE	24
4	COMPOUND	29
4	TURBINE	29
4	FIRE PROTECTION ASSEMBLY	33
6	COMPOUND	36
6	TURBINE	36
6	FIRE PROTECTION ASSEMBLY	45
8	TURBINE	42
8	FIRE PROTECTION ASSEMBLY	53
10	TURBINE	48
10	FIRE PROTECTION ASSEMBLY	68
12	TURBINE	68
16	TURBINE	68
20	TURBINE	68

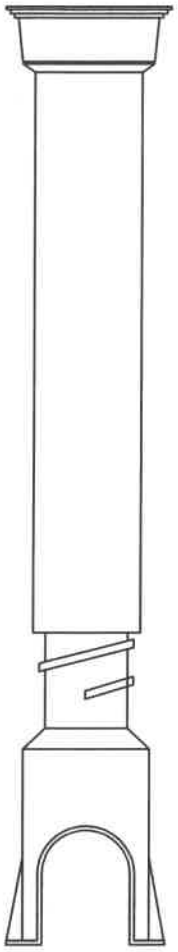
LAYING LENGTH INCLUDES STRAINER AND SPACER

GREATER CINCINNATI WATER WORKS

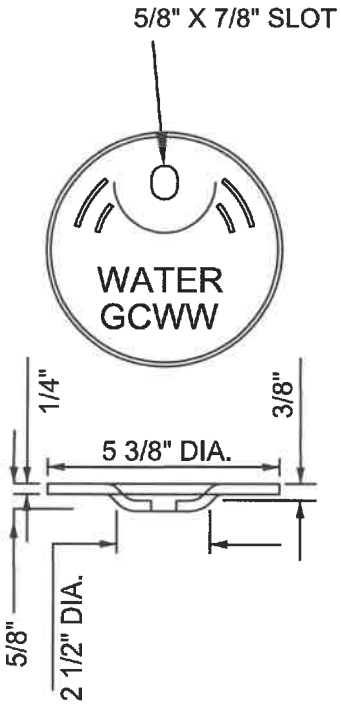
BRANCH / METER ENCLOSURE - GENERAL INFORMATION

WATER METER LAYING LENGTHS

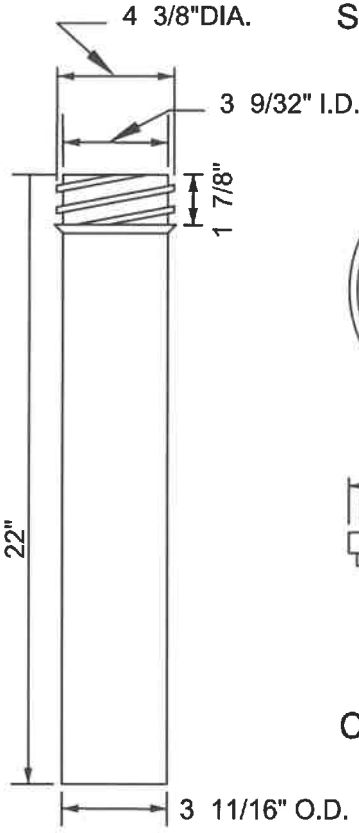
APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-1H



COMPLETE ASSEMBLY

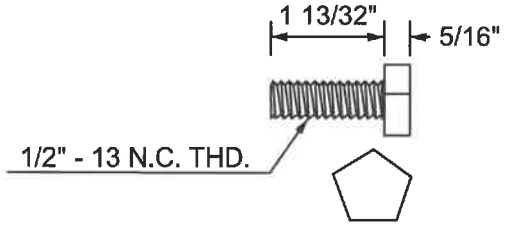


CAST IRON LID

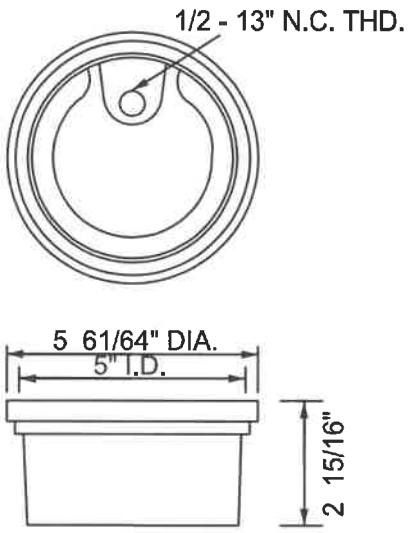


TOP

(THREAD ELIMINATED ON SLIP STYLE) (PLASTIC)



STANDARD PENTAGON HEAD BRASS BOLT



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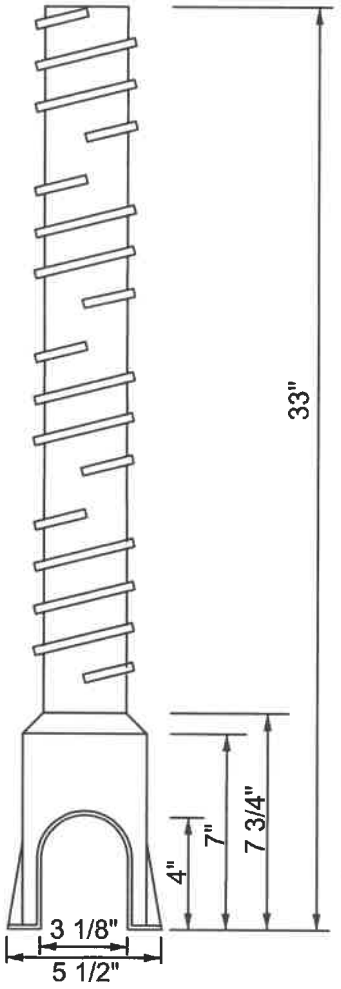


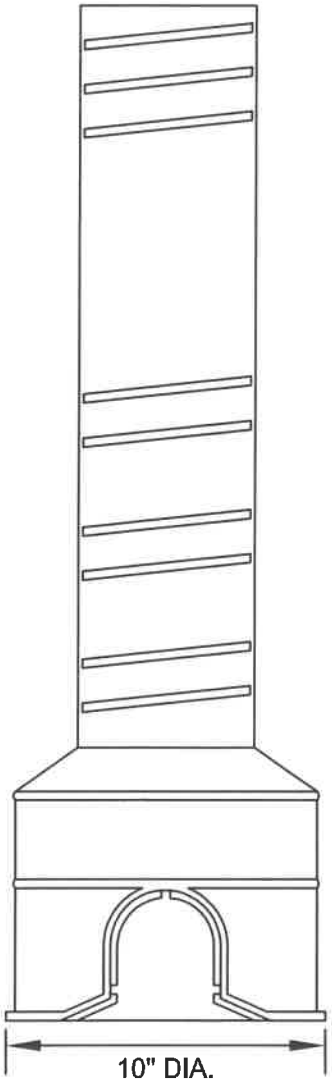
BOTTOM (PLASTIC)

GREATER CINCINNATI WATER WORKS

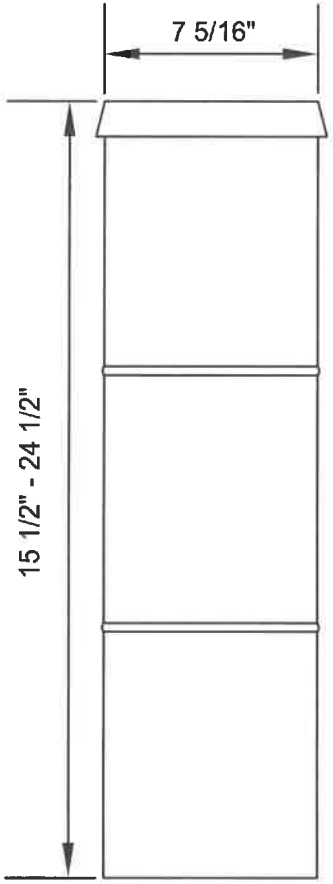
BRANCH / METER ENCLOSURE - GENERAL INFORMATION

CURB BOX - DIMENSIONS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-2A



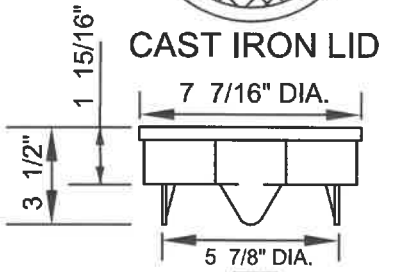
BOTTOM

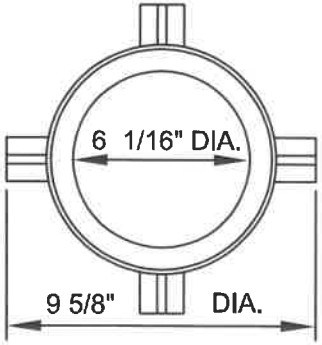


TOP

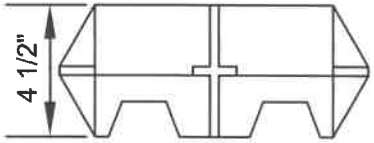
(THREAD ELIMINATED ON SLIP STYLE)

CAST IRON LID





CAST IRON RING

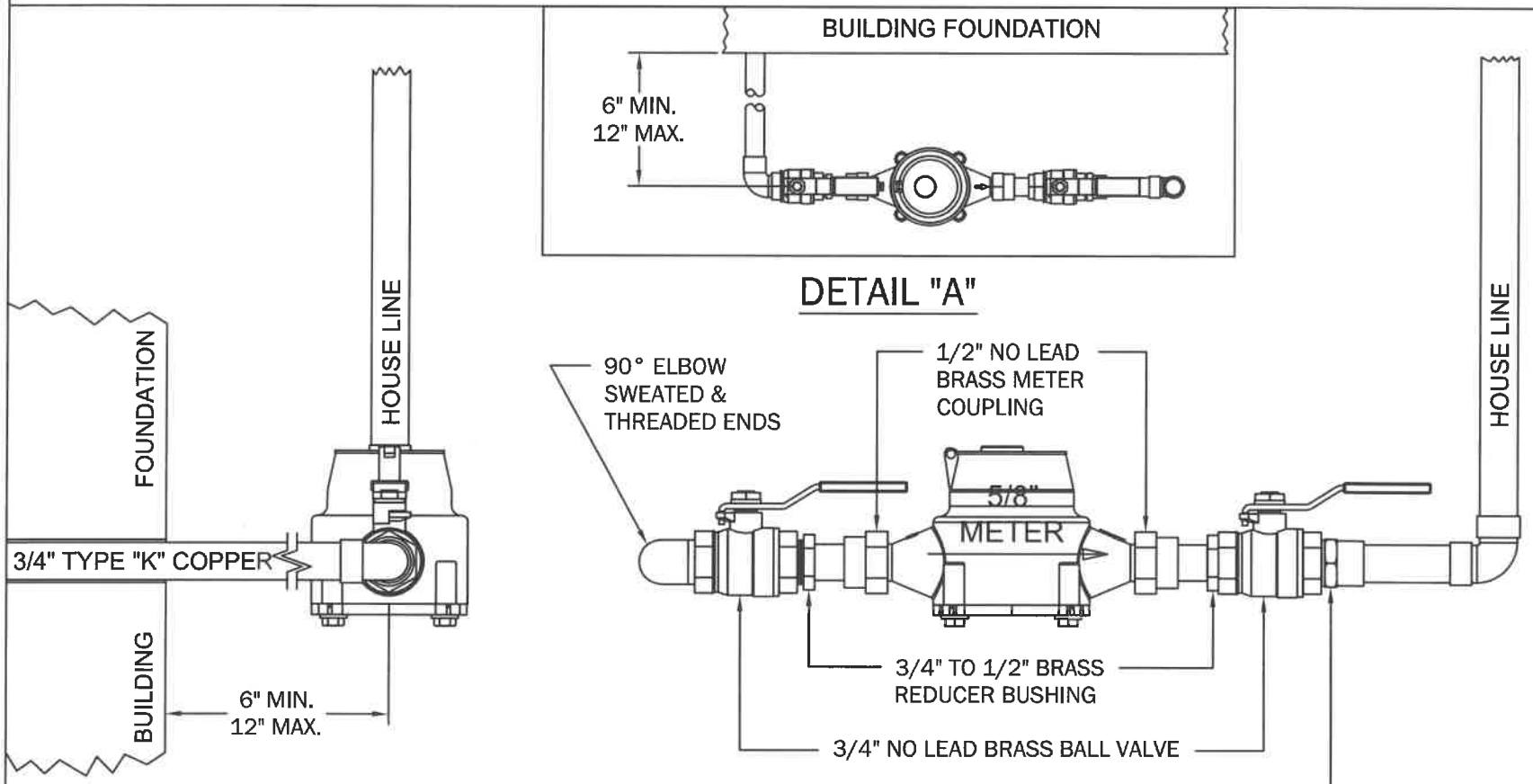


GREATER CINCINNATI WATER WORKS

BRANCH / METER ENCLOSURE - GENERAL INFORMATION

ROADWAY BOX - DIMENSIONS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-2B



DETAILS

A) NO METER SHALL BE SET MORE THAN 36" NOR LESS THAN 12" FROM THE FLOOR. METER SETTING MUST BE INSTALLED HORIZONTALLY AND AT 90° FROM ENTRY POINT SEE DETAIL "A" THIS SHEET.

B) NO LEAD BRASS BALL VALVES TO BE 150 LBS. S.W.P. WITH 3" HANDLES, STAINLESS STEEL OR BRASS BALL, BUNA-N-SEATS, CONFORMING TO ASTM B62 AND NSF 61.

C) LAYING LENGTH OF 5/8" METER IS 7 1/2".

D) METER MUST BE SEALED BY WATER WORKS PERSONNEL OR AUTHORIZED AGENT.

E) ANY ELECTRICAL GROUND WIRE ON THE SERVICE LINE MUST BE LOCATED BETWEEN THE INLET VALVE AND THE STREET.

F) THIS SETTING IS REQUIRED WHEN AN INSIDE METER REDUCTION IS APPROVED, OR BRANCH REPLACEMENT OCCURS.

G) A 1/4" HOLE MUST BE DRILLED THROUGH THE FOUNDATION/WALL AND AFTER RUNNING WIRE, SEALED WITH A FLEXIBLE SEALANT.

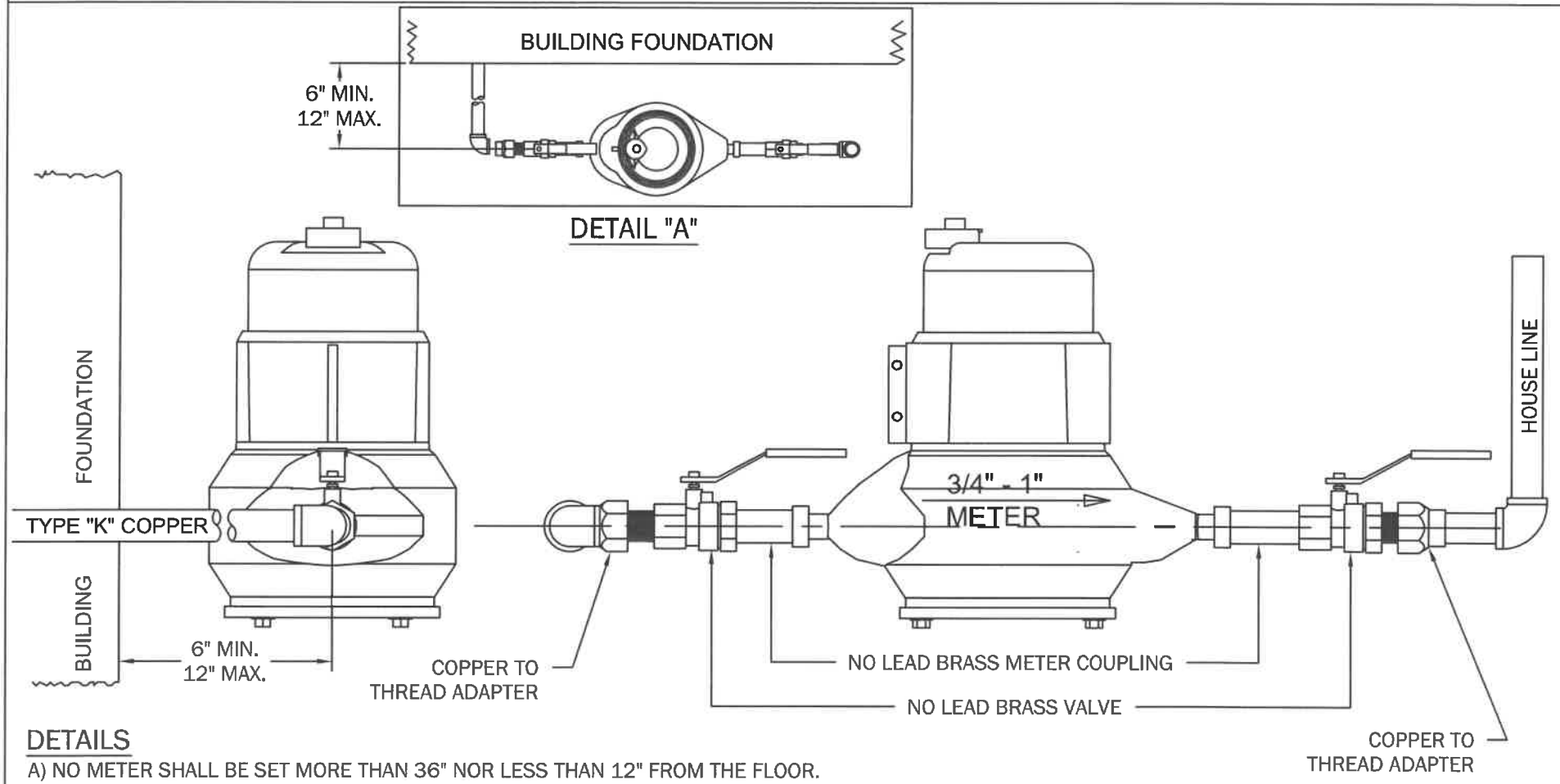
H) SEE 108-1D FOR DETAILS.

GREATER CINCINNATI WATER WORKS

INSIDE EMR METER SETTING

5/8" METER - COUPLING

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-3A



DETAILS

A) NO METER SHALL BE SET MORE THAN 36" NOR LESS THAN 12" FROM THE FLOOR. METER MUST BE INSTALLED HORIZONTALLY AND AT 90° TO ENTRY POINT. SEE DETAIL "A" THIS SHEET.

B) NO LEAD BRASS BALL VALVES TO BE 150 LBS. SWP WITH 3" HANDLES, STAINLESS STEEL OR BRASS BALL, BUNA-N-SEATS, CONFORMING TO ASTM B62 AND NSF 61. VALVES MUST BE THE SAME SIZE AS THE BRANCH.

C) LAYING LENGTH OF METERS; 3/4" METER IS 9", 1" METER IS 10 3/4".

D) METER MUST BE SEALED BY WATER WORKS PERSONNEL OR AUTHORIZED AGENT.

E) ANY ELECTRICAL GROUND WIRE ON THE SERVICE LINE MUST BE LOCATED BETWEEN THE INLET VALVE AND THE STREET.

F) THIS SETTING IS REQUIRED WHEN AN INSIDE METER REDUCTION IS APPROVED OR BRANCH REPLACEMENT OCCURS.

G) A 1/4" HOLE MUST BE DRILLED THROUGH THE FOUNDATION/WALL AND AFTER RUNNING WIRE, SEALED WITH A FLEXIBLE SEALANT.

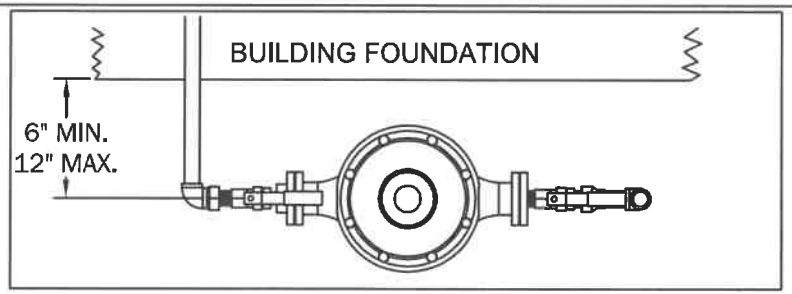
H) SEE 108-1D FOR DETAILS.

GREATER CINCINNATI WATER WORKS

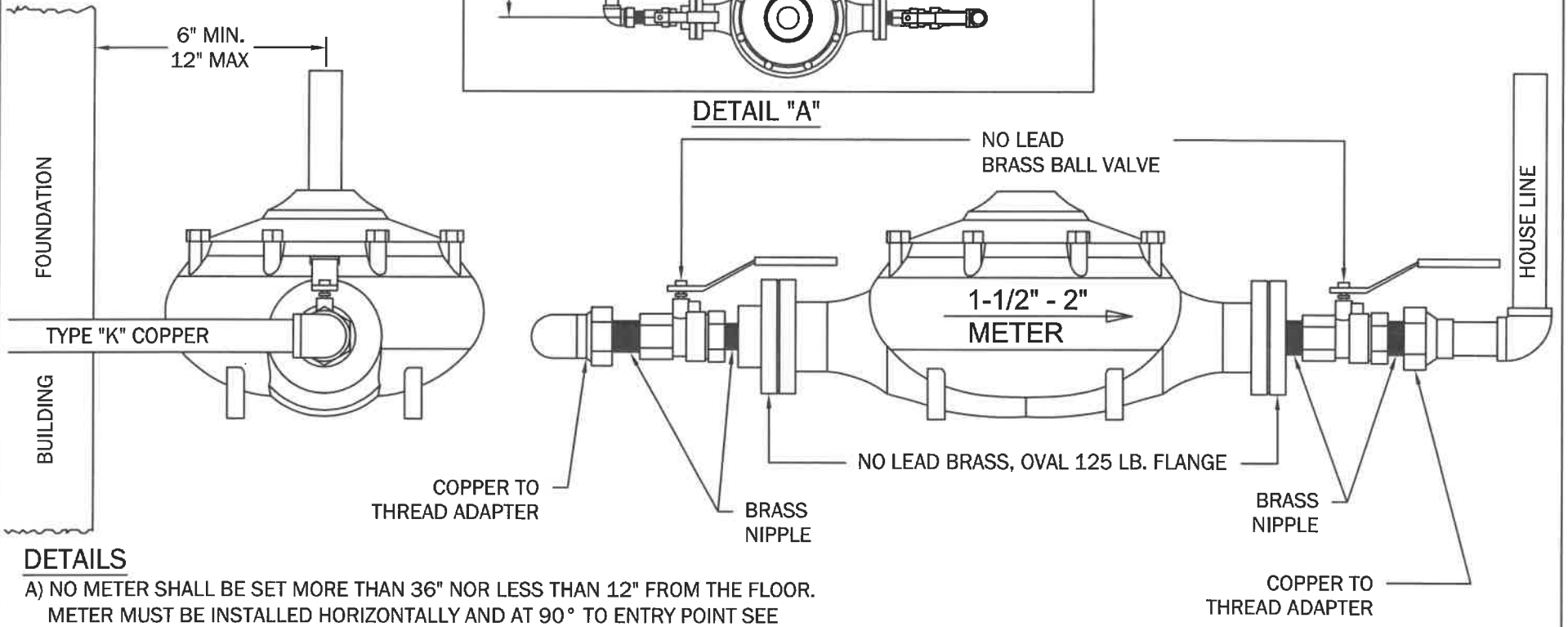
INSIDE EMR METER SETTING

3/4" AND 1" METERS - COUPLING

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-3B



DETAIL "A"



DETAILS

A) NO METER SHALL BE SET MORE THAN 36" NOR LESS THAN 12" FROM THE FLOOR. METER MUST BE INSTALLED HORIZONTALLY AND AT 90° TO ENTRY POINT SEE DETAIL "A" THIS SHEET.

B) NO LEAD BRASS BALL VALVES TO BE 150 LBS. S.W.P. WITH 3" HANDLES, STAINLESS STEEL OR BRASS BALL, BUNA-N-SEATS, CONFORMING TO ASTM B62 NAD NSF 61.

C) LAYING LENGTH OF METERS; 1 1/2" METER IS 13", 2" METER IS 17".

D) METER MUST BE SEALED BY WATER WORKS PERSONNEL OR AUTHORIZED AGENT.

E) ANY ELECTRICAL GROUND WIRE ON THE SERVICE LINE MUST BE LOCATED BETWEEN THE INLET VALVE AND THE STREET.

F) IT IS REQUIRED TO USE THIS SETTING WHEN AN INSIDE METER REDUCTION IS APPROVED, OR BRANCH REPLACEMENT OCCURS, PROVIDED BALL VALVES (AS SPECIFIED BELOW) ARE USED.

G) A ROADWAY BOX MUST BE INSTALLED OVER THE CURB STOP.

H) WHEN A METER SMALLER THAN THE BRANCH SIZE IS USED, THE PIPE REDUCER SHALL BE LOCATED WITHIN 4" OF THE INLET VALVE.

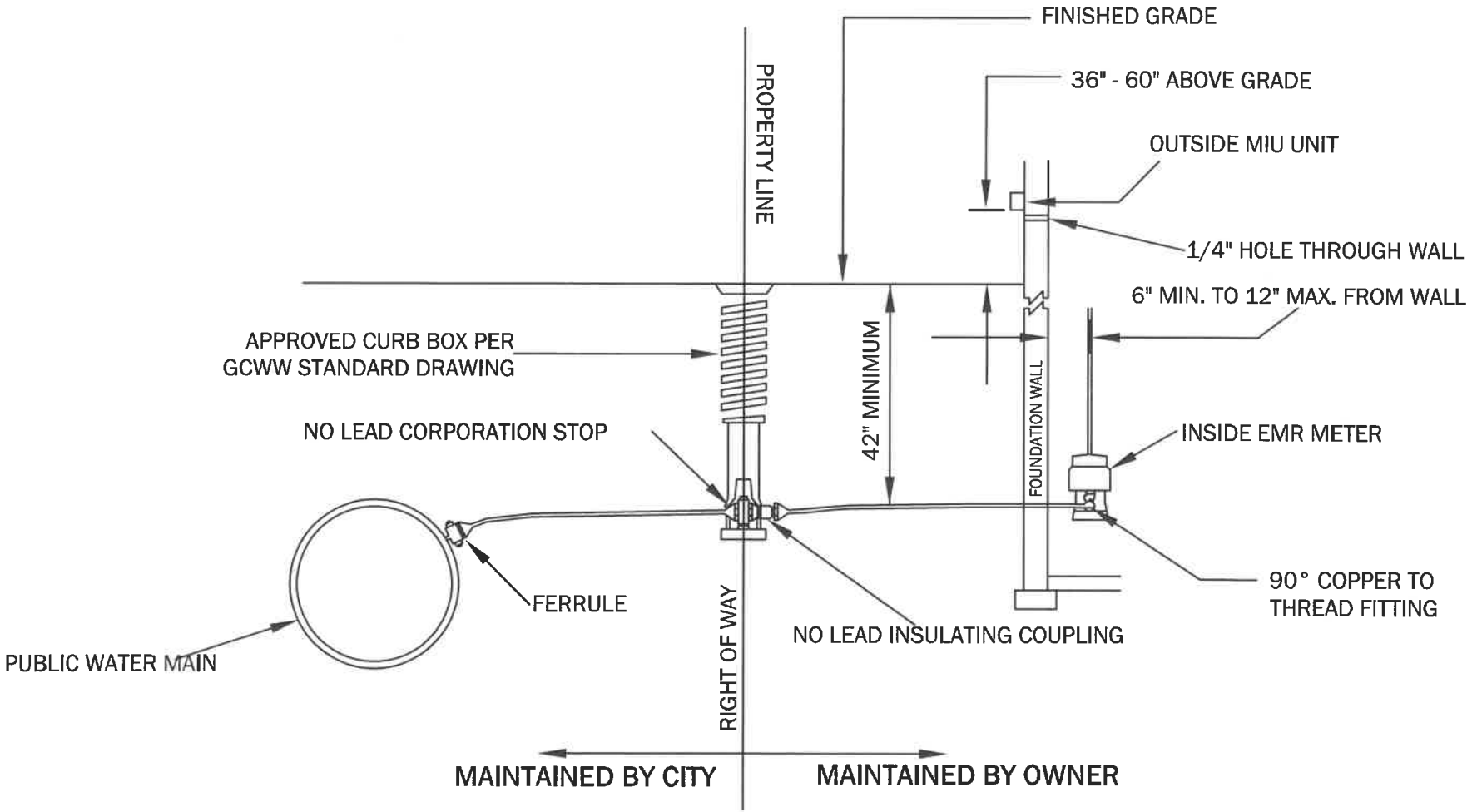
I) SEE 108-1D FOR DETAILS.

GREATER CINCINNATI WATER WORKS

INSIDE EMR METER SETTING

1 1/2" AND 2" METERS - FLANGED

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-3C



DETAILS

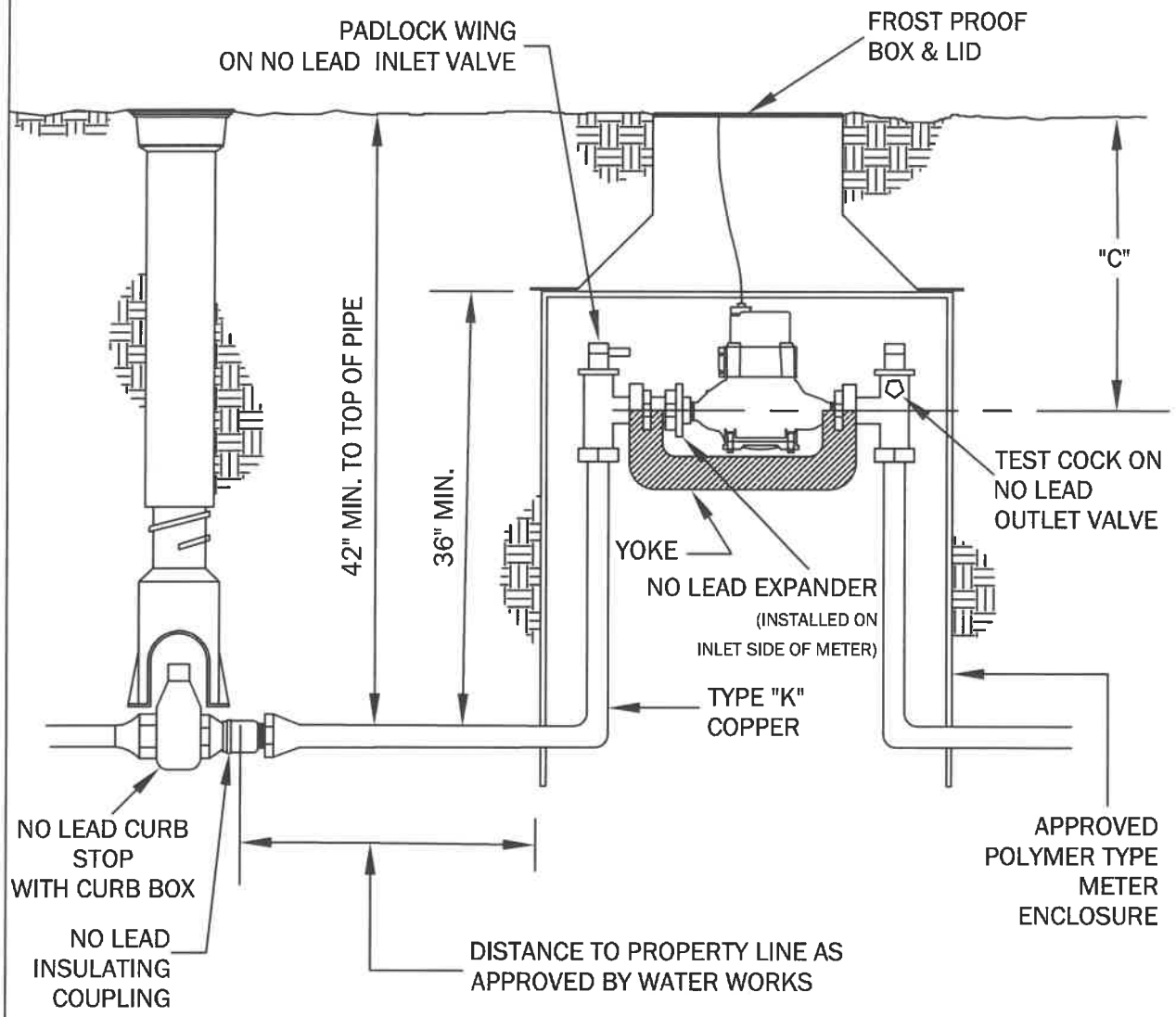
A) SEE 108-1D FOR MATERIAL & CONSTRUCTION SPECIFICATIONS.
B) SEE 108-3A FOR METER COUPLING SETTING DETAILS FOR 5/8" METERS.
C) SEE 108-3B FOR METER COUPLING SETTING DETAILS FOR 3/4" & 1" METERS.
E) SEE 108-3C FOR METER COUPLING SETTING DETAILS FOR 1 1/2" & 2" METERS.
F) INSULATING COUPLING TO BE INSTALLED ON HOUSE SIDE OF CORPORATION STOP.

