WATER STANDARD DETAIL

WATER STANDARD DETAIL INDEX

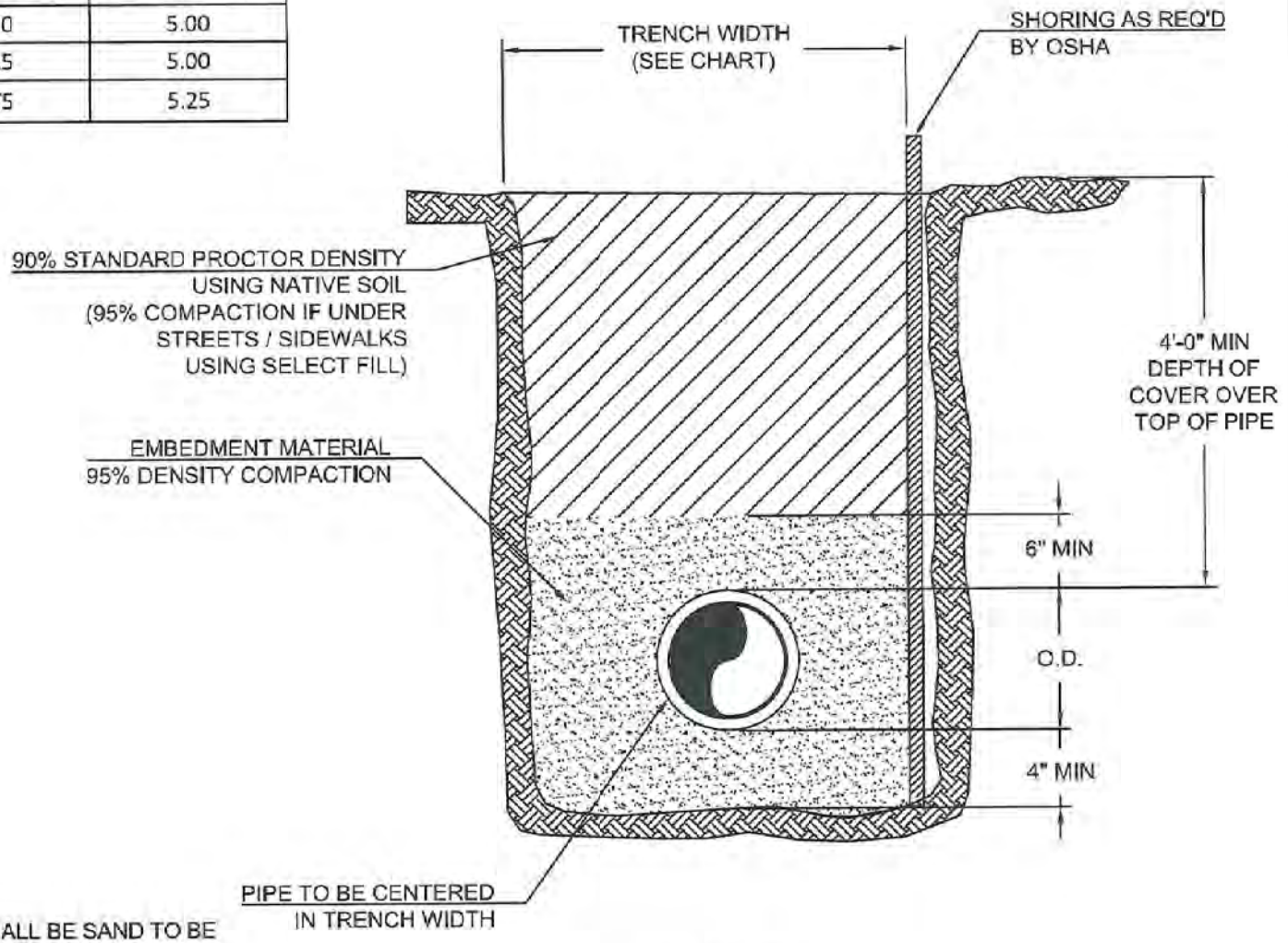
10/30/14 DATE	APPROVED BY: DATE: 11/03/14 ERIC J. WENGER, P.E., CITY ENGINEER	APPROVED BY: DATE: 10/30/14 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	W-00

OKLAHOMA CITY UTILITIES DEPARTMENT

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL

Pipe Nominal Size (Inches)	Minimum Trench Width (Feet)	Maximum Trench Width (Feet)
≤ 12	3.00	5.00
16	3.25	5.00
20	3.75	5.25



PVC PIPE

NOTES:
1. EMBEDMENT MATERIAL SHALL BE SAND TO BE READILY WORKED UNDER THE SIDES OF THE PIPE. IT SHALL BE FREE FROM REFUSE, ORGANIC MATERIAL, COBBLES, BOULDERS, LARGE ROCKS OR STONES.
2. SEE DETAIL W-13 FOR TRACER WIRE INSTALLATION.

06/13/14
DATE

APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

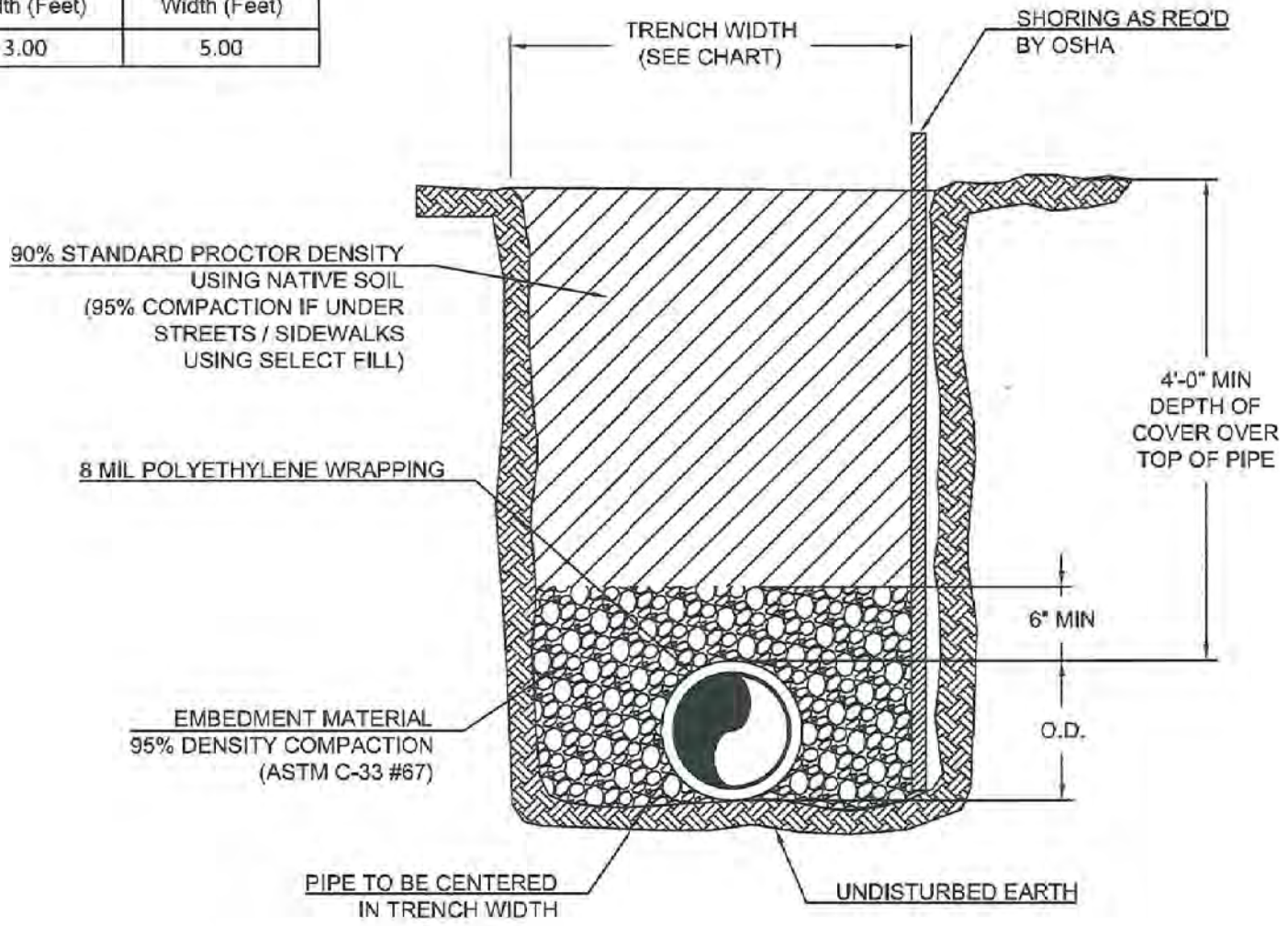
APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/17/14

BEDDING & TRENCHING DETAILS - PVC PIPE

W-01

WATER STANDARD DETAIL

Pipe Nominal Size (Inches)	Minimum Trench Width (Feet)	Maximum Trench Width (Feet)
≤ 12	3.00	5.00



NOTE:
1. EMBEDMENT MATERIAL TO BE FREE FROM REFUSE, ORGANIC MATERIAL, COBBLES, BOULDERS, LARGE ROCKS OR STONES.

DUCTILE IRON PIPE ≤ 12"

BEDDING & TRENCHING DETAILS - DIP ≤ 12"

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
DATE

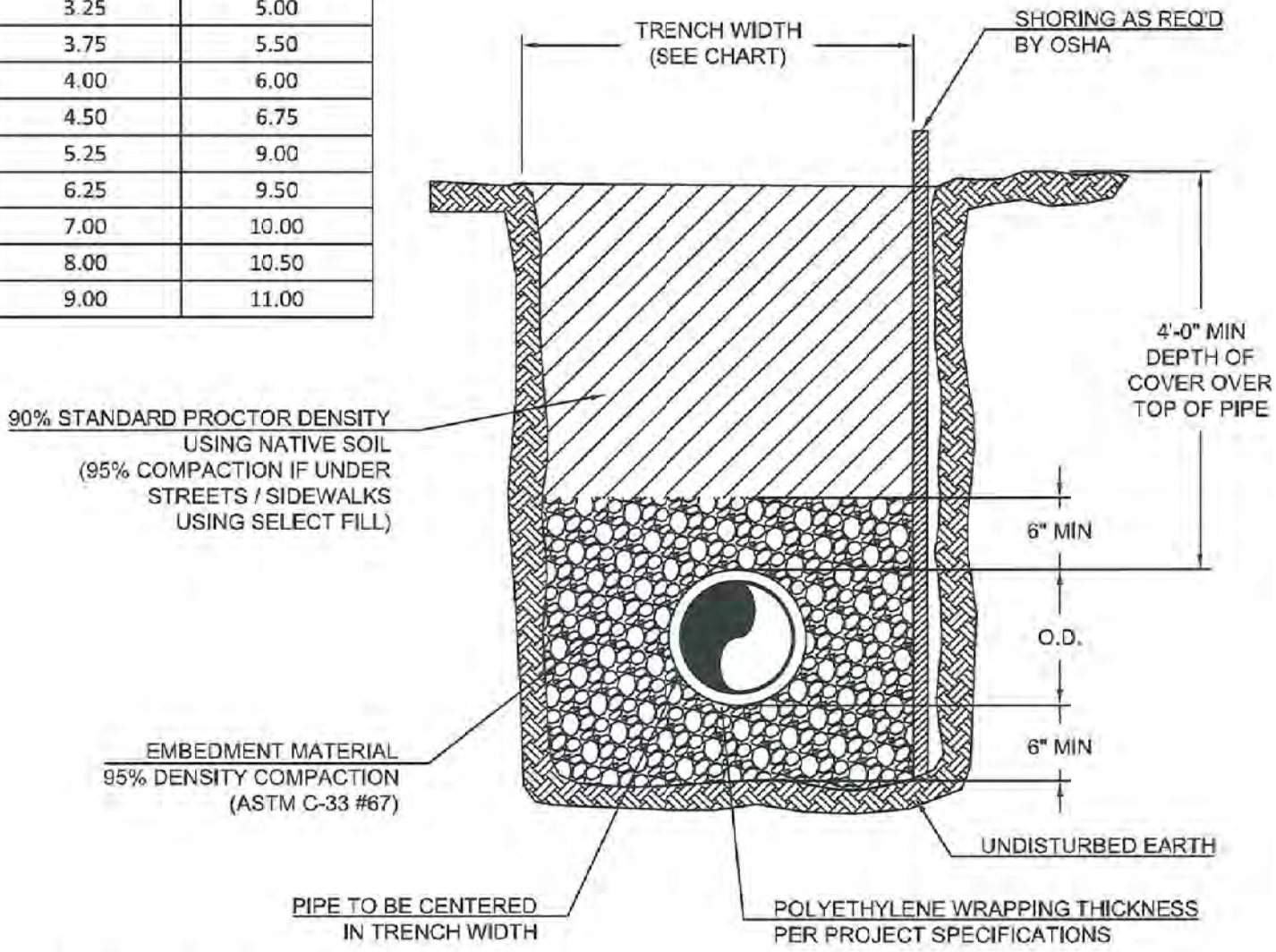
APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/7/14

W-02

WATER STANDARD DETAIL

Pipe Nominal Size (Inches)	Minimum Trench Width (Feet)	Maximum Trench Width (Feet)
16	3.25	5.00
20	3.75	5.50
24	4.00	6.00
30	4.50	6.75
36	5.25	9.00
42	6.25	9.50
48	7.00	10.00
54	8.00	10.50
60	9.00	11.00



NOTE:
1. EMBEDMENT MATERIAL TO BE FREE FROM REFUSE, ORGANIC MATERIAL, COBBLES, BOULDERS, LARGE ROCKS OR STONES.

DUCTILE IRON PIPE > 12"

BEDDING & TRENCHING DETAILS - DIP > 12"

APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER — DATE: 06/13/14

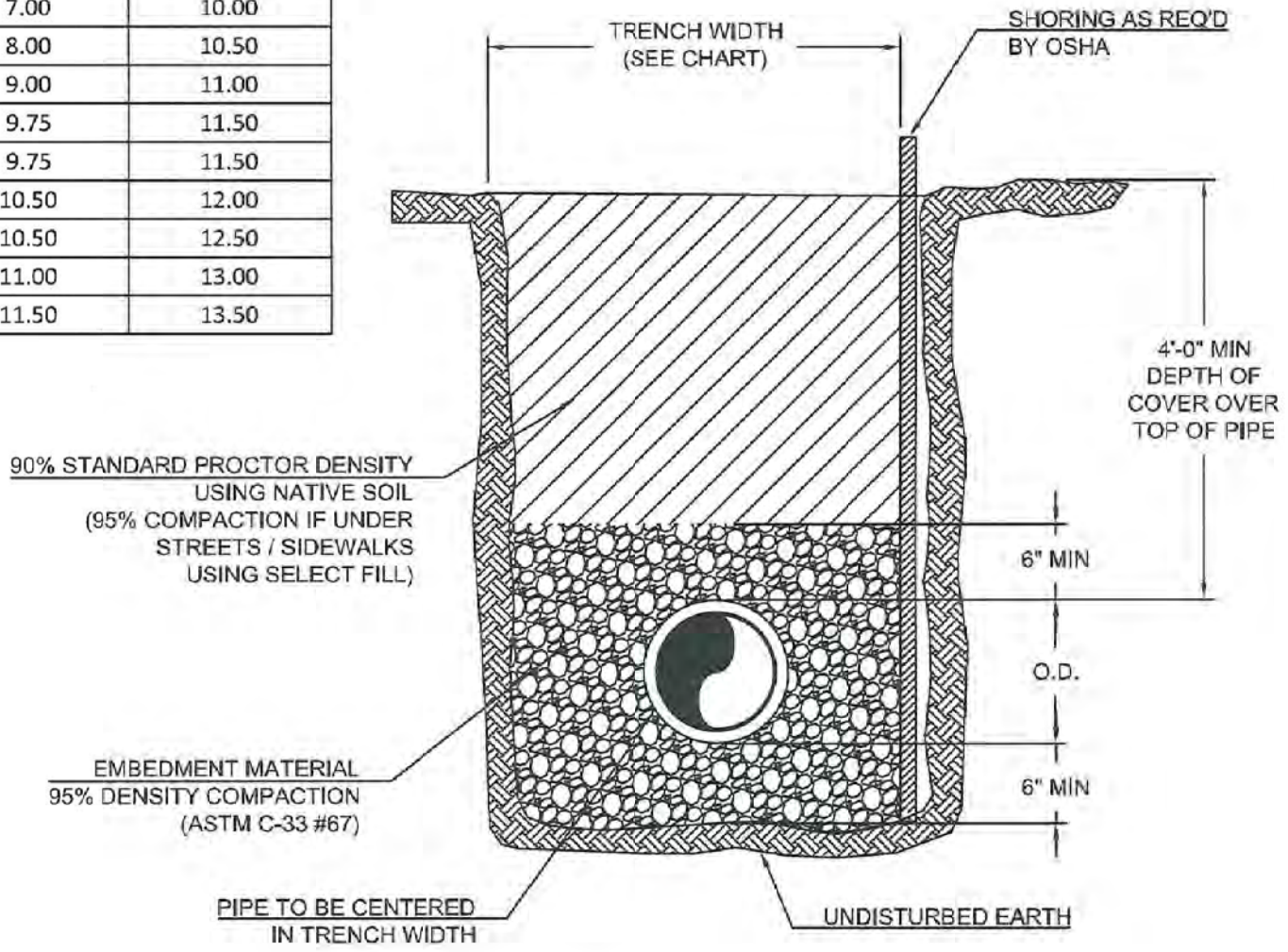
APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR — DATE: 8/7/14

W-03

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL

Pipe Nominal Size (Inches)	Minimum Trench Width (Feet)	Maximum Trench Width (Feet)
48	7.00	10.00
54	8.00	10.50
60	9.00	11.00
64	9.75	11.50
66	9.75	11.50
72	10.50	12.00
78	10.50	12.50
84	11.00	13.00
90	11.50	13.50



NOTE:
1. EMBEDMENT MATERIAL TO BE FREE FROM REFUSE, ORGANIC MATERIAL, COBBLES, BOULDERS, LARGE ROCKS OR STONES.

STEEL PIPE ≥ 48"

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
DATE

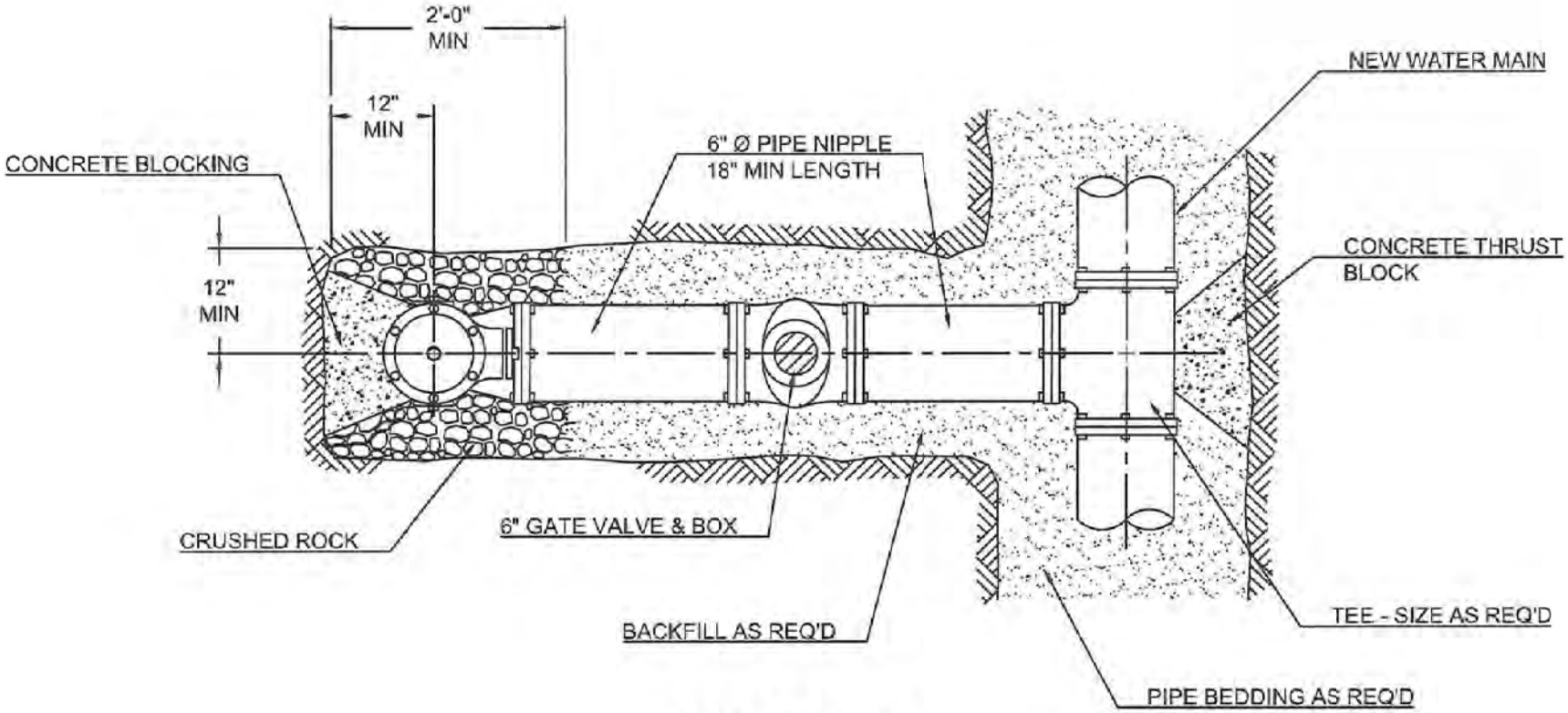
APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/17/14

BEDDING & TRENCHING DETAILS - STEEL PIPE

W-04

WATER STANDARD DETAIL



PLAN VIEW

NOTES:
1. HYDRANT COLOR IS AS FOLLOWS:
   (a) "INTERNATIONAL ORANGE" (SW 4081) FOR PUBLIC
   (b) "SAFETY RED" (SW 4082) FOR PRIVATE
2. SEE DETAIL W-43 & W-44 FOR THRUST BLOCK SIZING.
3. ALL VALVES & VALVE BOXES ARE TO BE INSTALLED OUTSIDE EXISTING OR PROPOSED ADA RAMPS.

