



Raleigh Water

STANDARD WATER DETAILS

TABLE OF CONTENTS

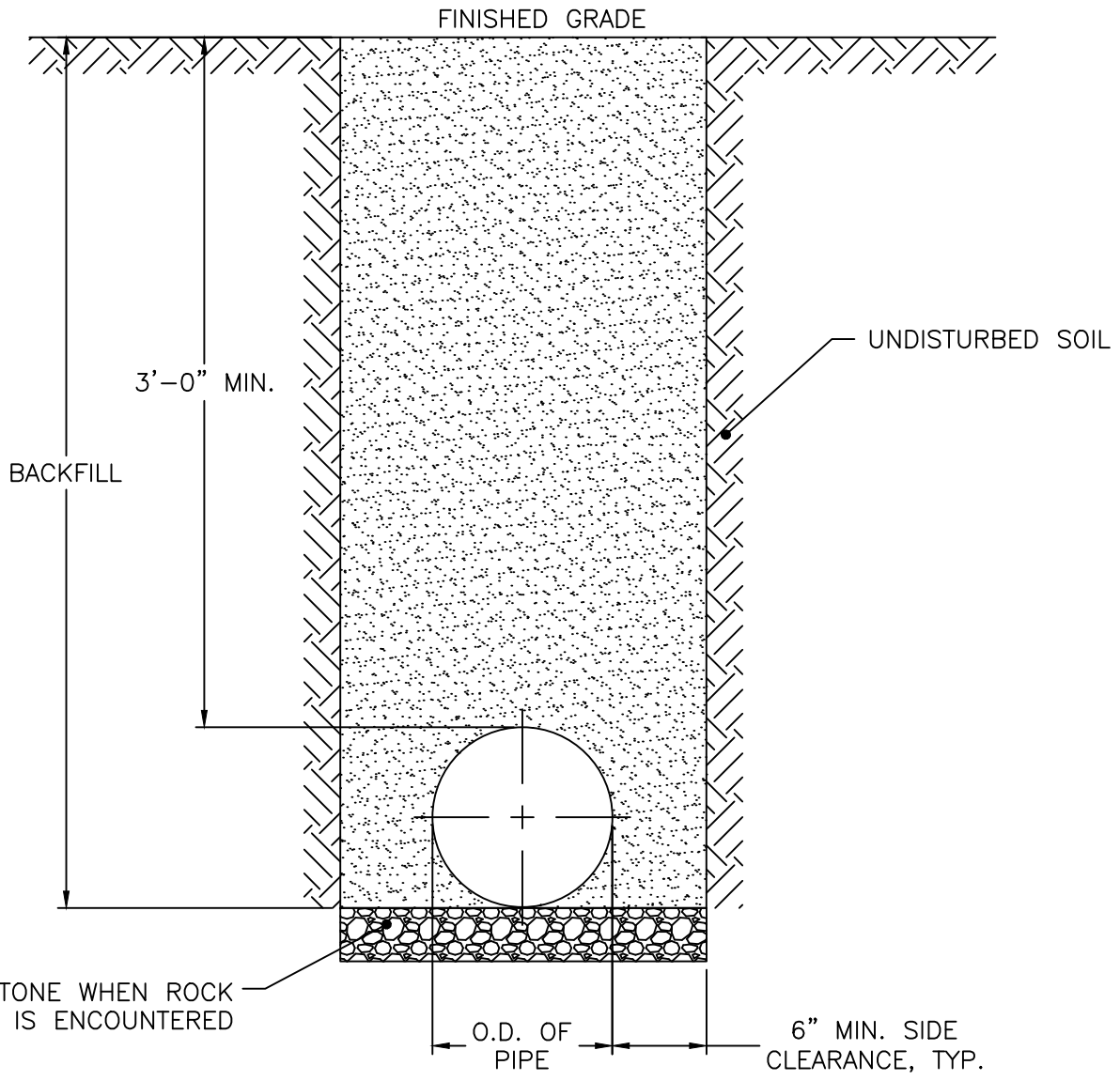
W-1	STANDARD CONCRETE PAVEMENT PATCH
W-2	STANDARD ASPHALT PAVEMENT PATCH
W-3	TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DI
W-4	STANDARD FIRE HYDRANT INSTALLATION (RESTRAINT GLANDS)
W-4A	STANDARD FIRE HYDRANT INSTALLATION (RESTRAINT RODS)
W-5	STANDARD FIRE HYDRANT WITH 5" STORZ PUMPER NOZZLE
W-6	HYDRANT OPERATING NUT AND 2 1/2" OUTLET THREADS
W-7	THRUST BLOCKING DESIGN DATA FOR WATER MAINS
W-8	THRUST BLOCKING INSTALL FOR 16" AND LARGER VALVES AND DEAD END MAINS
W-9	THRUST BLOCKING VIEWS
W-10	THRUST BLOCKING DESIGN QUANTITY TABLE
W-11	THRUST BLOCKING DESIGN QUANTITY TABLE
W-12	STANDARD VERTICAL BEND
W-13	MAIN & VALVE MARKER FOR POTABLE WATER IN EASEMENTS
W-14	4"-24" STANDARD TAPING SLEEVE AND VALVE ASSEMBLY
W-15	VALVE RESTRAINT AT TEES AND CROSSES FOR LINES (4"-24")
W-16	BUTTERFLY VALVE MANHOLE FOR 16" & LARGER MAINS
W-17	VALVE BOX INSTALLATION AND EXTENSION
W-17A	WATER VALVE AND BOX INSTALLATION
W-18	5 1/4" VALVE BOX DROP LID WITH 4" SKIRT
W-18A	REVERSE TAP 5 1/4" VALVE BOX DROP LID WITH 4" SKIRT
W-19	WATER AIR RELEASE VALVE
W-20	STANDARD MANHOLE COVER
W-21	TEMPORARY WATER MAIN BLOW OFF ASSEMBLY
W-22	PERMANENT WATER MAIN BLOW OFF ASSEMBLY
W-23	STANDARD 3/4" & 1" WATER SERVICE INSTALLATION
W-24	ONE OR TWO FAMILY DWELLINGS BACKFLOW PREVENTION/ METER ASSEMBLY
W-25	WATER METER BOX
W-26	STANDARD GANG METER ASSEMBLY
W-27	GANG METER ADDRESSING SINGLE STORY BUILDING
W-28	GANG METER ADDRESSING MULTI-STORY BUILDING
W-29	TYPICAL 4"-8" DOMESTIC WATER METER BYPASS INSTALLATION