GREATER CINCINNATI WATER WORKS

INSIDE EMR METER SETTING

5/8" THROUGH 2" METERS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-4



DETAILS

A) SEE 108-1D & 108-1E FOR MATERIAL & CONSTRUCTION SPECIFICATIONS.

B) METER TO BE SET AT RIGHT ANGLES TO RIGHT OF WAY AND MUST BE LEVEL AND CENTERED WITH YOKE VALVES UPRIGHT. METER TO BE 15" - 19" BELOW FINISHED GRADE.

C) FROST PROOF SETTING IN AN EMBANKMENT MAY REQUIRE A RETAINING WALL.

D) WHEN A METER SMALLER THAN THE BRANCH SIZE IS USED, AN APPROVED REDUCING YOKE VALVE SIMILAR TO A FORD AV92 SHALL BE INSTALLED, OR IF A SILVER SOLDER REDUCING FITTING IS USED, IT SHALL BE LOCATED ON THE RISER WITHIN 4" OF THE INLET VALVE.

E) GCWW APPROVED METER ENCLOSURE COVER TO BE SIMILAR TO FORD METER BOX #FW-3 OR AY McDONALD 74-M3W. THE OUTER LID MUST BE A GCWW APPROVED LID.

F) HEAVY DUTY OUTER LIDS ARE REQUIRED IN PAVED OR TRAVELED AREAS, MUST BE H-20 LOAD RATED.

G) CURB BOX OR ROADWAY BOX MUST BE INSTALLED.

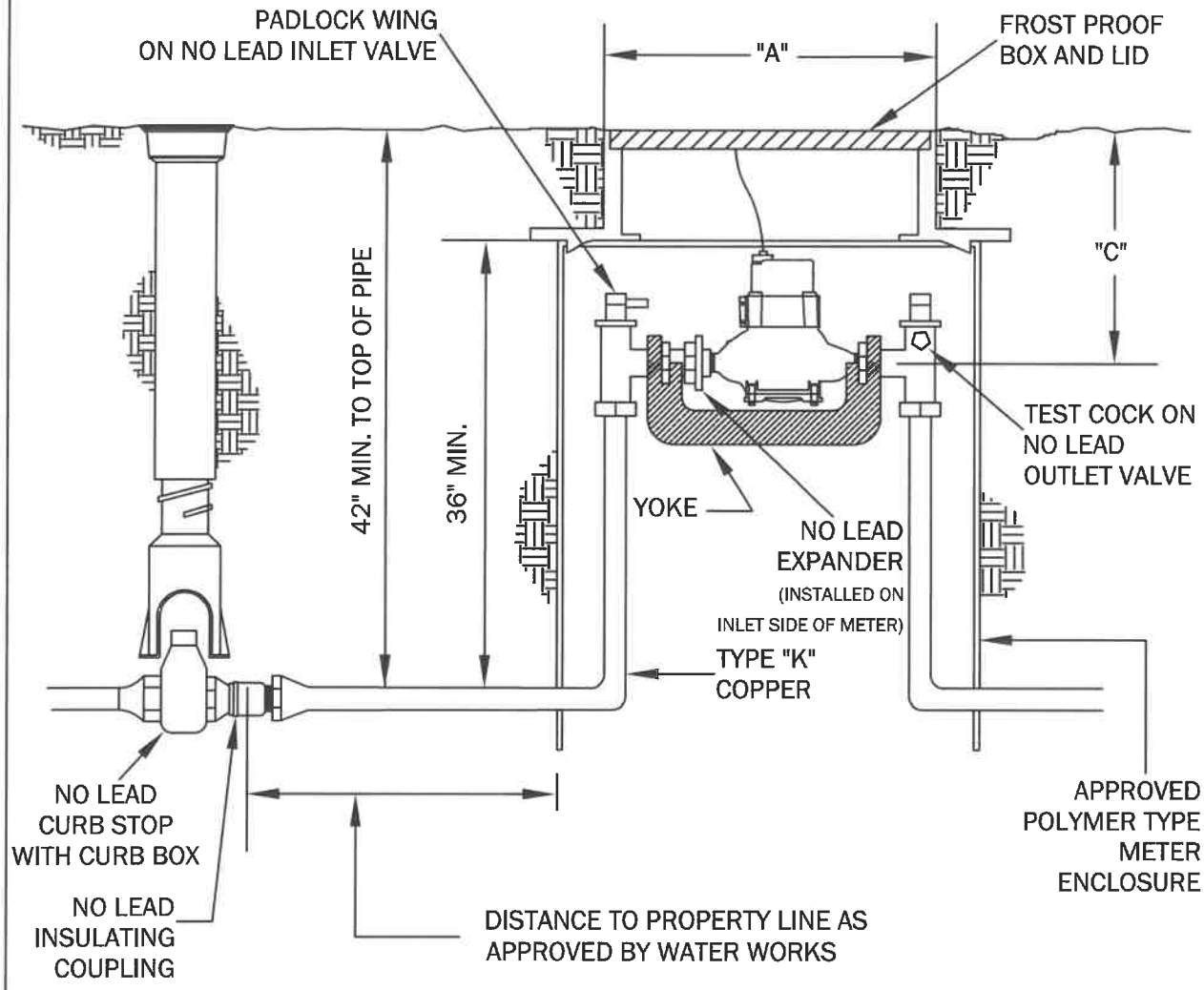
METER SIZE	METER ENCLOSURE DIAMETER	"C"
5/8"	20"	15" TO 19"
3/4"	20"	15" TO 19"

GREATER CINCINNATI WATER WORKS

OUTSIDE EMR METER BOX SETTING

5/8" & 3/4" METERS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-5A



DETAILS

A) SEE 108-1D & 108-1E FOR MATERIAL & CONSTRUCTION SPECIFICATIONS.

B) METER TO BE SET AT RIGHT ANGLES TO RIGHT OF WAY AND MUST BE LEVEL AND CENTERED WITH YOKE VALVES UPRIGHT. METER TO BE 15" -19" BELOW FINISHED GRADE.

C) FROST PROOF SETTING IN AN EMBANKMENT MAY REQUIRE A RETAINING WALL.

D) WHEN A METER SMALLER THAN THE BRANCH SIZE IS USED, AN APPROVED REDUCING YOKE VALVE SIMILAR TO A FORD AV92 SHALL BE INSTALLED, OR IF A SILVER SOLDER REDUCING FITTING IS USED, IT SHALL BE LOCATED ON THE RISER WITHIN 4" OF THE INLET VALVE.

E) GCWW APPROVED METER ENCLOSURE COVER TO BE SIMILAR TO FORD METER BOX #24 MONITOR COVER OR AY McDONALD 74-M3W. THE OUTER LID MUST BE A GCWW APPROVED LID.

F) HEAVY DUTY OUTER LIDS ARE REQUIRED IN PAVED OR TRAVELED AREAS, MUST BE H-20 LOAD RATED.

G) CURB BOX OR ROADWAY BOX MUST BE INSTALLED.

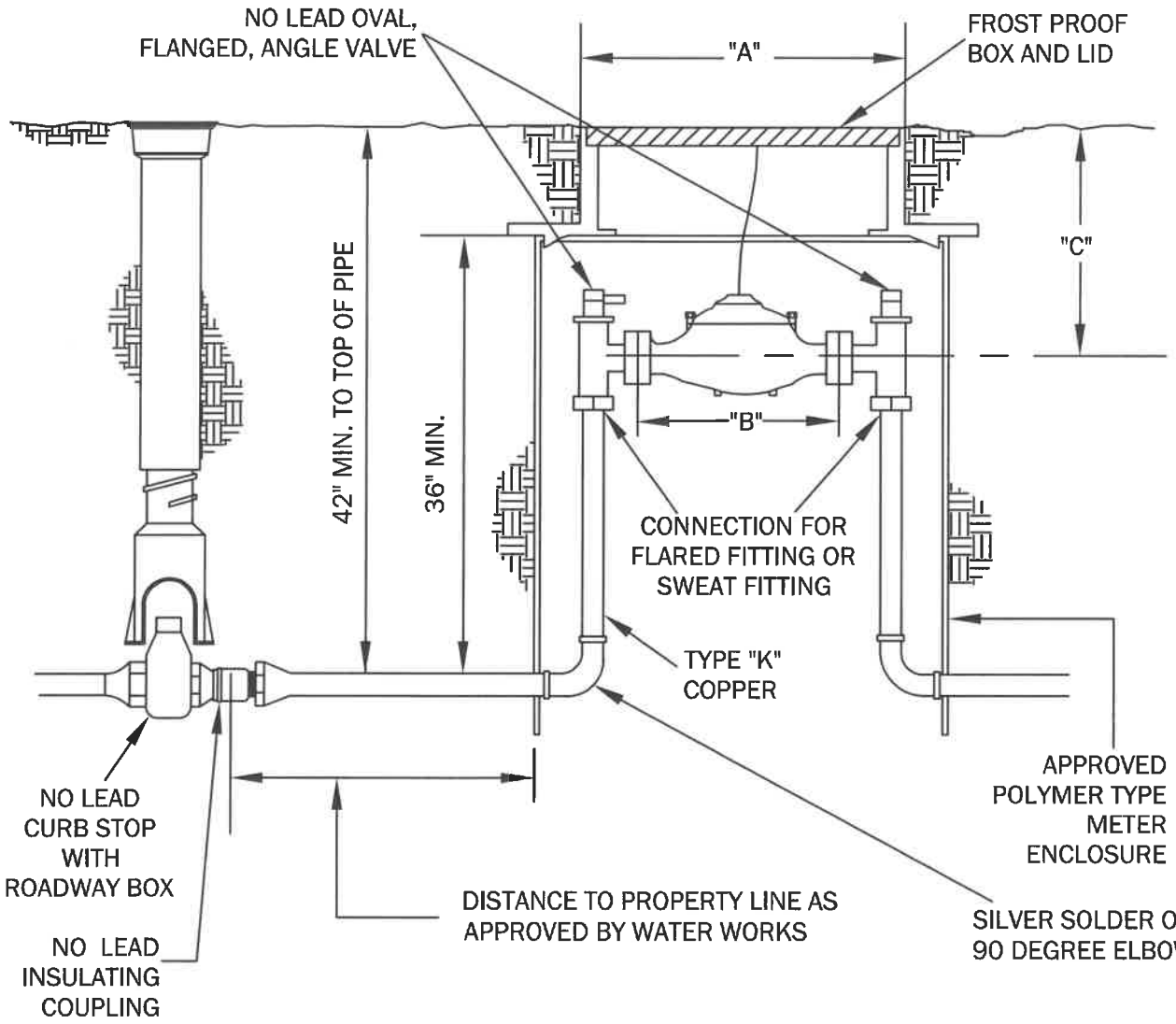
METER SIZE	METER ENCLOSURE DIAMETER	"A"	"C"
1"	24"	20 3/4"	15" TO 19"

GREATER CINCINNATI WATER WORKS

OUTSIDE EMR METER BOX SETTING

1" METERS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-5B



DETAILS

A) SEE 108-1D & 108-1E FOR MATERIAL & CONSTRUCTION SPECIFICATIONS.

B) METER TO BE SET AT RIGHT ANGLES TO RIGHT OF WAY AND MUST BE LEVEL AND CENTERED WITH VALVES UPRIGHT. METER TO BE 15" -19" BELOW FINISHED GRADE.

C) FROST PROOF SETTING IN AN EMBANKMENT MAY REQUIRE A RETAINING WALL.

D) WHEN A METER SMALLER THAN THE BRANCH SIZE IS USED, AN APPROVED REDUCING YOKE VALVE SIMILAR TO A FORD AV92 SHALL BE INSTALLED. OR IF A SILVER SOLDER REDUCING FITTING IS USED, IT SHALL BE LOCATED ON THE RISER WITHIN 4" OF THE INLET VALVE.

E) GCWW APPROVED METER ENCLOSURE COVER TO BE SIMILAR TO FORD METER BOX #24 MONITOR COVER OR AY McDONALD 74-M3W. THE OUTER LID MUST BE A GCWW APPROVED LID.

F) HEAVY DUTY OUTER LIDS ARE REQUIRED IN PAVED OR TRAVELED AREAS, MUST BE H-20 LOAD RATED.

G) ROADWAY BOX MUST BE INSTALLED.

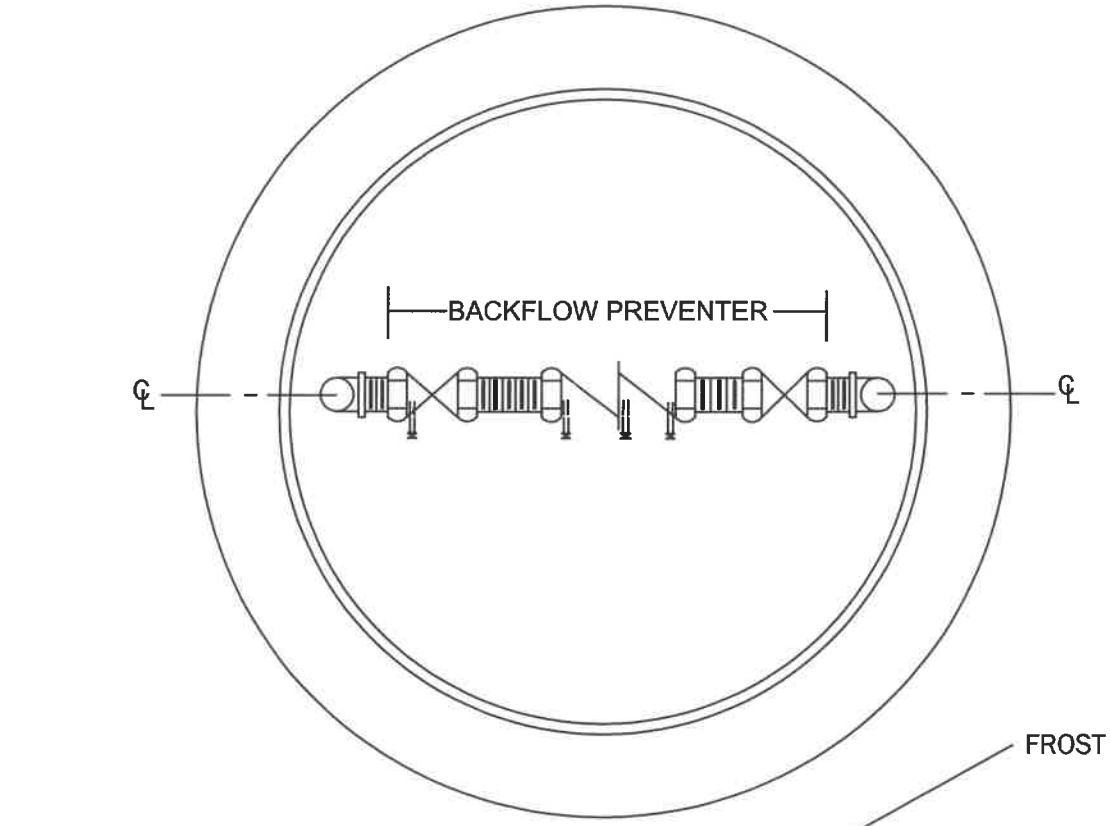
METER SIZE	METER ENCLOSURE DIAMETER	"A"	"B"	"C"
1 1/2"	24"	20 3/4"	13"	15" TO 19"
2"	30"	20 3/4"	17"	15" TO 19"

GREATER CINCINNATI WATER WORKS

OUTSIDE EMR METER BOX SETTING

1 1/2" AND 2" METERS

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-5C



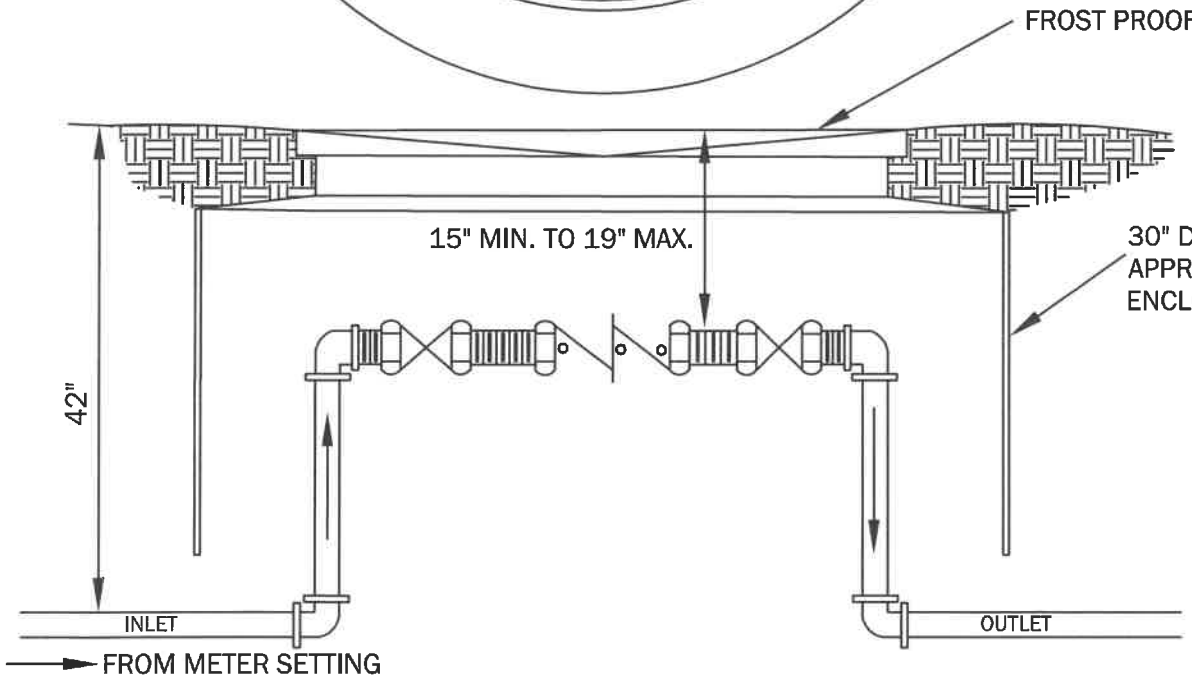
DETAILS:

A) THE BACKFLOW PREVENTER SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE METER SETTING.

B) THAT PORTION OF THE SERVICE PIPING BETWEEN THE METER AND THE BACKFLOW PREVENTER SHALL BE VOID OF BRANCHES OR OUTLETS OF ANY KIND.

C) BACKFLOW PREVENTER SHALL BE CENTERED IN BOX, 15" TO 19" BELOW GRADE.

D) BACKFLOW PREVENTER MUST BE NO SMALLER THAN THE SIZE OF THE METER.

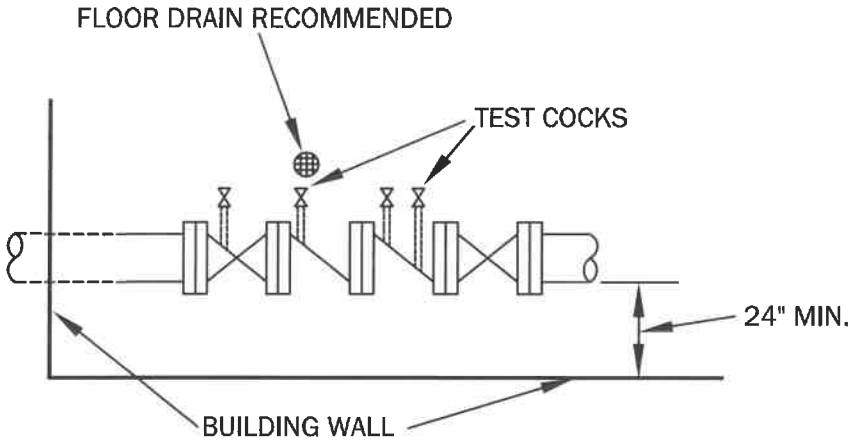


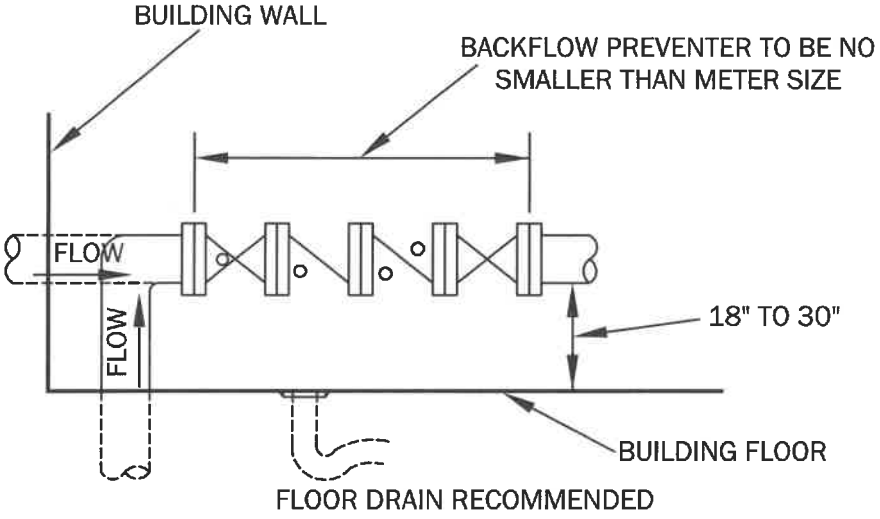
GREATER CINCINNATI WATER WORKS

GENERAL BACKFLOW SETTINGS

OUTSIDE 3/4" THROUGH 2" DOUBLE CHECK BACKFLOW PREVENTER IN FROST PROOF SETTING

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-6





DETAILS:

A) IF THE BACKFLOW PREVENTER IS ALLOWED TO BE INSTALLED INSIDE A BUILDING, THAT PORTION OF THE SERVICE PIPING BETWEEN THE METER AND THE BACKFLOW PREVENTER SHALL BE VOID OF BRANCHES OR OUTLETS OF ANY KIND.

B) THE BACKFLOW PREVENTER INSIDE A BUILDING SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE POINT WHERE THE PIPING ENTERS THE BUILDING. THIS LOCATION SHALL BE DETERMINED BY THE GCWW.

C) THE BACKFLOW PREVENTER SHALL BE INSTALLED DOWNSTREAM OF THE METER, A MINIMUM OF 24" FROM THE NEAREST WALL, WITH THE TEST COCKS FACING THE CENTER OF THE ROOM.

D) WATER WILL BE SPILLED DURING PERIODIC TESTING OF ALL BACKFLOW PREVENTERS AND DURING OPERATION OF REDUCED PRESSURE TYPE PREVENTERS. FOR THIS REASON, IT IS RECOMMENDED THAT A FLOOR DRAIN BE INSTALLED AS CLOSE AS POSSIBLE TO THE DEVICE.

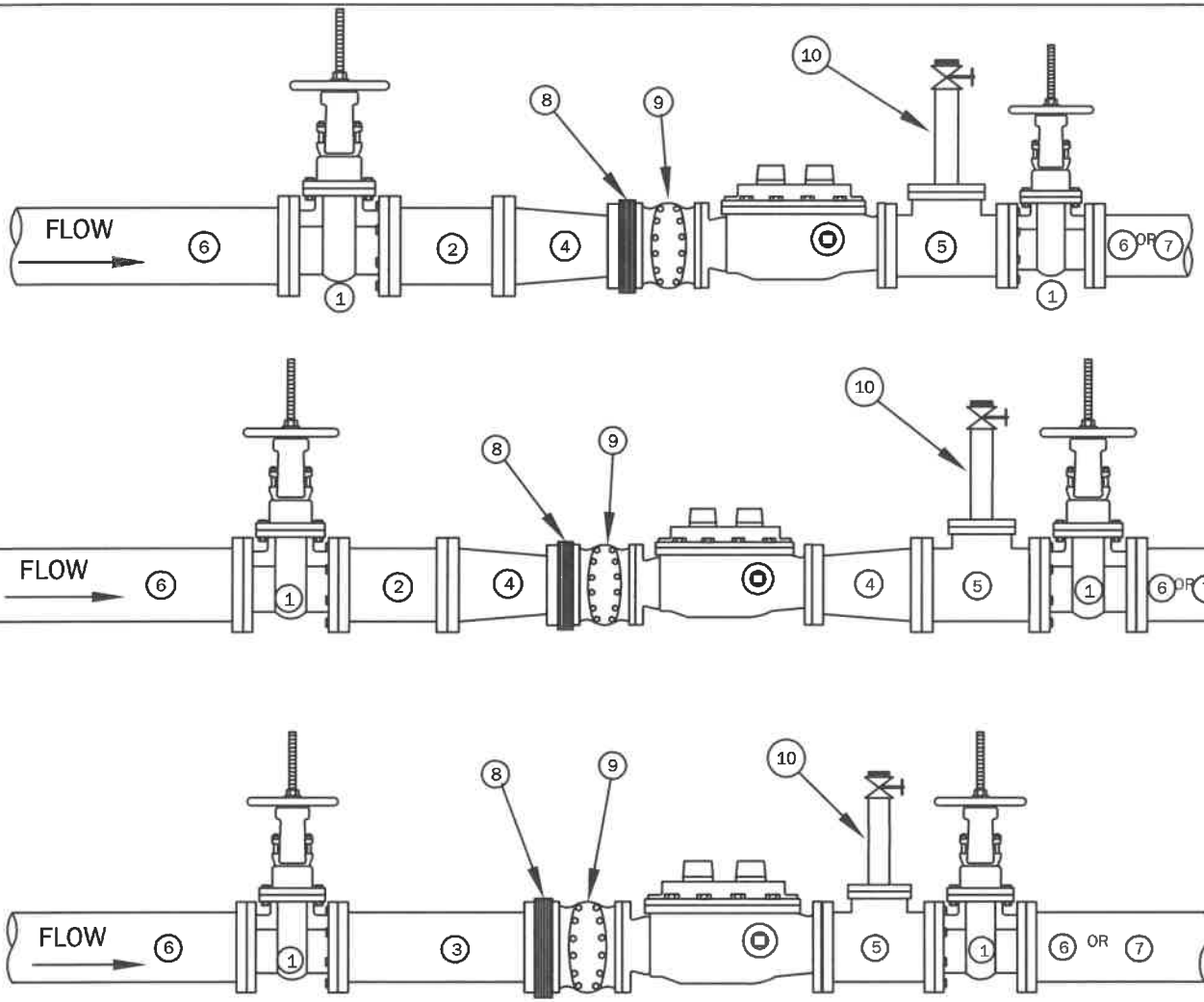
E) IN LIEU OF A FLOOR DRAIN, THE DISCHARGE FROM A REDUCED PRESSURE BACKFLOW PREVENTER MAY BE PIPED TO A SEWER PROVIDED AN APPROVED AIR-GAP IS MAINTAINED AT THE RELIEF VALVE OF THE DEVICE.

GREATER CINCINNATI WATER WORKS

GENERAL BACKFLOW SETTINGS

INSIDE SETTING OF BACKFLOW PREVENTER

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-7



DETAILS:

1) OS & Y FLANGED GATE VALVE WITH WHEEL OPERATOR. INLET VALVE MUST BE ANCHORED THROUGH WALL.

2) FLANGED SPOOL 6" LONG

3) FLANGED SPOOL 12" LONG

4) FLANGED REDUCING SPOOL

5) FLANGED TEST TEE

6) FLANGED BY PLAIN END ADAPTER 3' OR 6' LONG

7) FLANGED BY MECHANICAL JOINT ADAPTER, OPTIONAL

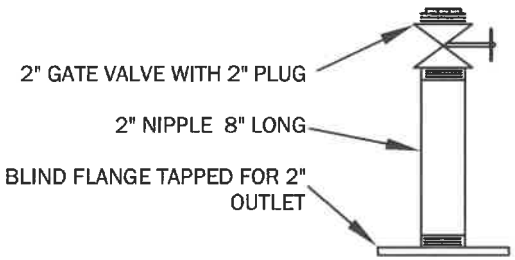
8) SPACER (PROVIDED WITH METER) MUST BE INSTALLED

9) STRAINER (PROVIDED WITH METER) MUST BE INSTALLED SIDEWAYS.

10) TEST TEE (SEE DETAIL)

11) STAINLESS STEEL BOLTS, WASHERS AND NUTS MUST BE USED FOR ALL CONNECTIONS IN METER SETTING

TEST TEE DETAIL

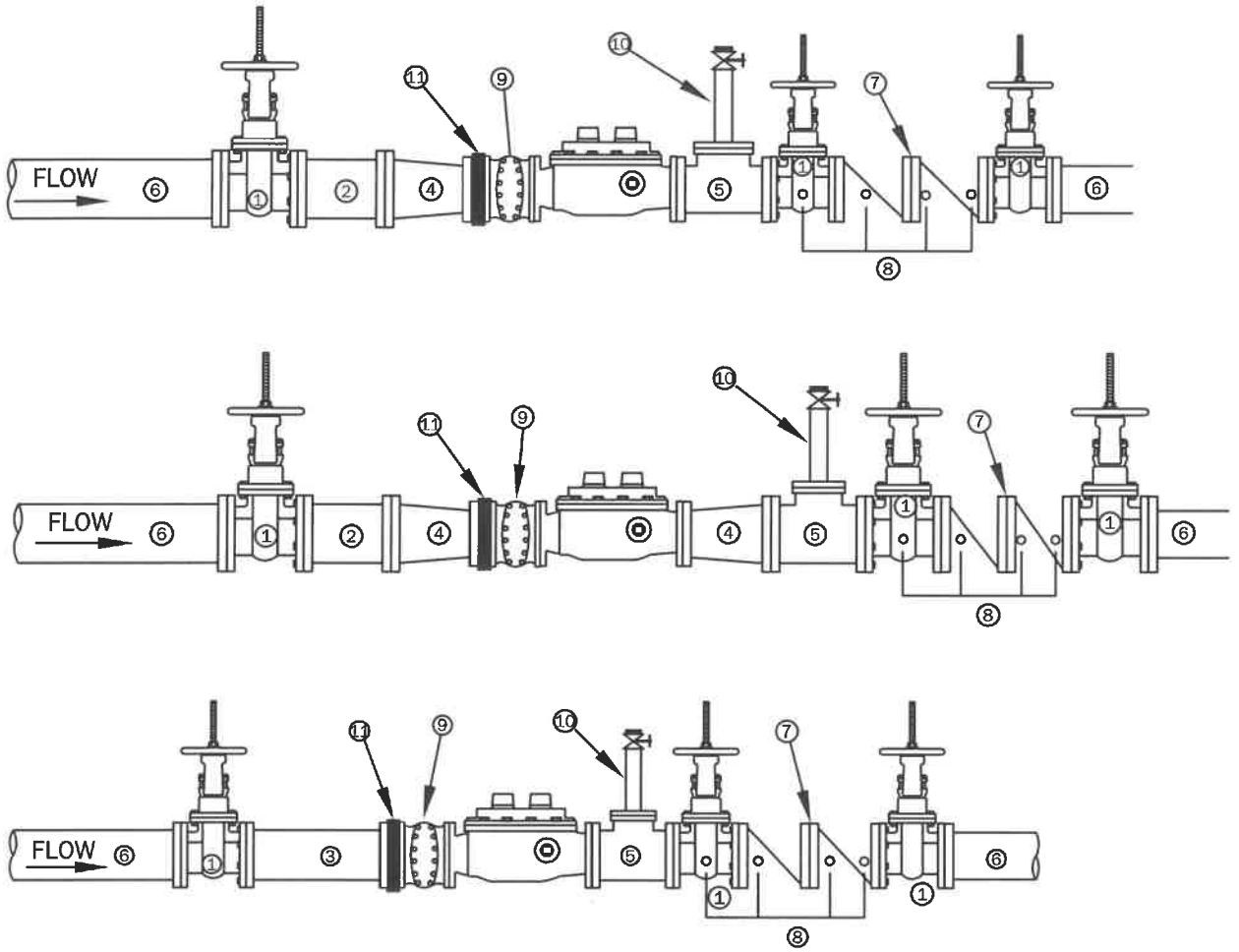


GREATER CINCINNATI WATER WORKS

PIPING ARRANGEMENT

DOMESTIC METERS 3" OR LARGER

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-8A



1) FLANGED GATE VALVE WITH WHEEL OPERATOR
2) FLANGED SPOOL 6" LONG
3) FLANGED SPOOL 12" LONG
4) FLANGED REDUCING SPOOL
5) FLANGED TEST TEE
6) FLANGED BY PLAIN END ADAPTER 3' OR 6' LONG
7) BACKFLOW PREVENTER (NO SMALLER THAN METER SIZE)
8) TEST COCKS
9) STRAINER
10) TEST TEE
11) SPACER

DETAILS:

A) TEST COCKS SHALL BE LOCATED AS FOLLOWS:
   1) INLET SIDE OF GATE VALVE IMMEDIATELY UPSTREAM OF BACKFLOW PREVENTER
   2) INLET SIDE OF UPSTREAM CHECK VALVE
   3) OUTLET SIDE OF DOWNSTREAM CHECK VALVE.