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
DATE

APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

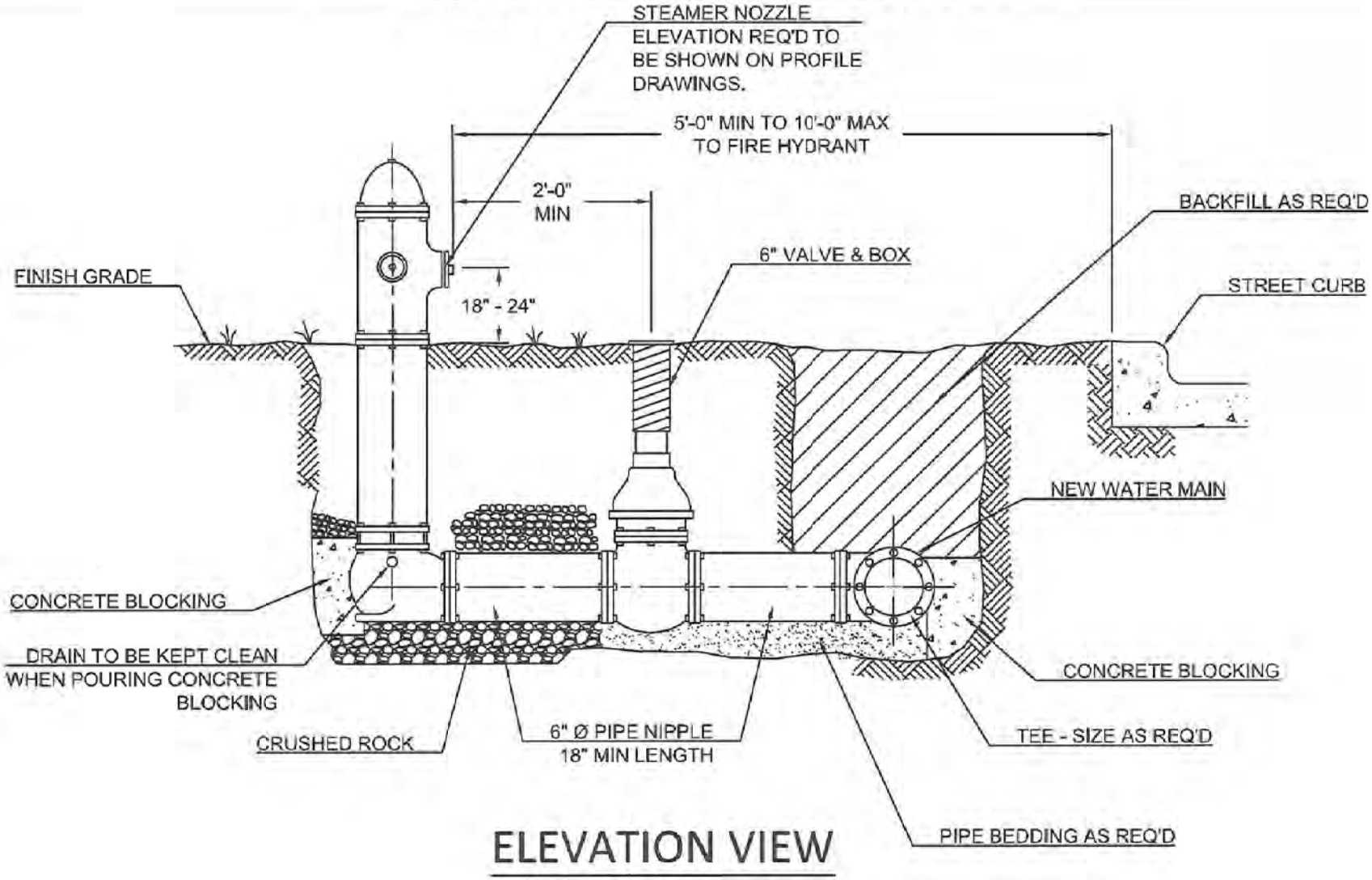
APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/13/14

FIRE HYDRANT INSTALLATION ON NEW MAIN

W-05

1 OF 2

WATER STANDARD DETAIL



ELEVATION VIEW

NOTES:
1. HYDRANT COLOR IS AS FOLLOWS:
(a) "INTERNATIONAL ORANGE" (SW 4081) FOR PUBLIC
(b) "SAFETY RED" (SW 4082) FOR PRIVATE
2. SEE DETAIL W-43 & W-44 FOR THRUST BLOCK SIZING.
3. ALL VALVES & VALVE BOXES ARE TO BE INSTALLED OUTSIDE EXISTING OR PROPOSED ADA RAMPS.

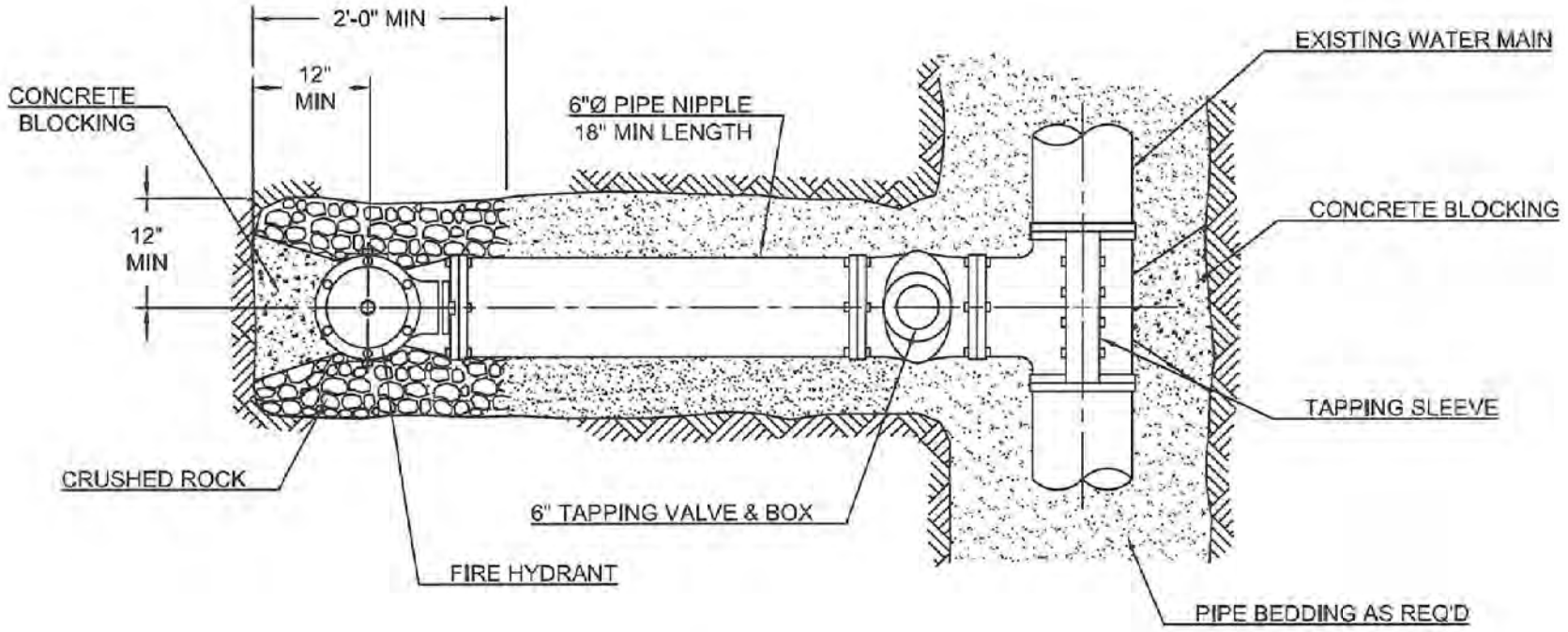
OKLAHOMA CITY UTILITIES DEPARTMENT

DATE	APPROVED BY:	APPROVED BY:	
06/13/14	ERIC J. WENGER, P.E., CITY ENGINEER DATE:	MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 8/7/14	W-06

FIRE HYDRANT INSTALLATION ON NEW MAIN

2 OF 2

WATER STANDARD DETAIL



PLAN VIEW

NOTES:
1. HYDRANT COLOR IS AS FOLLOWS:
(a) "INTERNATIONAL ORANGE" (SW 4081) FOR PUBLIC
(b) "SAFETY RED" (SW 4082) FOR PRIVATE
2. SEE DETAIL W-43 & W-44 FOR THRUST BLOCK SIZING.
3. ALL VALVES & VALVE BOXES ARE TO BE INSTALLED OUTSIDE EXISTING OR PROPOSED ADA RAMPS.

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
DATE

APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

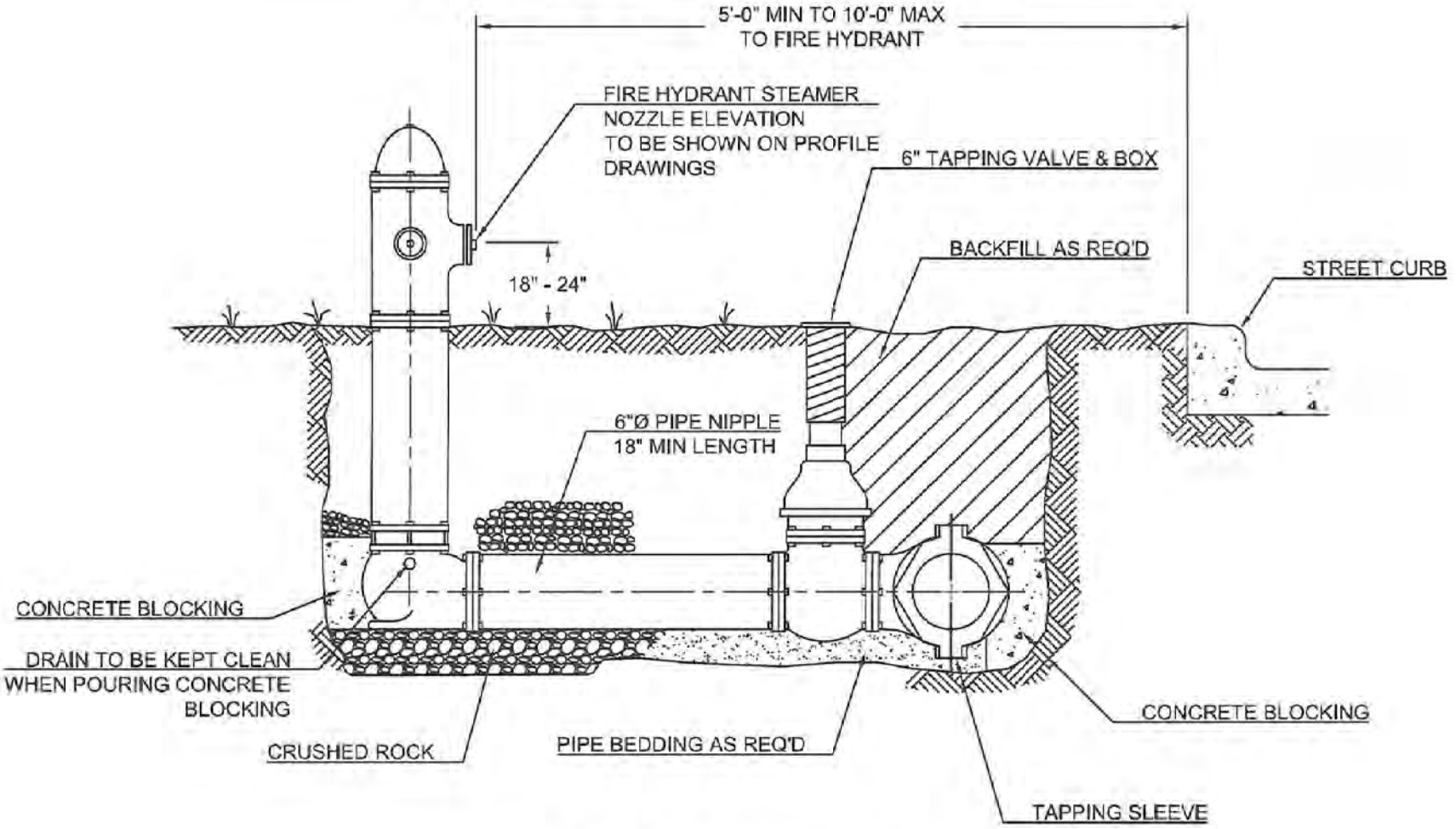
APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/17/14

FIRE HYDRANT INSTALLATION ON EXISITING MAIN

1 OF 2

W-07

WATER STANDARD DETAIL



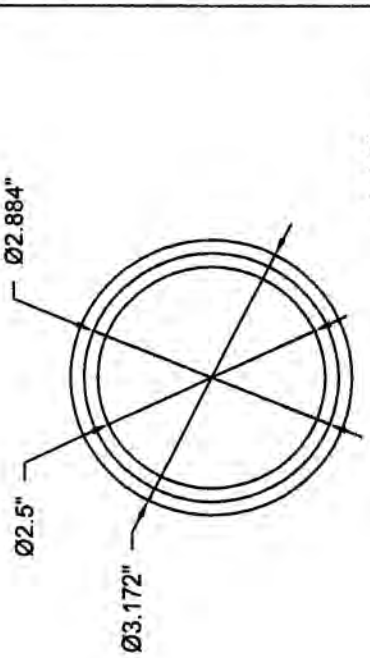
ELEVATION VIEW

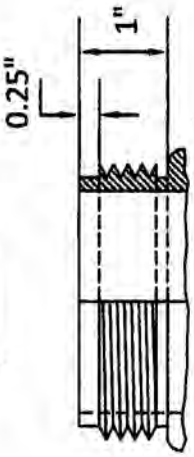
NOTES:
1. HYDRANT COLOR IS AS FOLLOWS:
(a) "INTERNATIONAL ORANGE" (SW 4081) FOR PUBLIC
(b) "SAFETY RED" (SW 4082) FOR PRIVATE
2. SEE DETAIL W-43 & W-44 FOR THRUST BLOCK SIZING.
3. ALL VALVES & VALVE BOXES ARE TO BE INSTALLED OUTSIDE EXISTING OR PROPOSED ADA RAMPS.

OKLAHOMA CITY UTILITIES DEPARTMENT

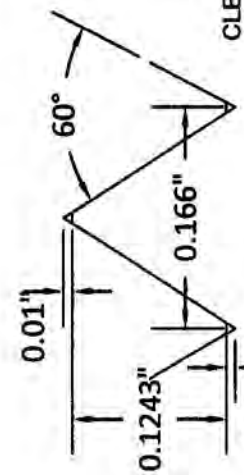
DATE	APPROVED BY:	FIRE HYDRANT INSTALLATION ON EXISITING MAIN	2 OF 2
06/13/14	ERIC J. WENGER, P.E., CITY ENGINEER DATE:		
	MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 6/7/14		W-08

WATER STANDARD DETAIL



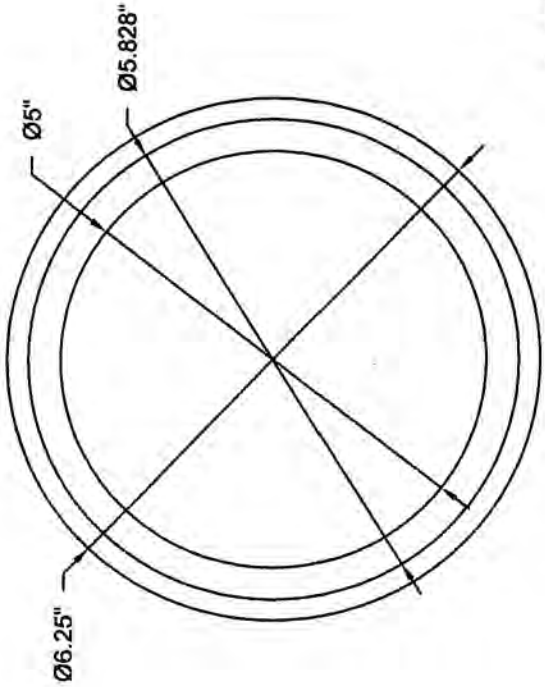


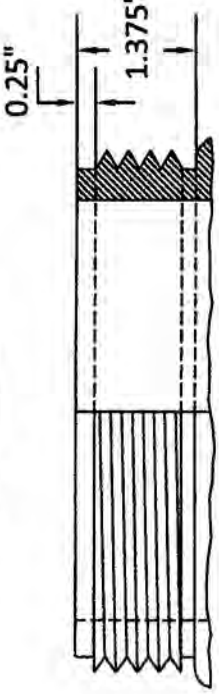
2.5" NOZZLE



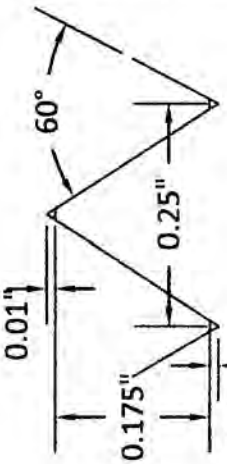
FORM OF THREAD

CLEARANCE BETWEEN MALE AND FEMALE THREAD .03",
6 THREADS PER INCH.
PITCH DIAMETER 3.028"
MAXIMUM VARIATION 0.005".





5" NOZZLE



FORM OF THREAD

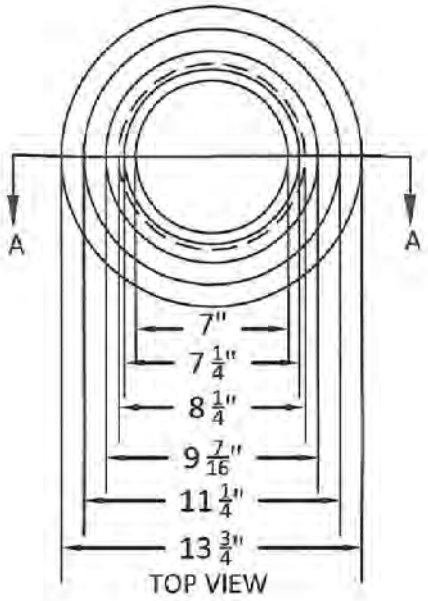
CLEARANCE BETWEEN MALE AND FEMALE THREAD .05"
4 THREADS PER INCH.
PITCH DIAMETER 6.033"
MAXIMUM VARIATION 0.009".

FIRE HYDRANT NOZZLES THREAD DETAILS

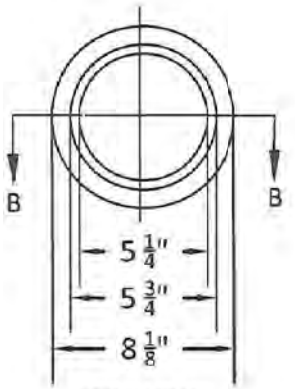
10/30/14 DATE	APPROVED BY: DATE:11/03/14 ERIC J. WENGER, P.E., CITY ENGINEER	APPROVED BY: DATE: 10/30/14 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	W-09

OKLAHOMA CITY UTILITIES DEPARTMENT

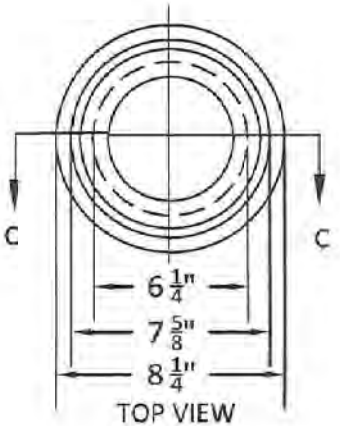
WATER STANDARD DETAIL



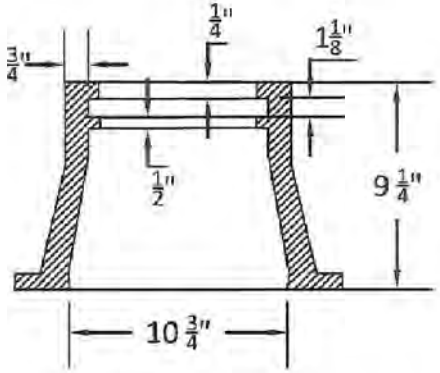
TOP VIEW



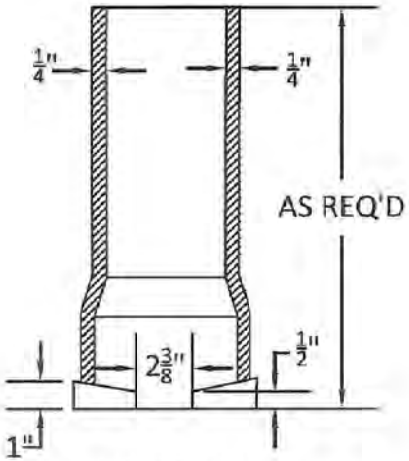
TOP VIEW



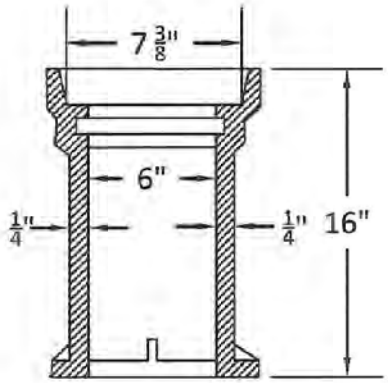
TOP VIEW



SECTION A-A
BASE SECTION



SECTION B-B
EXTENSION SECTION



SECTION C-C
TOP SECTION

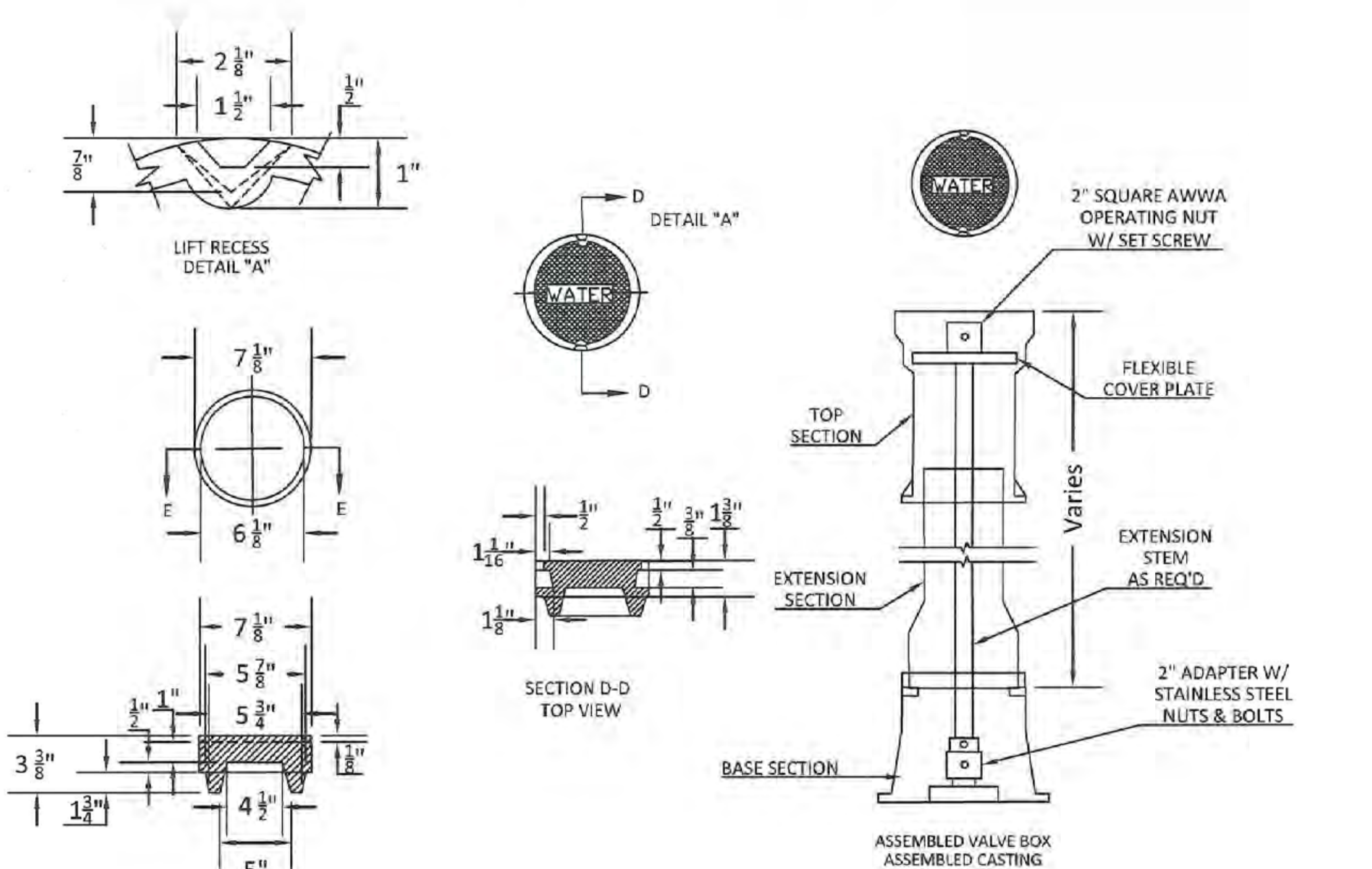
NOTE:
1. EXTENSION SECTION TO BE ONE PIECE.
2. NO PVC PIPE EXTENSIONS ARE ALLOWED IN PAVED AREAS.
3. ALL VALVES & VALVE BOXES ARE TO BE INSTALLED OUTSIDE EXISTING OR PROPOSED ADA RAMPS.