B) TEST COCK SIZES SHALL BE AS FOLLOWS:
   1) 1/4" FOR BACKFLOW PREVENTERS 2" AND SMALLER
   2) 1/2" FOR 3" AND 4" BACKFLOW PREVENTERS
   3) 3/4" FOR BACKFLOW PREVENTERS 6" AND LARGER.

C) IF A POST INDICATOR IS USED ON ANY VALVE WITHIN THE PIT, IT MUST BE A TYPE THAT WILL ATTACH TO THE WHEEL OPERATOR AND ALLOW OPERATION OF THE VALVE FROM INSIDE THE PIT, WHEN THE LOCK IS REMOVED.

D) SEE 108-8A FOR PIPING ARRANGEMENT OF DOMESTIC METERS 3" OR LARGER.

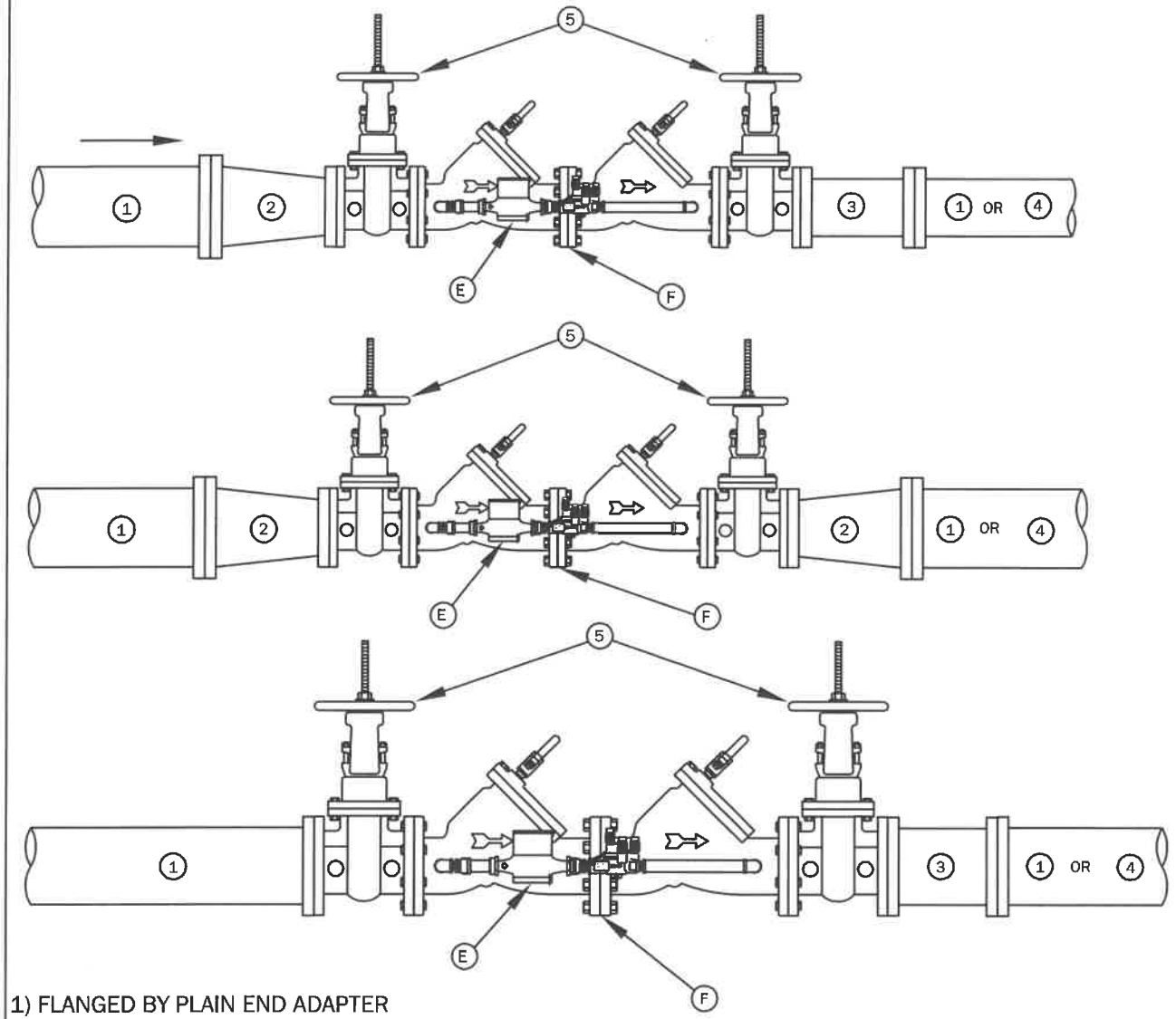
E) THAT PORTION OF THE SERVICE PIPING BETWEEN THE METER SETTING AND THE BACKFLOW PREVENTER SHALL BE VOID OF BRANCHES OR OUTLETS OF ANY KIND.

GREATER CINCINNATI WATER WORKS

PIPING ARRANGEMENT

DOMESTIC METERS 3" OR LARGER WITH BACKFLOW PREVENTER

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-8B



1) FLANGED BY PLAIN END ADAPTER

2) FLANGED REDUCING SPOOL

3) FLANGED SPOOL, 12" LONG

4) FLANGED BY MECHANICAL JOINT (OPTIONAL)

5) VALVES MUST BE OS & Y

DETAILS:

A) ANY PUMPER CONNECTION MUST BE INSTALLED ON SIDE OPPOSITE METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

B) IF A PUMPER CONNECTION IS USED IN A PIT, THE SPOOL "3" MAY BE ELIMINATED.

C) IF A PUMPER CONNECTION IS NOT USED IN A PIT, THE DUCTILE IRON SPOOL "3" SHALL BE INSTALLED DIRECTLY TO THE DOWNSTREAM SIDE OF THE OUTLET VALVE.

D) IF A POST INDICATOR IS USED ON ANY VALVE WITHIN A PIT, IT MUST BE A TYPE THAT WILL ATTACH TO THE WHEEL OPERATOR AND ALLOW OPERATION OF THE VALVE FROM INSIDE THE PIT. THE BASE OF THE POST INDICATOR SHALL NOT OBSTRUCT THE PIT OPENING.

E) METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.

F) DOUBLE CHECK DETECTOR CHECK AS APPROVED BY GCWW.

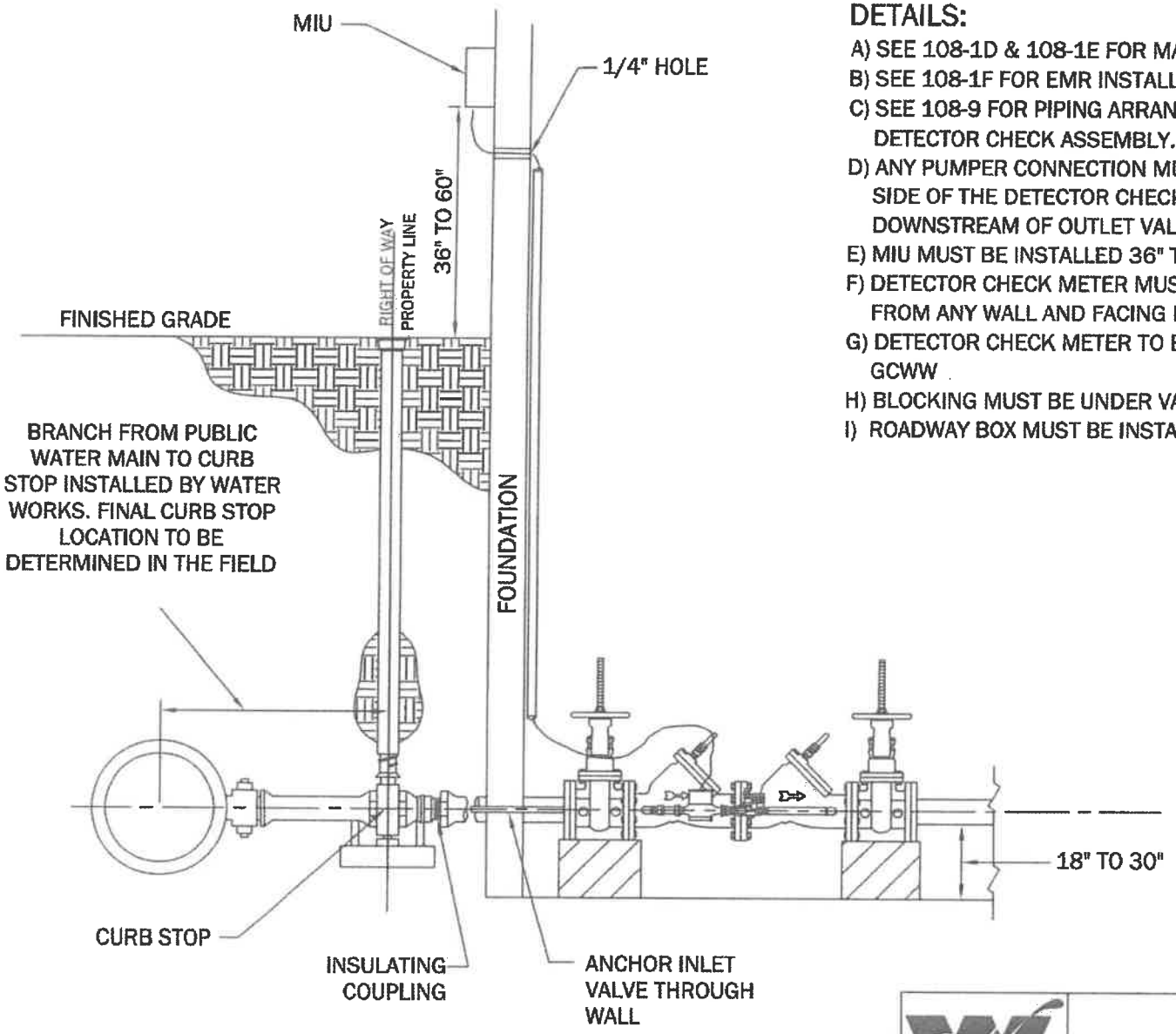
G) FIRE HYDRANT CONNECTIONS MUST BE DOWNSTREAM OF METER OUTLET OUTSIDE OF PIT.

GREATER CINCINNATI WATER WORKS

PIPING ARRANGEMENT

DOUBLE CHECK DETECTOR CHECK ASSEMBLY

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-9



DETAILS:

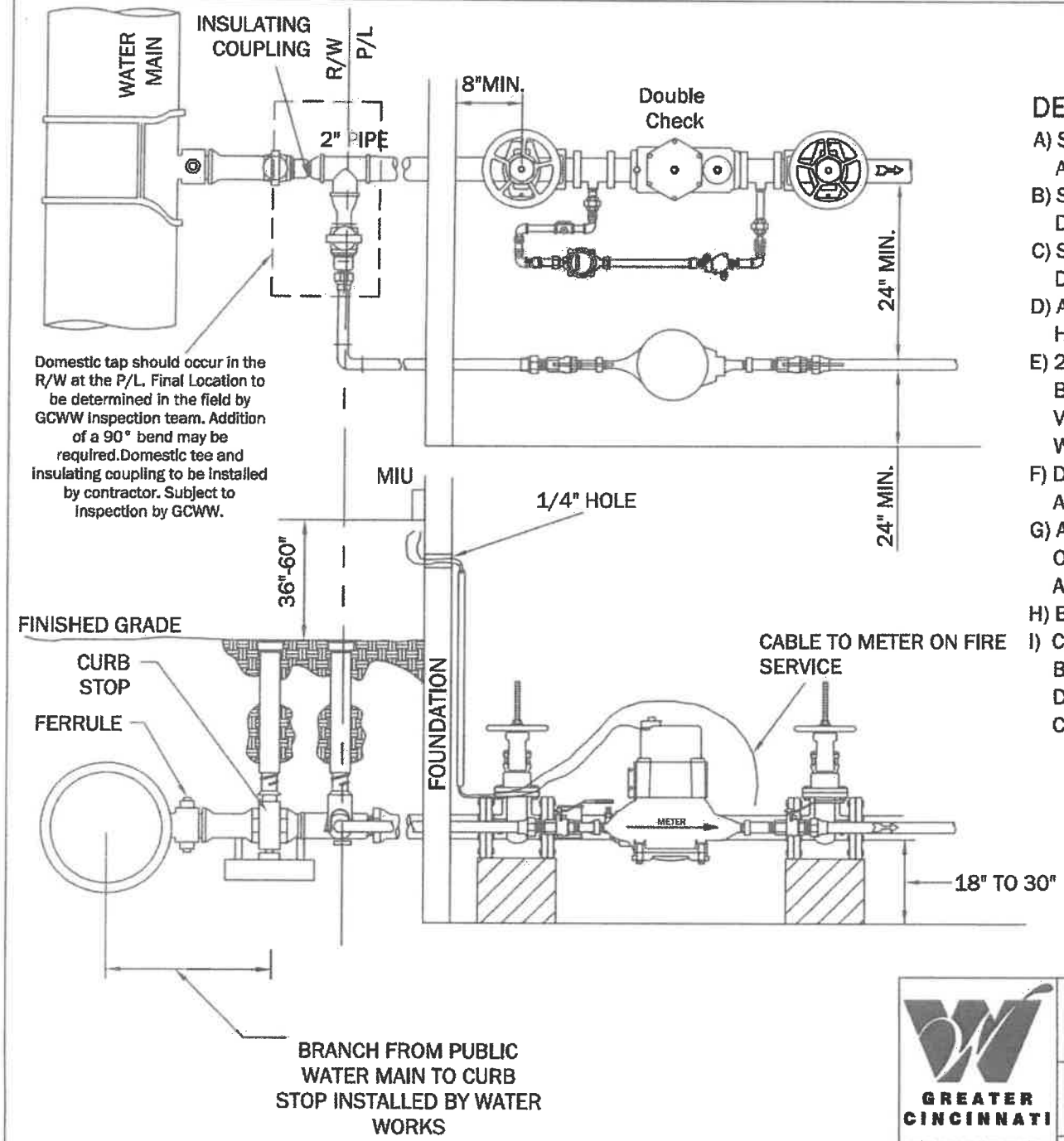
A) SEE 108-1D & 108-1E FOR MATERIAL & CONSTRUCTION SPECIFICATIONS.
B) SEE 108-1F FOR EMR INSTALLATION DETAILS.
C) SEE 108-9 FOR PIPING ARRANGEMENTS FOR DOUBLE CHECK DETECTOR CHECK ASSEMBLY.
D) ANY PUMPER CONNECTION MUST BE INSTALLED ON THE OPPOSITE SIDE OF THE DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.
E) MIU MUST BE INSTALLED 36" TO 60" ABOVE FINISHED GRADE.
F) DETECTOR CHECK METER MUST BE INSTALLED A MINIMUM OF 24" FROM ANY WALL AND FACING INTO THE ROOM.
G) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW
H) BLOCKING MUST BE UNDER VALVES.
I) ROADWAY BOX MUST BE INSTALLED.

GREATER CINCINNATI WATER WORKS

2" FIRE ONLY

INSIDE EMR SETTING FOR 2" DOUBLE CHECK DETECTOR CHECK ASSEMBLY

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-10A



DETAILS:

A) SEE 108-1D & 108-1E FOR MATERIAL SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.

B) SEE 108-3A & 108-3B FOR INSIDE METER SETTING DETAILS.

C) SEE 108-9 DETAILS PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.

D) AN INSULATOR COUPLING MUST BE INSTALLED ON THE HOUSE SIDE OF THE CURB STOP.

E) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN DOMESTIC METER AND DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL.

F) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW

G) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

H) BLOCKING MUST BE UNDER OS & Y VALVES.

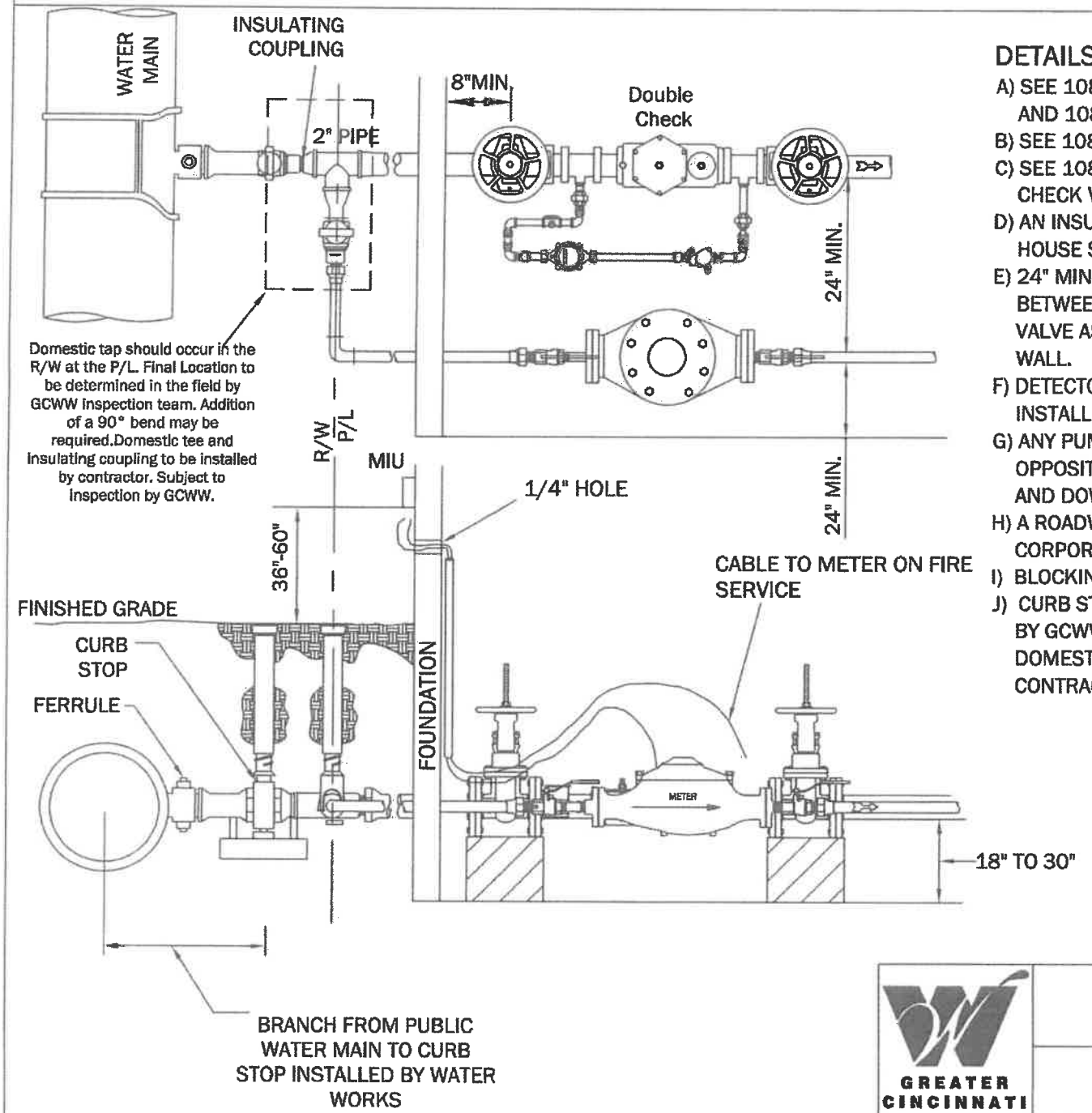
I) CURB STOP & INSULATING COUPLING TO BE INSTALLED BY GCWW. FLARED OR SILVER SOLDERED TEE & DOMESTIC CURB STOP TO BE INSTALLED BY CONTRACTOR.

GREATER CINCINNATI WATER WORKS

2" FIRE/DUAL SERVICE

INSIDE EMR SETTING FOR 2" FIRE AND 5/8", 3/4" OR 1" DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-10B



DETAILS:

A) SEE 108-1D & 108-1E FOR MATERIAL SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.

B) SEE 108-3C FOR INSIDE METER SETTING DETAILS.

C) SEE 108-9 FOR PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.

D) AN INSULATOR COUPLING MUST BE INSTALLED ON THE HOUSE SIDE OF THE CURB STOP.

E) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN DOMESTIC METER AND DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL.

F) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW

G) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

H) A ROADWAY BOX MUST BE INSTALLED OVER DOMESTIC CORPORATION STOP.

I) BLOCKING MUST BE UNDER OS & Y VALVES.

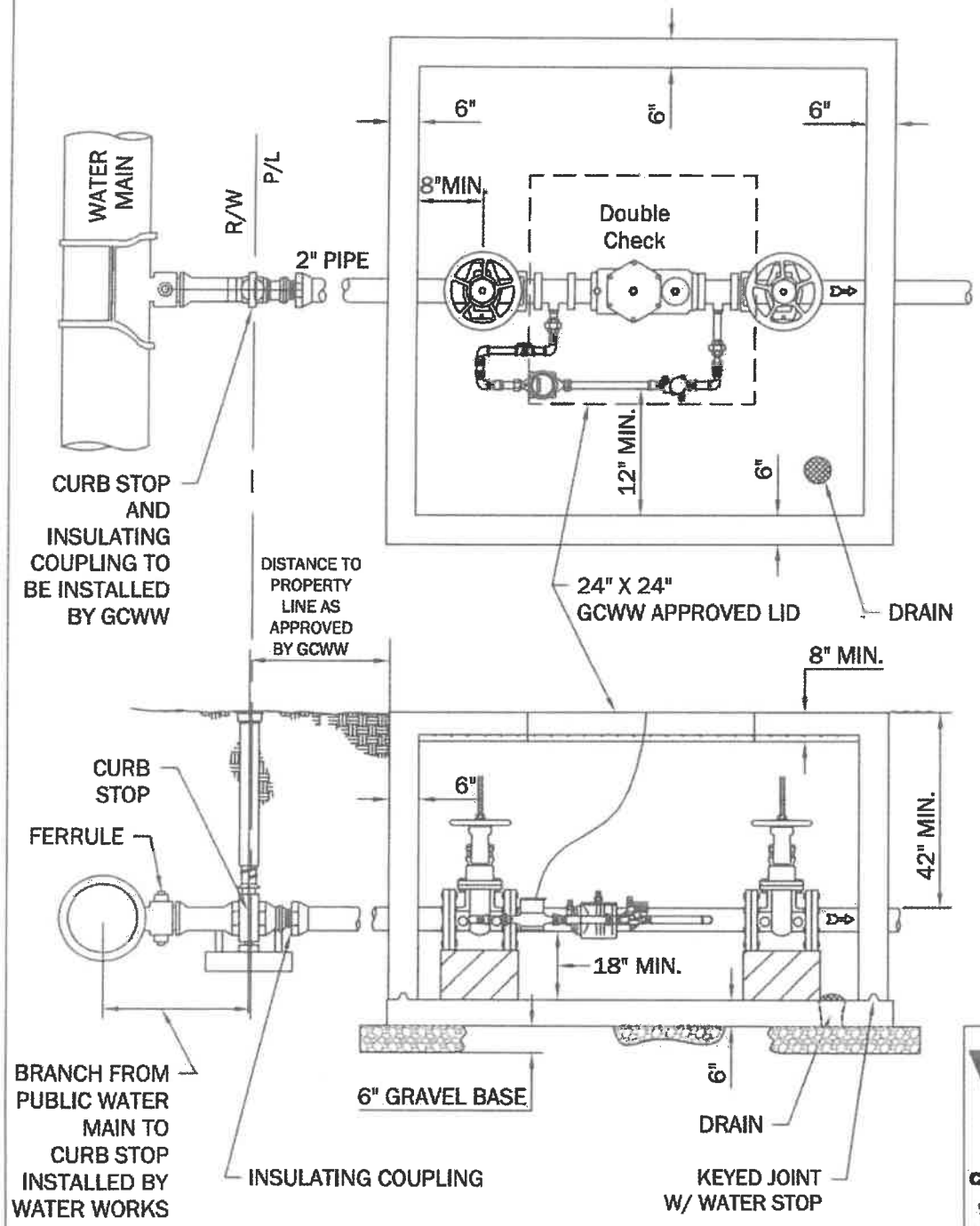
J) CURB STOP & INSULATING COUPLING TO BE INSTALLED BY GCWW. FLARED OR SILVER SOLDERED TEE & DOMESTIC CURB STOP TO BE INSTALLED BY CONTRACTOR.

GREATER CINCINNATI WATER WORKS

2" FIRE DUAL SERVICE

INSIDE EMR SETTING FOR 2" FIRE AND 1 1/2" OR 2" DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-10C



DETAILS:

A) PIT MUST BE GCWW APPROVED 5 X 5 X 5 CATCH BASIN SIMILAR TO KOI CONCRETE PRODUCTS WITH ACCOMPANYING FLOOR. SEE 108-1A, 1B, 1C, 1D, & 1E FOR TOP SLAB, MATERIAL SPECIFICATIONS. MUST INCLUDE APPROVED LADDER.

B) SEE 108-9 FOR DCDA PIPING ARRANGEMENT DETAILS.

C) A ROADWAY BOX MUST BE INSTALLED ON THE CURB STOP.

D) ANY PUMPER CONNECTION MUST BE INSTALLED DOWNSTREAM OF OUTLET VALVE AND OUTSIDE OF THE METER PIT.

E) CONCRETE BLOCKING MUST BE UNDER OS & Y VALVES.

F) DETECTOR CHECK METER MUST BE A MINIMUM OF 18" FROM THE FLOOR.

G) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.

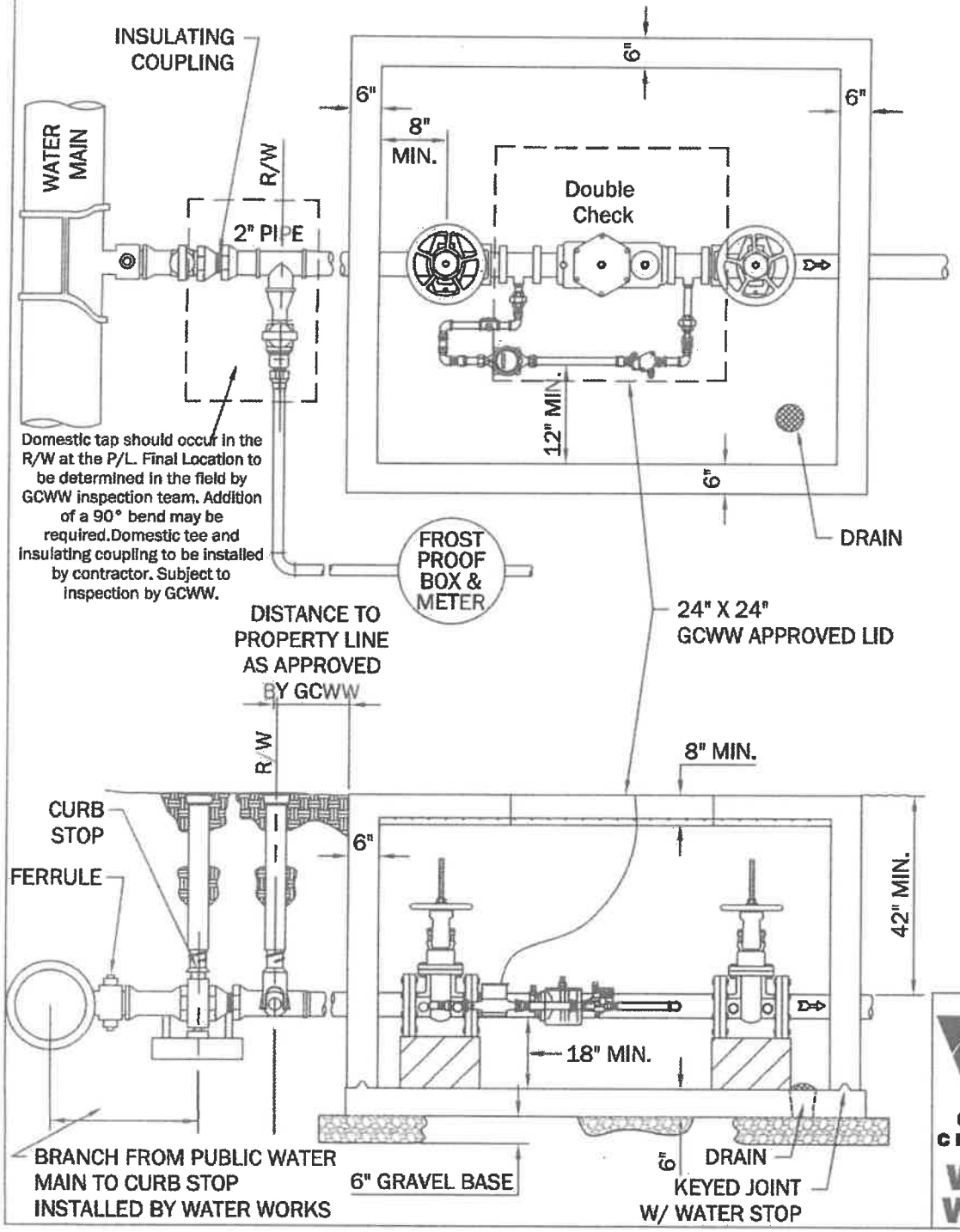
H) CURB STOP AND INSULATING COUPLING TO BE INSTALLED BY GCWW. FLARED OR SILVER SOLDERED TEE AND DOMESTIC CURB STOP TO BE INSTALLED BY CONTRACTOR.

GREATER CINCINNATI WATER WORKS

2" FIRE ONLY

OUTSIDE EMR SETTING FOR 2" DOUBLE CHECK DETECTOR CHECK ASSEMBLY

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-10D



DETAILS:

A) PIT MUST BE GCWW APPROVED 5 X 5 X 5 CATCH BASIN SIMILAR TO KOI CONCRETE PRODUCTS WITH ACCOMPANYING FLOOR. SEE 108-1A, 1B, 1C, 1D, & 1E FOR TOP SLAB, MATERIAL SPECIFICATIONS. MUST INCLUDE APPROVED LADDER.

B) SEE 108-5A, 5B, & 5C FOR DOMESTIC METER SETTING SPECIFICATIONS AND 108-9 FOR DCDA PIPING ARRANGEMENT DETAILS.

C) A CURB BOX MUST BE INSTALLED ON $\frac{3}{4}$" AND 1" BRANCHES AND A ROADWAY BOX MUST BE INSTALLED ON 1.5" AND 2" BRANCHES.

D) ANY PUMPER CONNECTION MUST BE INSTALLED DOWNSTREAM OF OUTLET VALVE AND OUTSIDE OF THE METER PIT.

E) CONCRETE BLOCKING MUST BE UNDER OS & Y VALVES.

F) DETECTOR CHECK METER MUST BE A MINIMUM OF 12" FROM THE SIDE WALL AND 18" FROM THE FLOOR.

G) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW

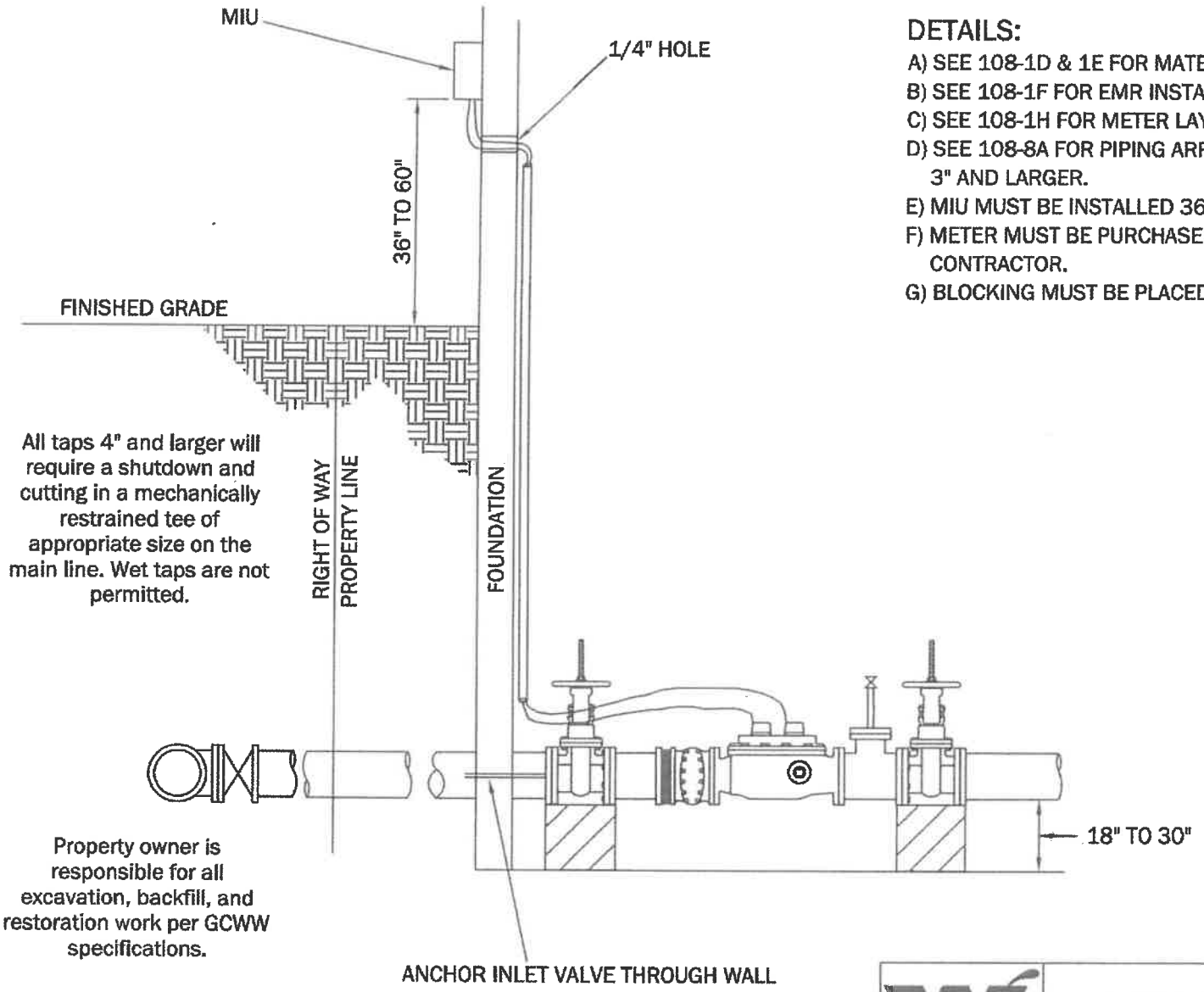
H) CURB STOP AND INSULATING COUPLING TO BE INSTALLED BY GCWW. FLARED OR SILVER SOLDERED TEE AND DOMESTIC CURB STOP TO BE INSTALLED BY CONTRACTOR.

GREATER CINCINNATI WATER WORKS

2" FIRE DUAL SERVICE

OUTSIDE EMR SETTING FOR
2" FIRE AND
2" OR SMALLER DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-10E



DETAILS:

A) SEE 108-1D & 1E FOR MATERIAL SPECIFICATIONS.
B) SEE 108-1F FOR EMR INSTALLATION DETAILS.
C) SEE 108-1H FOR METER LAYING LENGTH REQUIREMENTS.
D) SEE 108-8A FOR PIPING ARRANGEMENTS FOR DOMESTIC METERS 3" AND LARGER.
E) MIU MUST BE INSTALLED 36" TO 60" ABOVE FINISHED GRADE.
F) METER MUST BE PURCHASED FROM GCWW AND INSTALLED BY CONTRACTOR.
G) BLOCKING MUST BE PLACED UNDER VALVES.

All dead end pipe stubs must be mechanically restrained.

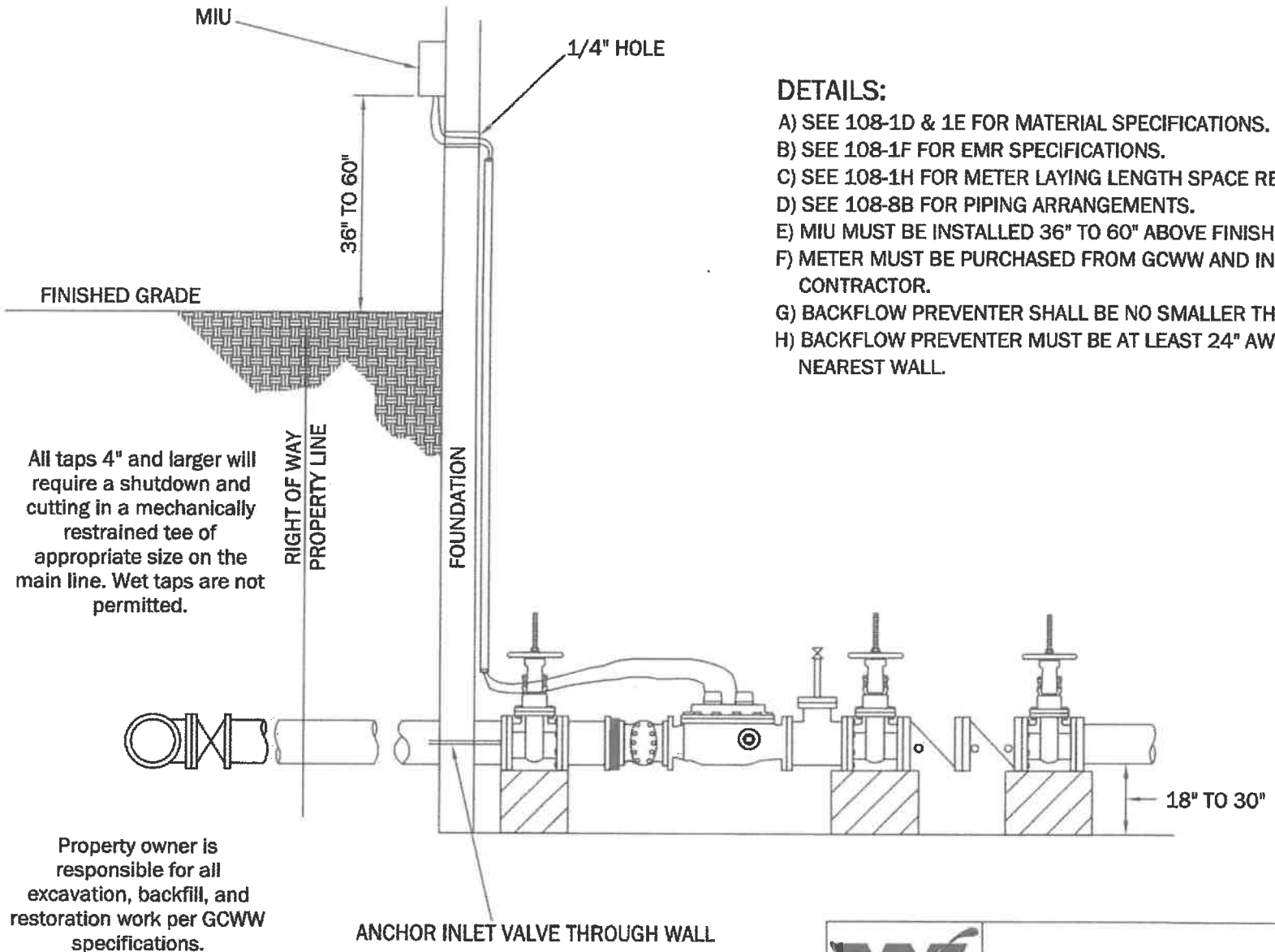
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

3" OR LARGER DOMESTIC ONLY

INSIDE EMR SETTING FOR 3" OR LARGER METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-11A



DETAILS:

A) SEE 108-1D & 1E FOR MATERIAL SPECIFICATIONS.
B) SEE 108-1F FOR EMR SPECIFICATIONS.
C) SEE 108-1H FOR METER LAYING LENGTH SPACE REQUIREMENTS.
D) SEE 108-8B FOR PIPING ARRANGEMENTS.
E) MIU MUST BE INSTALLED 36" TO 60" ABOVE FINISHED GRADE.
F) METER MUST BE PURCHASED FROM GCWW AND INSTALLED BY CONTRACTOR.
G) BACKFLOW PREVENTER SHALL BE NO SMALLER THAN METER SIZE.
H) BACKFLOW PREVENTER MUST BE AT LEAST 24" AWAY FROM NEAREST WALL.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

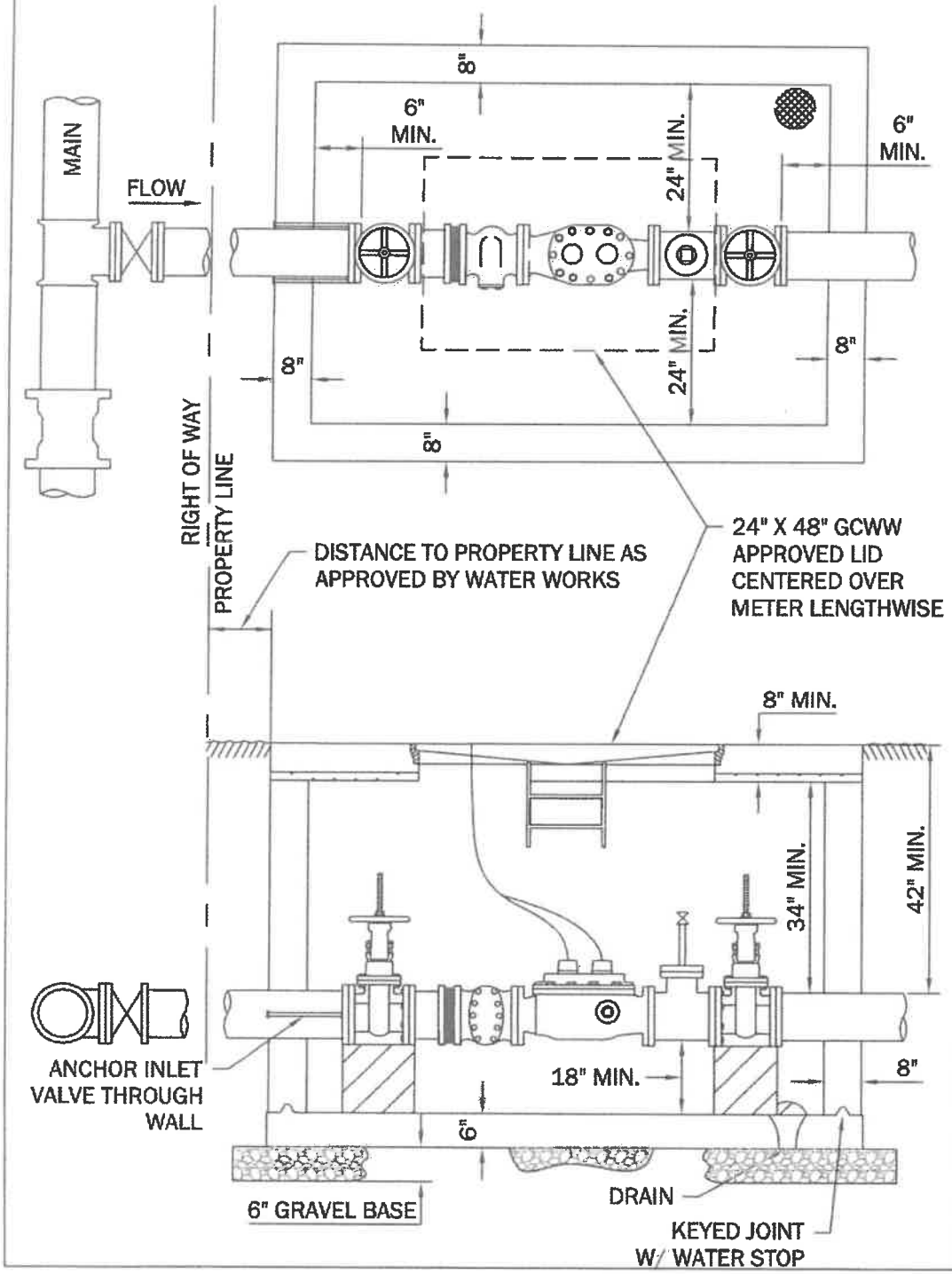
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

3" OR LARGER DOMESTIC ONLY

INSIDE EMR SETTING FOR 3" OR LARGER METER WITH BACKFLOW PREVENTER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-11B



DETAILS:

A) SEE 108-1A, 108-1B, 108-1C, 108-1D & 108-1E FOR MATERIAL AND CONSTRUCTION SPECIFICATIONS.
B) SEE 108-1F FOR EMR INSTALLATION DETAILS.
C) SEE 108-1H FOR METER LAYING LENGTH REQUIREMENTS.
D) SEE 108-8A FOR PIPING ARRANGEMENTS FOR DOMESTIC METERS 3" AND LARGER.
E) CONCRETE BLOCKING MUST BE PLACED UNDER VALVES.
F) METER MUST BE PURCHASED FROM GCWW AND INSTALLED BY CONTRACTOR.
G) A FACTORY DRILLED (1) ¾" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.
H) LID MUST BE CENTERED LENGTHWISE OVER THE METER.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

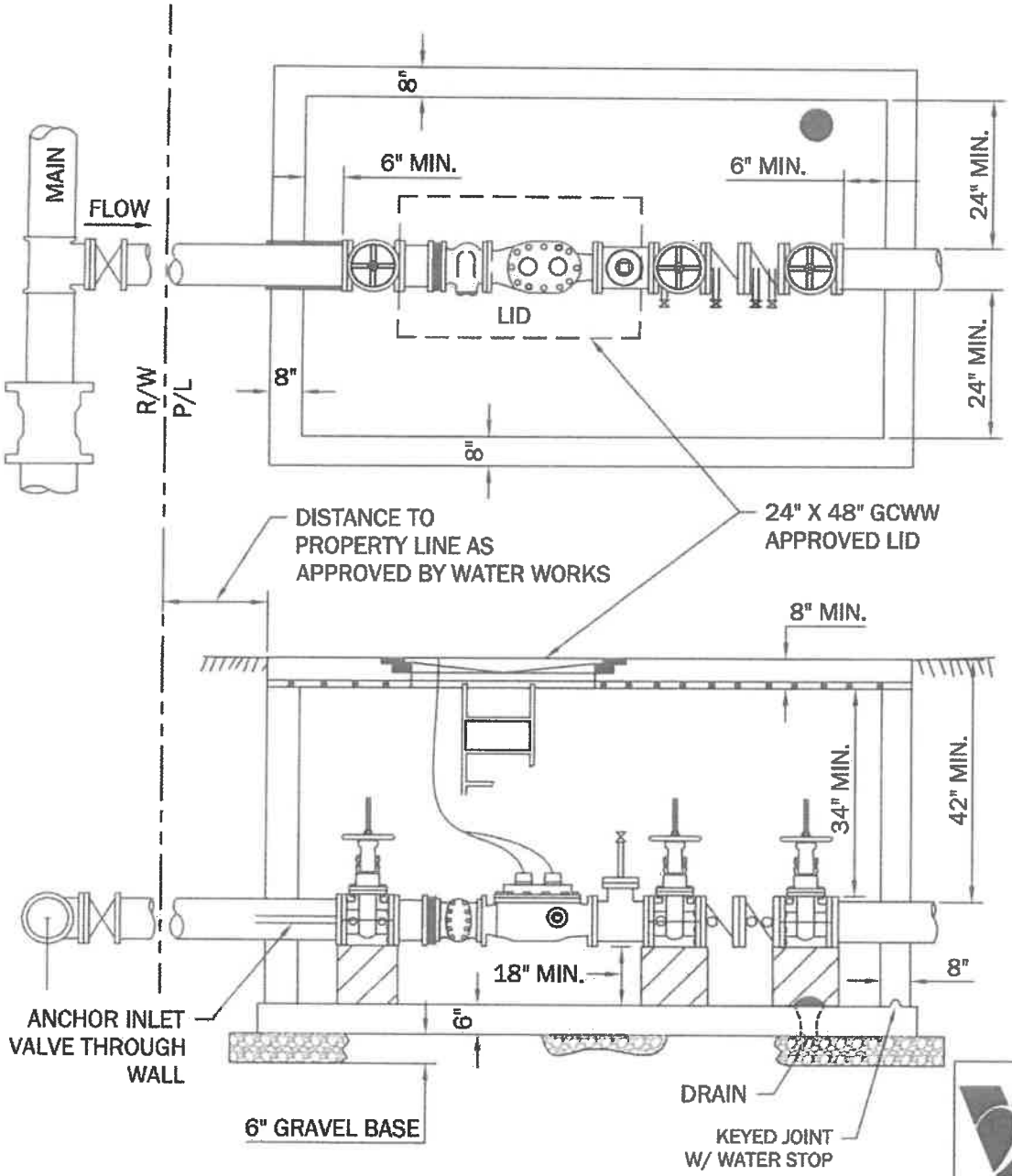
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

3" OR LARGER DOMESTIC ONLY

OUTSIDE EMR SETTING FOR 3" OR LARGER METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-11C



DETAILS:

A) LID MUST BE CENTERED LENGTHWISE OVER THE METER.
B) SEE 108-1A, 1C, 1D, & 1E FOR MATERIAL AND CONSTRUCTION SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.
C) SEE 108-8B FOR PIPING ARRANGEMENT ON DOMESTIC METER.
D) DOUBLE CHECK BACKFLOW PREVENTER SHALL BE NO SMALLER THAN METER SIZE.
E) CONCRETE BLOCKING MUST BE PLACED UNDER VALVE.
F) A FACTORY DRILLED (1) ¾" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

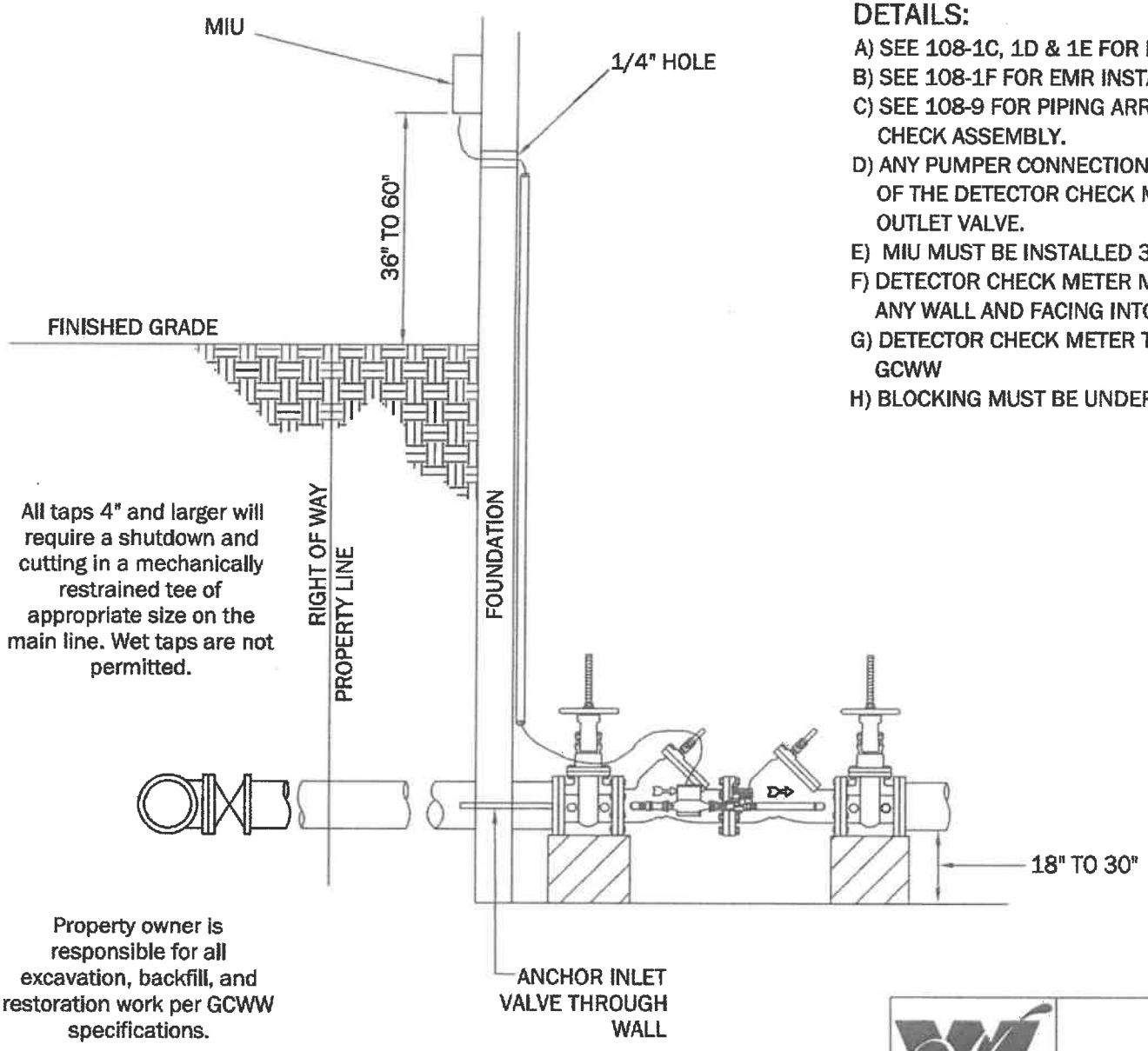
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

3" OR LARGER DOMESTIC ONLY

OUTSIDE EMR SETTING FOR 3" OR LARGER METER WITH DOUBLE CHECK BACKFLOW PREVENTER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-11D



All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

DETAILS:

A) SEE 108-1C, 1D & 1E FOR MATERIAL SPECIFICATIONS.
B) SEE 108-1F FOR EMR INSTALLATION DETAILS.
C) SEE 108-9 FOR PIPING ARRANGEMENTS FOR DOUBLE CHECK DETECTOR CHECK ASSEMBLY.
D) ANY PUMPER CONNECTION MUST BE INSTALLED ON THE OPPOSITE SIDE OF THE DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.
E) MIU MUST BE INSTALLED 36" TO 60" ABOVE FINISHED GRADE.
F) DETECTOR CHECK METER MUST BE INSTALLED A MINIMUM OF 24" FROM ANY WALL AND FACING INTO THE ROOM.
G) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW
H) BLOCKING MUST BE UNDER VALVES.

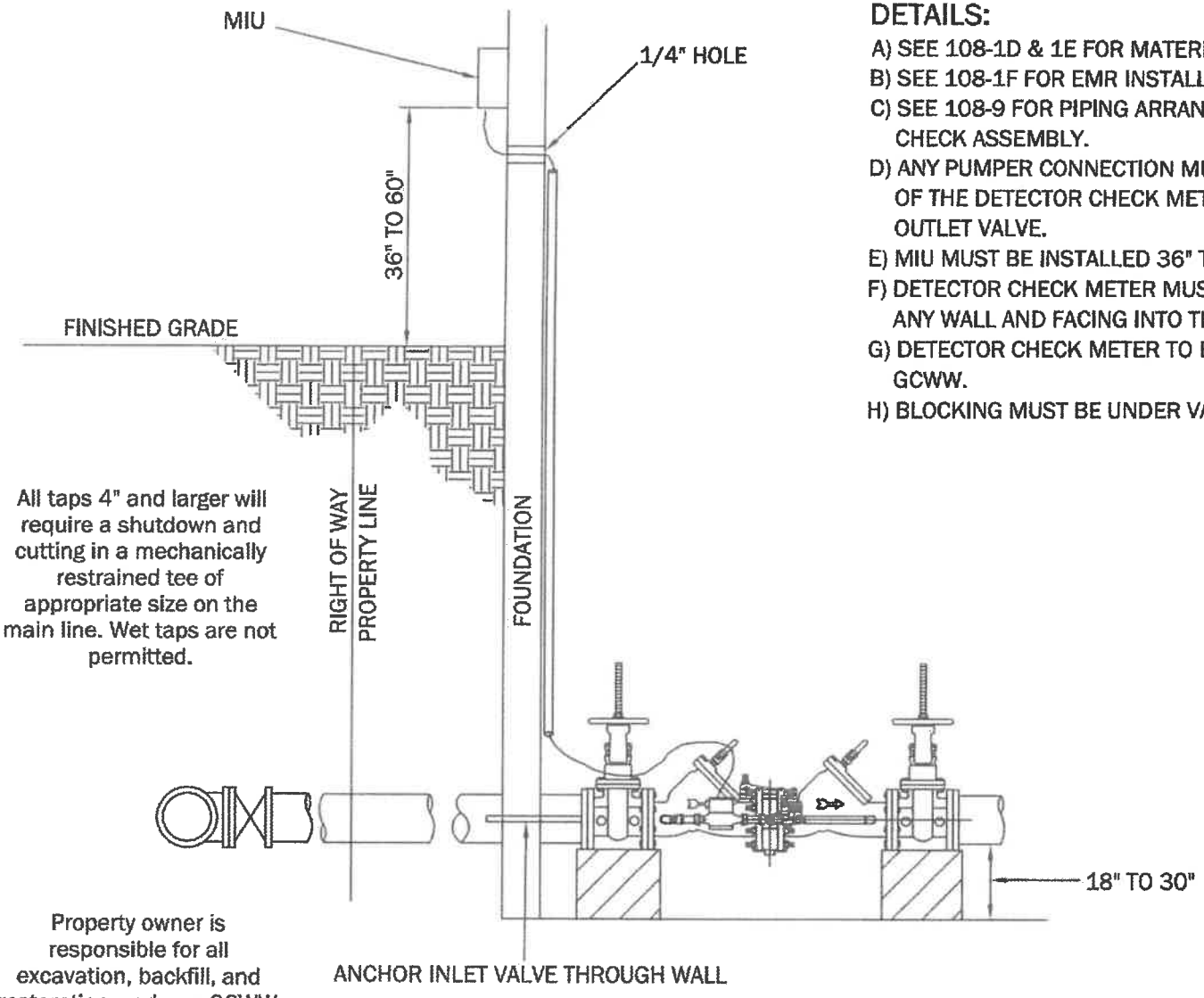
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE ONLY

INSIDE EMR SETTING DOUBLE CHECK DETECTOR CHECK ASSEMBLY

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-12A



All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

DETAILS:

A) SEE 108-1D & 1E FOR MATERIAL SPECIFICATIONS.
B) SEE 108-1F FOR EMR INSTALLATION DETAILS.
C) SEE 108-9 FOR PIPING ARRANGEMENTS FOR DOUBLE CHECK DETECTOR CHECK ASSEMBLY.
D) ANY PUMPER CONNECTION MUST BE INSTALLED ON THE OPPOSITE SIDE OF THE DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.
E) MIU MUST BE INSTALLED 36" TO 60" ABOVE FINISHED GRADE.
F) DETECTOR CHECK METER MUST BE INSTALLED A MINIMUM OF 24" FROM ANY WALL AND FACING INTO THE ROOM.
G) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.
H) BLOCKING MUST BE UNDER VALVES.

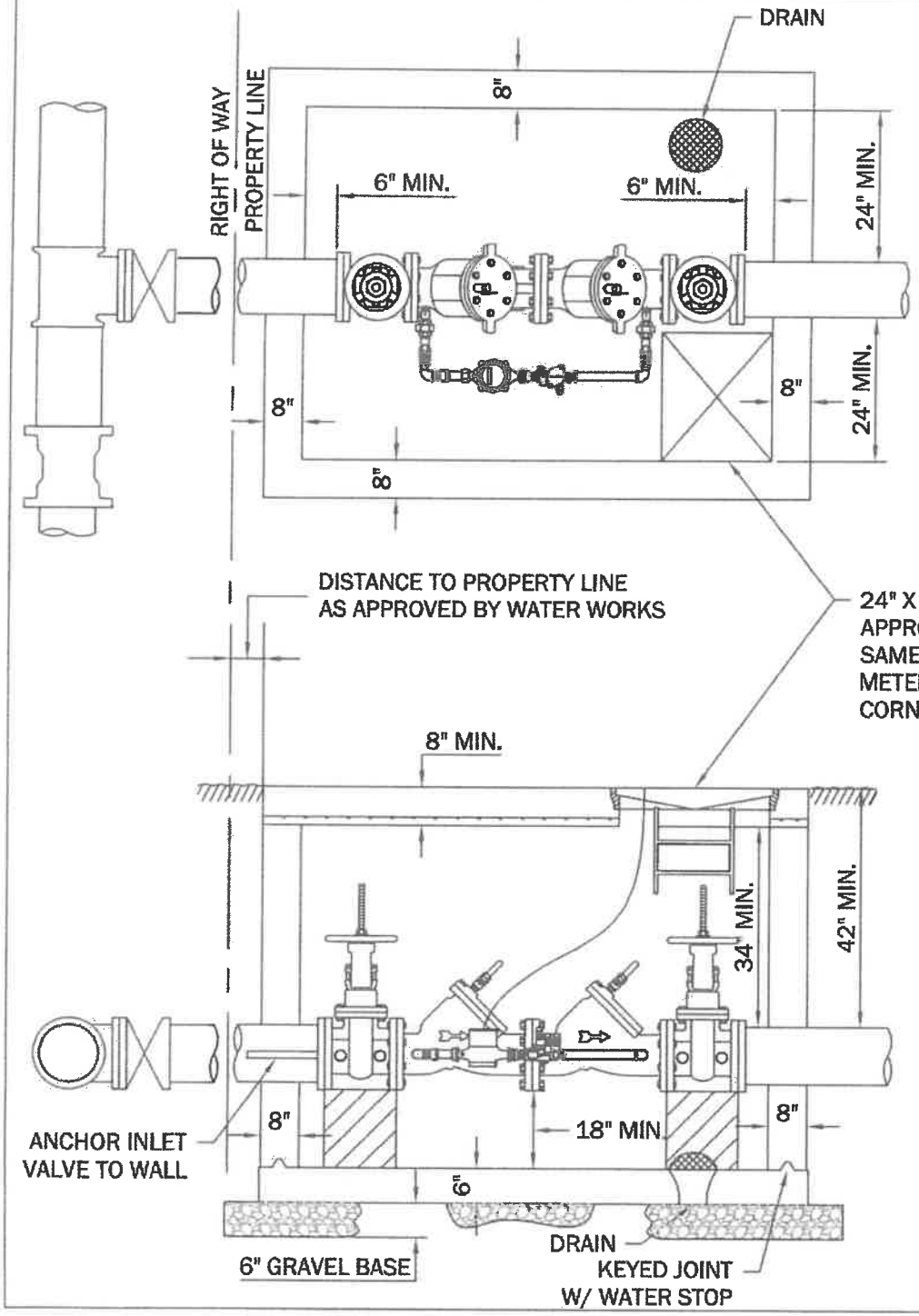
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE ONLY

INSIDE EMR SETTING REDUCED PRESSURE DETECTOR CHECK ASSEMBLY

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-12B



DETAILS:

A) SEE 108-1A, 108-1B, 108-1C, 108-1D, & 108-1E FOR MATERIAL AND CONSTRUCTION SPECIFICATIONS.
B) SEE 108-1F FOR EMR INSTALLATION SPECIFICATIONS.
C) SEE 108-9 FOR PIPING ARRANGEMENT.
D) PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF THE OUTLET VALVE.
E) DETECTOR CHECK METER MUST BE PURCHASED FROM AND INSTALLED BY GCWW.
F) CONCRETE BLOCKING MUST BE UNDER VALVES.
G) A FACTORY DRILLED (1) ¾" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.
H) LID SHALL BE LOCATED IN CORNER ON THE SAME SIDE AS METER.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

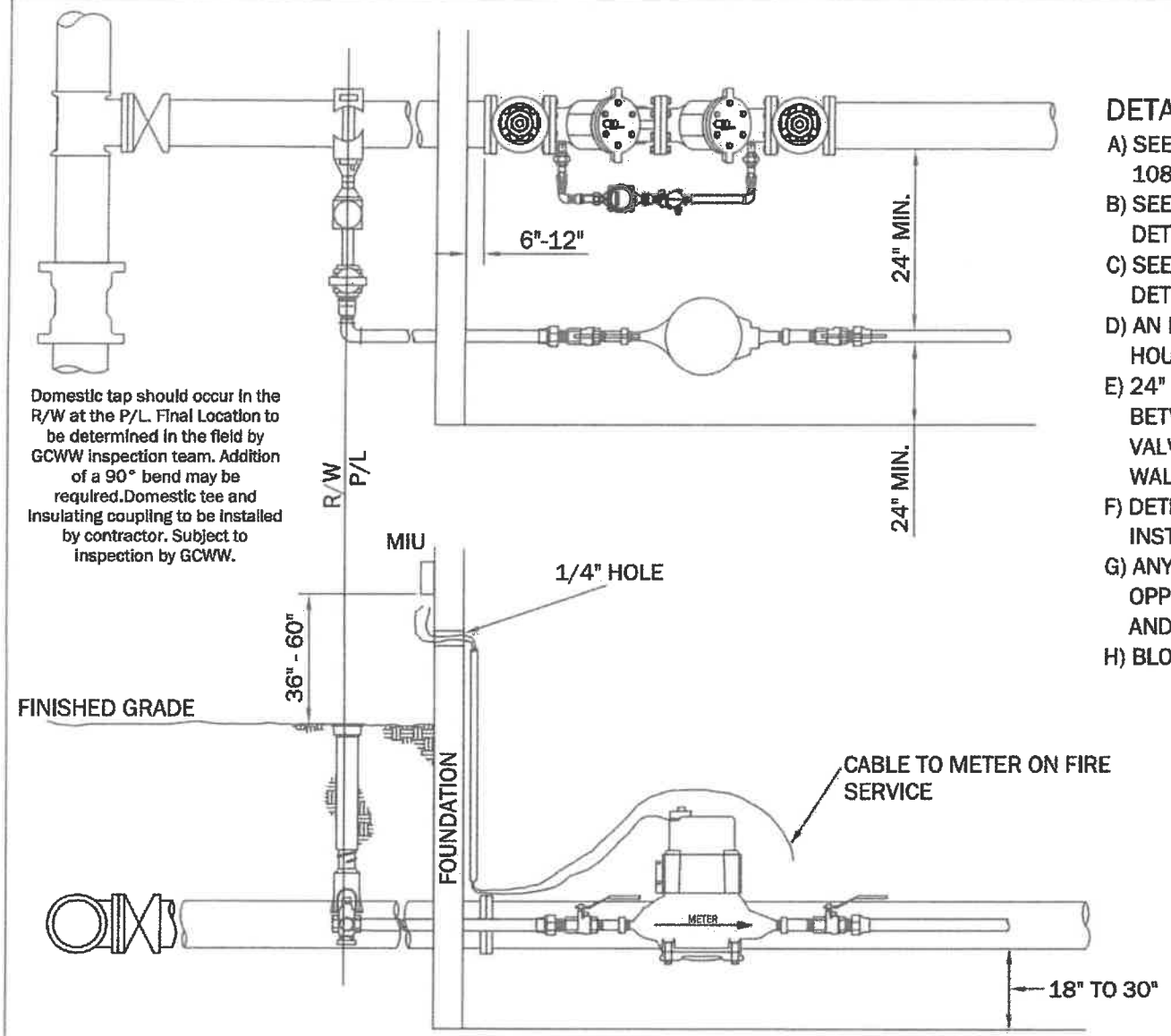
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE ONLY

OUTSIDE EMR SETTING DOUBLE CHECK DETECTOR CHECK ASSEMBLY

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-12C



Domestic tap should occur in the R/W at the P/L. Final Location to be determined in the field by GCWW inspection team. Addition of a 90° bend may be required.Domestic tee and insulating coupling to be installed by contractor. Subject to inspection by GCWW.

DETAILS:

A) SEE 108-1D & 1E FOR MATERIAL SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.
B) SEE 108-3A & 108-3B FOR INSIDE METER SETTING DETAILS.
C) SEE 108-9 DETAILS PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.
D) AN INSULATING COUPLING MUST BE INSTALLED ON THE HOUSE SIDE OF THE CURB STOP.
E) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN DOMESTIC METER AND DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL.
F) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.
G) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.
H) BLOCKING MUST BE UNDER OS & Y VALVES.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

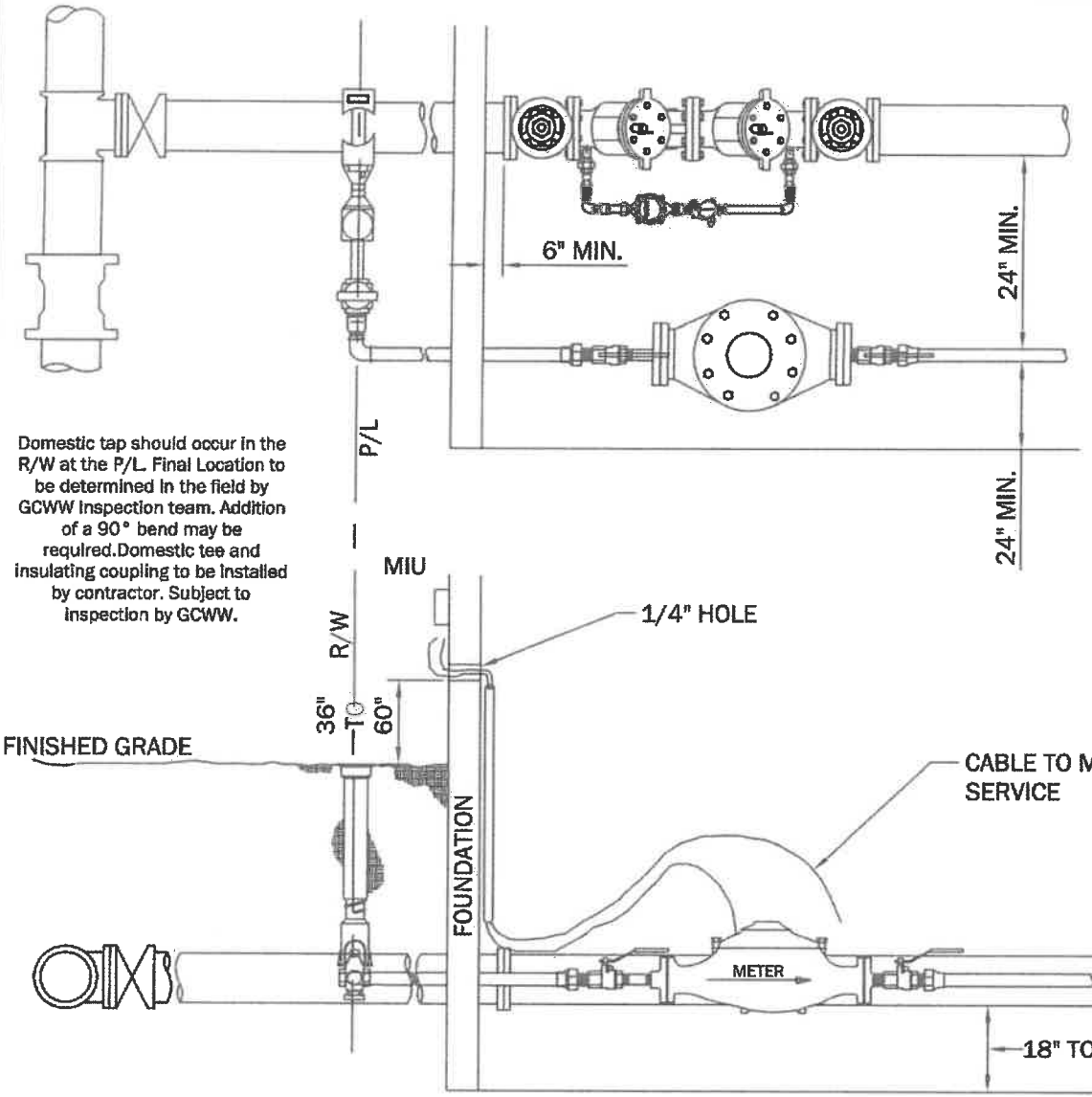
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE DUAL SERVICE

INSIDE EMR SETTING FOR 4" OR LARGER FIRE AND 5/8", 3/4" OR 1" DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-13A



Domestic tap should occur in the R/W at the P/L. Final Location to be determined in the field by GCWW Inspection team. Addition of a 90° bend may be required.Domestic tee and insulating coupling to be installed by contractor. Subject to inspection by GCWW.

DETAILS:

A) SEE 108-1D & 1E FOR MATERIAL SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.
B) SEE 108-3C FOR INSIDE METER SETTING DETAILS.
C) SEE 108-9 FOR PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.
D) AN INSULATING COUPLING MUST BE INSTALLED ON THE HOUSE SIDE OF THE CURB STOP.
E) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN DOMESTIC METER AND DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL.
F) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.
G) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.
H) A ROADWAY BOX MUST BE INSTALLED OVER DOMESTIC CORPORATION STOP.
I) BLOCKING MUST BE UNDER OS & Y VALVES.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

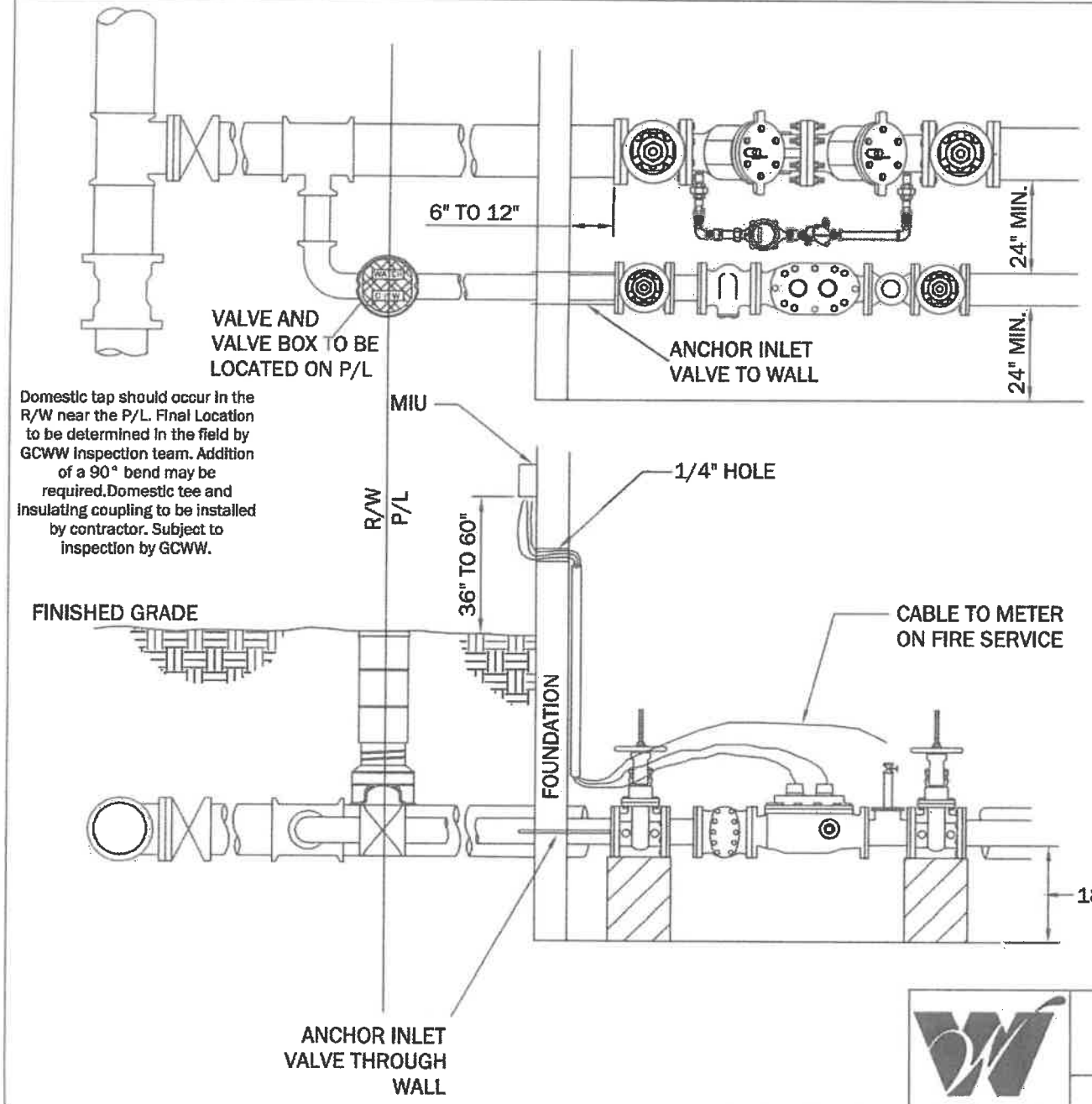
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE DUAL SERVICE

INSIDE EMR SETTINGS FOR 4" OR LARGER FIRE AND 1-1/2" OR 2" DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-13B



DETAILS:

A) SEE 108-1D, & 1E FOR MATERIAL SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.

B) SEE 108-8A FOR PIPING ARRANGEMENT ON DOMESTIC METER.

C) SEE 108-9 FOR PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.

D) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN DOMESTIC METER AND DOUBLE DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL. DC METER SHALL BE INSTALLED ON THE SIDE OPPOSITE OF THE DOMESTIC METER.

E) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.

F) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DOUBLE DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

G) A VALVE BOX COMPLETE MUST BE INSTALLED ON THE DOMESTIC BRANCH.

H) BLOCKING MUST BE UNDER OS & Y VALVES.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

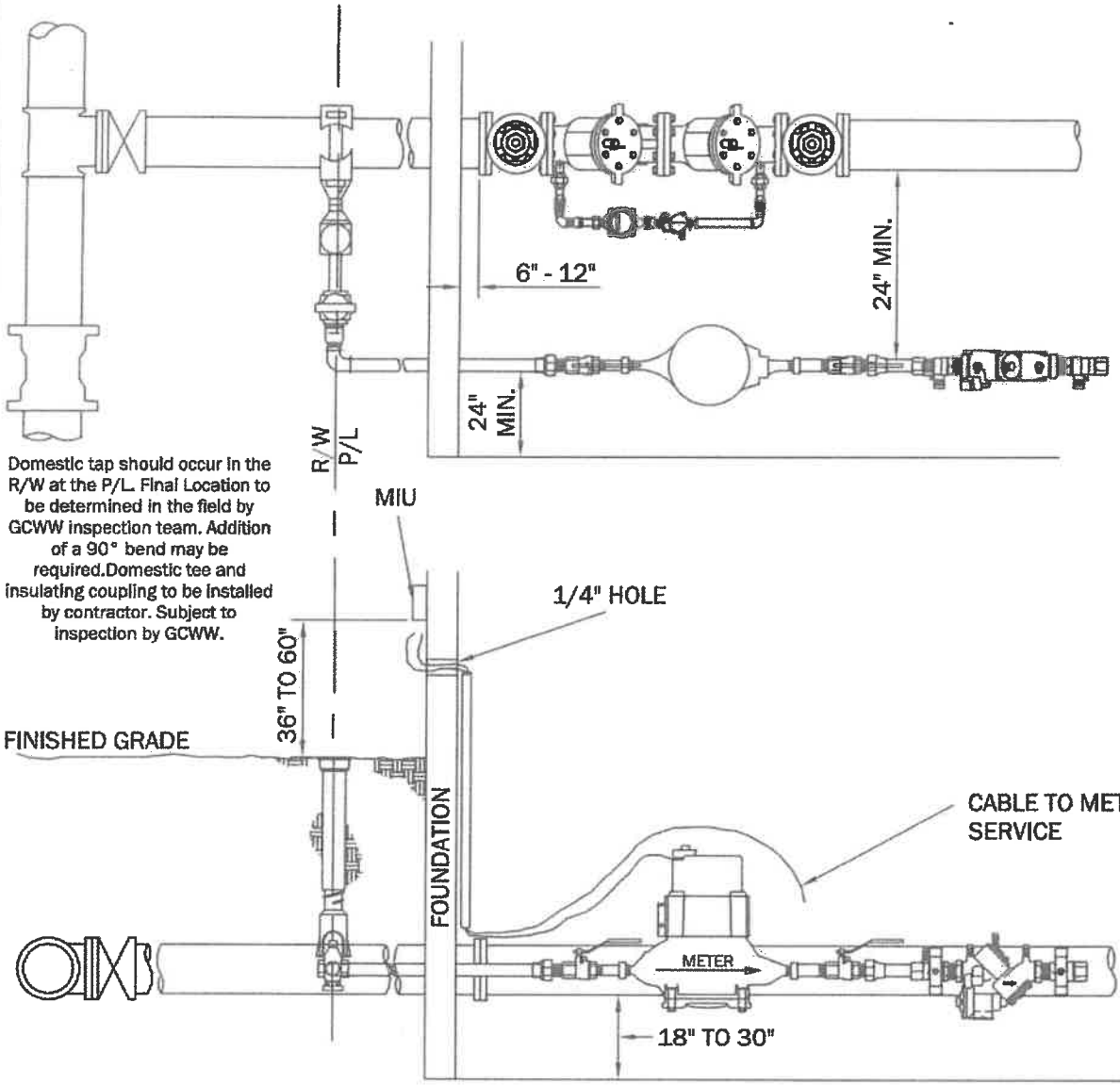
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE DUAL SERVICE

INSIDE EMR SETTING FOR 4" OR LARGER FIRE AND 3" OR LARGER DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-13C



Domestic tap should occur in the R/W at the P/L. Final Location to be determined in the field by GCWW inspection team. Addition of a 90° bend may be required.Domestic tee and insulating coupling to be installed by contractor. Subject to inspection by GCWW.

DETAILS:

A) SEE 108-1D &1E FOR MATERIAL SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.
B) SEE 108-3A & 108-3B FOR INSIDE METER SETTING DETAILS.
C) SEE 108-9 PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.
D) AN INSULATING COUPLING MUST BE INSTALLED ON THE HOUSE SIDE OF THE CURB STOP.
E) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN DOMESTIC METER AND DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL.
F) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.
G) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.
H) BLOCKING MUST BE UNDER OS & Y VALVES.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

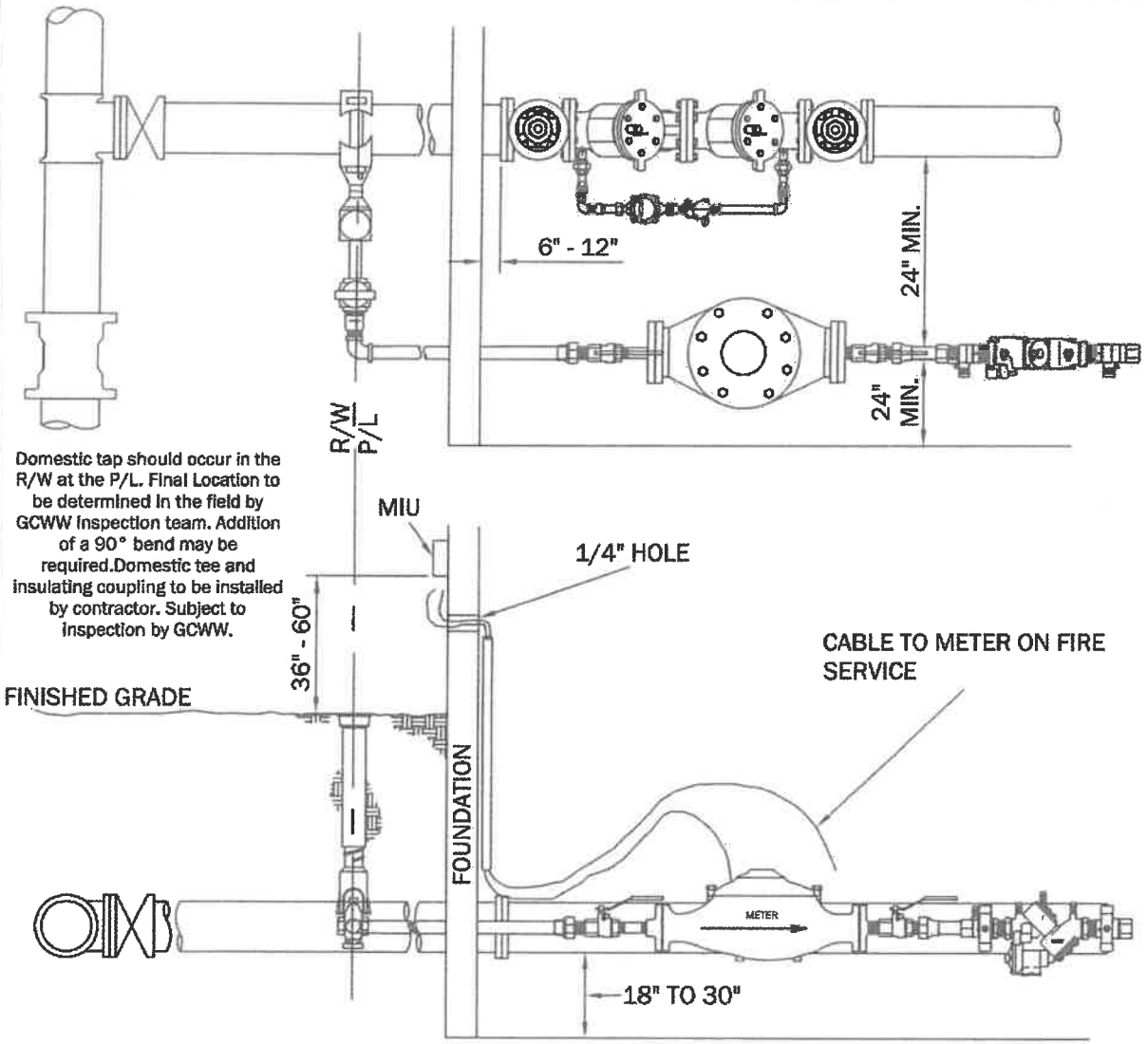
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE DUAL SERVICE WITH BACKFLOW ON DOMESTIC

INSIDE EMR SETTING FOR 4" OR LARGER FIRE AND 5/8", 3/4" OR 1" DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-13D



Domestic tap should occur in the R/W at the P/L. Final Location to be determined in the field by GCWW Inspection team. Addition of a 90° bend may be required.Domestic tee and insulating coupling to be installed by contractor. Subject to inspection by GCWW.

DETAILS:

A) SEE 108-1D & 1E FOR MATERIAL SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.
B) SEE 108-3C FOR METER SETTING DETAILS.
C) SEE 108-9 FOR PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.
D) AN INSULATING COUPLING MUST BE INSTALLED ON THE HOUSE SIDE OF THE CURB STOP.
E) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN DOMESTIC METER AND DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL.
F) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.
G) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.
H) A ROADWAY BOX MUST BE INSTALLED OVER DOMESTIC CORPORATION STOP.
I) BLOCKING MUST BE UNDER OS & Y VALVES.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

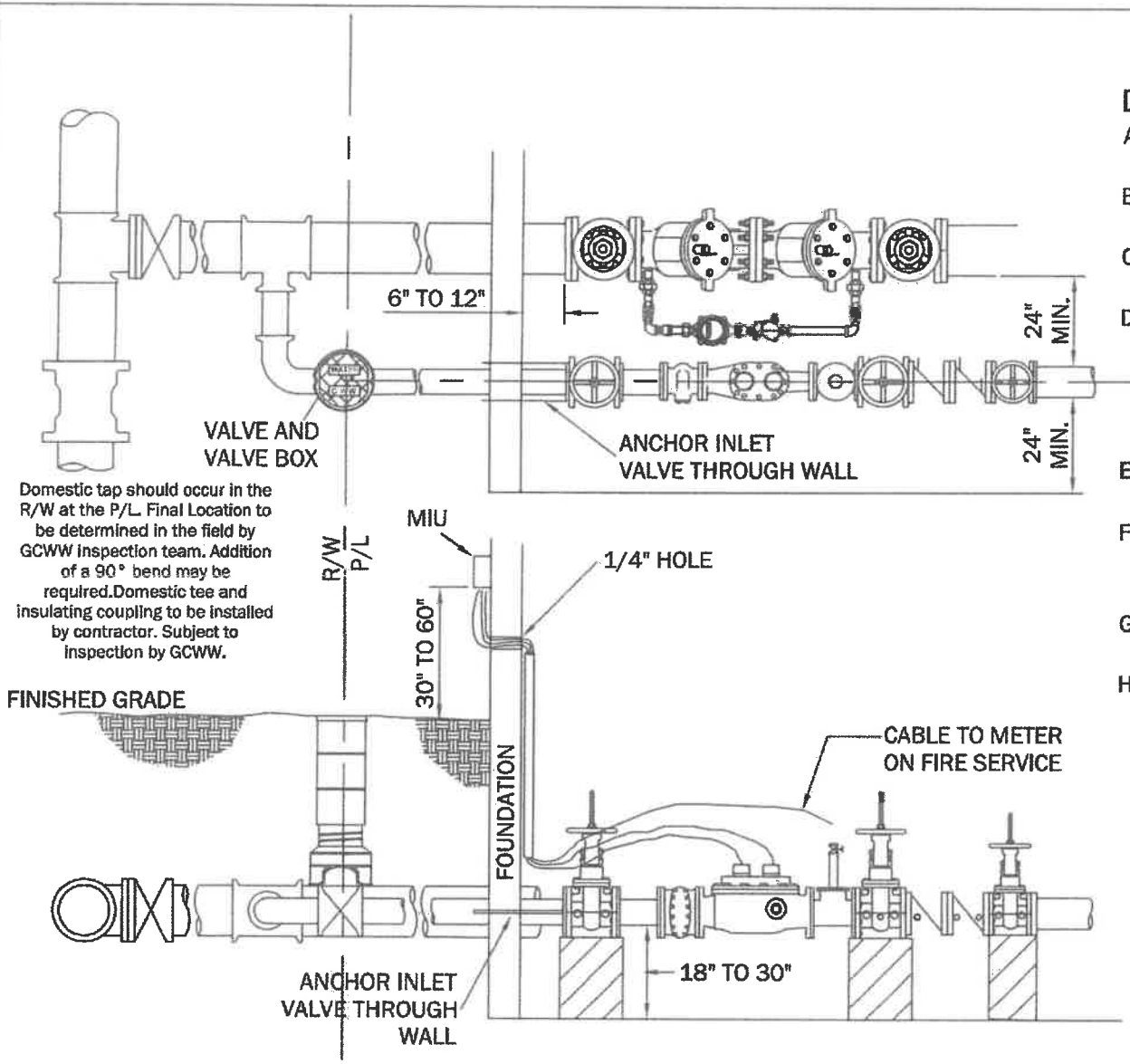
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE DUAL SERVICE WITH BACKFLOW ON DOMESTIC

INSIDE EMR SETTING FOR 4" OR LARGER FIRE AND 1-1/2" OR 2" DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-13E



DETAILS:

A) SEE 108-1D & 1E FOR MATERIAL SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.

B) SEE 108-8A FOR PIPING ARRANGEMENT ON DOMESTIC METER.

C) SEE 108-9 FOR PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.

D) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN DOMESTIC METER AND DOUBLE DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL. DC METER SHALL BE INSTALLED ON THE SIDE OPPOSITE OF THE DOMESTIC METER.

E) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.

F) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DOUBLE DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

G) A VALVE BOX COMPLETE MUST BE INSTALLED ON THE DOMESTIC BRANCH.

H) BLOCKING MUST BE UNDER ALL VALVES.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

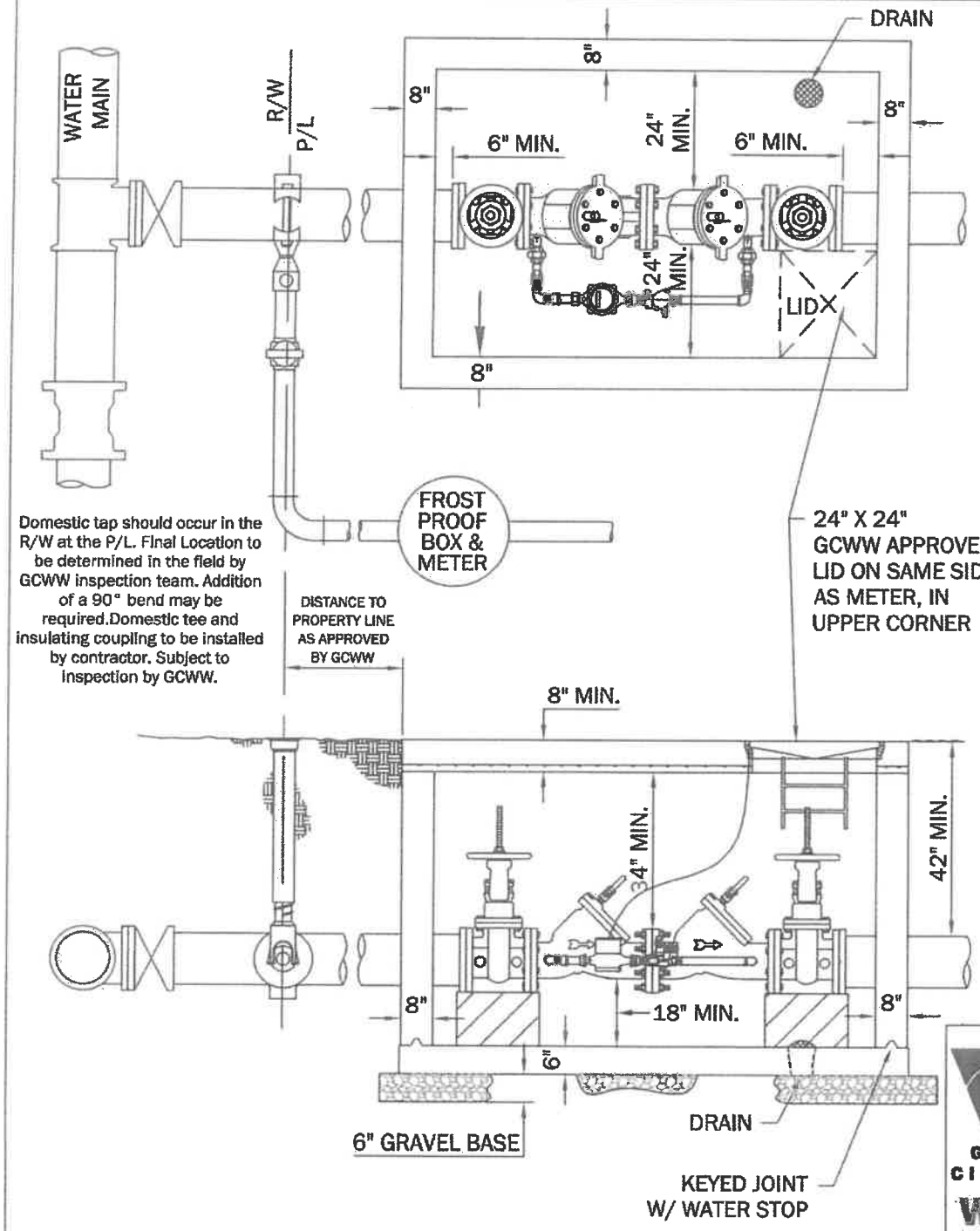
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE DUAL SERVICE WITH BACKFLOW ON DOMESTIC

INSIDE EMR SETTING FOR 4" OR LARGER FIRE AND 3" OR LARGER DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-13F



DETAILS:

A) SEE 108-1A, 108-1B, 108-1C, 108-1D & 108-1E FOR MATERIAL & CONSTRUCTION SPECIFICATIONS.

B) SEE 108-1F FOR EMR INSTALLATION SPECIFICATIONS.

C) SEE 108-5A FOR 5/8" AND 3/4" METER SETTINGS; 108-5B FOR 1" METER SETTINGS; 108-5C FOR 1 1/2" AND 2" METER SETTING SPECIFICATIONS.

D) SEE 108-9 FOR DETAILS PIPING ARRANGEMENT FOR DOUBLE CHECK DETECTOR CHECK VALVE ASSEMBLY.

E) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.

F) A CURB BOX MUST BE INSTALLED ON A 3/4" AND 1" DOMESTIC BRANCH AND A TELESCOPE BOX MUST BE INSTALLED ON A 1 1/2" AND 2" DOMESTIC BRANCH.

G) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DOUBLE DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

H) CONCRETE BLOCKING MUST BE UNDER OS & Y VALVES.

I) A FACTORY DRILLED (1) 3/4" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

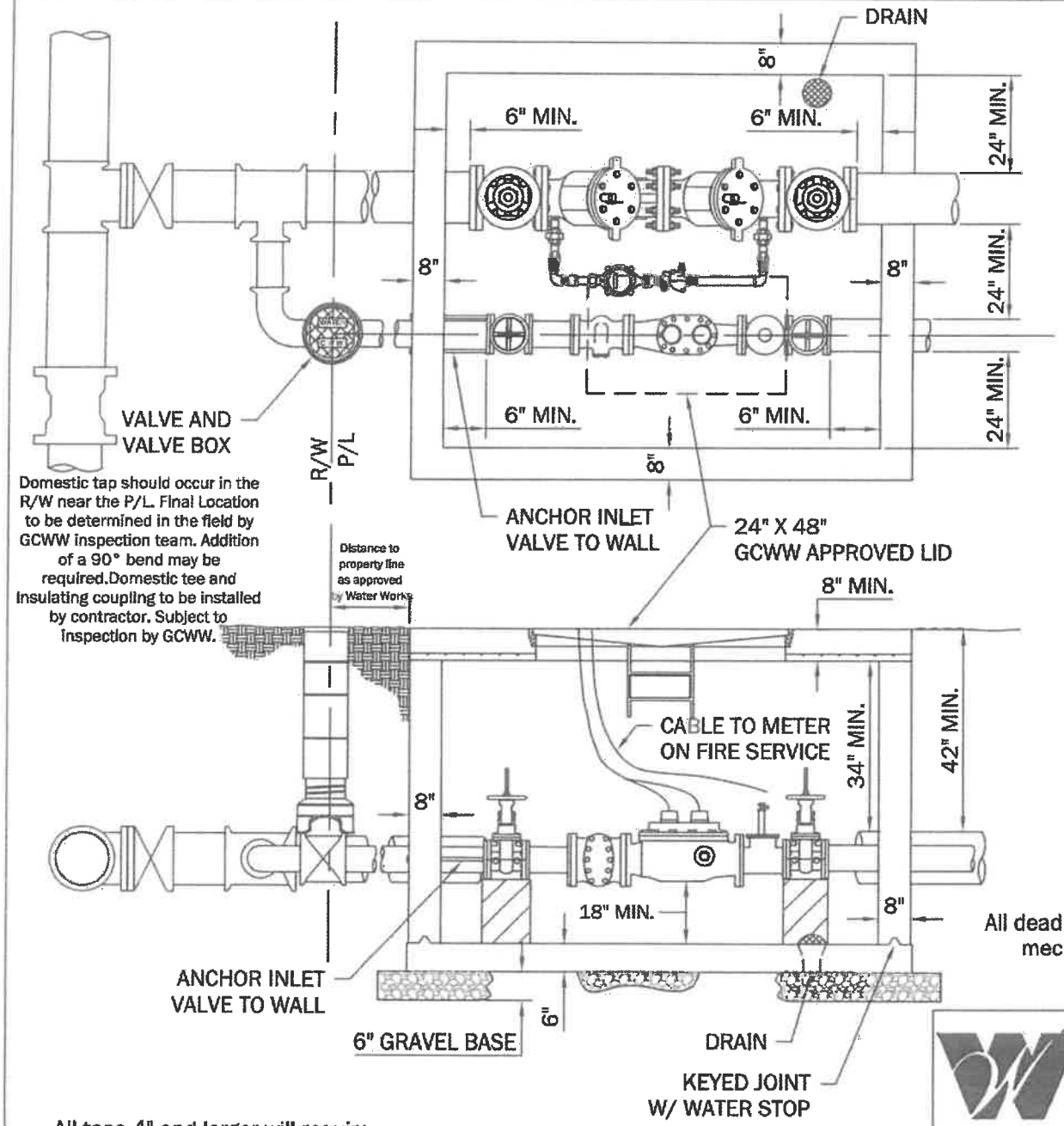
See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE DUAL SERVICE

OUTSIDE EMR SETTING FOR 4" OR LARGER FIRE AND 2" OR SMALLER DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-14A



DETAILS:

A) SEE 108-1A, 1C, 1D & 1E FOR MATERIAL AND CONSTRUCTION SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.