CAST IRON VALVE BOX, LID & EXTENSION

DATE	APPROVED BY:	APPROVED BY:		
06/13/14	ERIC J. WENGER, P.E., CITY ENGINEER DATE:	MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 8/14/14	W-10	1 OF 2

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL



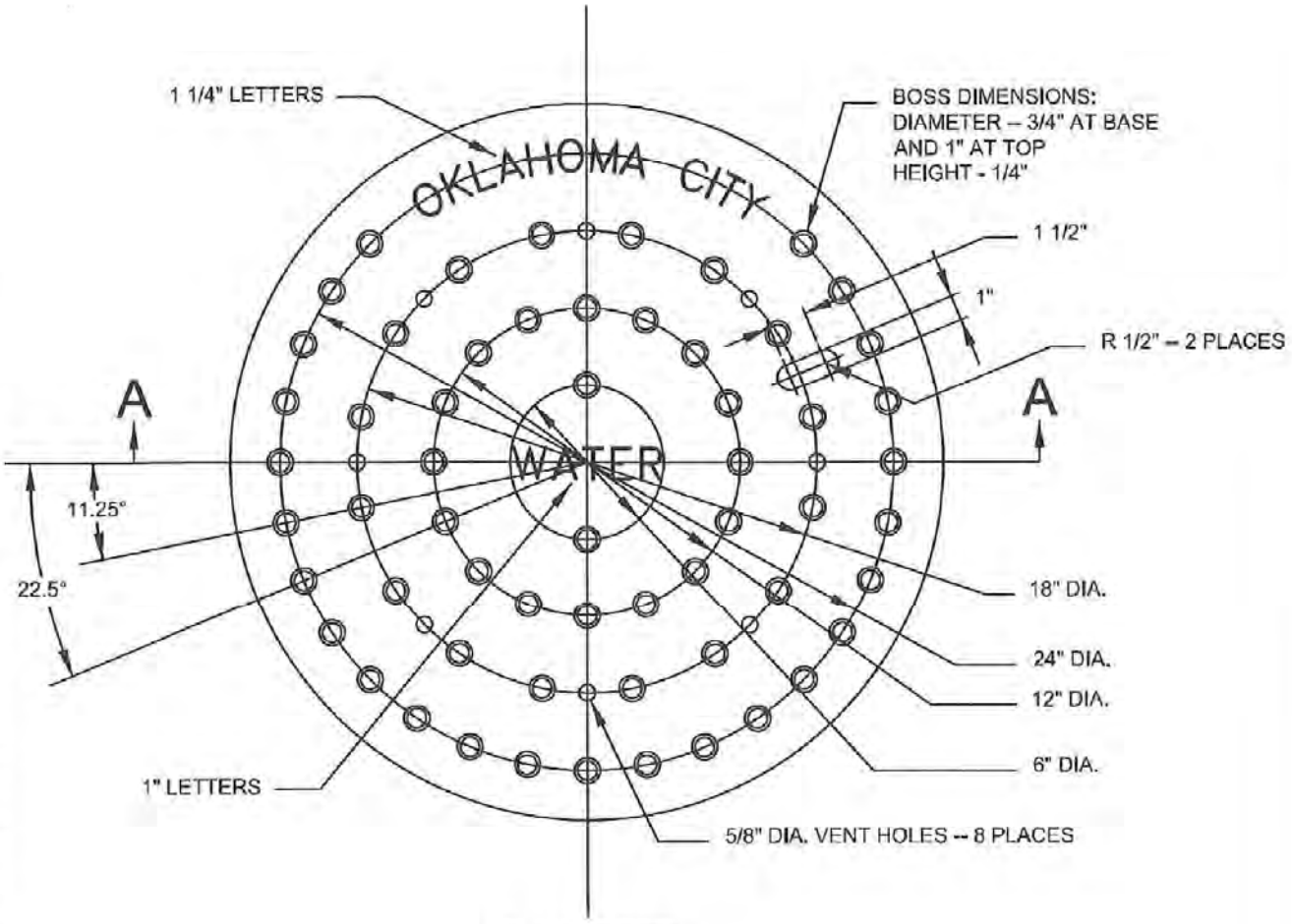
NOTE:
1. EXTENSION STEM TO BE ONE PIECE.
2. NO PVC PIPE EXTENSIONS ALLOWED IN PAVED AREAS.
3. ALL VALVES & VALVE BOXES ARE TO BE INSTALLED OUTSIDE EXISTING OR PROPOSED ADA RAMPS.

CAST IRON VALVE BOX, LID & EXTENSION — 2 OF 2

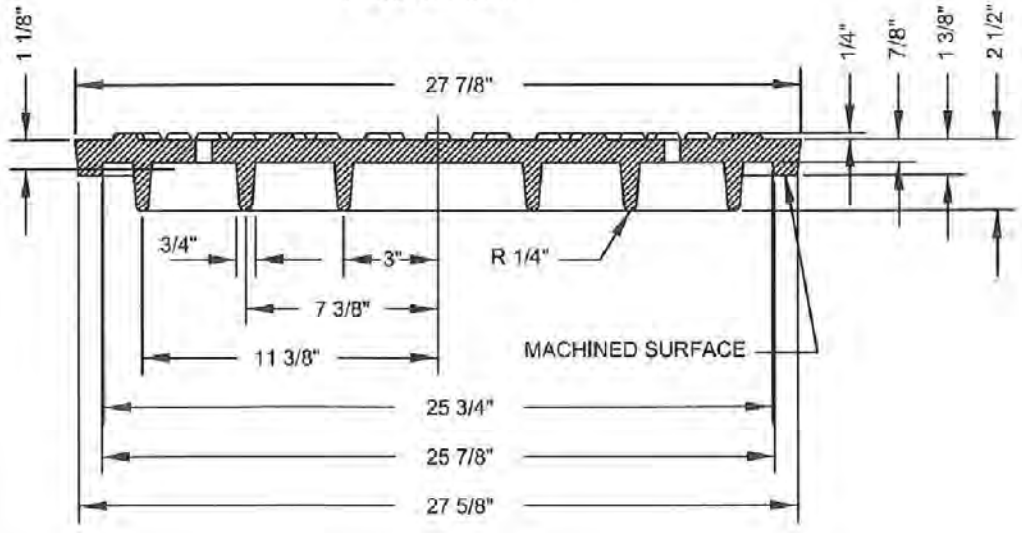
DATE	APPROVED BY:	APPROVED BY:	
06/13/14	ERIC J. WENGER, P.E., CITY ENGINEER — DATE:	MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR — DATE: 8/7/14	W-11

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL



PLAN OF TOP

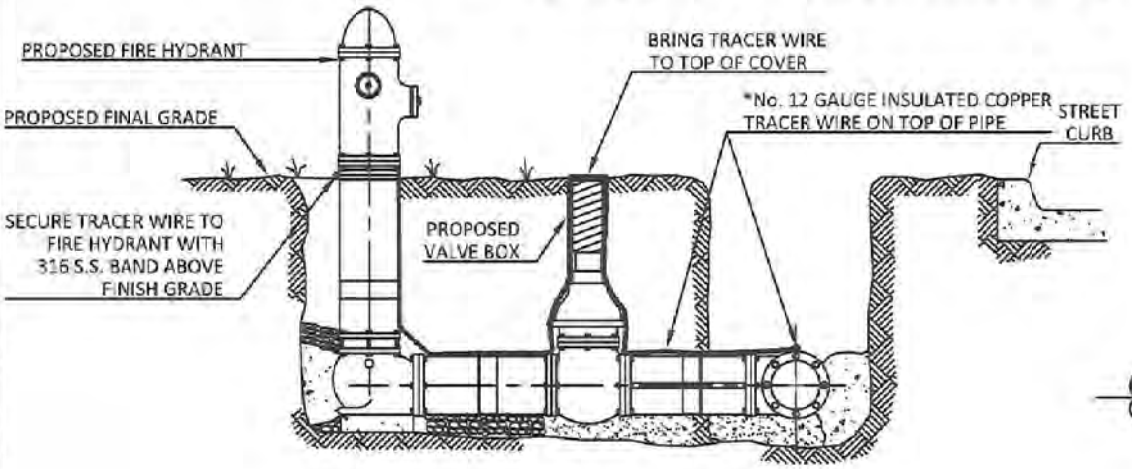


SECTION A-A

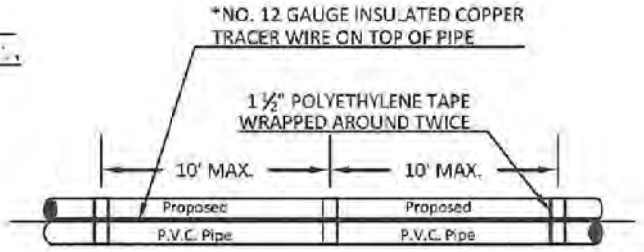
WATER MANHOLE COVER

06/13/14 DATE	APPROVED BY: DATE: ERIC J. WENGER, P.E., CITY ENGINEER	APPROVED BY: 8/7/14 DATE: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	W-12

WATER STANDARD DETAIL



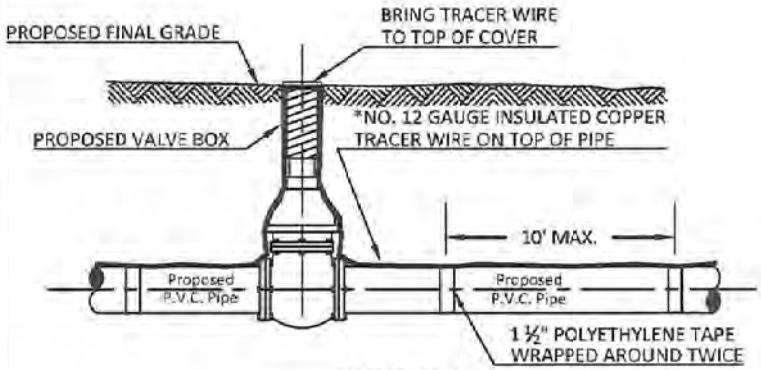
INSTALLATION OF TRACER WIRE FOR PROPOSED FIRE HYDRANT & VALVE



PLAN VIEW

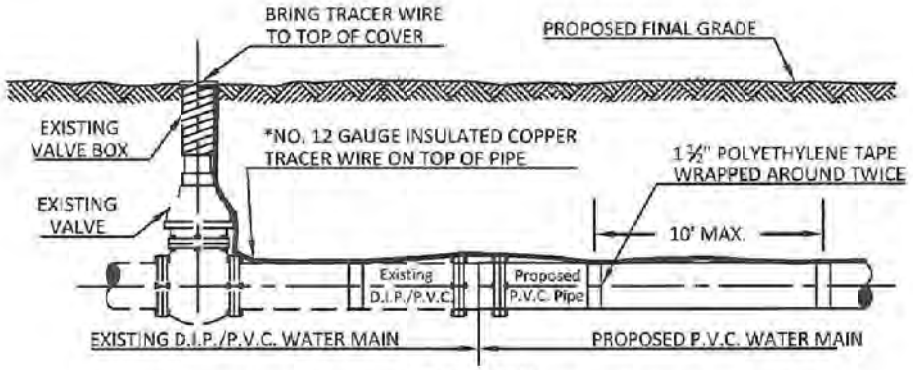
INSTALLATION OF TRACER WIRE ALONG TOP OF P.V.C. WATER MAIN

*NO. 12 GAUGE COPPER TRACER WIRE SHALL HAVE THERMOPLASTIC INSULATION/NYLON SHEATH. ABRASION, HEAT, MOISTURE, OIL & GASOLINE RESISTANT.



PROFILE VIEW

INSTALLATION OF TRACER WIRE FOR PROPOSED WATER VALVE & ALONG P.V.C. WATER MAIN



PROFILE VIEW

INSTALLATION OF TRACER WIRE FOR PROPOSED P.V.C. WATER MAIN WITH CONNECTION TO EXISTING D.I.P./P.V.C. WATER MAIN

NOTES:

1. ALL VALVES & VALVE BOXES ARE TO BE INSTALLED OUTSIDE EXISTING OR PROPOSED ADA RAMPS.
2. WHEN EXISTING DIP/PVC MAIN IS TO BE EXTENDED WITH A PVC MAIN, THE CONTRACTOR SHALL EXCAVATE ALONG THE TOP OF EXISTING MAIN TO THE NEAREST EXISTING VALVE AND INSTALL A TRACER WIRE ON TOP OF EXISTING PING, AS SHOWN IN DETAIL.

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
DATE

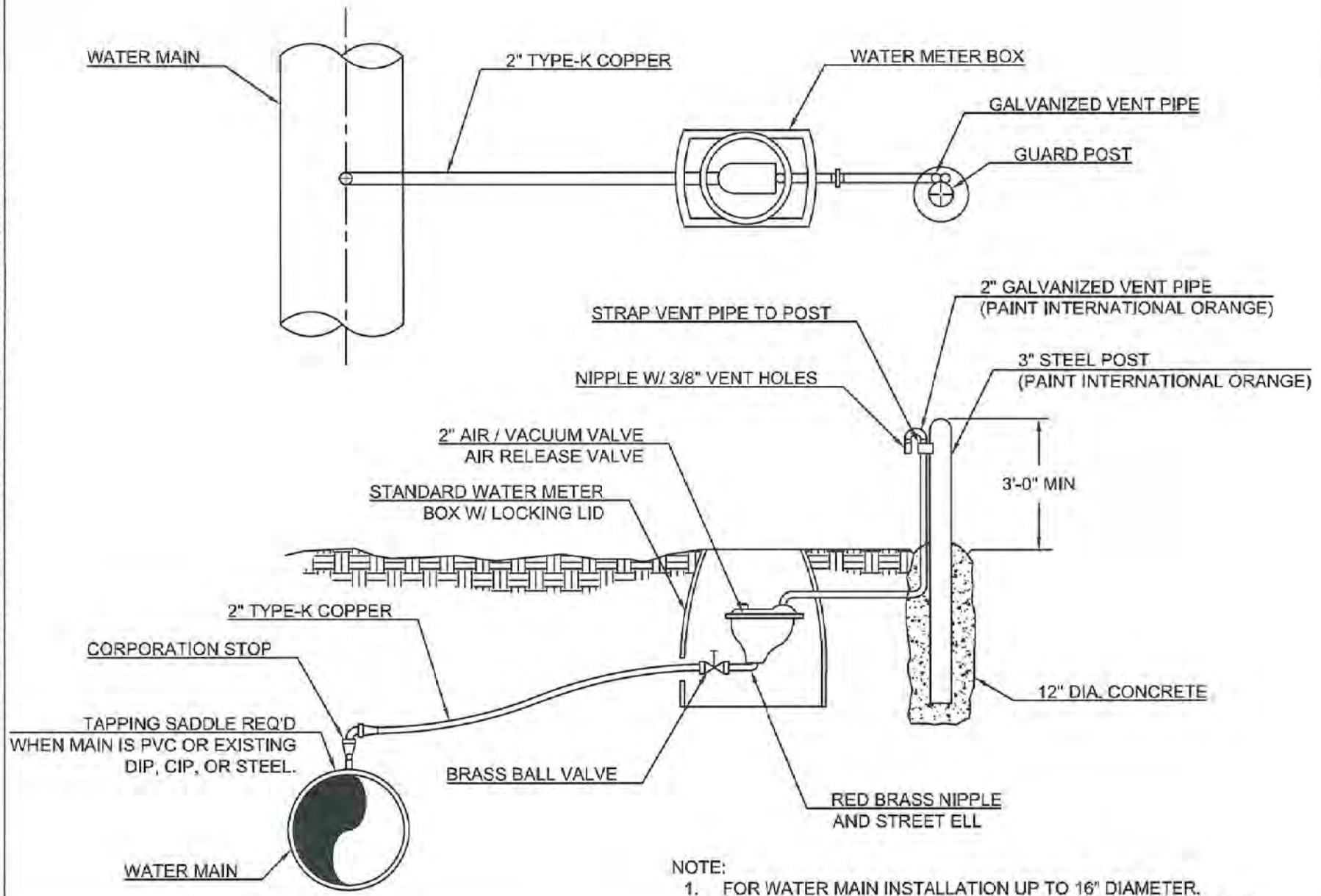
APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/17/14

PVC PIPE TRACER WIRE INSTALLATION

W-13

WATER STANDARD DETAIL



NOTE:
1. FOR WATER MAIN INSTALLATION UP TO 16" DIAMETER.
2. PLACE METER BOX & GUARD POST AS DIRECTED BY ENGINEER.

2" AIR / VACUUM RELEASE VALVE INSTALLATION

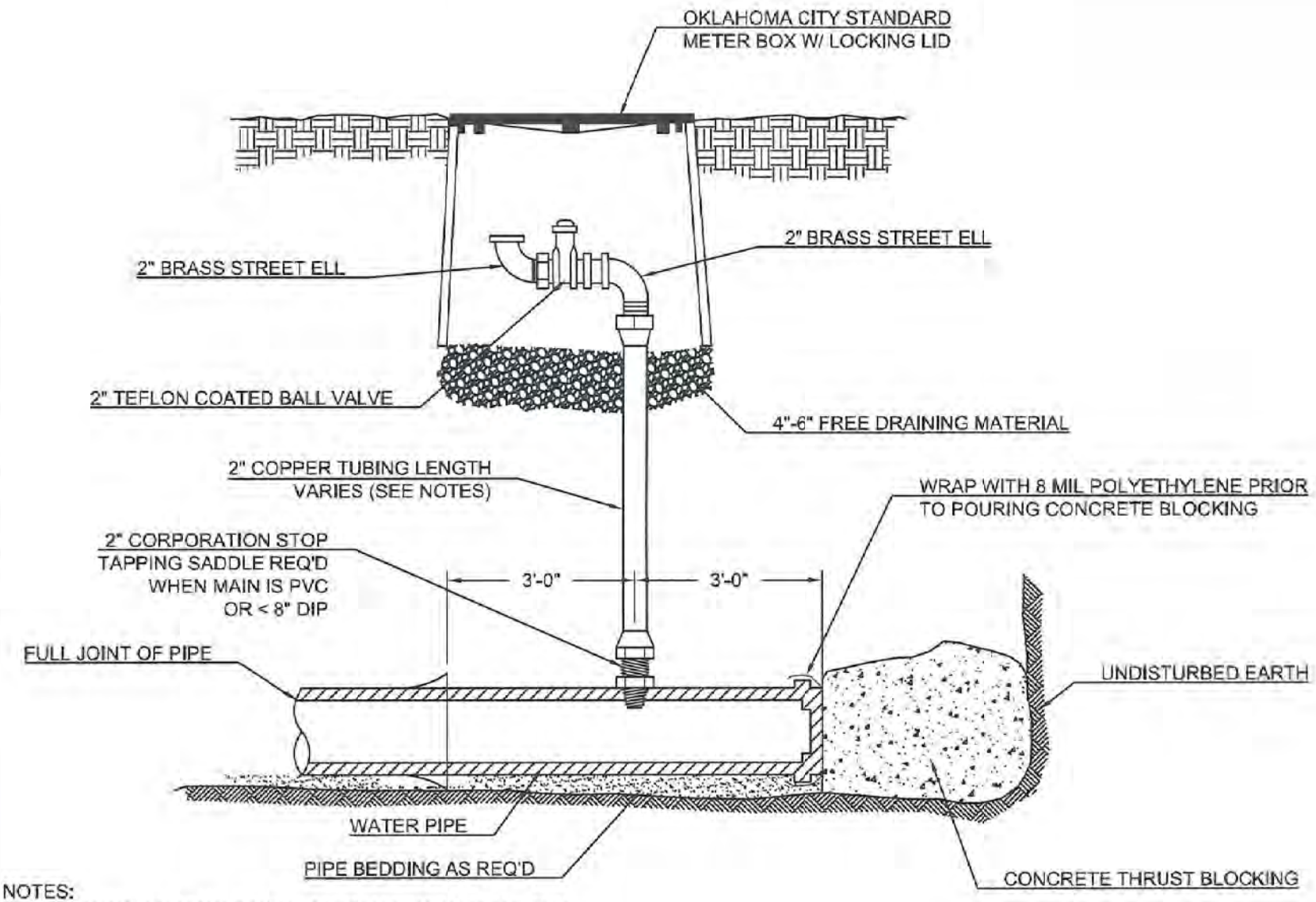
W-14

APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE: 06/13/14

APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/12/14

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL



NOTES:

1. FOR WATER MAIN INSTALLATION UP TO 24" DIAMETER.
2. PLACE METER BOX AS DIRECTED BY ENGINEER.
3. SEE W-43 & W-44 FOR THRUST BLOCKING SIZING.
4. LENGTH VARIES AND LOCATION VARIES HORIZONTALLY & VERTICALLY WHEN TAPPED UNDER A STREET.