B) SEE 108-8A FOR PIPING ARRANGEMENT ON DOMESTIC METER.

C) SEE 108-9 FOR PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.

D) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN METER AND DOUBLE DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL. DC METER MUST BE INSTALLED ON THE SIDE OPPOSITE FROM DOMESTIC METER.

E) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.

F) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DOUBLE DETECTOR CHECK ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

G) A VALVE BOX MUST INSTALLED ON THE DOMESTIC BRANCH.

H) CONCRETE BLOCKING MUST BE UNDER VALVES.

I) A FACTORY DRILLED (1) ¾" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.

J) LID MUST BE CENTERED LENGTHWISE OVER THE DOMESTIC METER.

All dead end pipe stubs must be mechanically restrained.

See Standard Drawing 108-19 For Inspection/Installation Procedures

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

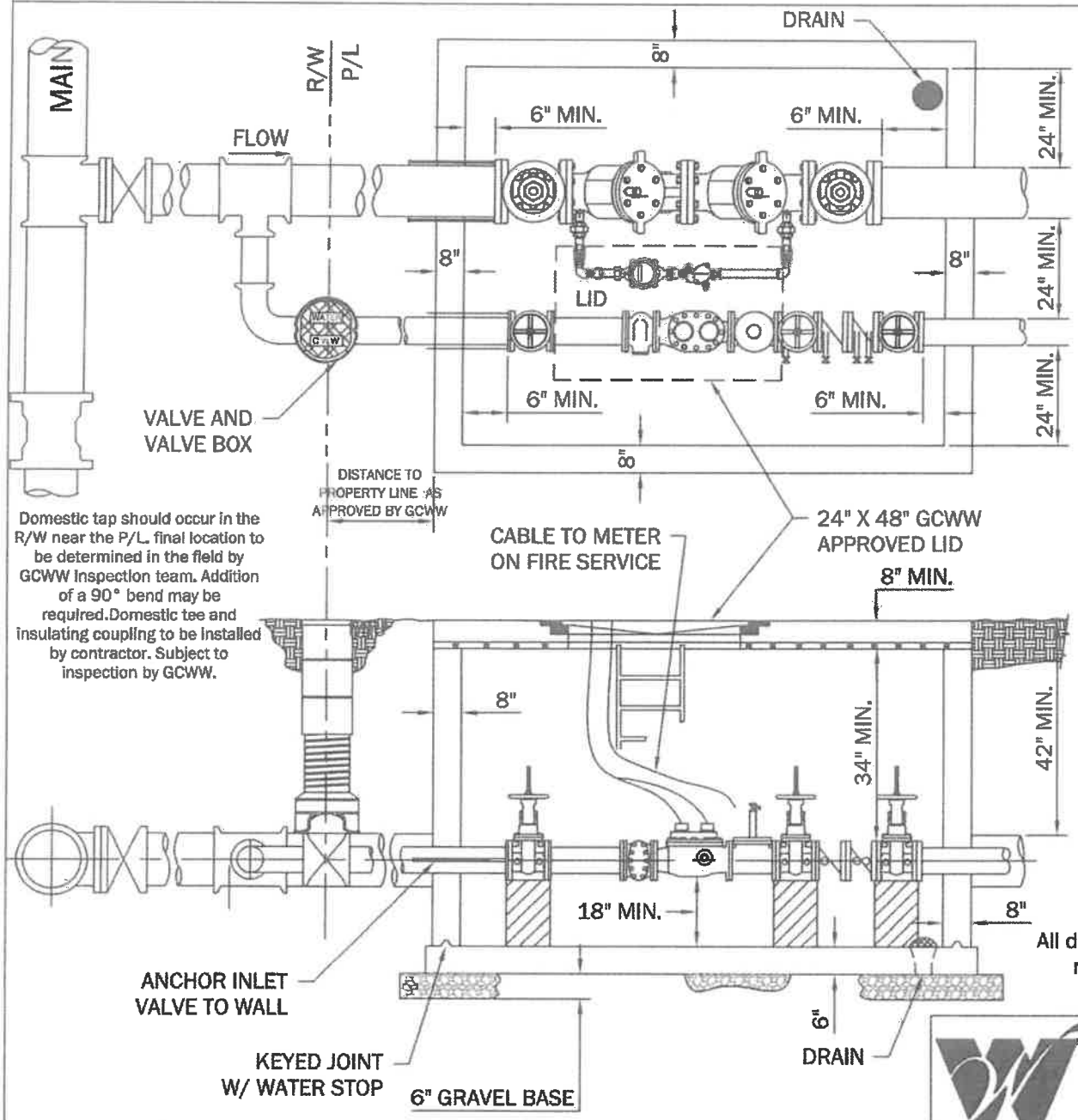
Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE DUAL SERVICE

OUTSIDE EMR SETTING FOR 4" OR LARGER FIRE AND 3" OR LARGER DOMESTIC METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-14B



DETAILS:

A) LID MUST BE CENTERED LENGTHWISE OVER THE METER.

B) SEE 108-1A, 1B, 1C, 1D, & 1E FOR MATERIAL AND CONSTRUCTION SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.

C) SEE 108-8B FOR PIPING ARRANGEMENT ON DOMESTIC METER

D) SEE 108-9 FOR DETAILS PIPING ARRANGEMENT FOR DOUBLE CHECK DETECTOR CHECK VALVE ASSEMBLY.

E) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN DOMESTIC METER AND DOUBLE DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL. DC METER SHALL BE INSTALLED ON THE SIDE OPPOSITE OF THE DOMESTIC METER.

F) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.

G) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DOUBLE DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

H) CONCRETE BLOCKING MUST BE UNDER OS & Y VALVES.

I) A VALVE BOX COMPLETE MUST BE INSTALLED IN THE DOMESTIC BRANCH.

J) BACKFLOW PREVENTER SHALL BE NO SMALLER THAN METER SIZE.

K) A FACTORY DRILLED (1) ¾" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.

All dead end pipe stubs must be mechanically restrained.

See Standard Drawing 108-19 For Inspection/Installation Procedures

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

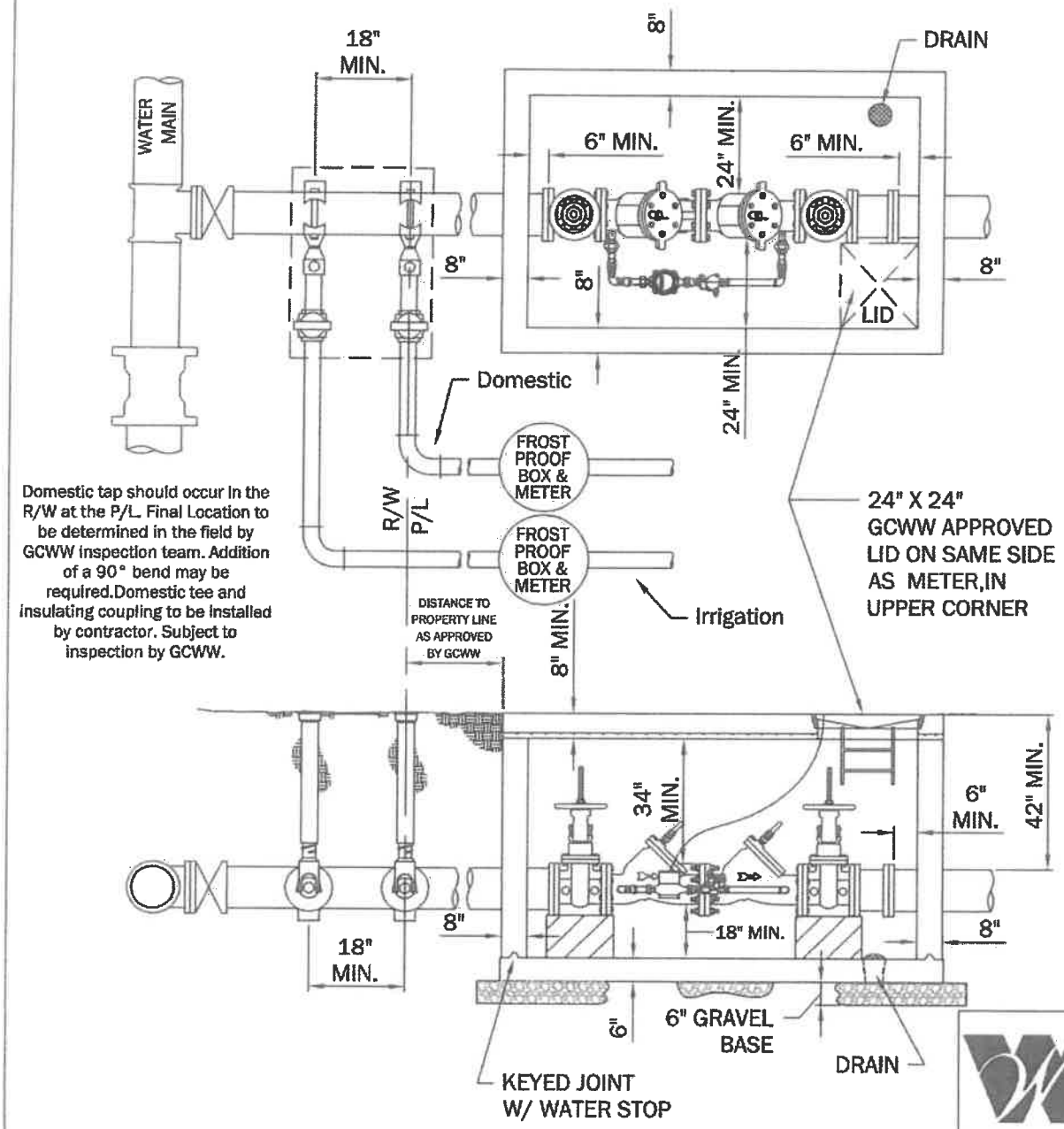
Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE DUAL SERVICE

OUTSIDE EMR SETTING FOR 4" OR LARGER FIRE AND 3" OR LARGER DOMESTIC METER W/ DOUBLE CHECK ASS'Y

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-14C



Domestic tap should occur in the R/W at the P/L. Final Location to be determined in the field by GCWW inspection team. Addition of a 90° bend may be required.Domestic tee and insulating coupling to be installed by contractor. Subject to inspection by GCWW.

DETAILS:

A) SEE 108-1A, 108-1B, 108-1C, 108-1D & 108-1E FOR MATERIAL & CONSTRUCTION SPECIFICATIONS.
B) SEE 108-1F FOR EMR INSTALLATION SPECIFICATIONS.
C) SEE 108-5A FOR 5/8" AND 3/4" METER SETTINGS; 108-5B FOR 1" METER SETTINGS; 108-5C FOR 1 1/2" AND 2" METER SETTING SPECIFICATIONS.
D) SEE 108-9 FOR DETAILS PIPING ARRANGEMENT FOR DOUBLE CHECK DETECTOR CHECK VALVE ASSEMBLY.
E) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.
F) A CURB BOX MUST BE INSTALLED ON A 3/4" AND 1" DOMESTIC BRANCH AND A TELESCOPE BOX MUST BE INSTALLED ON A 1 1/2" AND 2" DOMESTIC BRANCH.
G) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DOUBLE DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.
H) CONCRETE BLOCKING MUST BE UNDER OS & Y VALVES.
I) A FACTORY DRILLED (1) 3/4" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

See Standard Drawing 108-19 For Inspection/Installation Procedures

GREATER CINCINNATI WATER WORKS

4" OR LARGER FIRE TRI-SERVICE

W/ ONE DOMESTIC SERVICE BRANCH AND ONE IRRIGATION SERVICE BRANCH

OUTSIDE EMR SETTING FOR

(1) 2" OR SMALLER DOMESTIC METER
(1) 2" OR SMALLER IRRIGATION METER

APPROVED

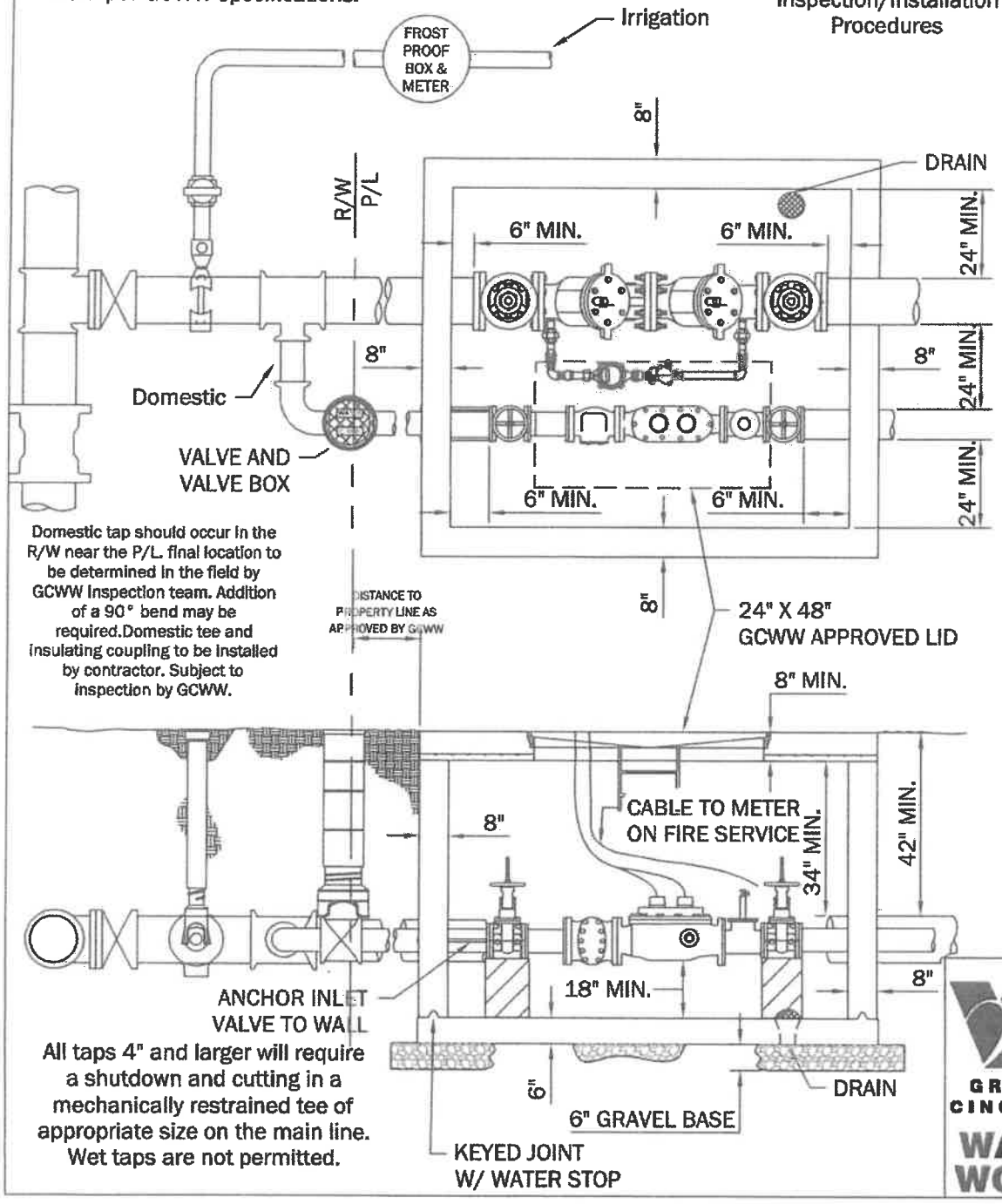
DATE 7/12/19

STANDARD DRAWING 108-15A

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

All dead end pipe stubs must be mechanically restrained.

See Standard Drawing 108-19 For Inspection/Installation Procedures



DETAILS:

A) SEE 108-1A, 1B, 1C, 1D & 1E FOR MATERIAL AND CONSTRUCTION SPECIFICATIONS.

B) SEE 108-1F FOR EMR SPECIFICATIONS.

C) SEE 108-5A FOR 5/8" AND 3/4" METER SETTINGS; 108-5B FOR 1" METER SETTINGS; 108-5C FOR 1 1/2" AND 2" METER SETTING SPECIFICATIONS.

D) SEE 108-8A FOR PIPING ARRANGEMENT ON DOMESTIC METER.

E) SEE 108-9 FOR PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.

F) A CURB BOX MUST BE INSTALLED ON A 3/4" AND 1" DOMESTIC BRANCH AND A TELESCOPE BOX MUST BE INSTALLED ON A 1 1/2" AND 2" DOMESTIC BRANCH.

G) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN METER AND DOUBLE DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL. DC METER MUST BE INSTALLED ON THE SIDE OPPOSITE FROM DOMESTIC METER.

H) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW

I) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DOUBLE DETECTOR CHECK ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

J) CONCRETE BLOCKING MUST BE UNDER OS & Y VALVES.

K) A VALVE BOX MUST INSTALLED ON THE DOMESTIC BRANCH.

L) A FACTORY DRILLED (1) ¾" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.

M) LID MUST BE CENTERED LENGTHWISE OVER THE DOMESTIC METER.

GREATER CINCINNATI WATER WORKS

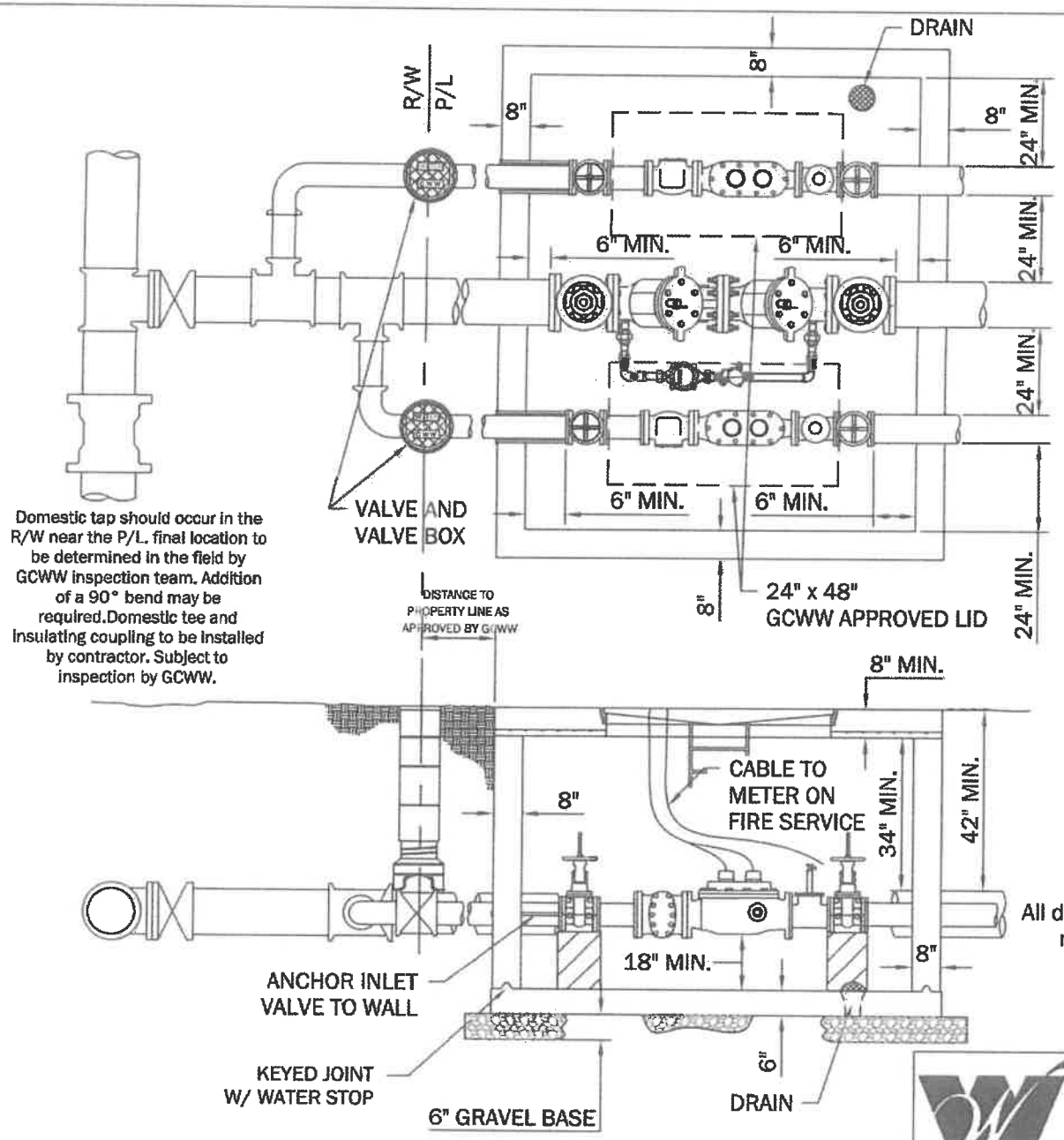
4" OR LARGER FIRE TRI-SERVICE

W/ ONE DOMESTIC SERVICE BRANCH AND ONE IRRIGATION SERVICE BRANCH

OUTSIDE EMR SETTING FOR

(1) 2" OR SMALLER METER AND (1) 3" OR LARGER METER 1 FOR IRRIGATION SERVICE, 1 FOR DOMESTIC SERVICE

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-15B



Domestic tap should occur in the R/W near the P/L. final location to be determined in the field by GCWW inspection team. Addition of a 90° bend may be required. Domestic tee and insulating coupling to be installed by contractor. Subject to inspection by GCWW.

DETAILS:

A) SEE 108-1A, 1C, 1D & 1E FOR MATERIAL AND CONSTRUCTION SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.

B) SEE 108-8A FOR PIPING ARRANGEMENT ON DOMESTIC METER.

C) SEE 108-9 FOR PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.

D) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN METER AND DOUBLE DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL. DC METER MUST BE INSTALLED ON THE SIDE OPPOSITE FROM DOMESTIC METER.

E) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.

F) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DOUBLE DETECTOR CHECK ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

G) A VALVE BOX MUST INSTALLED ON THE DOMESTIC BRANCH.

H) CONCRETE BLOCKING MUST BE UNDER VALVES.

I) A FACTORY DRILLED (1) ¾" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.

J) LID MUST BE CENTERED LENGTHWISE OVER THE DOMESTIC METER.

All dead end pipe stubs must be mechanically restrained.

See Standard Drawing 108-19 For Inspection/Installation Procedures

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

GREATER CINCINNATI WATER WORKS

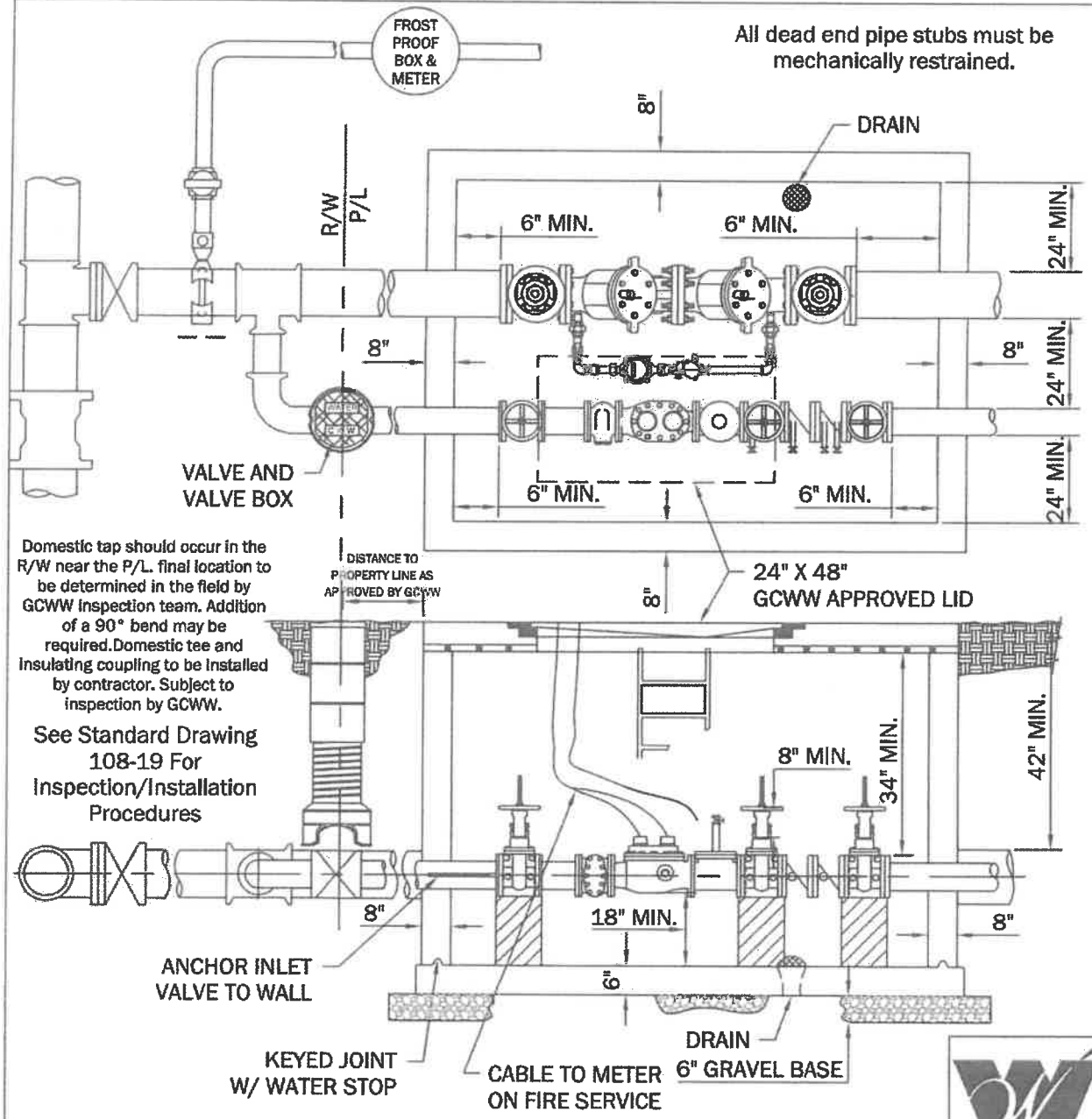
4" OR LARGER FIRE TRI-SERVICE

W/ ONE DOMESTIC SERVICE BRANCH AND ONE IRRIGATION SERVICE BRANCH

OUTSIDE EMR SETTING FOR

(1) 3" OR LARGER DOMESTIC METER AND (1) 3" OR LARGER IRRIGATION METER

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-15C



DETAILS:

A) SEE 108-1A, 1B, 1C, 1D & 1E FOR MATERIAL AND CONSTRUCTION SPECIFICATIONS.
B) SEE 108-1F FOR EMR SPECIFICATIONS.
C) SEE 108-5A FOR 5/8" AND 3/4" METER SETTINGS; 108-5B FOR 1" METER SETTINGS; 108-5C FOR 1 1/2" AND 2" METER SETTING SPECIFICATIONS.
D) SEE 108-8A FOR PIPING ARRANGEMENT ON DOMESTIC METER.
E) SEE 108-9 FOR PIPING ARRANGEMENT ON DETECTOR CHECK VALVE ASSEMBLY.
F) A CURB BOX MUST BE INSTALLED ON A 3/4" AND 1" DOMESTIC BRANCH AND A TELESCOPE BOX MUST BE INSTALLED ON A 1 1/2" AND 2" DOMESTIC BRANCH.
G) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN METER AND DOUBLE DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL. DC METER MUST BE INSTALLED ON THE SIDE OPPOSITE FROM DOMESTIC METER.
H) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW
I) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DOUBLE DETECTOR CHECK ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.
J) CONCRETE BLOCKING MUST BE UNDER OS & Y VALVES.
K) A VALVE BOX MUST INSTALLED ON THE DOMESTIC BRANCH.
L) A FACTORY DRILLED (1) ¾" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.
M) LID MUST BE CENTERED LENGTHWISE OVER THE DOMESTIC METER.

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

ONLY FOR USE IN FIRE STATIONS

GREATER CINCINNATI WATER WORKS

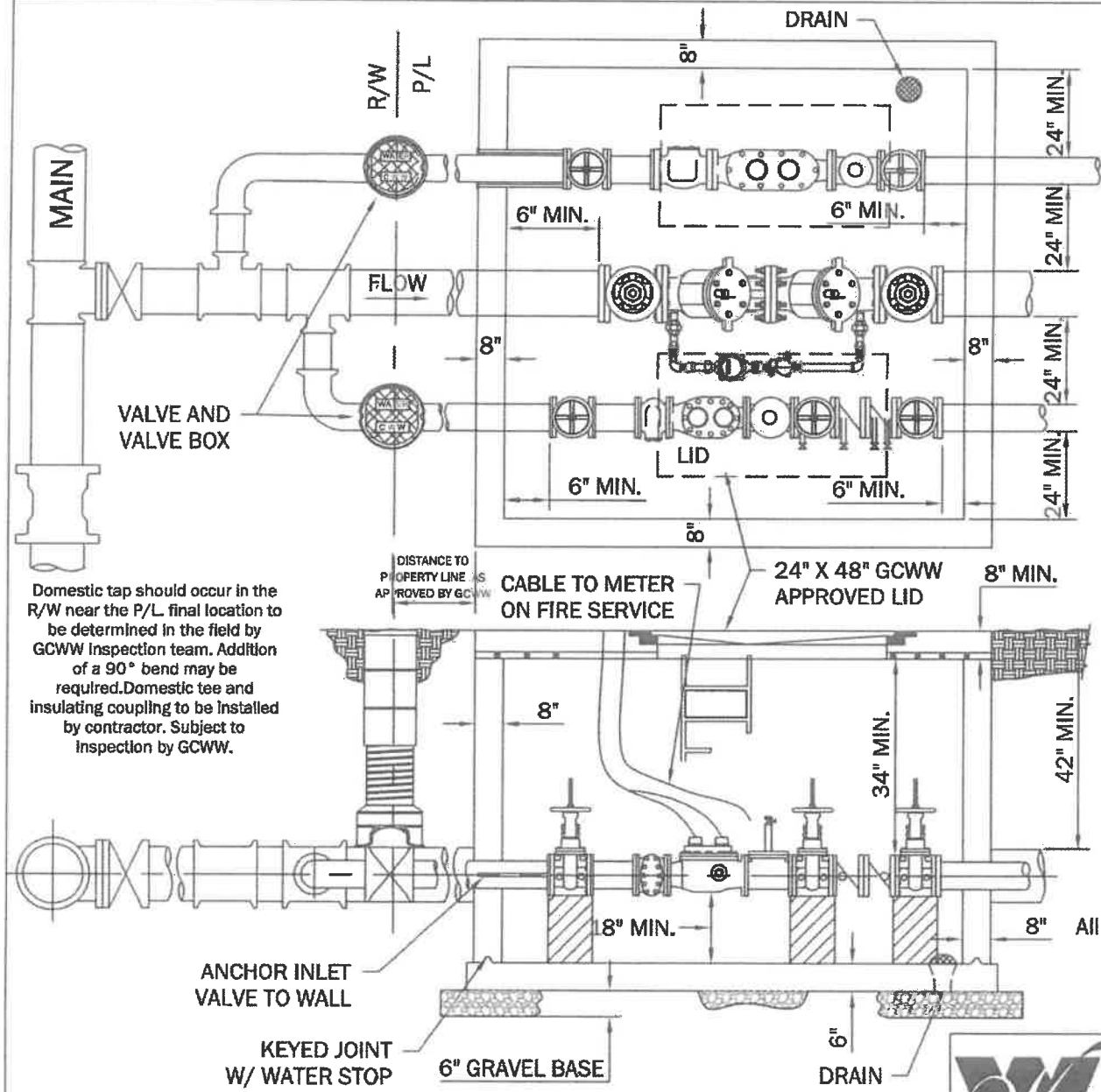
4" OR LARGER FIRE TRI-SERVICE

W/ ONE FIRE DEPARTMENT TRAINING BRANCH AND ONE DOMESTIC SERVICE BRANCH

OUTSIDE EMR SETTING FOR

(1) 2" OR SMALLER DOMESTIC METER AND (1) 3" OR LARGER DOMESTIC METER W/ DOUBLE CHECK ASS'Y

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-15D



Domestic tap should occur in the R/W near the P/L. final location to be determined in the field by GCWW inspection team. Addition of a 90° bend may be required.Domestic tee and insulating coupling to be installed by contractor. Subject to inspection by GCWW.

DETAILS:

A) SEE 108-1A, 1B, 1C, 1D, & 1E FOR MATERIAL AND CONSTRUCTION SPECIFICATIONS AND 108-1F FOR EMR SPECIFICATIONS.

B) SEE 108-8B FOR PIPING ARRANGEMENT ON DOMESTIC METER

C) SEE 108-9 FOR DETAILS PIPING ARRANGEMENT FOR DOUBLE CHECK DETECTOR CHECK VALVE ASSEMBLY.

D) 24" MINIMUM CLEARANCE SHALL BE MAINTAINED BETWEEN DOMESTIC METER AND DOUBLE DETECTOR CHECK VALVE ASSEMBLY AND A MINIMUM OF 24" FROM ANY WALL. DC METER SHALL BE INSTALLED ON THE SIDE OPPOSITE OF THE DOMESTIC METER.

E) DETECTOR CHECK METER TO BE PURCHASED FROM AND INSTALLED BY GCWW.

F) ANY PUMPER CONNECTION MUST BE INSTALLED ON OPPOSITE SIDE OF DOUBLE DETECTOR CHECK METER ASSEMBLY AND DOWNSTREAM OF OUTLET VALVE.

G) CONCRETE BLOCKING MUST BE UNDER OS & Y VALVES.

H) A VALVE BOX COMPLETE MUST BE INSTALLED IN THE DOMESTIC BRANCH.

I) BACKFLOW PREVENTER SHALL BE NO SMALLER THAN METER SIZE.

J) A FACTORY DRILLED (1) ¾" HOLE MUST BE DRILLED IN THE GCWW APPROVED LID IF THE PIT IS LOCATED IN AN UNPAVED AREA.

K) LID MUST BE CENTERED LENGTHWISE OVER THE METER.

All dead end pipe stubs must be mechanically restrained.

See Standard Drawing 108-19 For Inspection/Installation Procedures

All taps 4" and larger will require a shutdown and cutting in a mechanically restrained tee of appropriate size on the main line. Wet taps are not permitted.

Property owner is responsible for all excavation, backfill, and restoration work per GCWW specifications.

ONLY FOR USE IN FIRE STATIONS

GREATER CINCINNATI WATER WORKS

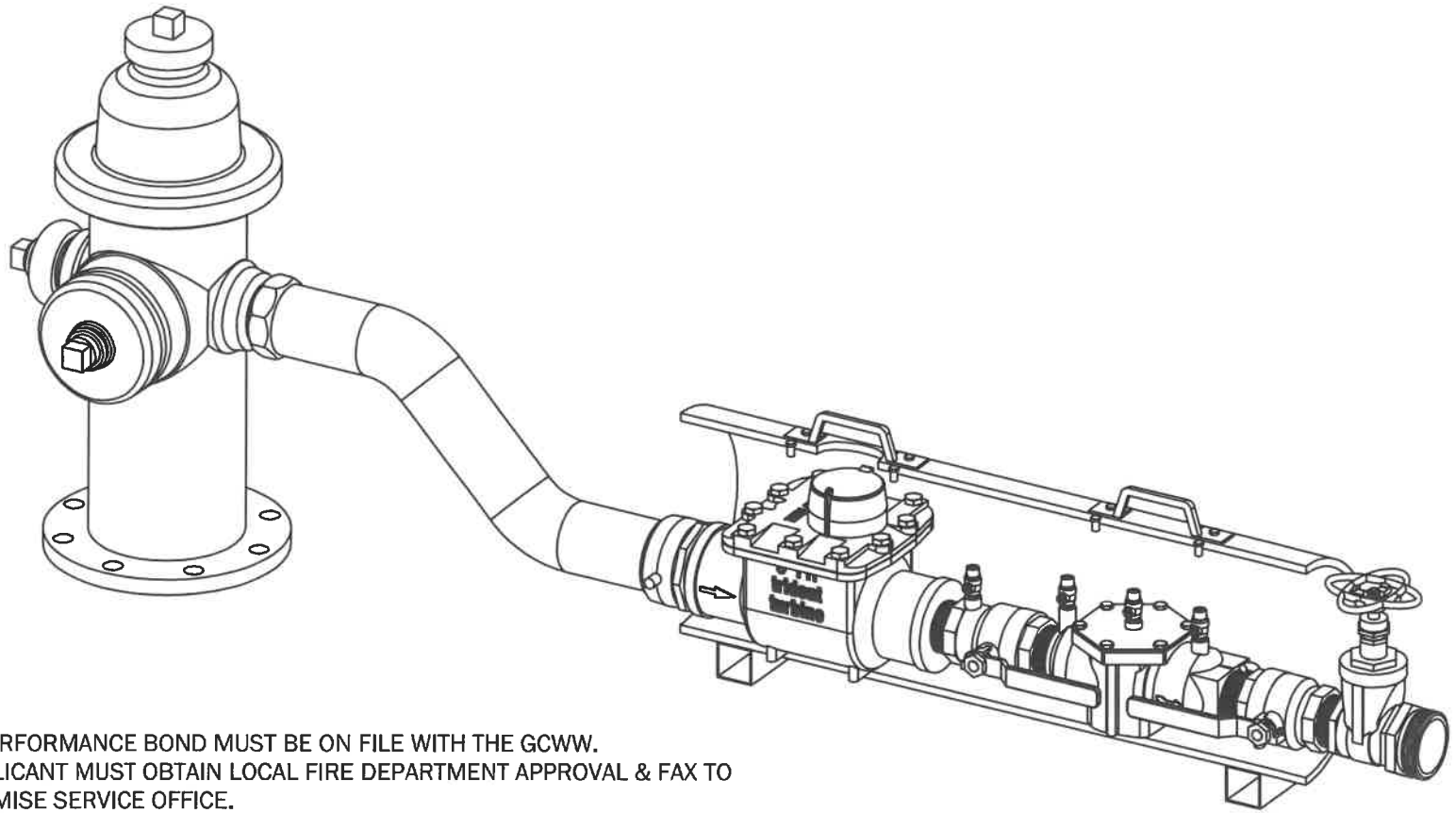
4" OR LARGER FIRE TRI-SERVICE

W/ ONE FIRE DEPARTMENT TRAINING BRANCH AND ONE DOMESTIC SERVICE BRANCH

OUTSIDE EMR SETTING FOR

(2) 3" OR LARGER DOMESTIC METER W/ DOUBLE CHECK ASS'Y

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-15E



A) A PERFORMANCE BOND MUST BE ON FILE WITH THE GCWW.
B) APPLICANT MUST OBTAIN LOCAL FIRE DEPARTMENT APPROVAL & FAX TO PREMISE SERVICE OFFICE.
C) WHEN A & B ARE MET, CALL FIELD SERVICES SECTION 48 HOURS IN ADVANCE TO REQUEST A METER. PERMIT, METER AND SPANNER WRENCH MAY BE PICKED UP AT THE FIELD SERVICES DESK.
D) ONLY AN APPROVED FIRE HYDRANT SPANNER WRENCH MAY BE USED ON THE HYDRANT VALVE.
E) ANY FIRE HYDRANT CAP NOT BEING USED MUST BE TIGHTENED TO AVOID LEAKING.
F) THE FIRE HYDRANT VALVE MUST BE TURNED ON SLOWLY AND FULLY.
G) THE OUTLET VALVE ON THE METER SETTING MUST BE USED TO CONTROL THE FLOW OF WATER.
H) WHERE TRAFFIC CROSSES HOSES, JUMPER BOARDS MUST BE USED.
I) EVERY EVENING, REMOVE METER, PUMP OUT HYDRANT AND PUT CAP BACK ON.
J) WHEN JOB IS COMPLETE, RETURN METER AND SPANNER TO GCWW
K) USER IS RESPONSIBLE FOR THE RETURN OF ALL ITEMS ON THE METER AND ENCLOSURE. IF ANYTHING IS MISSING OR DAMAGED, THE USER WILL BE CHARGED FOR ITS REPLACEMENT.
L) FIRE HYDRANT VALVE MUST BE TURNED OFF SLOWLY TO AVOID DAMAGE TO PUBLIC WATER SYSTEM.

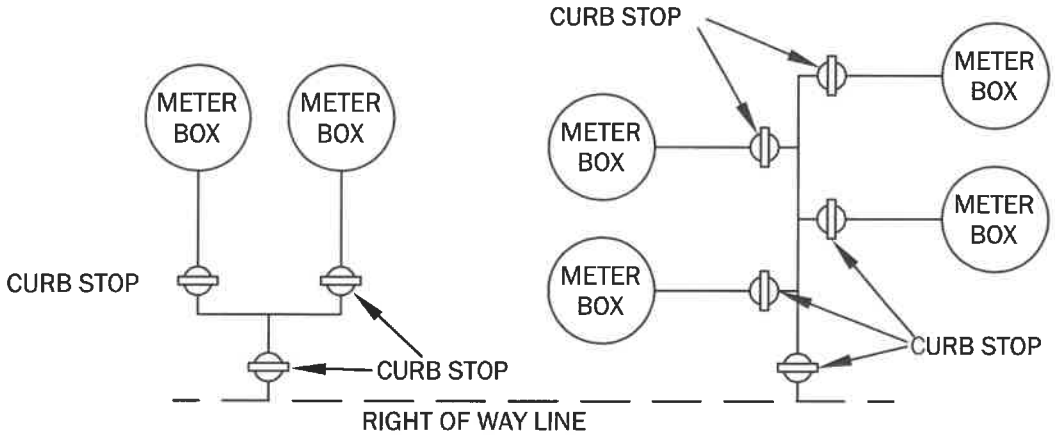
PERMIT MAY BE REVOKED FOR FAILURE TO COMPLY WITH THESE REGULATIONS.

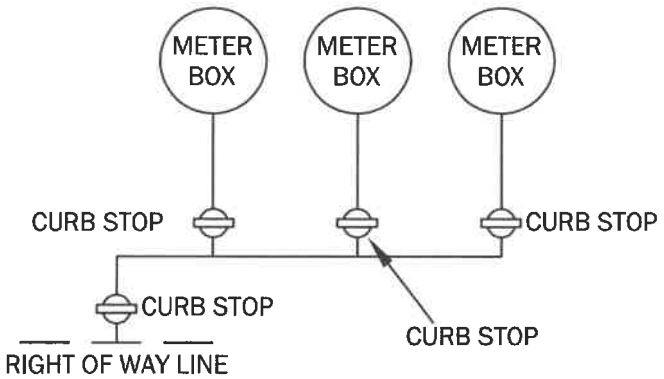
GREATER CINCINNATI WATER WORKS

TEMPORARY WATER

CONNECTION TO FIRE HYDRANT FOR TEMPORARY WATER

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-16





DETAILS:

A) APPROVAL OF ALL MANIFOLD SETTINGS SHALL BE DETERMINED BY THE DIRECTOR OR AUTHORIZED REPRESENTATIVE.

B) IN NO CASE SHALL THE CAPACITY (IN GALLONS) OF THE TOTAL METERS BE GREATER THAN THE CAPACITY OF THE BRANCH.

C) ALL TEES SHALL BE SILVER SOLDERED.

D) METERS INSTALLED IN OUTSIDE MANIFOLD MAY BE INSTALLED IN SEVERAL WAYS, BUT IN ALL CASES THE BOXES SHALL BE INSTALLED AS CLOSE TOGETHER AS POSSIBLE.

E) THE REDUCTION TO ACCOMMODATE EACH METER SHALL BE MADE AT THE TEE OR ON THE VERTICAL RISER (WITHIN 4" OF THE INLET VALVE).

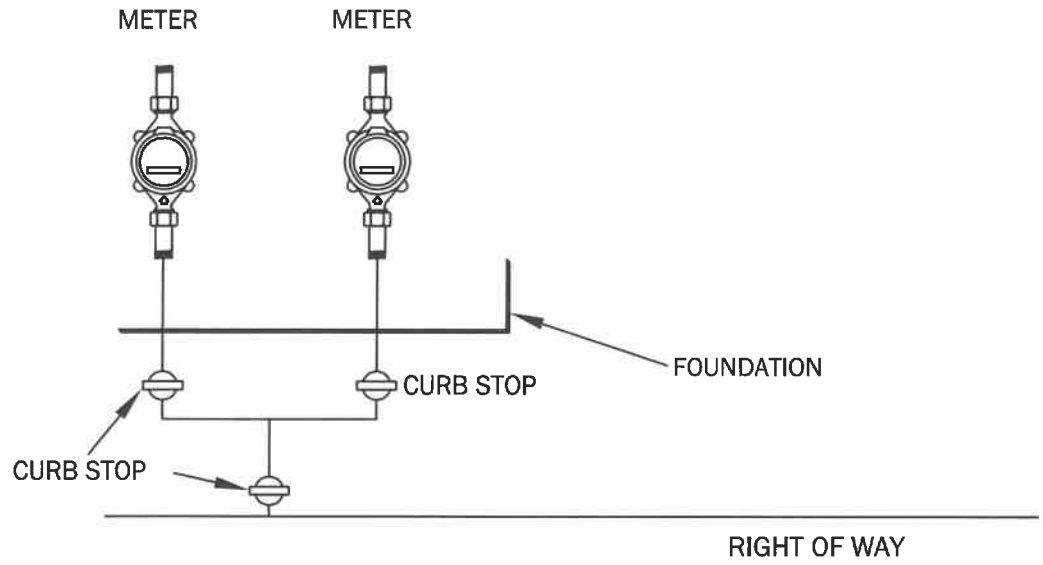
F) A CURB BOX SHALL BE INSTALLED OVER EACH INDIVIDUAL CURB STOP OF EACH INDIVIDUAL MANIFOLD METER, PLUS A CURB BOX SHALL BE INSTALLED OVER THE MAIN BRANCH CURB STOP.

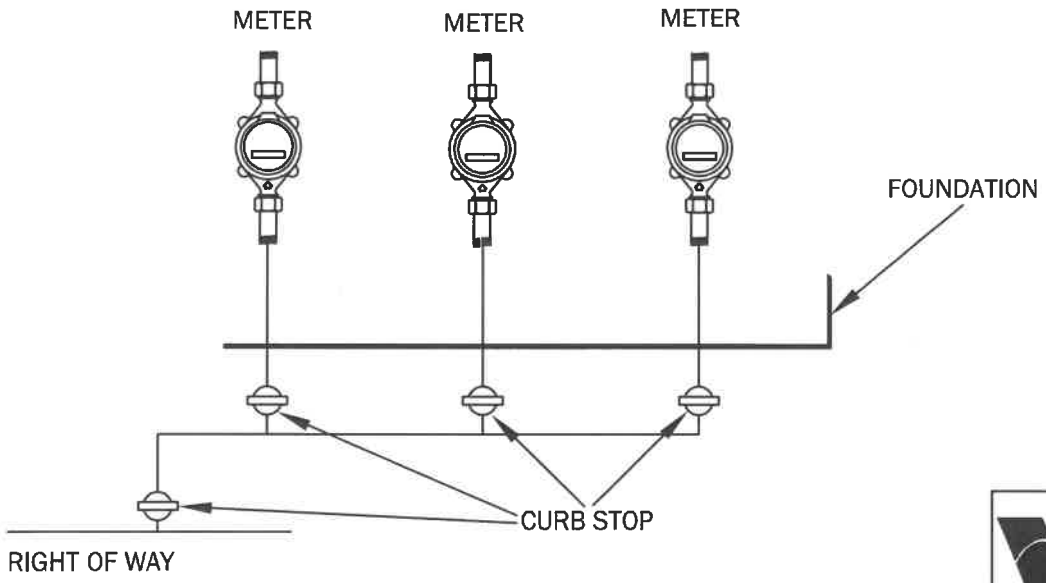
GREATER CINCINNATI WATER WORKS

MANIFOLD METERS

FROST PROOF BOX SETTING

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-17





DETAILS:

A) APPROVAL OF ALL MANIFOLD SETTINGS SHALL BE DETERMINED BY THE DIRECTOR OR AUTHORIZED REPRESENTATIVE.

B) IN NO CASE SHALL THE CAPACITY (IN GALLONS) OF THE TOTAL METERS BE GREATER THAN THE CAPACITY OF THE BRANCH.

C) METERS INSTALLED IN AN "INSIDE" MANIFOLD MAY BE INSTALLED IN SEVERAL WAYS, BUT IN ALL CASES THE METERS SHALL BE INSTALLED AS CLOSE TOGETHER AS POSSIBLE.

D) THE REDUCTION TO ACCOMMODATE EACH METER SHALL BE MADE AT THE TEE OR ON THE VERTICAL RISER (WITHIN 4" OF THE INLET VALVE).

E) A CURB BOX SHALL BE INSTALLED OVER EACH INDIVIDUAL CURB STOP OF EACH INDIVIDUAL MANIFOLD METER, PLUS A CURB BOX SHALL BE INSTALLED OVER THE MAIN BRANCH CURB STOP.

F) ALL METERS INSTALLED IN MANIFOLD SHALL BE INSTALLED IN A STANDARD METER SETTING PER STANDARD DRAWING 108-3A OR 108-3B INSIDE METER SETTING STANDARD DETAIL FOR THE APPROPRIATE METER SIZE.

GREATER CINCINNATI WATER WORKS

MANIFOLD METERS

INSIDE SETTING

APPROVED	DATE	STANDARD DRAWING
	1/4/13	108-18

Large Branch (4 inch and Larger) Installation Procedures:

1) The GCWW Inspection Section (513) 591-7870 is responsible to inspect the installation of the tap from the water main up to the Right-of-Way (ROW) Line, or location approved by the GCWW.

2) The GCWW Premise Services Section (513) 591-7825 is responsible to inspect the installation from the ROW to the meter, including the meter pit and/or Ford/Monitor Box(es)

3) The contractor shall secure and provide to the GCWW Inspector a Temporary Water Use Permit. The Temporary Use Permits are obtained from the GCWW Premise Services Section (513) 591-7825. Failure to provide a Temporary Use Permit to the Inspector will result in the work being cancelled until the permit is secured.

4) All large (4 inch and above) taps will be made by means of a shut down and cutting in a tee. A "Wet Tap" will not be permitted to be made except in extenuating circumstances as approved by the GCWW Supervisor of Inspection.

5) Only one (1) Solid Sleeve will be permitted if the installation is on nominal size Cast or Ductile Iron Pipe.

6) The use of two (2) Dual Purpose or Oversize Sleeves will only be permitted on oversized pipe.

7) If a Dual or Tri Service Branch, the Inspection Section will require both the fire branch and domestic(s) services to be installed at the same time. Inspection will not allow the installation of only the fire branch, then return at a later date to install the domestic service(s).

8) Upon installation to the ROW line or approved location, the contractor shall end with a hub and CJ plug. The plug shall be restrained by means of mechanical restraint device approved by the GCWW.

9) The branch will be energized once installed to the ROW line and effectively plugged.

10) Installation of service branches shall be limited to a standard eight (8) hour day.

11) Some installations will require weekend, holiday or after normal hour work to accommodate GCWW customer's needs. The GCWW Inspector will coordinate other than normal hours with the contractor.

12) A charge of eight (8) hours at current inspector rate will be billed to the contractor if for any reason the contractor chooses to cancel a scheduled shutdown. This fee is over and above the Inspection Fees included in the purchase price of the tap.

13) All work associated with the branch installation shall be performed with a GCWW Inspector present and performed to the current GCWW Standard Drawings, and in accordance with the current City Suppleiment to the State of Ohio Department of Transportation Construction and material Specifications Manual.

Large Branch (4 inch and Larger) Purchase & Staking Procedures:

1) The Developer or his representative shall provide the following to the GCWW Branch Services Section:

   a) Properly completed application(s) for new water service.

   b) GCWW Contractor's Bond for $10,000.00

   c) A Contractor's Letter of Intent stating the site address, scope of work and intended start date on company letter head.

   d) A Street Opening Permit from the proper road authority (even if the pavement is not being cut), with the exception of ODOT and Warren County. ODOT and Warren County permits must be secured by the GCWW.

   e) Payment in full for the new branch.

2) Once the conditions of item Number 1 are met, the Developers Representative shall:

   a) Stake the desired location in the field by means of a blue top stake, paint mark, or another acceptable mean of identifying the location.

   b) Notify the GCWW Tap Locator (513) 591-7873, that the location has been marked.

3) The GCWW Tap Locator will investigate the desired location to assure installation can take place as desired free of any field obstructions. If an obstruction is found, the GCWW Tap Locator will contact the Developer's Representative to mutually agree upon a new location for the tap.

4) Once the location is approved by the GCWW Tap Locator, the Locator will contact the Developer's Representative to inform him/her that the location is acceptable. At that time the Developer's representative may contact the GCWW Supervisor of Inspection (513) 591-7870 to schedule installation.

5) The GCWW Supervisor of Inspection will reserve up to seven business days before permitting the start of installation.

GREATER CINCINNATI WATER WORKS

Large Branch Installation Inspection Procedures

APPROVED	DATE	STANDARD DRAWING
	7/12/19	108-19

General Notes:

These Standard Details apply to the installation of water mains, branches, and appurtenances within the confines of an electrified streetcar corridor. Installation practices must meet all other GCWW requirements as set forth in the City of Cincinnati Supplement to the State of Ohio Department of Transportation Construction and Material Specifications, latest editions, as well any details specified in the project design plans.

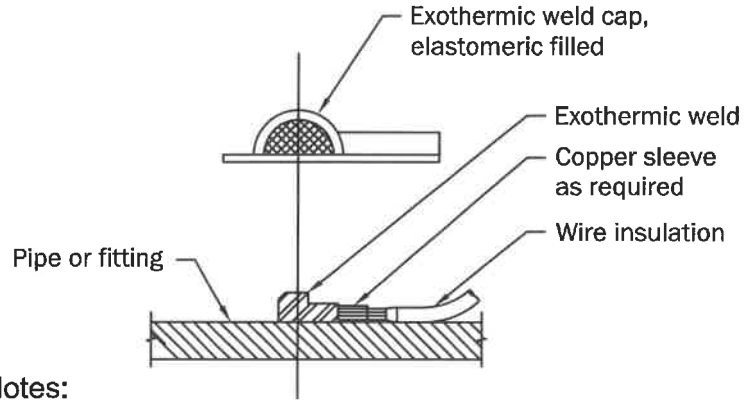
1. All joints, fittings, valves, fire hydrant leads to the shoe to be bonded. No extra payment shall be made for this work, all cost to be included in contractor's unit bid price for item 1101, laying pipe and fittings.
2. All proposed pipe to be poly wrapped per GCWW standard.
3. Payment for test stations to be: item 1116 test station installation complete, per plan.
4. Casings to be installed where proposed main, fire hydrant leads & branches cross street car track slab.
5. A test station and isolation joint shall be installed per plan, and at each main and iron branch tie-in point.
6. Any work in street corridor must be coordinated by streetcar operations.

GREATER CINCINNATI WATER WORKS

STREET CAR CORRIDOR

GENERAL NOTES

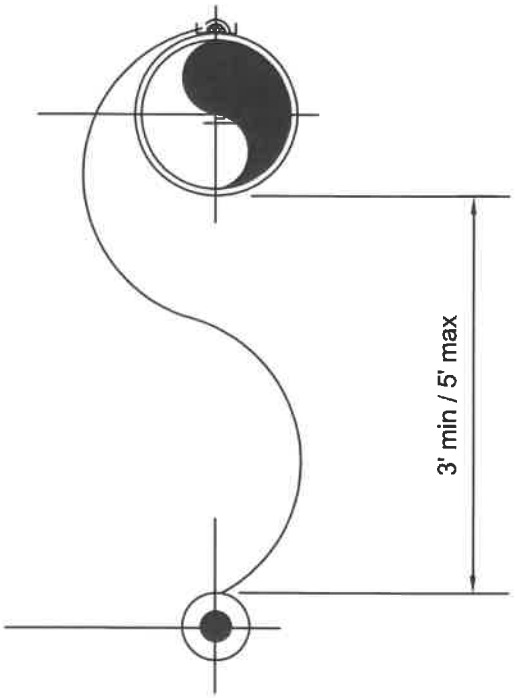
APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-1



Notes:

1. Grind pipe to bright metal before exothermic welding.
2. Apply weld cap directly to pipe, not to pipe wrap. Use primer as required by the manufacturer.
3. Completely enclose wire within weld cap.
4. Repair any damaged coating not covered by weld cap.

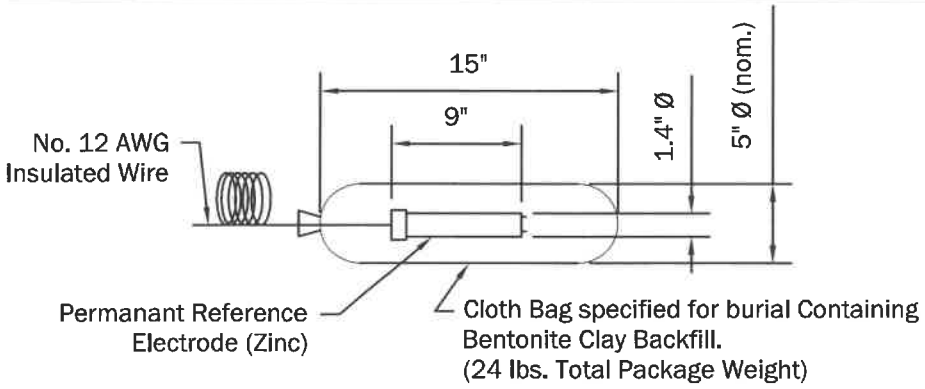
Exothermic Weld for Uncoated & Dielectric Coated Pipe



Notes:

1. Locate anodes a max of 3 feet horizontally from centerline of pipe.
2. Place galvanic anode in clean native backfill and compact to 12" above anode.
3. Anodes may be placed upright or horizontally, horizontal orientation shown.
4. Anode wire shall be exothermic welded directly to pipe or incorporated into the joint bond with a split-bolt connection.
5. Locate anodes a minimum of every 50 feet along pipe.

General Galvanic Anode Placement



Notes:

1. Remove reference electrode from Plastic bag prior to installation.
2. Before backfilling, wet reference electrode with approximately 2 gallons of water.

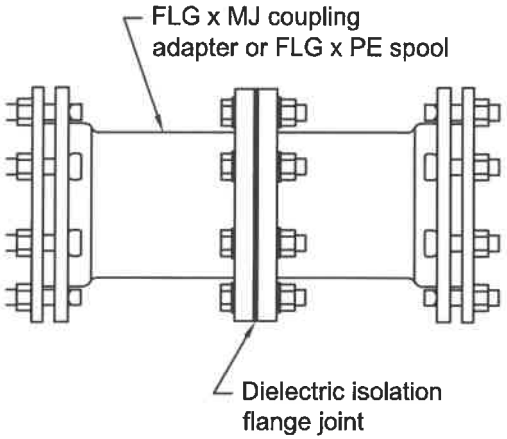
Detail A
Zinc Reference Electrode (Factory Manufactured)

GREATER CINCINNATI WATER WORKS

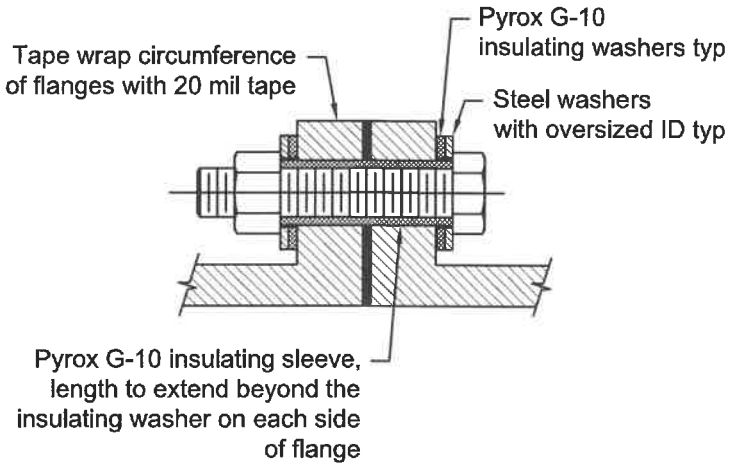
STREET CAR CORRIDOR

CATHODIC PROTECTION: EXOTHERMIC WELD & ANODE DETAIL

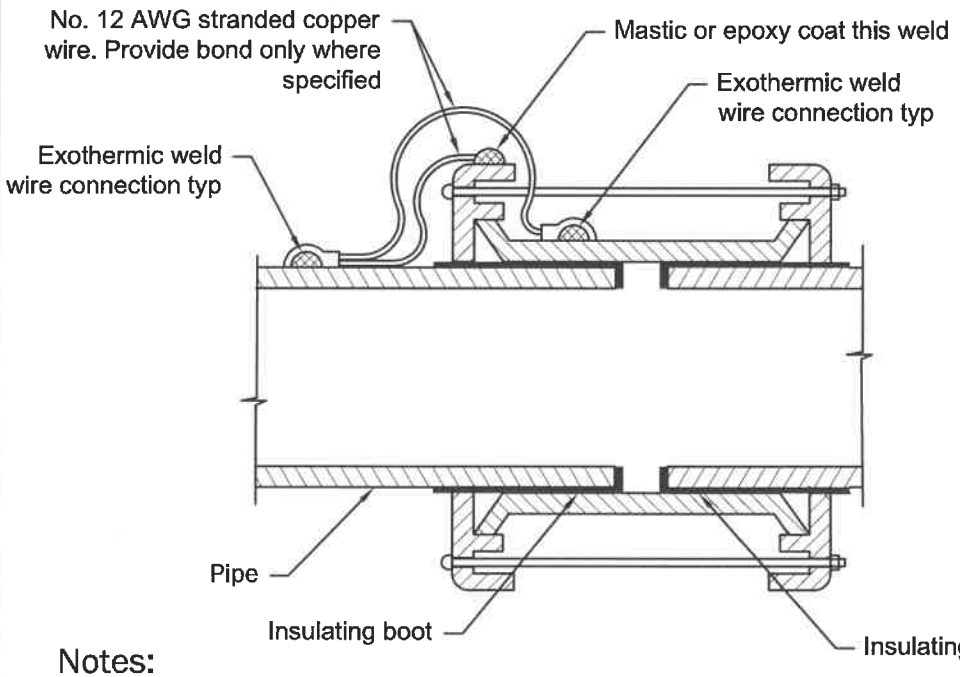
APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-1A



Joint Assembly



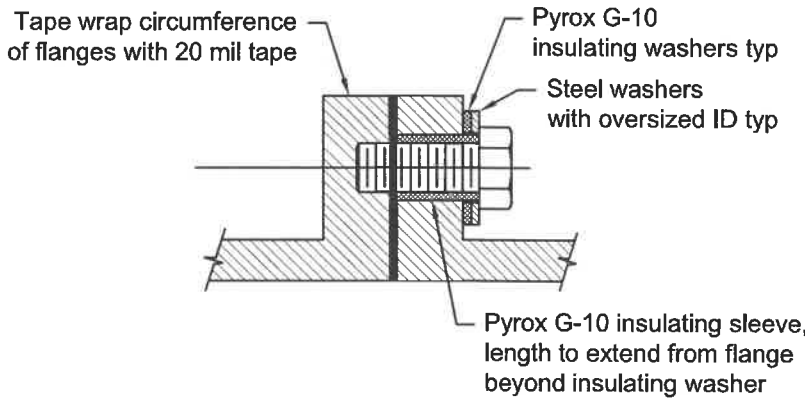
Flange Joint Through Bolt Detail



Notes:

1. Center flexible coupling over insulating boots.
2. Exothermic weld to coupling prior to assembly. Do not burn boots.
3. All wire insulation is USE-type or HMWPE_type.
4. Bond the coupling to a protected side of the joint.