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
DATE

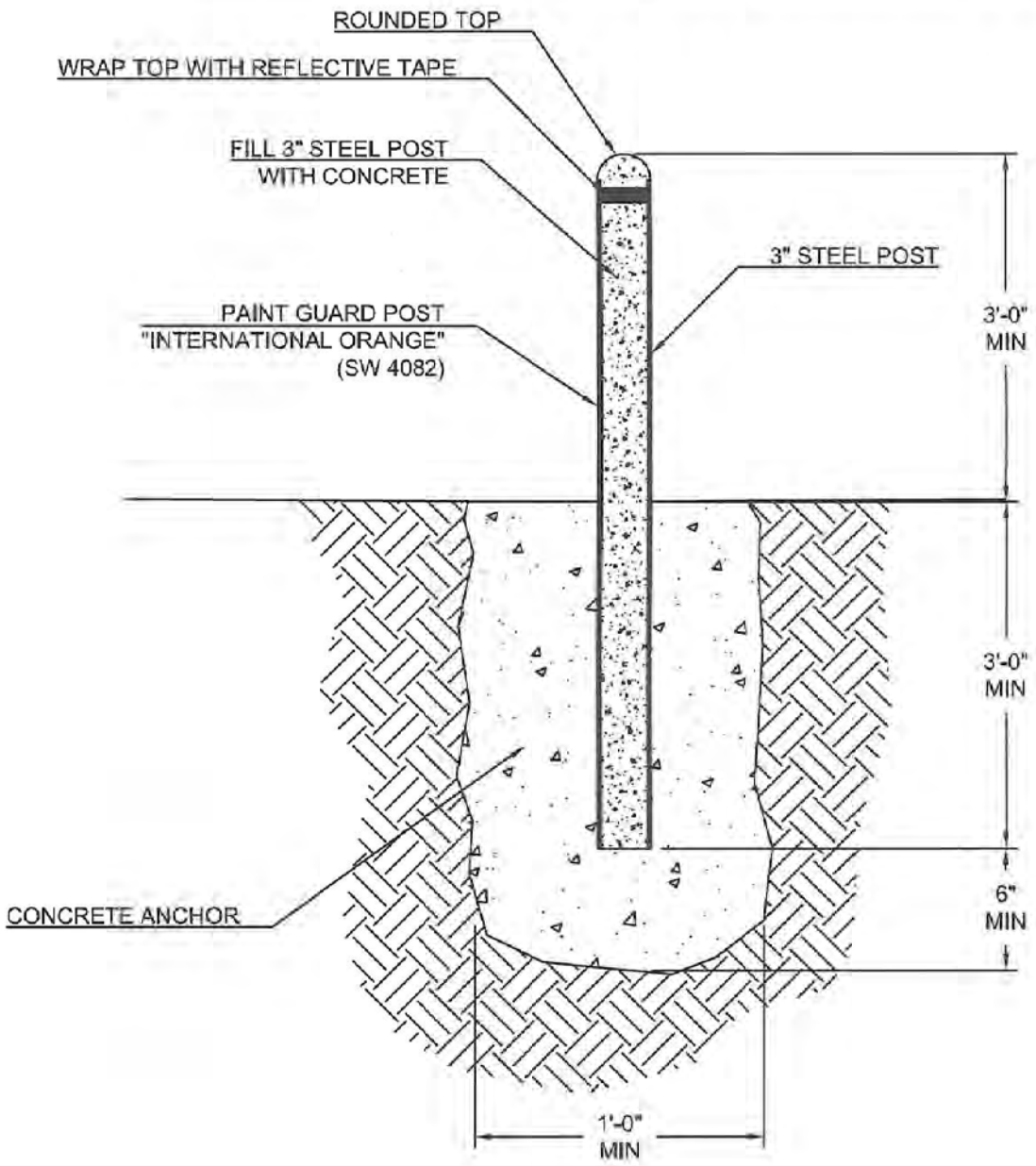
APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

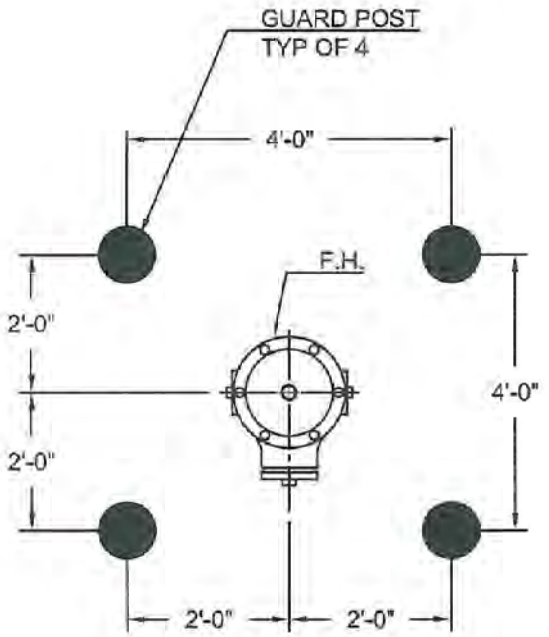
APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 8/7/14

2" BLOW OFF INSTALLATION

W-15

WATER STANDARD DETAIL





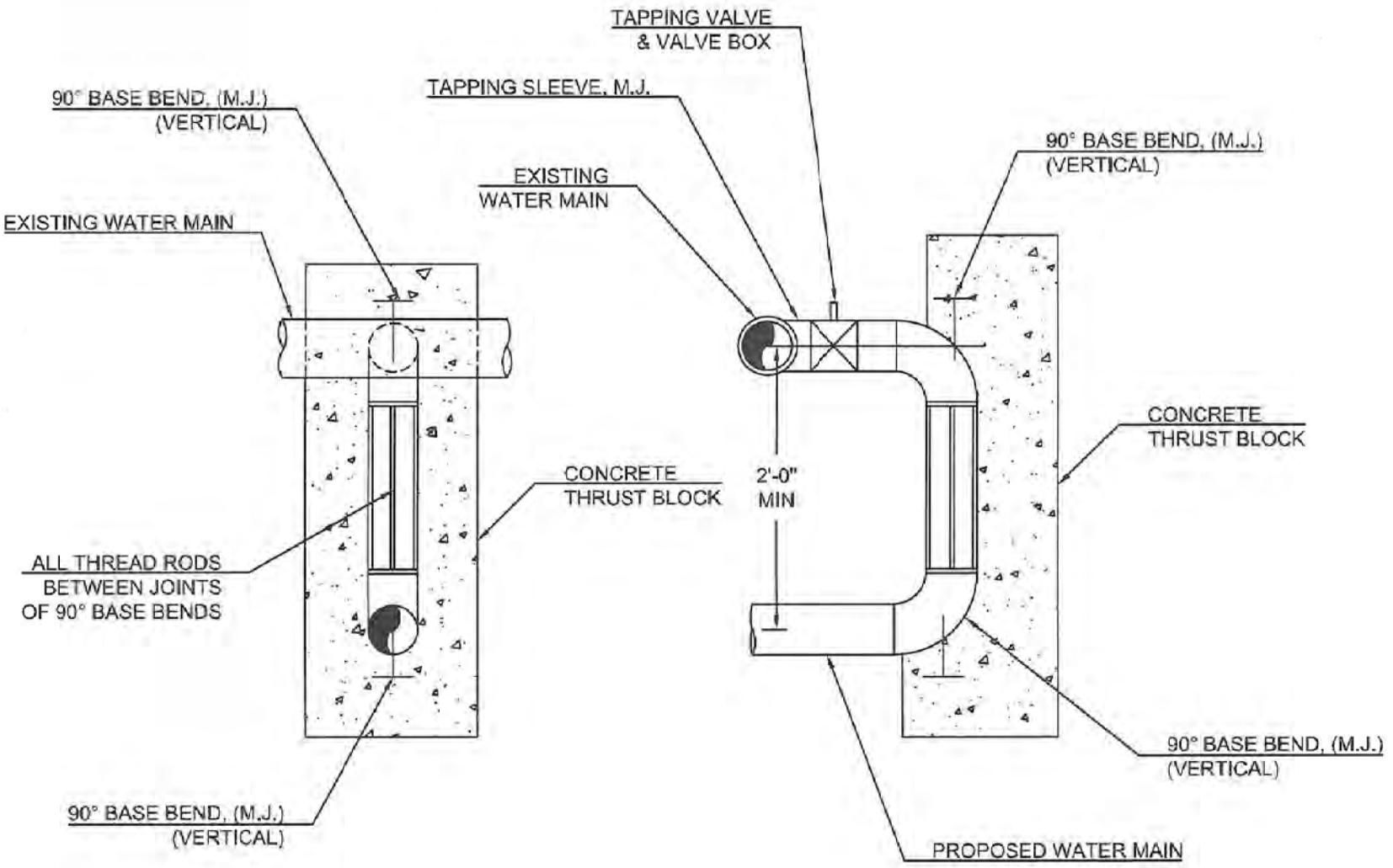
TYPICAL FIRE HYDRANT PROTECTION IN TRAFFIC AREAS

GUARD POST INSTALLATION DETAIL

APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER	DATE:	06/13/14
APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	DATE: 6/17/14	
		W-16

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL



NOTE:
RESTRAIN JOINT SYSTEM OPTIONS:
(A) MEGA-LUG TYPE JOINT RESTRAINT SYSTEM ON ALL JOINTS.
(B) STAINLESS STEEL ALL THREAD RODS B/W 90° VERTICAL BASE BENDS.

REVERSE TAP INSTALLATION

06/13/14 DATE	APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER DATE:	APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 6/17/14
		W-17

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL

PIPE BORING AND CASING INSTALLATION

1 OF 2

06/13/14 DATE	APPROVED BY: DATE: ERIC J. WENGER, P.E., CITY ENGINEER	APPROVED BY: DATE: 8/7/14 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	W-18

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL

NOTE:

SEALED CASING ENDS - NEOPRENE RUBBER END SEALS SECURED WITH 316 STAINLESS STEEL BANDING REQUIRED

PLUGGED PIPE ENDS - BOTH ENDS OF THE CASING PIPE SHALL BE PLUGGED WITH A NON-SHRINK GROUT OR CONCRETE HAVING A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI OR GROUTED MASONRY. EACH PLUG SHALL BE A MINIMUM LENGTH OF 18". GROUTING PRESSURE SHALL NOT EXCEED THE PIPE MANUFACTURER'S RECOMMENDATIONS.

VENT PIPES - VENT PIPES SHALL BE INSTALLED ON BOTH ENDS OF CASING FOR BORINGS THAT CROSS ODOT ROADS AND RAILROAD CROSSINGS. VENTS SHALL BE 2" DIA FOR CASING SIZES <= 30-IN. VENTS SHALL BE 4" DIA FOR CASING SIZES > 30-IN. VENTS SHALL HAVE A 90 DEG BEND TO POINT TOWARDS THE GROUND AND SHALL BE PAINTED INTERNATIONAL ORANGE. BUG SCREEN SHALL BE INCLUDED ON THE OPEN END OF VENT PIPE.

CASING PIPE SIZE - STEEL CASING PIPE SHALL HAVE THE FOLLOWING MINIMUM DIAMETERS: SEE TABLE 1

CASING PIPE THICKNESS - STEEL CASING PIPE SHALL HAVE THE FOLLOWING MINIMUM THICKNESS(ES), IN INCHES, FOR THE INDICATED MAXIMUM DEPTH OF COVER(S), IN FEET: SEE TABLE 2

CASING MATERIAL - STEEL CASING PIPE SHALL CONFORM WITH ASTM A-139, STANDARD SPECIFICATION FOR ELECTRIC-FUSION (ARC) - WELDED STEEL PIPE (NPS4 AND OVER). THE STEEL MATERIAL SHALL BE NEW, SMOOTH WALL, CARBON STEEL, GRADE B, WITH A MINIMUM TENSILE STRENGTH AND MINIMUM THIRTY-FIVE-THOUSAND (35,000 PSI) POUNDS PER SQUARE INCH YIELD STRENGTH

TABLE 1
RECOMMENDED CASING SIZING

PIPE NOMINAL SIZE (INCHES)	SUGGESTED CASING PIPE INSIDE DIAMETER (INCHES)		PIPE NOMINAL SIZE (INCHES)	SUGGESTED CASING PIPE INSIDE DIAMETER (INCHES)
4	8 TO 10		20	28 TO 30
6	10 TO 12		24	31 TO 33
8	14 TO 16		30	36 TO 42
10	16 TO 18		36	42 TO 48
12	18 TO 20		42	54 TO 60
16	20 TO 22		48	60 TO 66
18	24 TO 26			

TABLE 2
CASING PIPE THICKNESS

Outside Diameter (Inches)	Under Highway		Under Railroad		
	Wall Thickness (Inches)	Maximum Cover (Feet)	BNSF (Uncoated) Wall Thickness (Inches)	Union Pacific Wall Thickness (Inches)	Maximum Cover (Feet)
≤ 12	0.1880	30	0.2500	0.2500	30
16	0.2500	30	0.3125	0.3125	30
18	0.2500	30	0.3125	0.3125	30
20	0.2500	30	0.3750	0.3750	30
24	0.2500	30	0.4375	0.4375	30
30	0.3220	30	0.5000	0.5000	30
36	0.3750	30	0.5625	0.5625	30
42	0.3750	25	0.5625	0.5625	30
48	0.4380	25	0.6250	0.6250	25

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14 DATE

APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER DATE:

APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 6/7/14

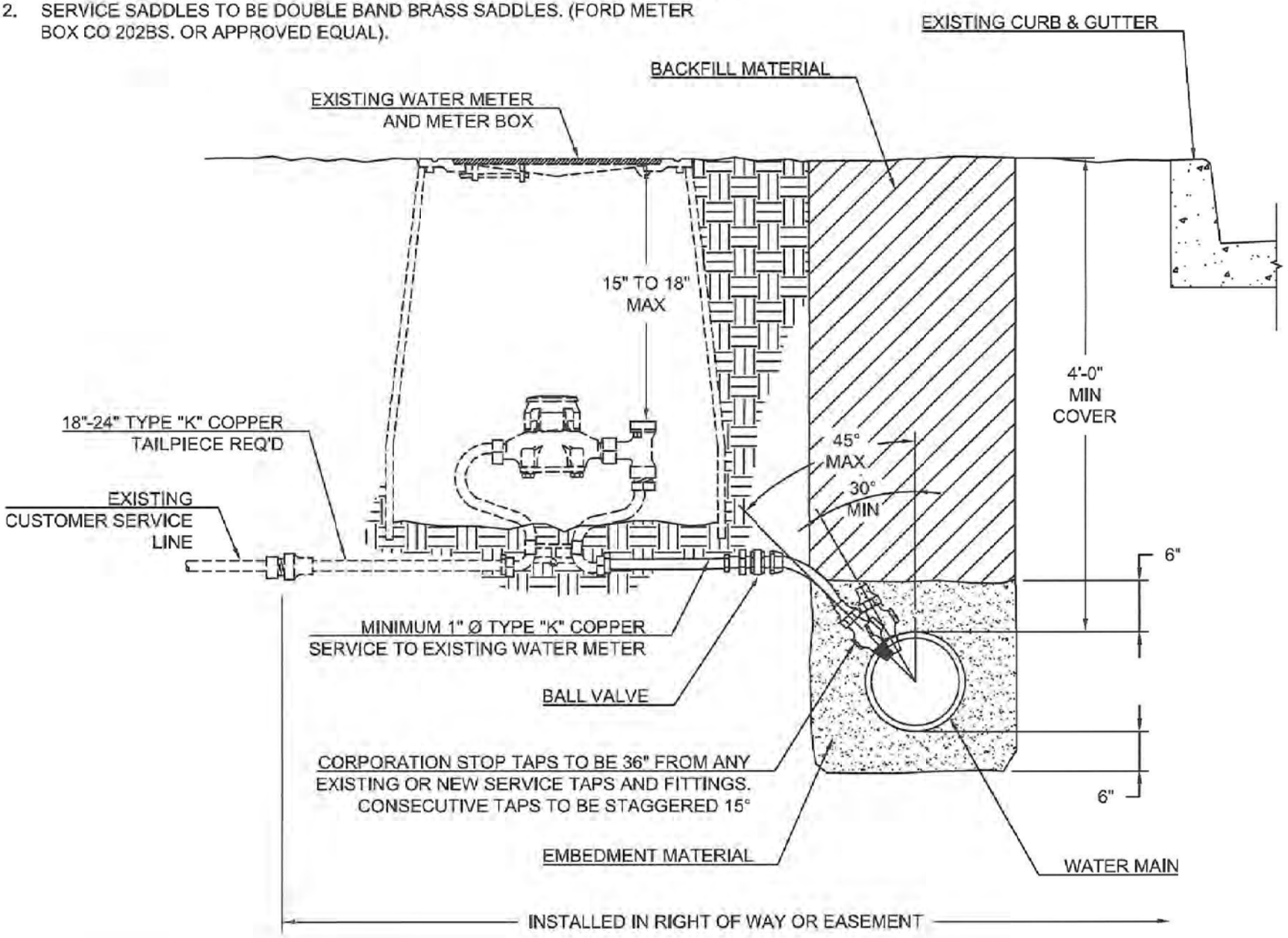
PIPE BORING AND CASING INSTALLATION

W-19

2 OF 2

WATER STANDARD DETAIL

NOTE:
1. SERVICE SADDLES REQUIRED ON ALL TAPS UNLESS OTHERWISE SPECIFIED.
2. SERVICE SADDLES TO BE DOUBLE BAND BRASS SADDLES. (FORD METER BOX CO 202BS. OR APPROVED EQUAL).



OKLAHOMA CITY UTILITIES DEPARTMENT

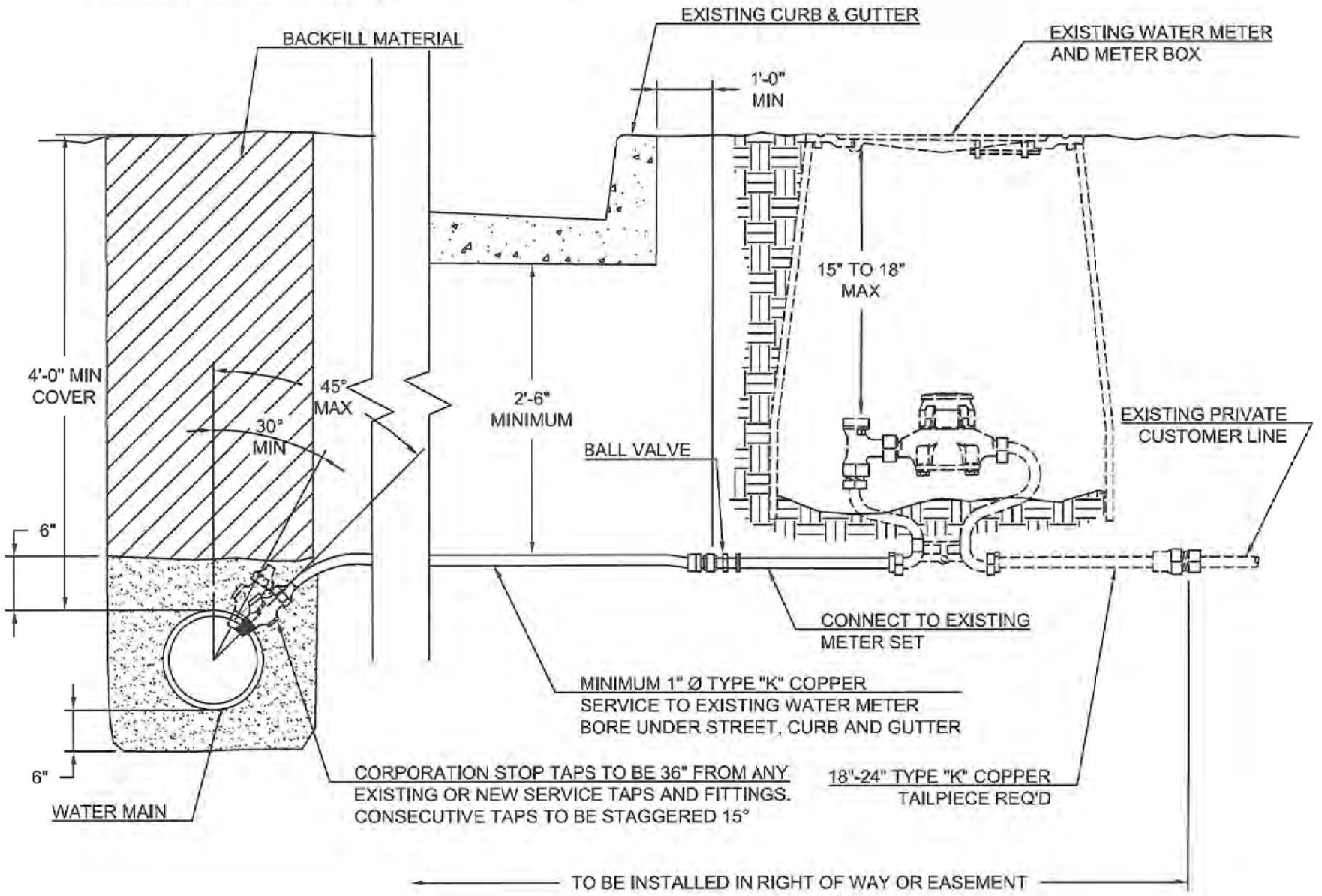
DATE: 06/13/14	APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER	DATE:
	APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	DATE: 6/17/14

SINGLE SHORT SERVICE REPLACEMENT

W-20

WATER STANDARD DETAIL

NOTE:
1. SERVICE SADDLES REQUIRED ON ALL TAPS UNLESS OTHERWISE SPECIFIED.
2. SERVICE SADDLES TO BE DOUBLE BAND BRASS SADDLES. (FORD METER BOX CO 202BS. OR APPROVED EQUAL).



OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
DATE

APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

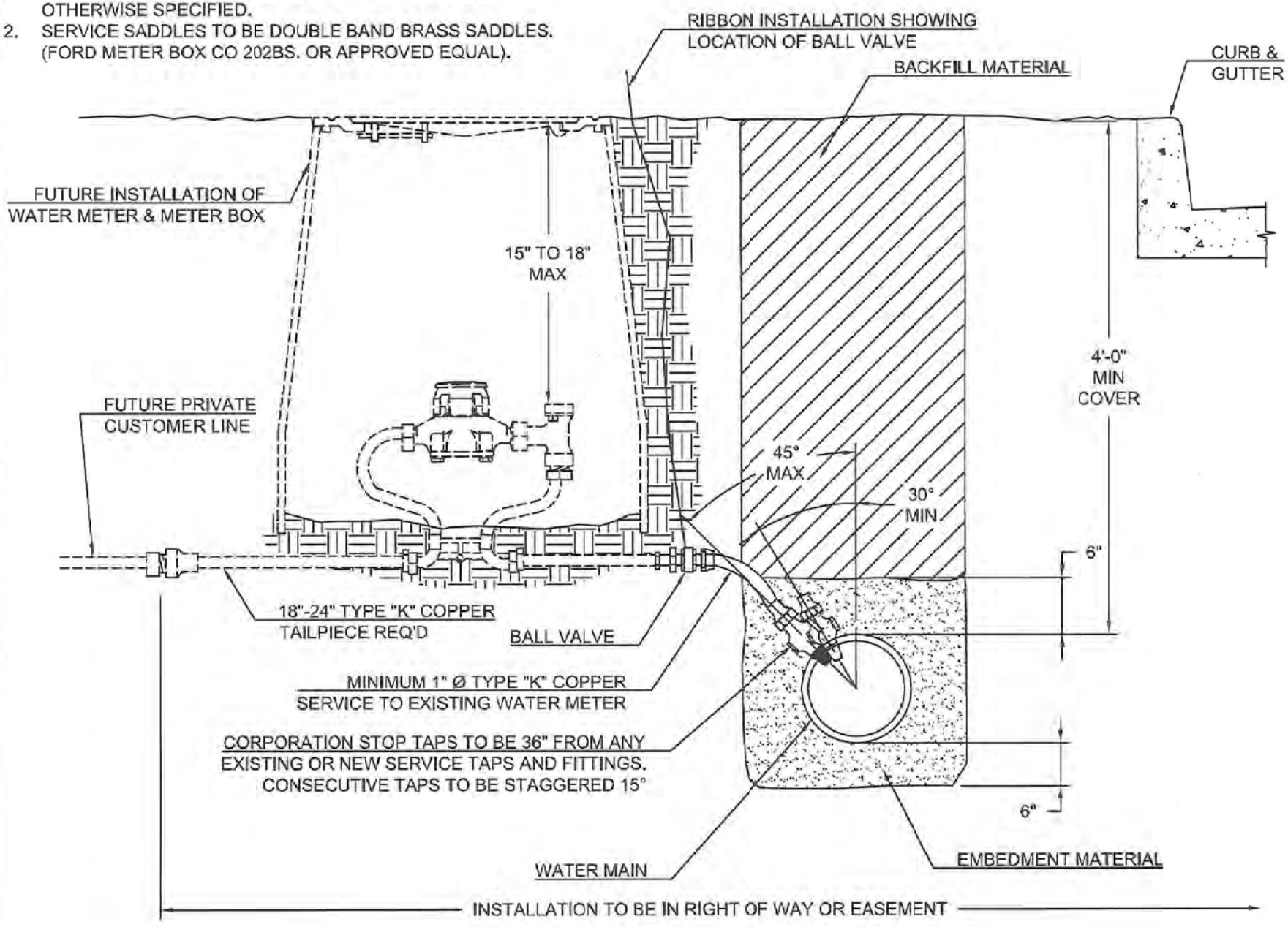
APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/7/14

SINGLE LONG SERVICE REPLACEMENT

W-21

WATER STANDARD DETAIL

NOTE:
1. SERVICE SADDLES REQUIRED ON ALL TAPS UNLESS OTHERWISE SPECIFIED.
2. SERVICE SADDLES TO BE DOUBLE BAND BRASS SADDLES. (FORD METER BOX CO 202BS. OR APPROVED EQUAL).

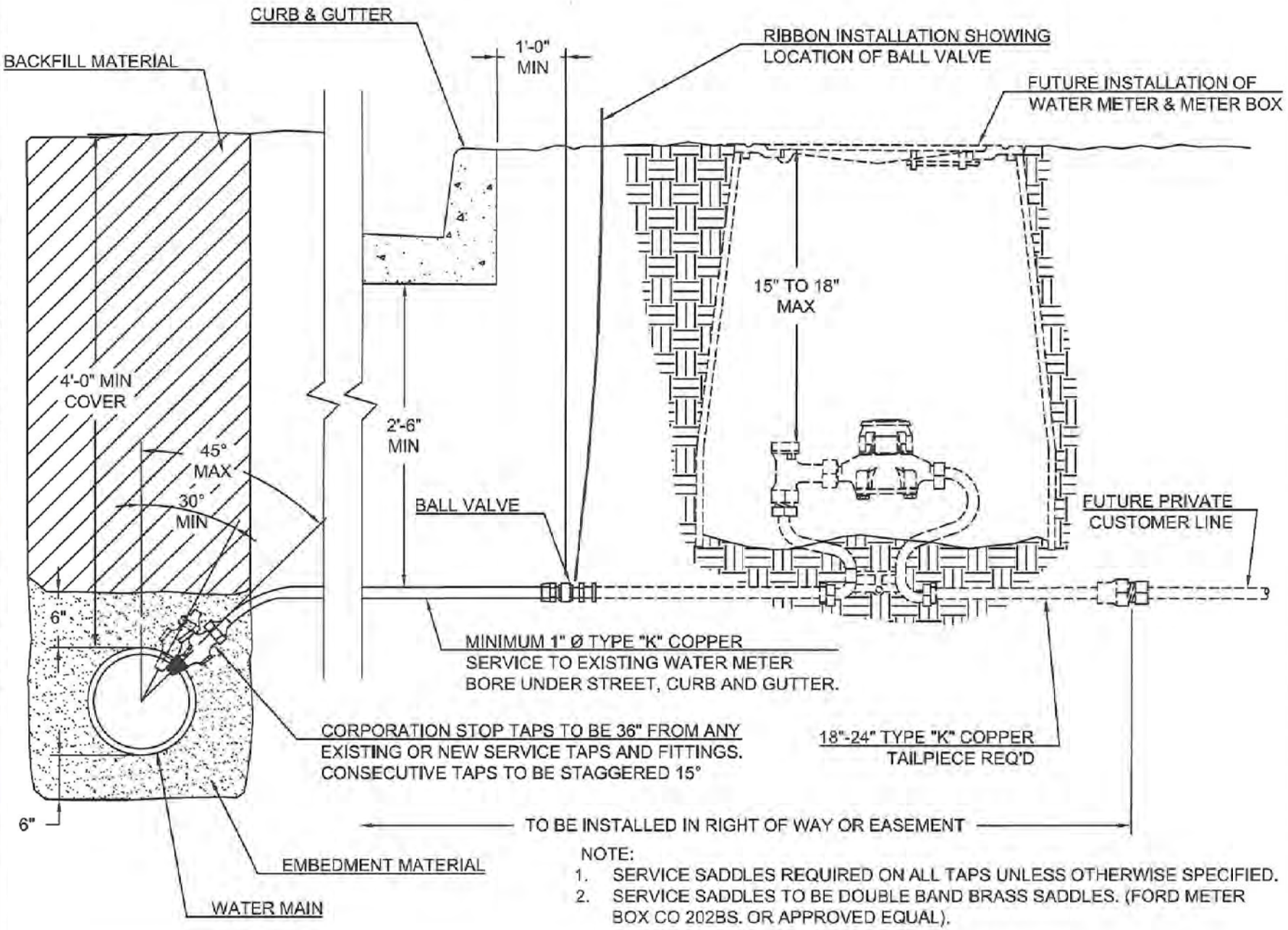


SINGLE SHORT SERVICE NEW INSTALLATION

DATE: 06/13/14	
APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER — DATE:	
APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR — DATE: 8/7/14	
	W-22

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL



NOTE:
1. SERVICE SADDLES REQUIRED ON ALL TAPS UNLESS OTHERWISE SPECIFIED.
2. SERVICE SADDLES TO BE DOUBLE BAND BRASS SADDLES. (FORD METER BOX CO 202BS. OR APPROVED EQUAL).

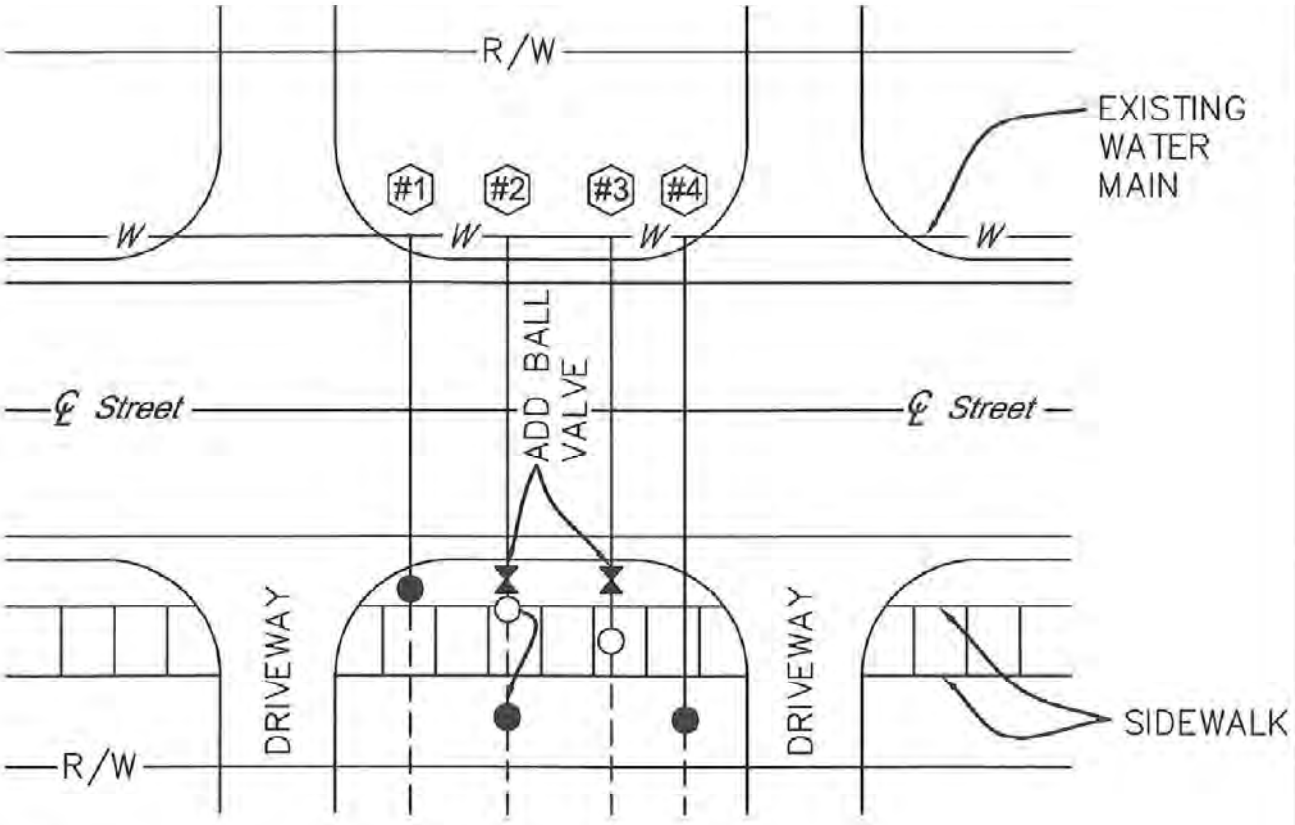
SINGLE LONG SERVICE NEW INSTALLATION

OKLAHOMA CITY UTILITIES DEPARTMENT

DATE	APPROVED BY:	DATE:
06/13/14	ERIC J. WENGER, P.E., CITY ENGINEER	
	MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	8/7/14

W-23

WATER STANDARD DETAIL



#1 METER FALLS BETWEEN CURB AND PROPOSED SIDEWALK.

- NO ACTION REQUIRED.

#2 METER FALLS PARTIALLY WITHIN PROPOSED SIDEWALK OR WHEN THE OUTSIDE OF THE METER LID IS WITHIN 6" OF THE THE SIDEWALK EDGE.

- CUT EXISTING SERVICE LINE AND INSTALL BALL VALVE 1'-0" BACK OF CURB.
- EXTEND COPPER SERVICE LINE AND RELOCATE METER WITH NEW TILE BEHIND SIDEWALK.
- RECONNECT NEW COPPER SERVICE LINE TO CUSTOMER'S EXISTING SERVICE LINE, WITHIN CITY RIGHT OF WAY OR EASEMENT.

#3 METER FALLS WITHIN THE CENTER AREA OF PROPOSED SIDEWALK OR ADA RAMP, NOT WITHIN 6" OF SIDEWALK EDGE.

- REPLACE EXISTING METER TILE WITH APPROVED TRAFFIC RATED TILE.

#4 METER FALLS ON CUSTOMER'S SIDE OF PROPOSED SIDEWALK.

- NO RELOCATION REQUIRED.

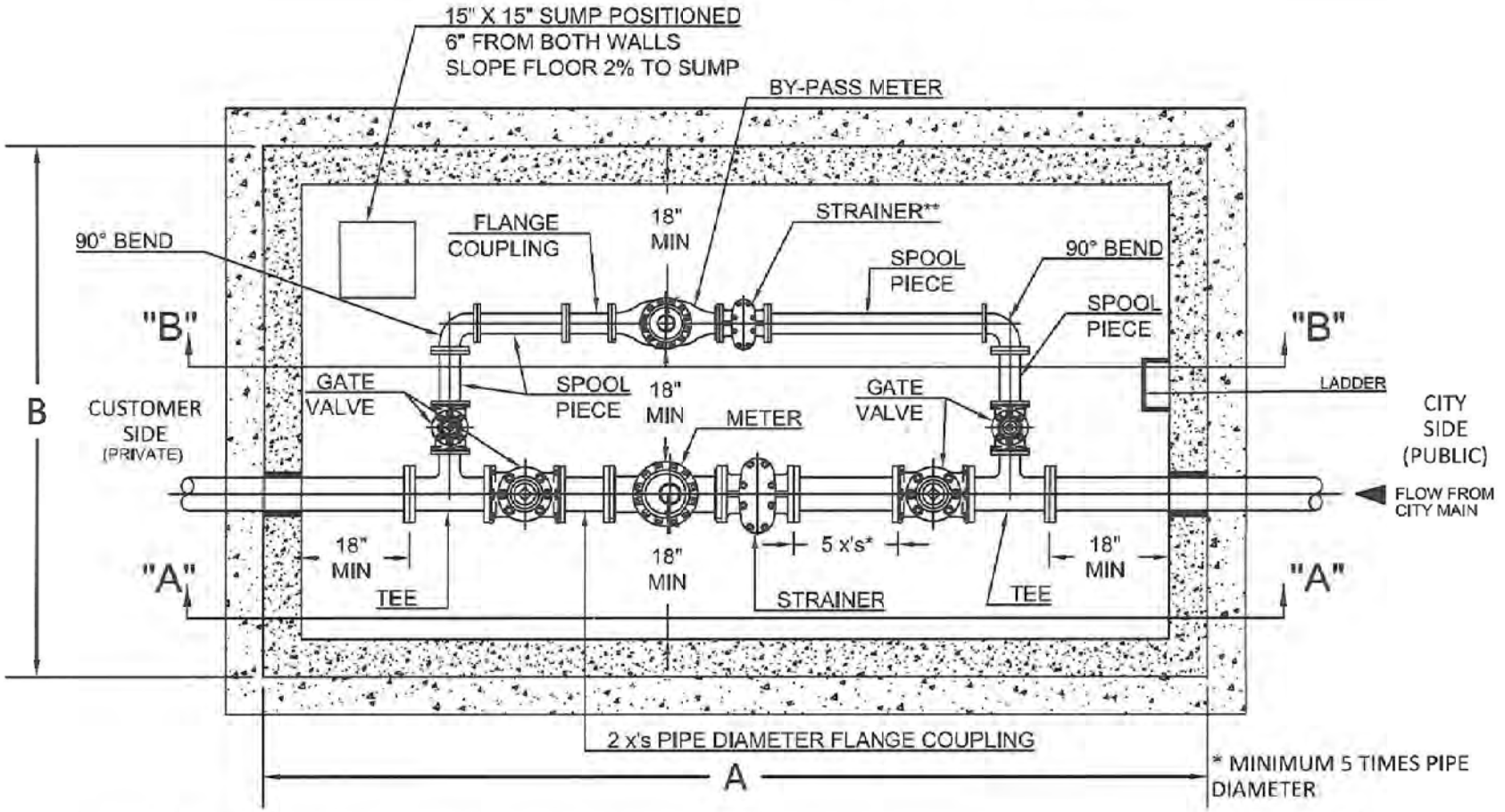
DOMESTIC METER RELOCATION REQUIREMENTS APPLY TO BOTH LONG AND SHORT SERVICES. SHORT SERVICE METER RELOCATION WILL REQUIRE A NEW COPPER SERVICE LINE FROM THE MAIN TO THE METER LOCATION WITHOUT THE BALL VALVE INSTALLATION REQUIREMENT.

METER RELOCATION FOR STREET RESURFACING, SIDEWALKS, & ADA RAMPS

06/13/14 DATE	APPROVED BY: Eric J. Wenger DATE: ERIC J. WENGER, P.E., CITY ENGINEER	APPROVED BY: MSlaughter DATE: 8/7/14 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	W-29

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL



NOTES:

1. INSTALLATION OF FLANGED COUPLING AND STRAINER REQUIRED ON 3" BY-PASS METERS AND LARGER.
2. ALL DUCTILE IRON JOINTS INSIDE THE VAULT SHALL BE FLANGED.
3. PROVIDE STRAIGHT PIPE UPSTREAM AND DOWNSTREAM OF METER/STRAINER IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
4. HATCH COVER TO BE HALLIDAY OR EQUAL WITH SAFETY FALL GRATING.
5. FOR WALL AND FLOOR STEEL REINFORCEMENT REQUIREMENTS, SEE METER VAULT SHEET W-35.

** STRAINER ONLY REQUIRED FOR 3-IN BYPASS AND LARGER

Meter Size	By-Pass Size	A	B
3"	2"	12'-2"	7'-10"
4"	2"	13'-8"	7'-10"
6"	3"	16'-4"	8'-2"

DATE: 06/13/14

APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER DATE:

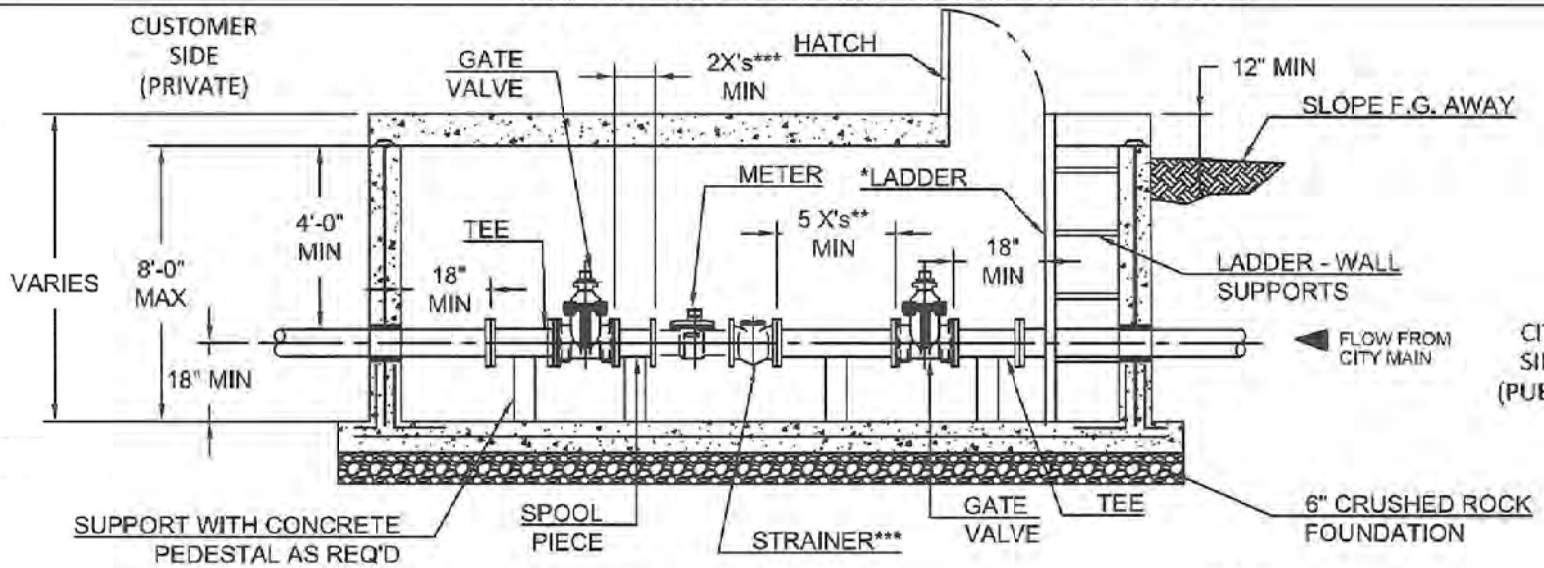
APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 8/7/14

WATER METER VAULT INSTALLATION

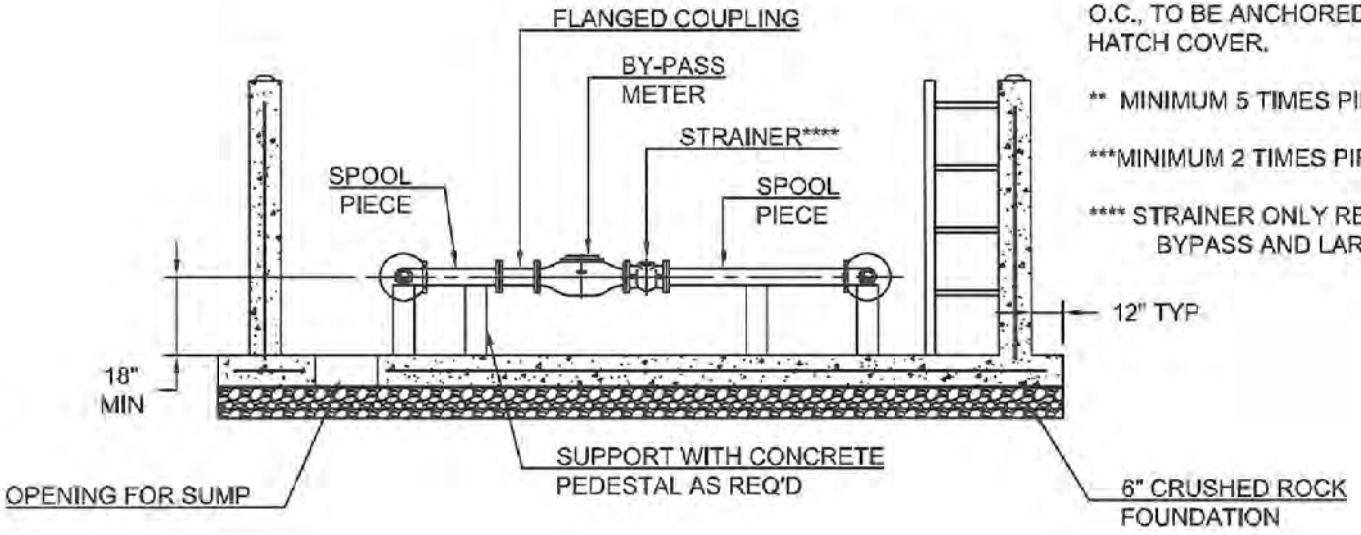
W-30

1 OF 6

WATER STANDARD DETAIL



SECTION "A-A" METER



SECTION "B-B" BY-PASS METER

NOTE:

* ALUMINUM ACCESS LADDER WITH SAFETY EXTENSION AND NON-SKID RUNGS @ 12" O.C., TO BE ANCHORED TO VAULT WALL AND HATCH COVER.

** MINIMUM 5 TIMES PIPE DIAMETER

***MINIMUM 2 TIMES PIPE DIAMETER

**** STRAINER ONLY REQUIRED FOR 3-IN BYPASS AND LARGER

OKLAHOMA CITY UTILITIES DEPARTMENT

DATE: 06/13/14

APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER DATE:

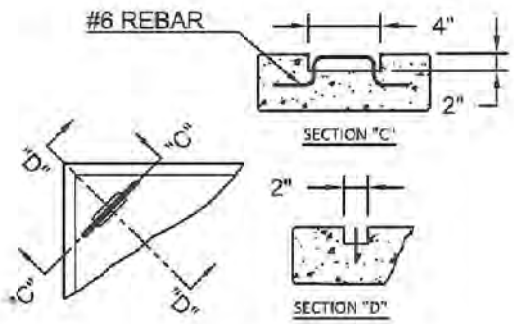
APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 8/7/14

WATER METER VAULT INSTALLATION

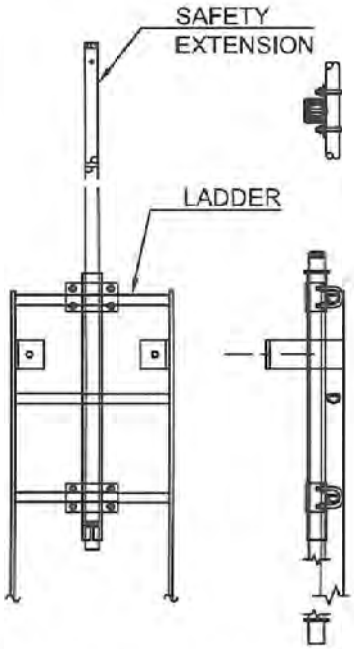
W-31

2 OF 6

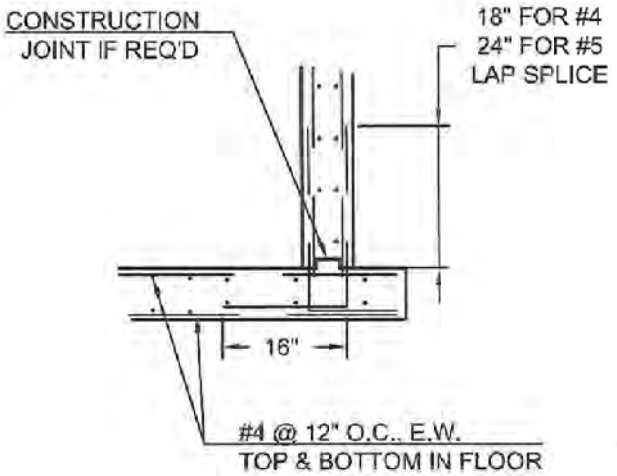
WATER STANDARD DETAIL



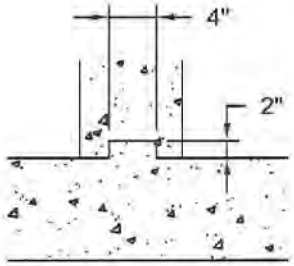
LIFTING EYE DETAIL



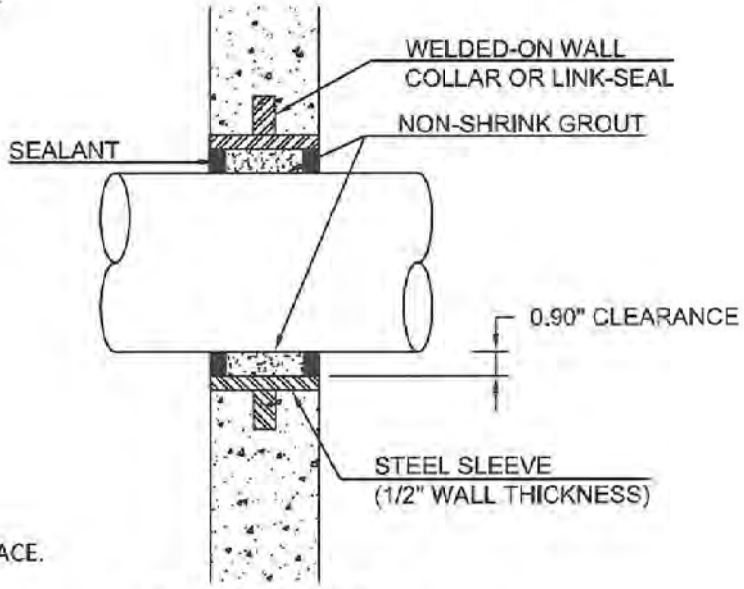
LADDER-UP EXTENSION



LAP BARS



KEYED CONSTRUCTION JOINT



SEAL & GROUT

NOTE:

1. REINFORCING STEEL SHALL BE GRADE 60.
2. CONCRETE SHALL HAVE A MINIMUM 7 DAY COMPRESSIVE STRENGTH OF 3500 PSI.
3. VAULT DEPTH NOT TO EXCEED 8 FEET.
4. REINFORCING STEEL SHALL HAVE A MINIMUM 2" CLEAR SPACE FROM EXPOSED SURFACE.
5. FOR REINFORCING STEEL SCHEDULE, SEE WATER-METER VAULT SHEET W-35.

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
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APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

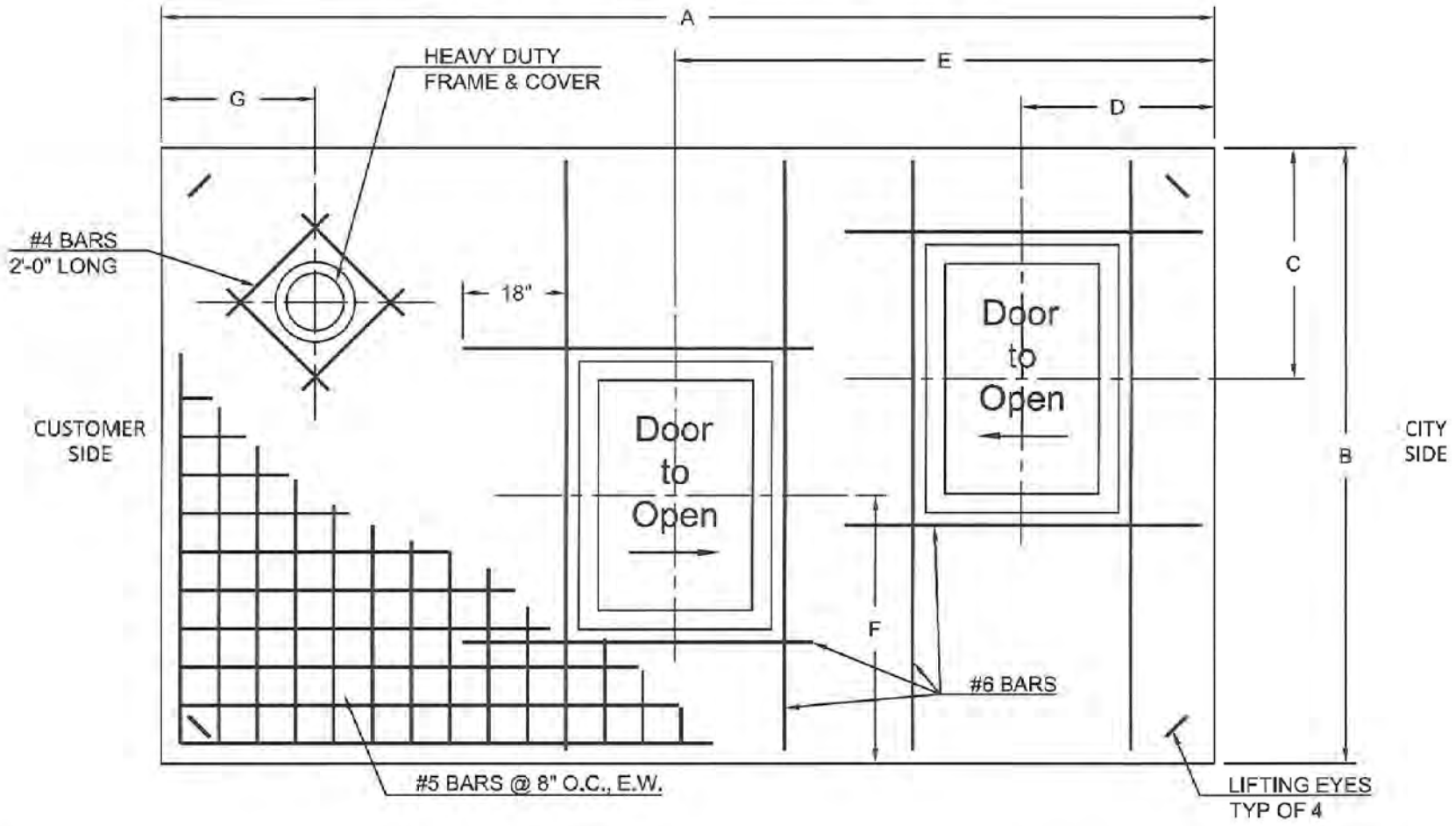
APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/17/14

WATER METER VAULT INSTALLATION

3 OF 6

W-32

WATER STANDARD DETAIL



NOTE:

1. PROVIDE WATER TIGHT SEAL BETWEEN LID AND WALLS IN ACCORDANCE WITH SEC. 932.08 (F) OF OKC STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS.
2. DOORS SHALL BE HALLIDAY DOORS, SERIES H1R (H20 LOAD RATED) OR APPROVED EQUAL W/ SAFETY FALL GRATING.
3. HEAVY DUTY FRAME AND COVER TO BE EAST JORDAN IRON V1610-3 SERIES OR EQUAL.
4. LIFTING EYES TO BE EMBEDDED #6 REBAR. GROUT FILL WHEN VAULT IS IN SIDEWALK, DRIVEWAY, AND/OR PARKING LOT.

Meter Size	By-Pass Size	A	B	C	D	E	F	G	Door Size
3"	2"	12'-2"	7'-10"	3'-0"	2'-6"	6'-9"	3'-6"	2'-0"	H1R-24-36
4"	2"	13'-8"	7'-10"	3'-0"	2'-6"	7'-0"	3'-6"	2'-0"	H1R-24-36

OKLAHOMA CITY UTILITIES DEPARTMENT

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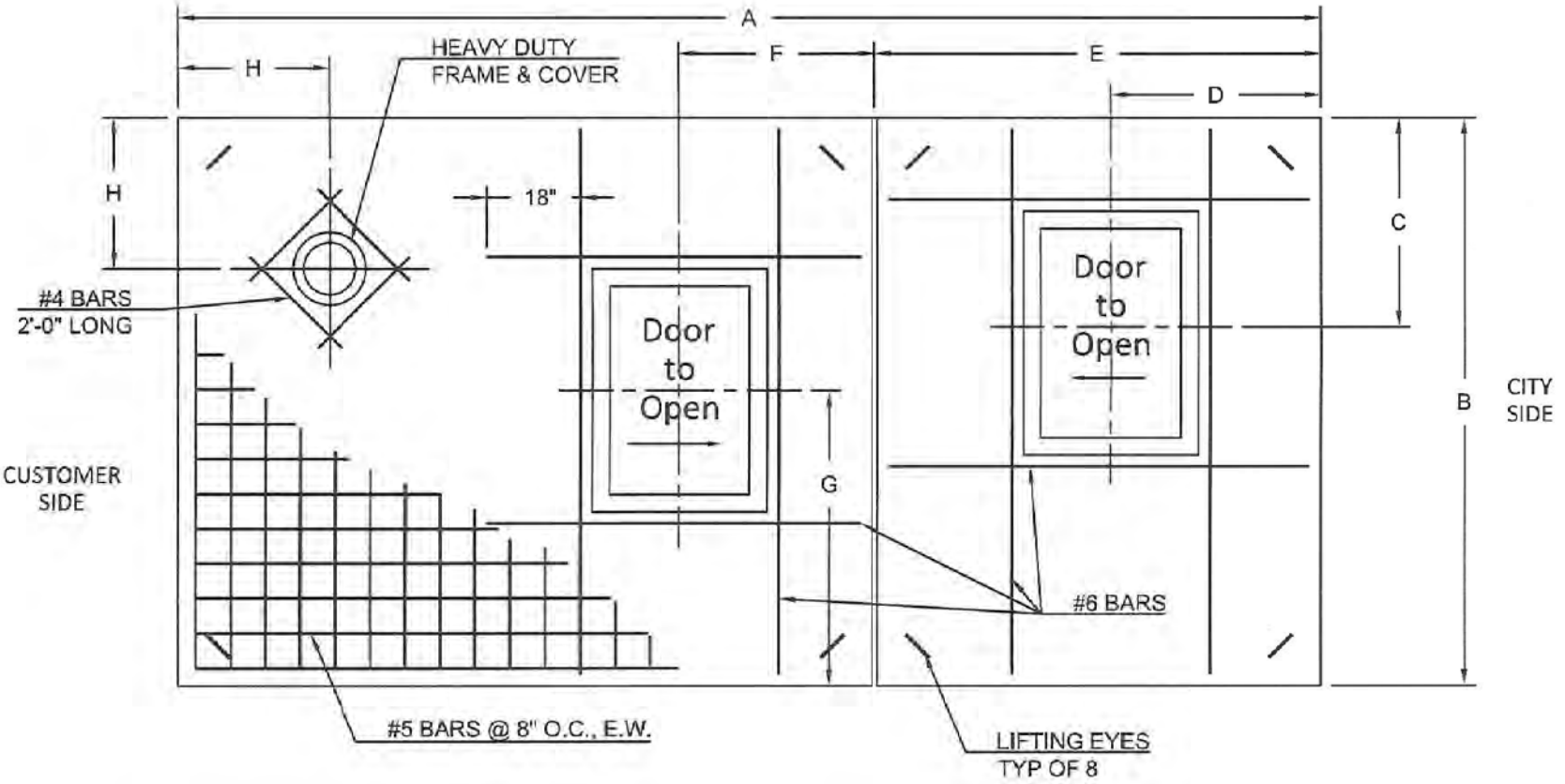
APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 6/7/14

WATER METER VAULT INSTALLATION

W-33

4 OF 6

WATER STANDARD DETAIL



NOTE:

1. VAULT LID FOR 6" METERS AND LARGER WILL CONSIST OF TWO REMOVABLE SECTIONS.
2. PROVIDE WATER TIGHT SEAL BETWEEN LID SECTIONS AND WALLS IN ACCORDANCE WITH SEC. 932.08 (F) OF OKC STANDARD SPECIFICATIONS FOR CONSTRUCTION FOR PUBLIC IMPROVEMENTS.
3. DOORS SHALL BE HALLIDAY DOORS, SERIES H1R (H20 LOAD RATED) OR APPROVED EQUAL W/ SAFETY FALL GRATING.
4. HEAVY DUTY FRAME AND COVER TO BE EAST JORDAN IRON V1610-3 SERIES OR EQUAL.
4. LIFTING EYES TO BE EMBEDDED #6 REBAR. GROUT FILL WHEN VAULT IS IN SIDEWALK, DRIVEWAY, AND/OR PARKING LOT.

Meter Size	By-Pass Size	A	B	C	D	E	F	G	H	Door Size
6"	3"	16'-4"	8'-2"	3'-0"	3'-0"	6'-4"	2'-9"	4'-3"	2'-2"	H1R-36-36

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14 DATE

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APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 6/7/14

WATER METER VAULT INSTALLATION

5 OF 6

W-34

WATER STANDARD DETAIL

Reinforcing Schedule for Concrete Vaults														
Meter Size	By-Pass Size	Design No.	Depth (feet)	A	B	Wall Thickness	Floor Thickness	Vertical Bars		Horizontal Bars		Top Thickness	Top Bars	
								Size	Spacing	Size	Spacing		Size	Spacing
3"	2"	1	5	12'-2"	7'-10"	8	10	4	12	4	12	8	5	8
		2	6	12'-2"	7'-10"	8	10	4	9	4	12	8	5	8
		3	7	12'-2"	7'-10"	8	10	5	12	4	12	8	5	8
		4	8	12'-2"	7'-10"	8	10	5	9	4	12	8	5	8
4"	2"	5	5	13'-8"	7'-10"	8	10	4	12	4	12	8	5	8
		6	6	13'-8"	7'-10"	8	10	4	9	4	12	8	5	8
		7	7	13'-8"	7'-10"	8	10	5	12	4	12	8	5	8
		8	8	13'-8"	7'-10"	8	10	5	9	4	12	8	5	8
6"	3"	9	5	16'-4"	8'-2"	8	10	4	12	4	12	8	5	8
		10	6	16'-4"	8'-2"	8	10	4	9	4	12	8	5	8
		11	7	16'-4"	8'-2"	8	10	5	12	4	12	8	5	8
		12	8	16'-4"	8'-2"	8	10	5	9	4	12	8	5	8

NOTES:
1. ALL REINFORCING REBAR SHALL BE GRADE 60.
2. TOP BARS SHALL BE PLACED IN TWO MATS. BAR SIZE AND SPACING SHALL IN EACH DIRECTION BE INCLUDED IN EACH MAT OF STEEL
3. FLOOR REINFORCING USE #4 BARS @ 12" C/C EACH WAY FOR THE TOP MAT AND THE BOTTOM MAT OF REINFORCING.
4. WALL, FLOOR AND TOP THICKNESS ARE IN INCHES. STEEL REINFORCEMENT SPACING IS IN INCHES.

OKLAHOMA CITY UTILITIES DEPARTMENT

DATE 06/13/14

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DATE:

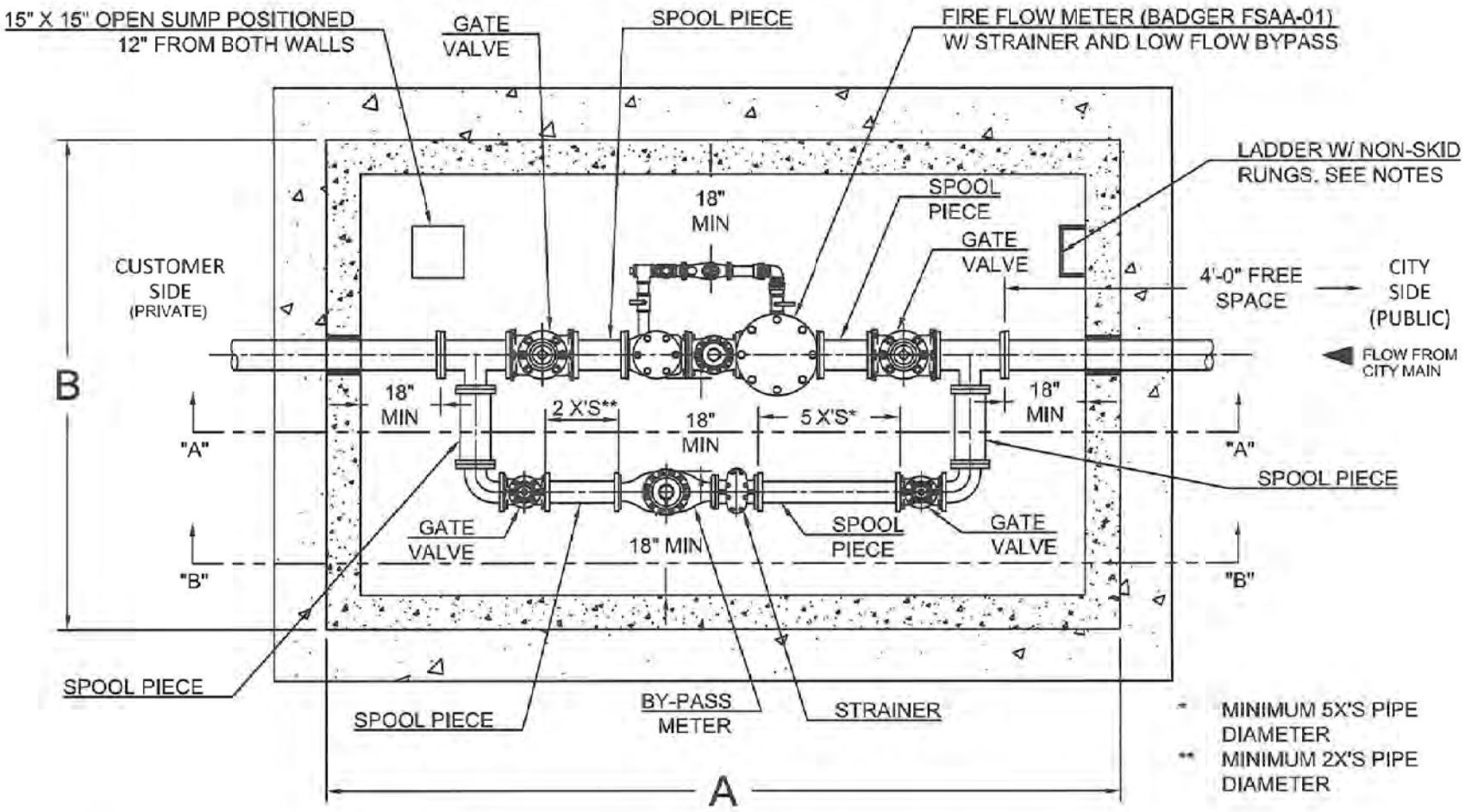
APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 8/7/14

WATER METER VAULT INSTALLATION

6 OF 6

W-35

WATER STANDARD DETAIL



NOTES:

1. ALL DUCTILE IRON JOINTS INSIDE THE VAULT SHALL BE FLANGED.
2. PROVIDE STRAIGHT PIPE UPSTREAM AND DOWNSTREAM OF METER/STRAINER IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
3. HATCH COVER TO BE HALLIDAY OR EQUAL WITH SAFETY FALL GRATING.
4. LADDER TO BE INSTALLED WITH LADDER-UP SAFETY POST EXTENSION.
5. FOR WALL AND FLOOR STEEL REINFORCEMENT REQUIREMENTS, SEE METER VAULT SHEET W-40.
6. 6" AND ABOVE TURBINE (TURBO) METERS NEEDS APPROVAL FROM METER SHOP SUPERVISOR.