Flexible Sleeve Coupling



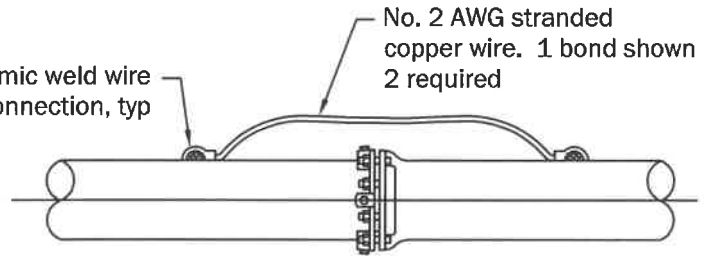
Flange Joint Tap Screw Detail

GREATER CINCINNATI WATER WORKS

DIELECTRIC ISOLATION JOINTS

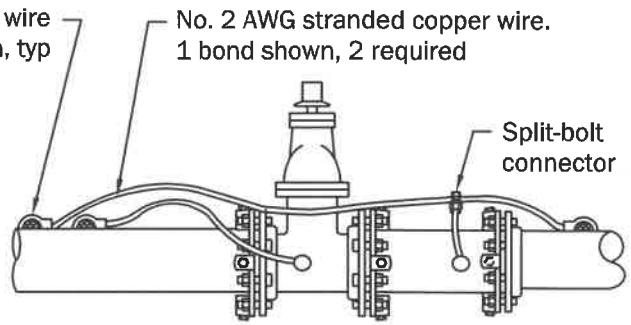
JOINT ASSEMBLY, FLEXIBLE SLEEVE COUPLING, FLANGE JOINT THROUGH BOLT DETAIL

APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-2



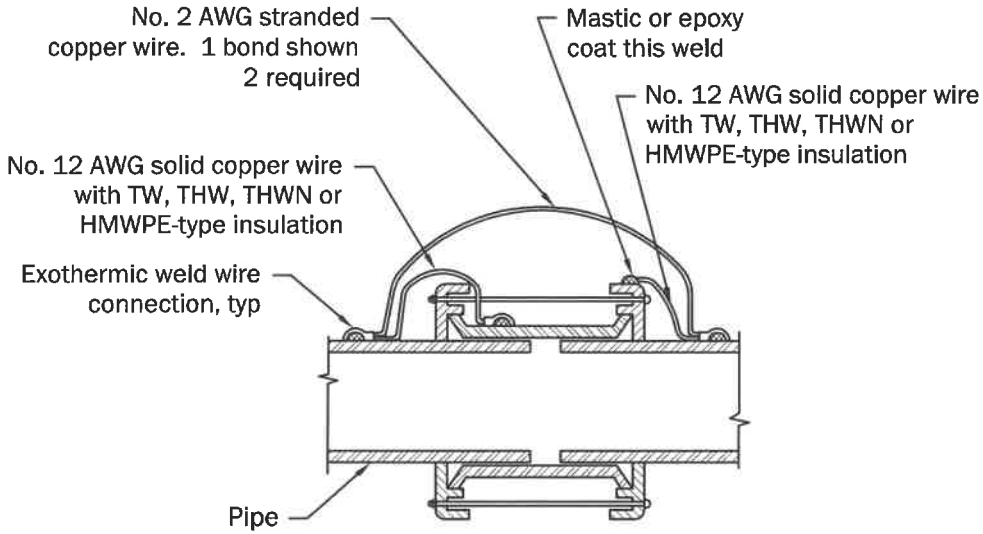
Note:
1. Mechanical joint style shown, other joints similar.

Uncoated & Dielectric Coated Pipe



Note:
1. Mechanical joint style shown, other joints similar.

Fittings & Valves



Flexible Sleeve Coupling

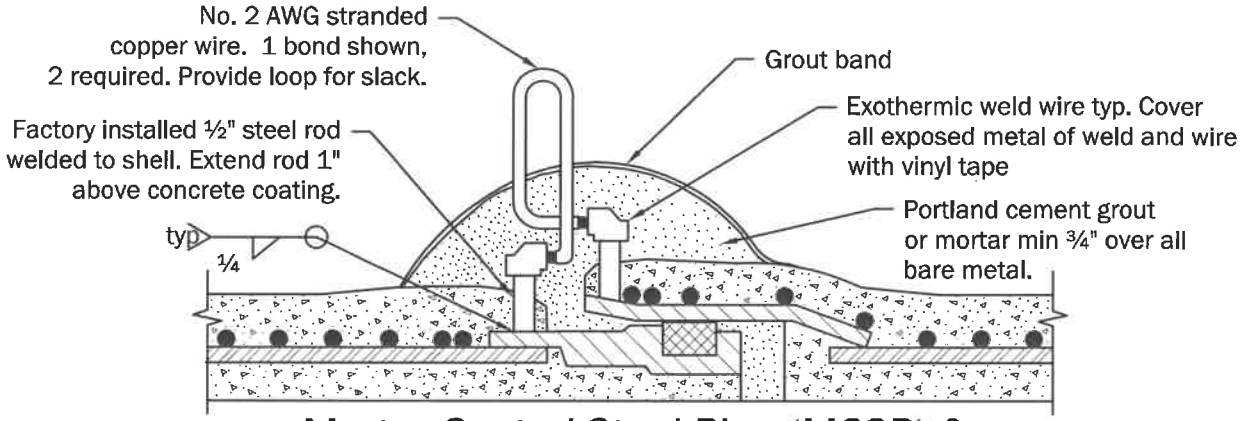
General Note:
1. All wire insulation is USE-type or HMWPE-type.

GREATER CINCINNATI WATER WORKS

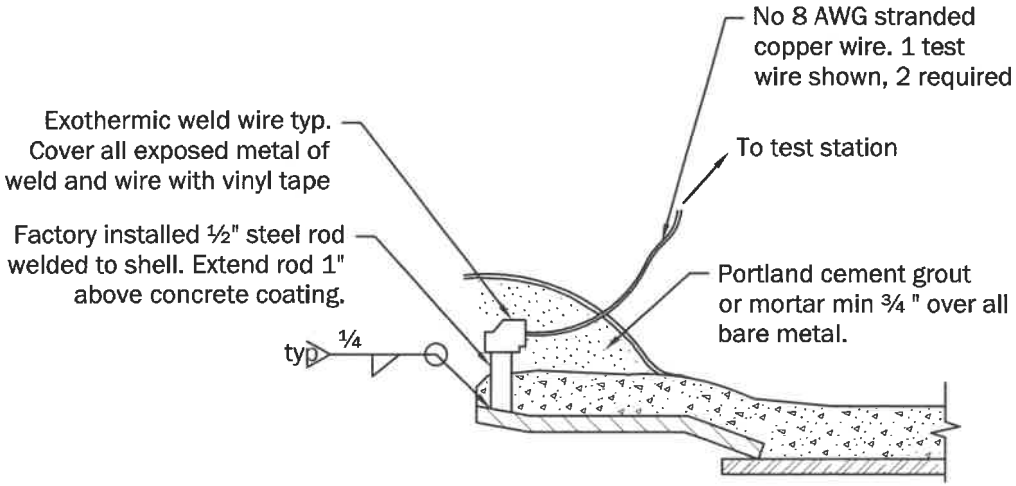
CORROSION CONTROL DETAILS AT JOINT BONDS

UNCOATED & DIELECTRIC COATED PIPE, FLEXIBLE SLEEVE COUPLING, & FITTINGS AND VALVES

APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-3A



Mortar Coated Steel Pipe (MCSP) & Concrete Cylinder Pipe (CCP)



Corrosion Control Test Wire Connection MCSP & CCP Pipe

General Note:

1. All wire insulation is USE-type or HMWPE-type.

GREATER CINCINNATI WATER WORKS

CORROSION CONTROL DETAILS AT JOINT BONDS

MORTAR COATED STEEL PIPE (MCSP) & CONCRETE CYLINDER PIPE (CCP), & CORROSION CONTROL TEST WIRE CONNECTION MCSP & CCP PIPE

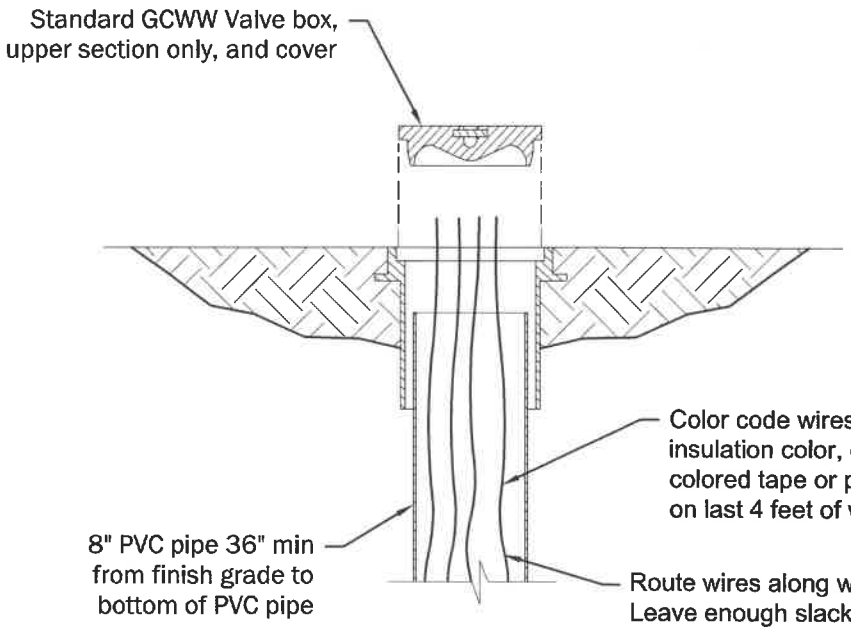
APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-3B

Corrosion Control Test Wire Identification Table

Item	Wire color	Wire
new water main	white	8 AWG, stranded copper wire, USE-type insulation
existing water main	black	8 AWG, stranded copper wire, USE-type insulation
casing pipe	orange	8 AWG, stranded copper wire, USE-type insulation
galvanic anodes	blue	12 AWG, solid copper wire, TW-type. or THHN insulation
zinc reference cell	yellow	12 AWG, solid copper wire, TW-type. or THHN insulation
cp monitoring coupons	purple	12 AWG, stranded copper wire, TW-type or THHN insulation

NOTES:

1. Wire shall have enough slack to extend a min of 2 ft above finished grade after final paving.
2. For an isolation joint test station in the middle of a long run of new water pipe, wire on the up station side of the isolation joint shall be white and wire on the down station side of the isolation joint shall be black.
3. Color code wires by insulation color, or by colored tape or paint on last 4 ft of wire.



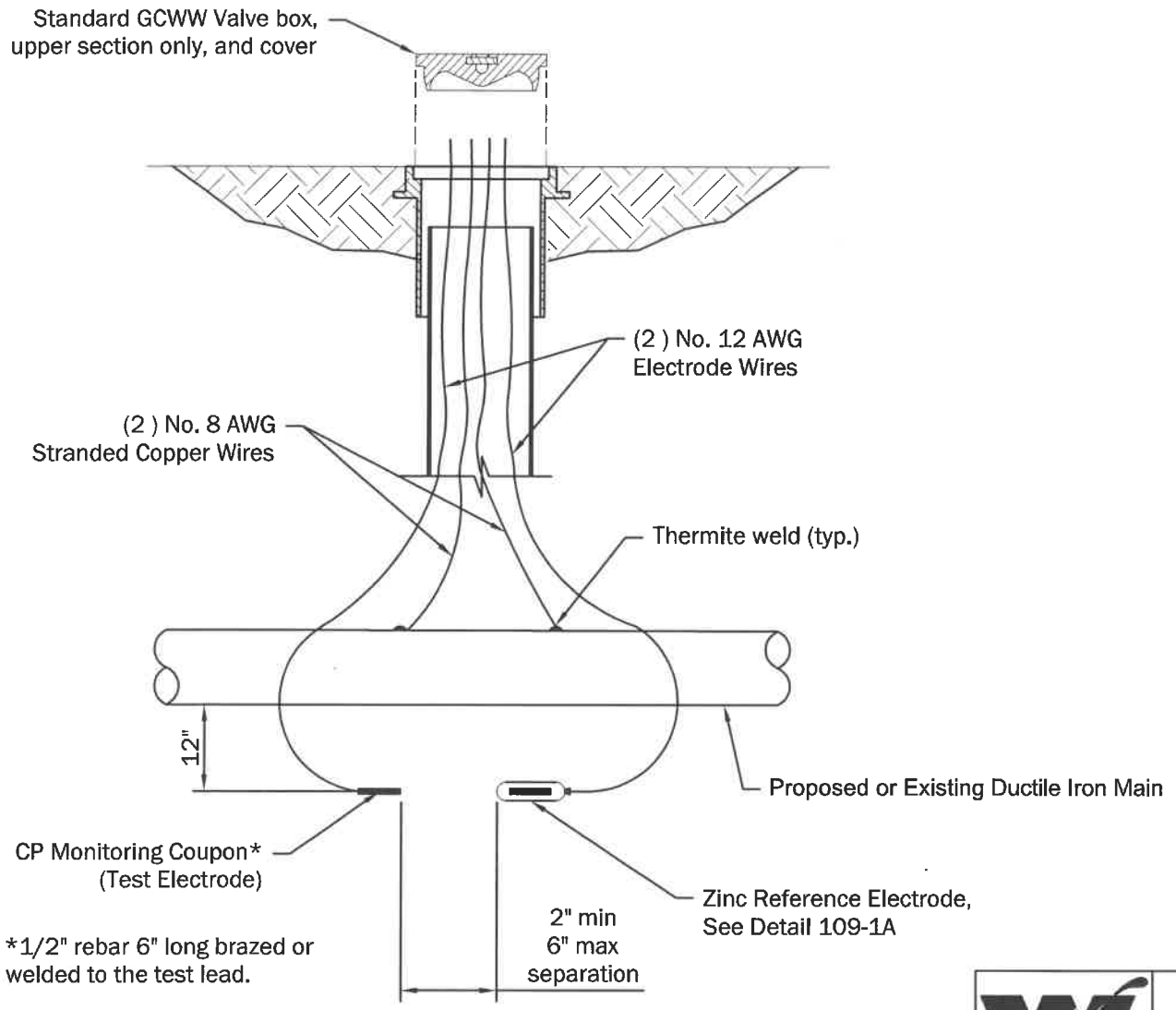
Test Station Installation

GREATER CINCINNATI WATER WORKS

TEST STATIONS

INSTALLATION

APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-4A



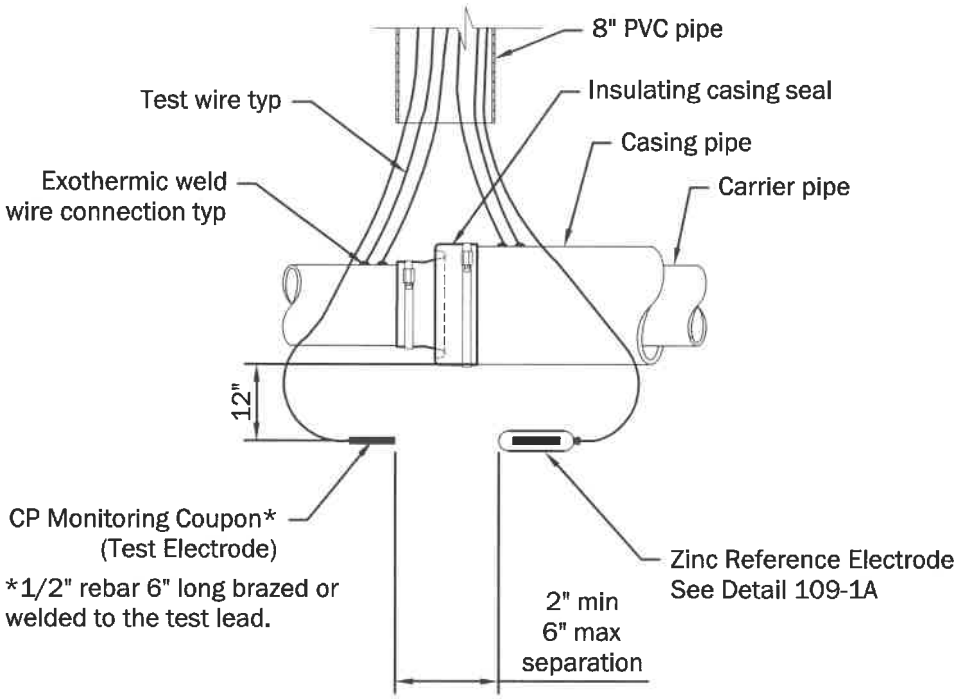
Inline Test Station (I-TS)

GREATER CINCINNATI WATER WORKS

TEST STATIONS

INLINE TEST STATION (I-TS)

APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-4B



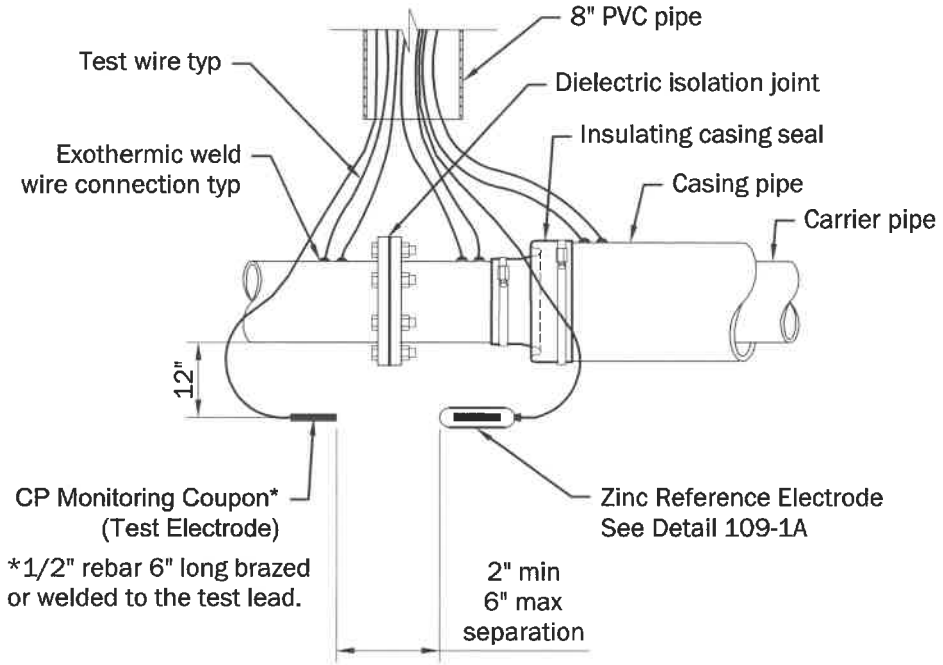
Casing Test Station (TS/CA)

GREATER CINCINNATI WATER WORKS

TEST STATIONS

CASING TEST STATION (TS/CA)

APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-4C



Note:

1. Isolation flange joint shown.
   Others similar.

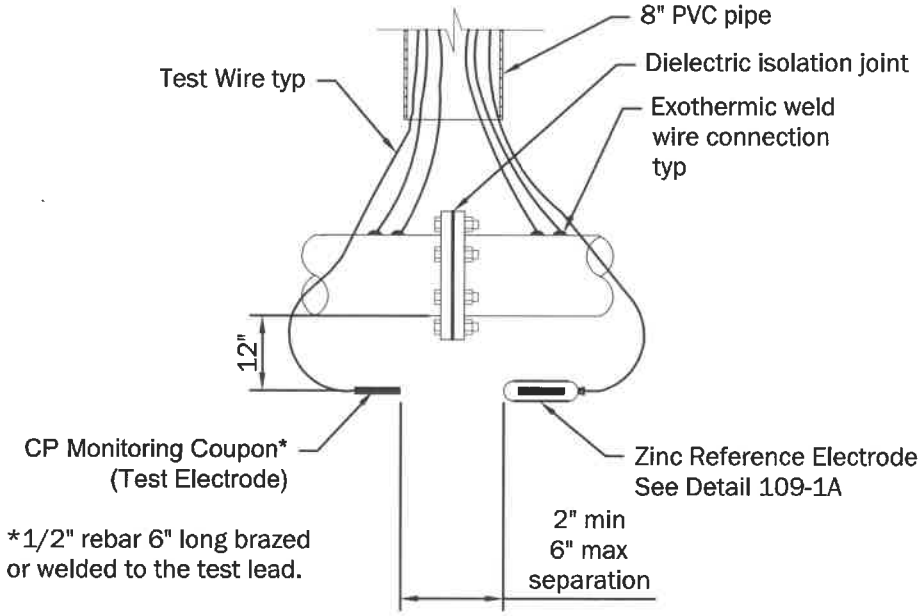
Combination Test Station (TS/C/IJ)

GREATER CINCINNATI WATER WORKS

TEST STATIONS

COMBINATION TEST STATION (TS/C/IJ)

APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-4D



Note:

1. Isolation flange joint shown.
   Others similar.

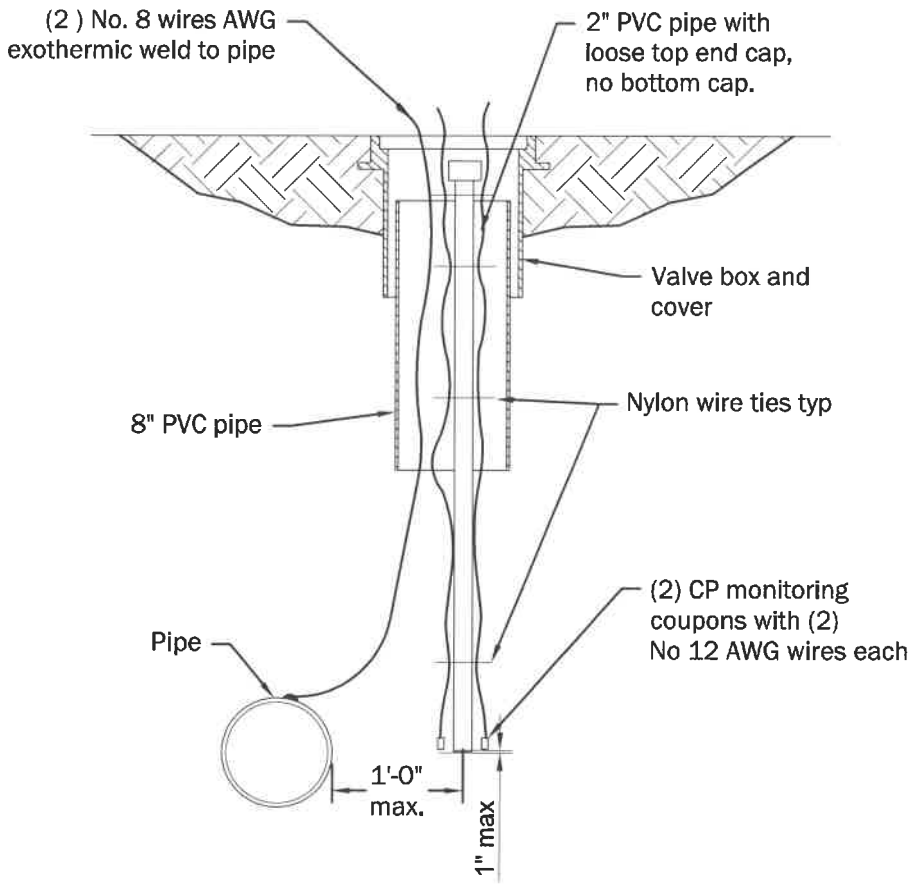
Isolation Joint Test Station (TS/IJ)

GREATER CINCINNATI WATER WORKS

TEST STATIONS

ISOLATION JOINT TEST STATION (TS/IJ)

APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-4E



Notes:

1. Bed coupon in same backfill as pipe. Compact backfill to 1 ft min above coupon.
2. Backfill 8" PVC to 1 ft below finish grade.
3. Do not backfill inside 2" PVC pipe.

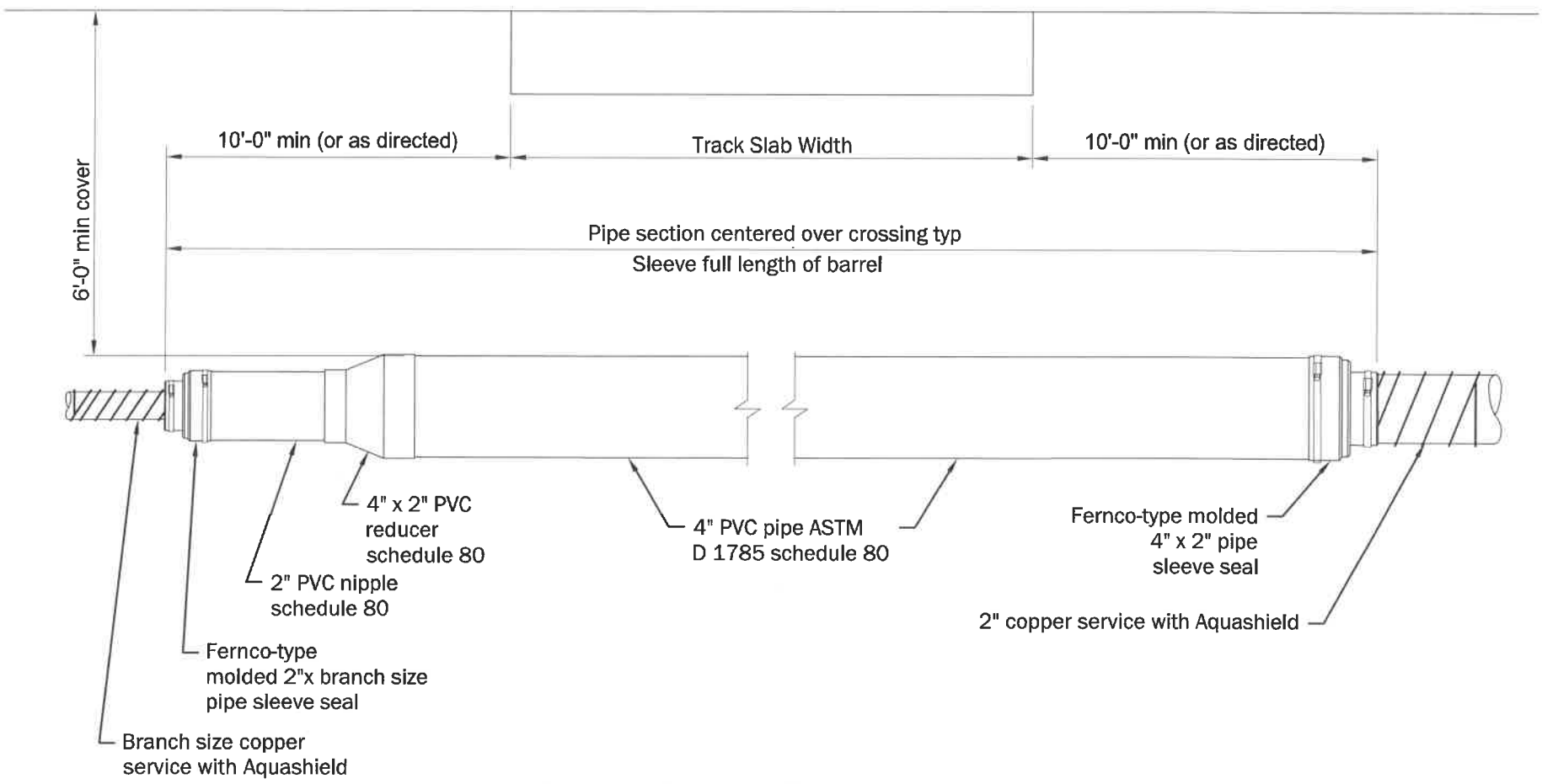
Monitoring Test Station (TSM)

GREATER CINCINNATI WATER WORKS

TEST STATIONS

MONITORING TEST STATION (TSM)

APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-4F



Copper Service Branch Sleeve

3/4" to 2" copper

Notes:

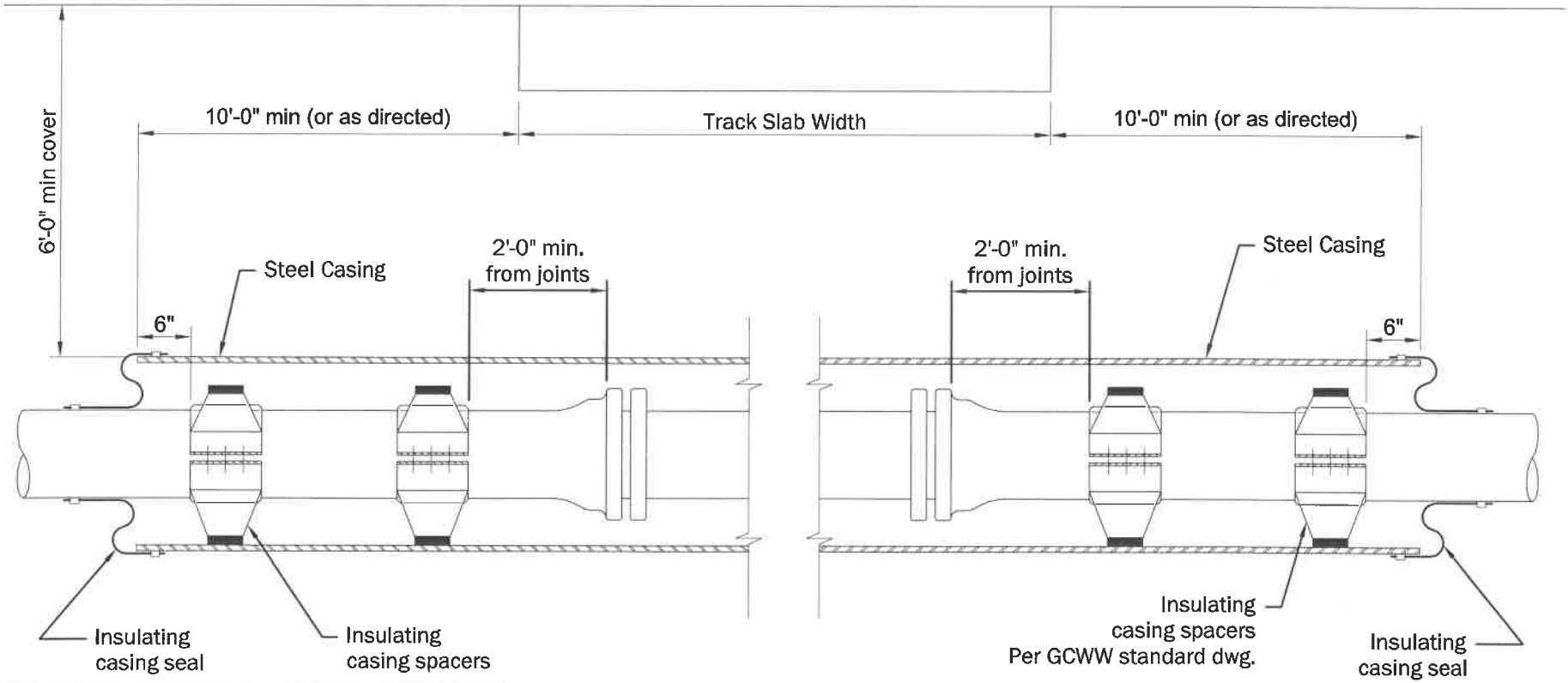
1. Provide a sleeve when crossing over or under potential stray current sources.
2. Sleeves and casings shall be dry & moisture free before sealing.
3. Certified plumber will be furnishing and installing 4" PVC Service Branch Casing, per plan.

GREATER CINCINNATI WATER WORKS

CASINGS & SPACERS

CASING FOR 2" AND SMALLER PIPE

APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-5A



Steel Casing For Branches 4" & Larger					
Pipe Size	Railroad		Pipe Size	Railroad	
	Casing O.D.	Plate Thickness		Casing O.D.	Plate Thickness
4"	14"	3/8"	10"	22"	3/8"
6"	18"	3/8"	12"	24"	3/8"
8"	20"	3/8"			

Casing Spacers & End Seals

Notes:

1. Developer's contractor shall furnish and install Steel Casing per plan.
2. Provide a spacer within 6" of each casing end. Provide intermediate spacers as required, not to exceed the maximum distance specified by the manufacturer.
3. Install casing seal per manufacturer requirements to prevent tensioning seal during backfill.
4. All casings shall have test stations at each end. (See 109-4C).
5. GCWW inspection shall be present during installation.

GREATER CINCINNATI WATER WORKS

CASINGS & SPACERS

CASING FOR 4" AND LARGER SERVICE BRANCHES

APPROVED	DATE	STANDARD DRAWING
	1/4/13	109-5B