Meter Size	By-Pass Size	A	B
6"	3"	15'-6"	9'-6"
8"	4"	17'-0"	11'-0"
10"	6"	20'-0"	13'-6"
12"	8"	22'-0"	15'-6"

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
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DATE:

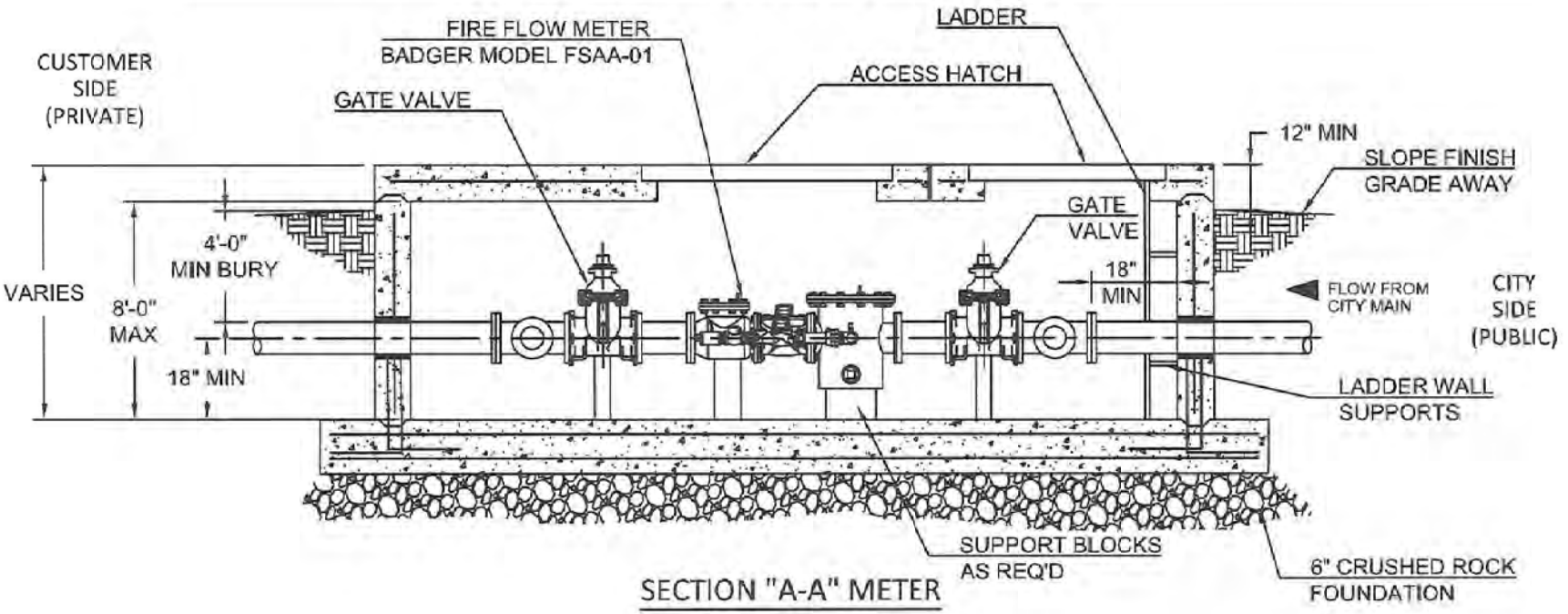
APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/17/14

FIRE FLOW METER VAULT INSTALLATION

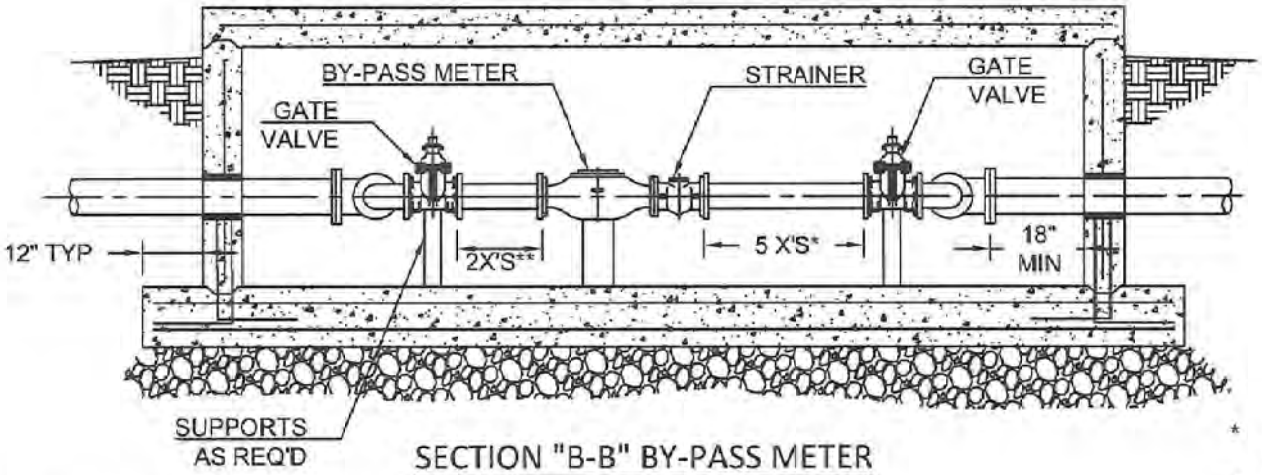
W-36

1 OF 5

WATER STANDARD DETAIL



SECTION "A-A" METER



SECTION "B-B" BY-PASS METER

NOTE:

1. ALUMINUM ACCESS LADDER WITH SAFETY EXTENSION AND NON-SKID RUNGS @ 12" O.C., TO BE ANCHORED TO VAULT WALL AND HATCH COVER.

* MINIMUM 5X'S PIPE DIAMETER

** MINIMUM 2X'S PIPE DIAMETER

OKLAHOMA CITY UTILITIES DEPARTMENT

DATE: 06/13/14

APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER DATE:

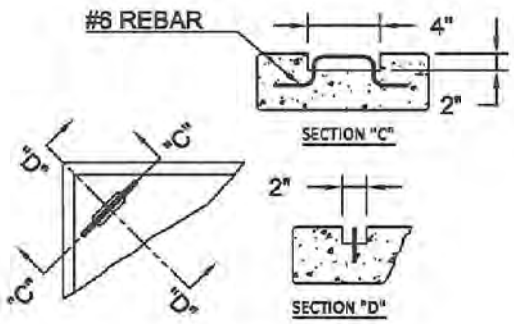
APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 6/17/14

FIRE FLOW METER VAULT INSTALLATION

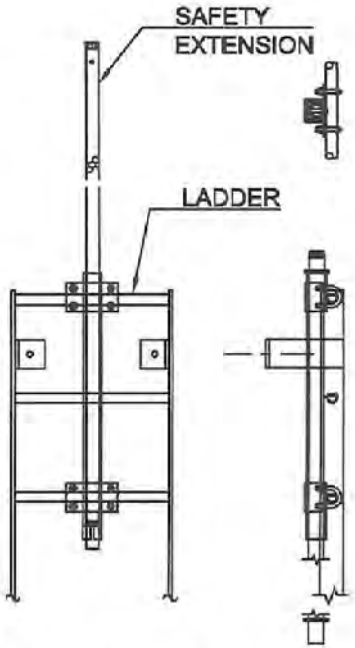
2 OF 5

W-37

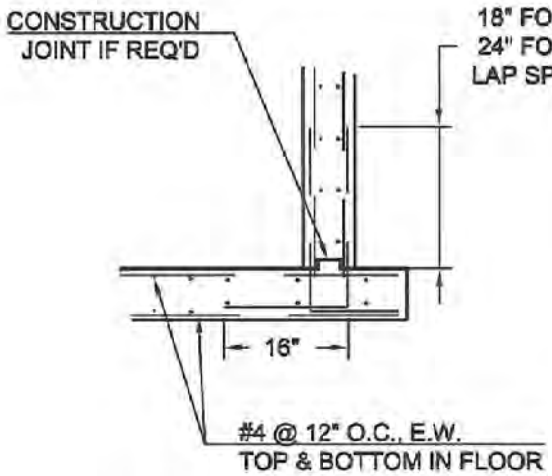
WATER STANDARD DETAIL



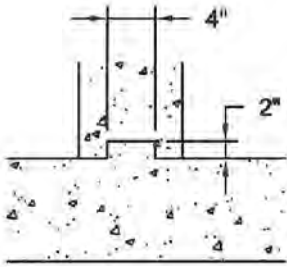
LIFTING EYE DETAIL



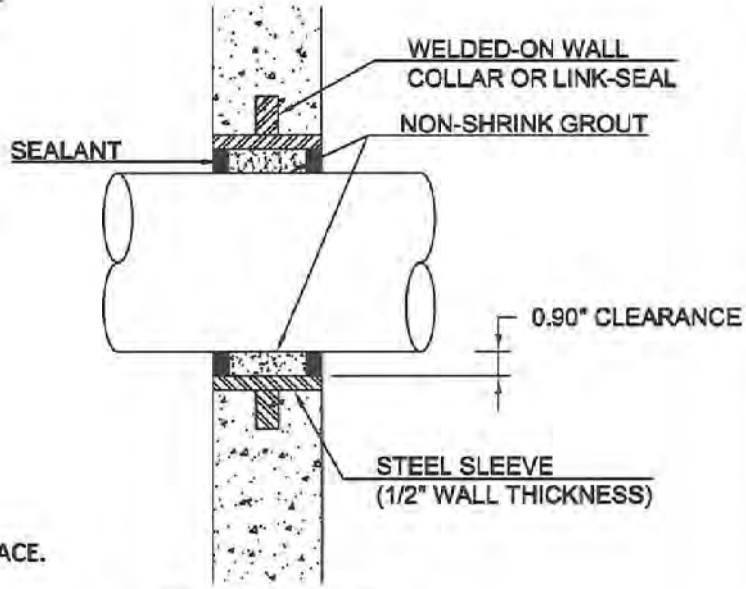
LADDER-UP EXTENSION



LAP BARS



KEYED CONSTRUCTION JOINT



SEAL & GROUT

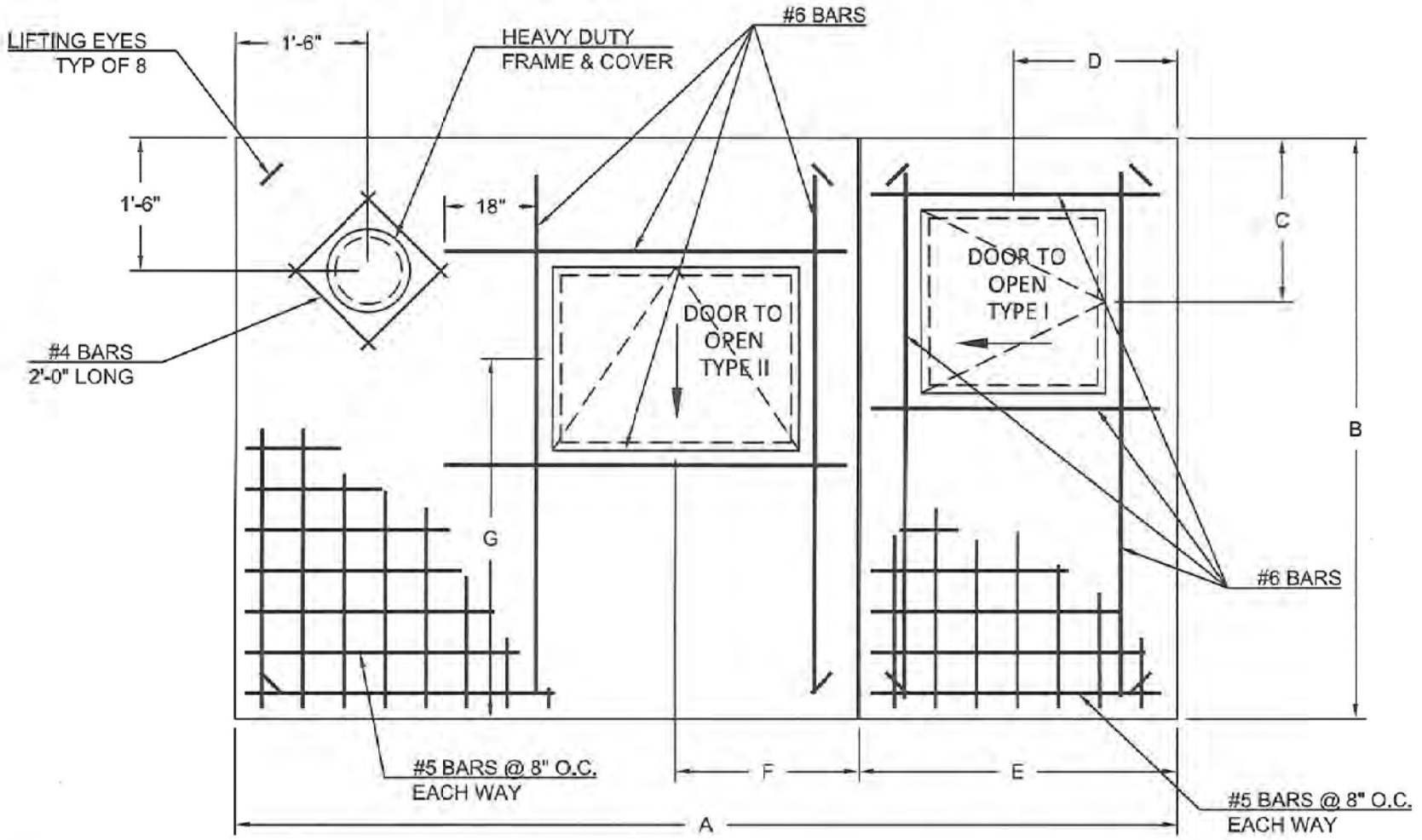
NOTE:

1. REINFORCING STEEL SHALL BE GRADE 60.
2. CONCRETE SHALL HAVE A MINIMUM 7 DAY COMPRESSIVE STRENGTH OF 3500 PSI.
3. VAULT DEPTH NOT TO EXCEED 8 FEET.
4. REINFORCING STEEL SHALL HAVE A MINIMUM 2" CLEAR SPACE FROM EXPOSED SURFACE.
5. FOR REINFORCING STEEL SCHEDULE, SEE WATER-METER VAULT SHEET W-40.

OKLAHOMA CITY UTILITIES DEPARTMENT

DATE: 06/13/14	APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER DATE:	FIRE FLOW METER VAULT INSTALLATION
	APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 6/17/14	3 OF 5
		W-38

WATER STANDARD DETAIL



Meter Size	By-Pass Size	A	B	C	D	E	F	G	Door Size - I	Door Size - II
6"	3"	15'-6"	9'-6"	2'-8"	2'-8"	4'-6"	3'-0"	6'-0"	H1R-36-36	H1R-36-42
8"	4"	17'-0"	11'-0"	2'-8"	2'-8"	6'-0"	3'-0"	7'-6"	H1R-36-36	H1R-36-42
10"	6"	20'-0"	13'-6"	2'-8"	2'-8"	8'-0"	3'-0"	10'-0"	H1R-36-36	H1R-36-42
12"	8"	20'-0"	15'-6"	2'-8"	2'-8"	8'-0"	3'-0"	12'-0"	H1R-36-36	H1R-36-42

OKLAHOMA CITY UTILITIES DEPARTMENT

DATE	APPROVED BY:	APPROVED BY:	DATE:	
06/13/14	ERIC J. WENGER, P.E., CITY ENGINEER	MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	8/7/14	W-39

FIRE FLOW METER VAULT INSTALLATION

WATER STANDARD DETAIL

Reinforcing Schedule for Concrete Vaults														
Meter Size	By-Pass Size	Design No.	Depth (feet)	A	B	Wall Thickness	Floor Thickness	Vertical Bars		Horizontal Bars		Top Thickness	Top Bars	
								Size	Spacing	Size	Spacing		Size	Spacing
6"	3"	9	5	15'-6"	9'-6"	8	10	4	12	4	12	8	5	8
		10	6	15'-6"	9'-6"	8	10	4	9	4	12	8	5	8
		11	7	15'-6"	9'-6"	8	10	5	12	4	12	8	5	8
		12	8	15'-6"	9'-6"	8	10	5	9	4	12	8	5	8
8"	4"	13	5	17'-0"	11'-0"	8	10	4	12	4	12	8	5	8
		14	6	17'-0"	11'-0"	8	10	4	9	4	12	8	5	8
		15	7	17'-0"	11'-0"	8	10	5	12	4	12	8	5	8
		16	8	17'-0"	11'-0"	8	10	5	9	4	12	8	5	8
10"	6"	17	5	20'-0"	13'-6"	8	10	4	12	4	12	8	5	8
		18	6	20'-0"	13'-6"	8	10	4	9	4	12	8	5	8
		19	7	20'-0"	13'-6"	10	11	5	12	4	12	8	5	8
		20	8	20'-0"	13'-6"	10	11	5	12	4	12	8	5	8
12"	8"	21	5	20'-0"	15'-6"	8	10	4	12	4	12	8	5	8
		22	6	20'-0"	15'-6"	8	10	4	9	4	12	8	5	8
		23	7	20'-0"	15'-6"	10	11	4	6	5	12	8	5	8
		24	8	20'-0"	15'-6"	10	11	5	6	5	12	8	5	8

NOTES:
1. ALL REINFORCING REBAR SHALL BE GRADE 60.
2. TOP BARS SHALL BE PLACED IN TWO MATS. BAR SIZE AND SPACING SHALL IN EACH DIRECTION BE INCLUDED IN EACH MAT OF STEEL
3. FLOOR REINFORCING USE #4 BARS @ 12" C/C EACH WAY FOR THE TOP MAT AND THE BOTTOM MAT OF REINFORCING.
4. WALL, FLOOR AND TOP THICKNESS ARE IN INCHES. STEEL REINFORCEMENT SPACING IS IN INCHES.

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14 DATE

APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER DATE:

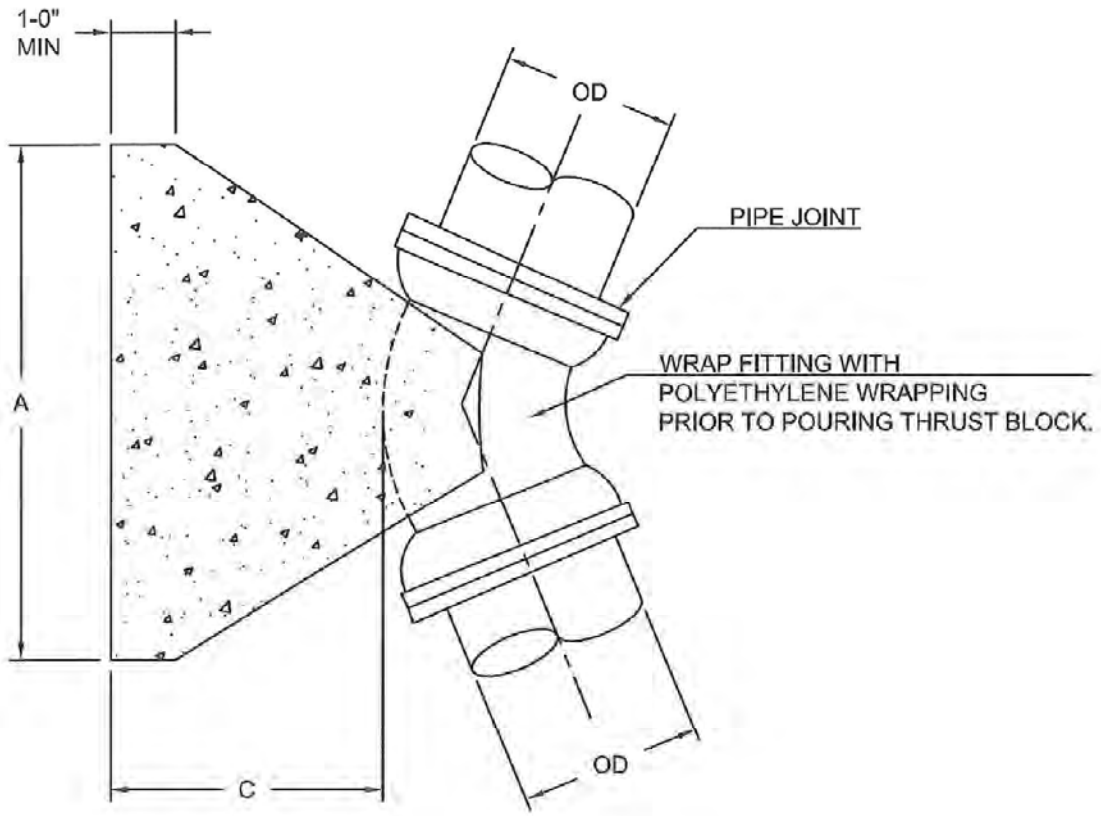
APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR DATE: 6/11/14

FIRE FLOW METER VAULT INSTALLATION

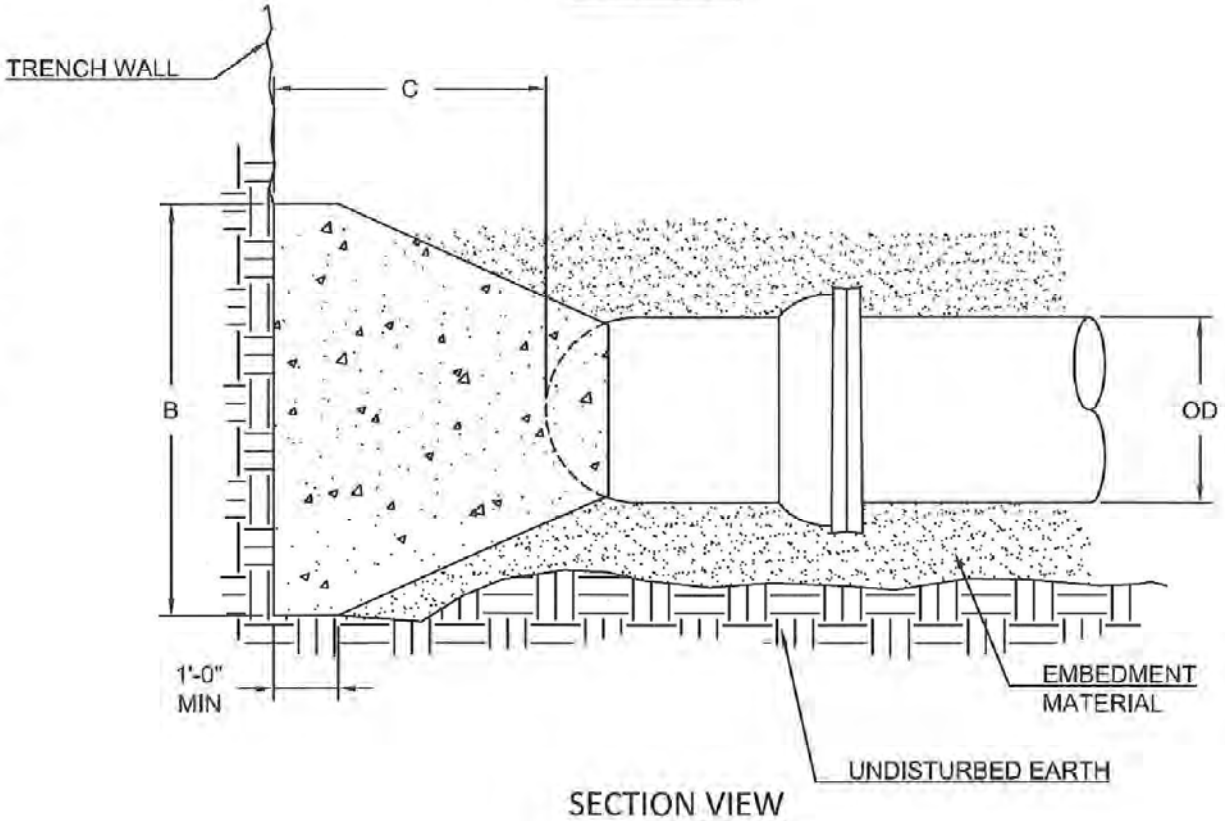
5 OF 5

W-40

WATER STANDARD DETAIL



PLAN VIEW



SECTION VIEW

HORIZONTAL THRUST BLOCK - BENDS

1 OF 3

06/13/14 DATE	APPROVED BY: Eric J. Wenger DATE: ERIC J. WENGER, P.E., CITY ENGINEER	APPROVED BY: M Slaughter DATE: 8/7/14 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	W-41

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
DATE

APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/7/14

HORIZONTAL THRUST BLOCK - BENDS

2 OF 3

W-42

Thrust Force (Tons)				
Pipe Dia (in)	90 Deg Bend	45 Deg Bend	22.5 Deg Bend	11.25 Deg Bend
4	0.02	2.60	1.32	0.67
6	9.92	5.37	2.74	1.37
8	17.06	9.23	4.71	2.36
10	25.66	13.89	7.08	3.56
12	36.29	19.64	10.01	5.03
14	48.75	26.38	13.45	6.76
16	63.05	34.12	17.40	8.74
18	79.19	42.86	21.85	10.98
20	97.17	52.59	26.81	13.47
24	138.63	75.02	38.25	19.22
30	213.26	115.41	58.84	29.56

Area of Thrust Block (sf)				
Pipe Dia (in)	90 Deg Bend	45 Deg Bend	22.5 Deg Bend	11.25 Deg Bend
4	**6.40**	**3.46**	**1.77**	**0.89**
6	**13.22**	**7.15**	**3.65**	**1.83**
8	**22.74**	**12.31**	**6.27**	**3.15**
10	**34.21**	**18.52**	**9.44**	**4.74**
12	**48.38**	**26.18**	**13.35**	**6.71**
14	**65.00**	**35.18**	**17.93**	**9.01**
16	**84.07**	**45.50**	**23.19**	**11.65**
18	**105.59**	**57.14**	**29.13**	**14.64**
20	**129.55**	**70.11**	**35.74**	**17.96**
24	**184.84**	**100.03**	**51.00**	**25.62**
30	**284.34**	**153.89**	**78.45**	**39.42**

NOTES:

- SIZING OF THRUST BLOCK BASED ON THE FOLLOWING CONDITIONS:

  SOIL BEARING: 1500 PSI
  WORKING PRESSURE: 150 PSI
  SURGE PRESSURE: 100 PSI
  TOTAL DESIGN PRESSURE: 250 PSI
  FACTOR OF SAFETY: 1.5

- THRUST BLOCK CONCRETE TO BE 3500 PSI 7 DAY HIGH EARLY STRENGTH CONCRETE.
- WRAP FITTINGS AND/PIPE WITH 8 MIL POLYETHYLENE WRAPPING PRIOR TO POURING THRUST BLOCK.
- THRUST BLOCK TO BE POURED AGAINST UNDISTURBED EARTH. IF FILL IS REQUIRED, 95% COMPACTION IS REQUIRED FOR FILL MATERIAL.
- BEARING AREAS, VOLUMES, AND SPECIAL THRUST BLOCKING DETAILS SHOWN ON DRAWINGS TAKE PRECEDENCE OVER THIS PLAN.
- THRUST BLOCK DIMENSIONS CAN BE MODIFIED BUT MUST STILL MAINTAIN THE SURFACE AREA FOOTPRINT AGAINST THE SOIL.
- LEAVE ALL PIPE JOINTS COMPLETELY ACCESSIBLE. DO NOT POUR CONCRETE OVER ANY PIPE JOINTS.
- FITTINGS GREATER THAN 36-INCH REQUIRE CALCULATIONS FROM ENGINEER TO BE SUBMITTED FOR REVIEW.

Volume of Thrust Block (cy)				
Pipe Dia (in)	90 Deg Bend	45 Deg Bend	22.5 Deg Bend	11.25 Deg Bend
4	**0.07**	**0.03**	**0.01**	**0.00**
6	**0.20**	**0.09**	**0.03**	**0.01**
8	**0.42**	**0.19**	**0.07**	**0.02**
10	**0.84**	**0.35**	**0.13**	**0.05**
12	**1.50**	**0.57**	**0.21**	**0.08**
14	**2.25**	**0.95**	**0.33**	**0.12**
16	**3.26**	**1.32**	**0.51**	**0.17**
18	**4.24**	**1.96**	**0.72**	**0.24**
20	**5.41**	**2.61**	**0.95**	**0.33**
24	**8.27**	**4.22**	**1.58**	**0.57**
30	**14.49**	**7.12**	**3.01**	**1.08**

WATER STANDARD DETAIL

Dimension "A" (ft)						Dimension "B" (ft)				
Pipe Dia (in)	90 Deg Bend	45 Deg Bend	22.5 Deg Bend	11.25 Deg Bend		Pipe Dia (in)	90 Deg Bend	45 Deg Bend	22.5 Deg Bend	11.25 Deg Bend
4	3.75	2.75	1.75	1.25		4	1.75	1.25	1.00	0.75
6	5.25	3.50	2.50	2.00		6	2.50	2.00	1.50	1.00
8	7.50	5.00	3.50	2.50		8	3.00	2.50	1.75	1.25
10	8.50	6.25	4.25	3.00		10	4.00	3.00	2.25	1.50
12	9.75	7.50	5.50	4.00		12	5.00	3.50	2.50	1.75
14	12.00	8.50	6.00	4.50		14	5.50	4.25	3.00	2.00
16	13.50	9.50	6.75	4.75		16	6.25	4.75	3.50	2.50
18	16.25	10.50	7.25	5.50		18	6.50	5.50	4.00	2.75
20	19.25	11.75	8.50	6.00		20	6.75	6.00	4.25	3.00
24	25.50	15.00	10.25	10.25		24	7.25	6.75	5.00	2.50
30	34.50	20.50	12.50	8.75		30	8.25	7.50	6.25	4.50

Dimension "C" (ft)				
Pipe Dia (in)	90 Deg Bend	45 Deg Bend	22.5 Deg Bend	11.25 Deg Bend
4	0.88	0.63	0.50	0.38
6	1.25	1.00	0.75	0.50
8	1.50	1.25	0.88	0.63
10	2.00	1.50	1.13	0.75
12	2.50	1.75	1.25	0.88
14	2.75	2.13	1.50	1.00
16	3.13	2.38	1.75	1.25
18	3.25	2.75	2.00	1.38
20	3.38	3.00	2.13	1.50
24	3.63	3.38	2.50	1.25
30	4.13	3.75	3.13	2.25

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
DATE

APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

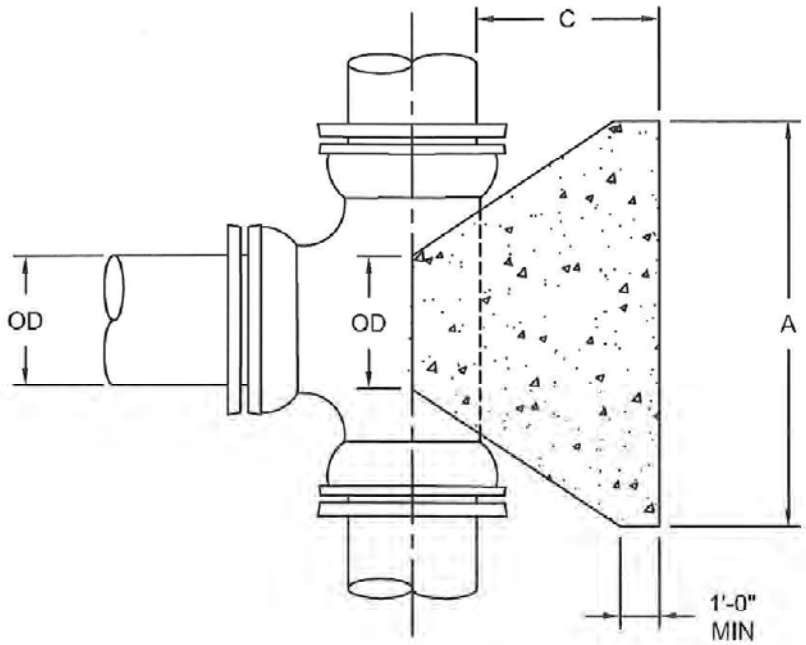
APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 6/7/14

HORIZONTAL THRUST BLOCK - BENDS

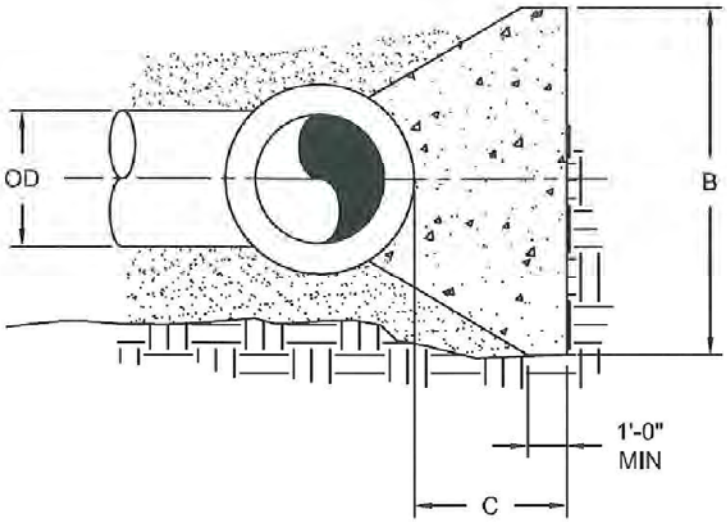
3 OF 3

W-43

WATER STANDARD DETAIL



PLAN VIEW



SECTION VIEW

HORIZONTAL THRUST BLOCK - TEES, PLUGS, VALVES

06/13/14 DATE	APPROVED BY: Eric J. Wenger DATE: ERIC J. WENGER, P.E., CITY ENGINEER	APPROVED BY: M Slaughter DATE: 8/7/14 MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR	W-44

WATER STANDARD DETAIL

NOTES:

- SIZING OF THRUST BLOCK BASED ON THE FOLLOWING CONDITIONS:

  SOIL BEARING: 1500 PSI
  WORKING PRESSURE: 150 PSI
  SURGE PRESSURE: 100 PSI
  TOTAL DESIGN PRESSURE: 250 PSI
  FACTOR OF SAFETY: 1.5

- THRUST BLOCK CONCRETE TO BE 3500 PSI 7 DAY HIGH EARLY STRENGTH CONCRETE.
- WRAP FITTINGS AND/PIPE WITH 8 MIL POLYETHYLENE WRAPPING PRIOR TO POURING THRUST BLOCK.
- THRUST BLOCK TO BE POURED AGAINST UNDISTURBED EARTH. IF FILL IS REQUIRED, 95% COMPACTION IS REQUIRED FOR FILL MATERIAL.
- BEARING AREAS, VOLUMES, AND SPECIAL THRUST BLOCKING DETAILS SHOWN ON DRAWINGS TAKE PRECEDENCE OVER THIS PLAN.
- THRUST BLOCK DIMENSIONS CAN BE MODIFIED BUT MUST STILL MAINTAIN THE SURFACE AREA FOOTPRINT AGAINST THE SOIL.
- LEAVE ALL PIPE JOINTS COMPLETELY ACCESSIBLE. DO NOT POUR CONCRETE OVER ANY PIPE JOINTS.
- FITTINGS GREATER THAN 36-INCH REQUIRE CALCULATIONS FROM ENGINEER TO BE SUBMITTED FOR REVIEW.

Pipe Dia (in)	*Thrust (Tons)*	*Dim "A" (ft)*	*Dim "B" (ft)*	*Dim "C" (ft)*	*Area (sf)*	*Volume (cy)*
4	3.4	3.00	1.50	1.00	4.52	0.04
6	7.0	4.25	2.25	1.00	9.35	0.13
8	12.1	5.50	3.00	1.25	16.08	0.31
10	18.1	7.00	3.50	1.50	24.19	0.53
12	25.7	8.00	4.25	1.75	34.21	0.89
14	34.5	9.25	5.00	2.00	45.96	1.43
16	44.6	11.00	5.50	2.25	59.45	2.05
18	56.0	12.00	6.25	2.50	74.66	2.89
20	68.7	14.00	6.50	2.75	91.61	3.65
24	98.0	18.75	7.00	3.25	130.70	5.67
30	150.8	27.00	7.50	3.75	201.06	9.38

OKLAHOMA CITY UTILITIES DEPARTMENT

06/13/14
DATE

APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

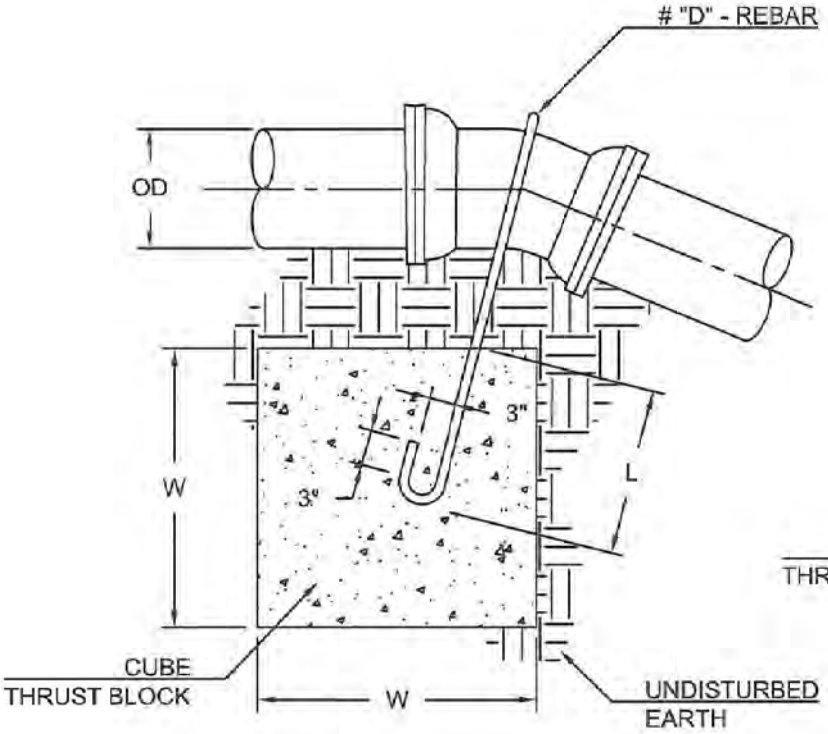
APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 8/7/14

HORIZONTAL THRUST BLOCK - TEES, PLUGS, VALVES

2 OF 2

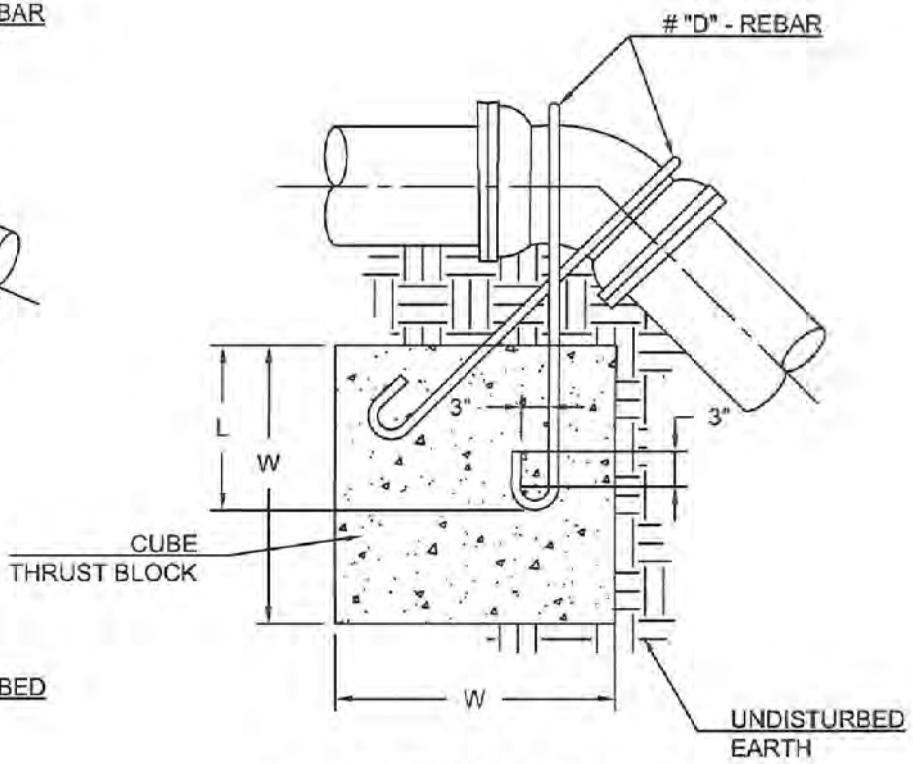
W-45

WATER STANDARD DETAIL



TYPE A RESTRAINT

FOR 11.25° & 22.50° VERT BENDS



TYPE B RESTRAINT

FOR 45° VERT BENDS

ELEVATION VIEW

VERTICAL THRUST BLOCK - BENDS

1 OF 2

DATE	06/13/14
APPROVED BY: ERIC J. WENGER, P.E., CITY ENGINEER — DATE:	
APPROVED BY: MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR — DATE:	6/17/14
	W-46

OKLAHOMA CITY UTILITIES DEPARTMENT

OKLAHOMA CITY UTILITIES DEPARTMENT

WATER STANDARD DETAIL

Type A Restraint

Pipe Dia	Bend (deg)	Side of Cube (W)	Bar Dia (D)	Embedment (L)	Volume
[inches]	[deg]	[ft]		[ft]	[cy]
4	11.25	2.00	#5	2.00	0.3
	22.50	2.75	#5	2.00	0.7
6	11.25	2.75	#5	2.00	0.7
	22.50	3.50	#5	2.00	1.4
8	11.25	3.25	#5	2.00	1.2
	22.50	4.00	#5	2.00	2.3
12	11.25	4.00	#6	2.00	2.5
	22.50	5.25	#6	3.00	4.9
16	11.25	5.00	#7	3.00	4.3
	22.50	6.25	#7	4.00	8.6
20	11.25	5.75	#8	3.50	6.7
	22.50	7.25	#8	4.00	13.2
24	11.25	6.50	#8	4.00	9.5
	22.50	8.00	#8	4.00	18.9
30	11.25	7.50	#8	4.00	14.6
	22.50	9.25	#8	4.00	29.1

Type B Restraint

Pipe Dia	Bend (deg)	Side of Cube (W)	Bar Dia (D)	Embedment (L)	Volume
[inches]	[deg]	[ft]		[ft]	[cy]
4	45.00	3.25	#5	2.00	1.3
6	45.00	4.25	#5	2.50	2.6
8	45.00	5.00	#5	2.00	4.6
12	45.00	6.50	#5	4.00	9.7
16	45.00	7.75	#6	4.00	16.9
20	45.00	9.00	#6	4.00	26.0
24	45.00	10.00	#6	4.00	37.0
30	45.00	12.00	#6	4.00	57.0

NOTES:

- SIZING OF THRUST BLOCK BASED OFF THE FOLLOWING CONDITIONS:

  SOIL BEARING: 1500 PSI
  WORKING PRESSURE: 150 PSI
  SURGE PRESSURE: 100 PSI
  TOTAL DESIGN PRESSURE: 250 PSI
  FACTOR OF SAFETY: 1.5

- THRUST BLOCK CONCRETE TO BE 3500 PSI 7 DAY HIGH EARLY STRENGTH CONCRETE.
- WRAP FITTINGS AND/PIPE WITH 8 MIL POLYETHYLENE WRAPPING PRIOR TO POURING THRUST BLOCK.
- THRUST BLOCK TO BE POURED AGAINST UNDISTURBED EARTH. IF FILL IS REQUIRED, 95% COMPACTION IS REQUIRED FOR FILL MATERIAL.
- BEARING AREAS, VOLUMES, AND SPECIAL THRUST BLOCKING DETAILS SHOWN ON DRAWINGS TAKE PRECEDENCE OVER THIS PLAN.
- THRUST BLOCK DIMENSIONS CAN BE MODIFIED BUT MUST STILL MAINTAIN THE SURFACE AREA FOOTPRINT AGAINST THE SOIL.
- LEAVE ALL PIPE JOINTS COMPLETELY ACCESSIBLE. DO NOT POUR CONCRETE OVER ANY PIPE JOINTS.
- EPOXY COATED REBAR MINIMUM STRESS YIELD STRENGTH OF REBAR IS 60 KSI.
- FITTINGS GREATER THAN 36-INCH REQUIRE CALCULATIONS FROM ENGINEER TO BE SUBMITTED FOR REVIEW.

06/13/14
DATE

APPROVED BY:
ERIC J. WENGER, P.E., CITY ENGINEER
DATE:

APPROVED BY:
MARSHA W. SLAUGHTER, P.E., UTILITIES DIRECTOR
DATE: 8/7/14

VERTICAL THRUST BLOCK - BENDS

2 OF 2

W-47