- W-30 TYPICAL 6"-10" FIRE SERVICE AND DOMESTIC METER W/ BYPASS
 - W-31 TYPICAL 1 1/2"-2" WATER METER BOX INSTALLATION
 - W-32 TYPICAL 4" WATER METER VAULT
 - W-33 TYPICAL 6"-10" WATER METER VAULT
 - W-34 FIRE, DOMESTIC & IRRIGATION OPTIONS SCHEMATIC
 - W-35 IRRIGATION TAP ON NEW AND EXISTING SERVICES
 - W-35A IRRIGATION METER TERMINATION
 - W-36 TYPICAL REDUCED PRESSURE ZONE BACKFLOW PREVENTER ASSEMBLY
 - W-37 TYPICAL FIRE MAIN DOUBLE DETECTOR CHECK VALVE ASSEMBLY
 - W-38 STANDARD DOUBLE CHECK VALVE ASSEMBLY
 - W-39 NOT USED
 - W-40 PIPE ALIGNMENT GUIDE
 - W-41 CONCRETE CRADLE PROTECTION FOR WATER LINE CROSSINGS
-

SEE TRANSPORTATION DETAIL
T-10.05.1 FOR ASPHALT REPAIR

SEE TRANSPORTATION DETAIL
T-10.05.2 FOR ASPHALT REPAIR EXTENTS

CITY OF RALEIGH		
STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	STANDARD ASPHALT PAVEMENT PATCH	
	W-2	

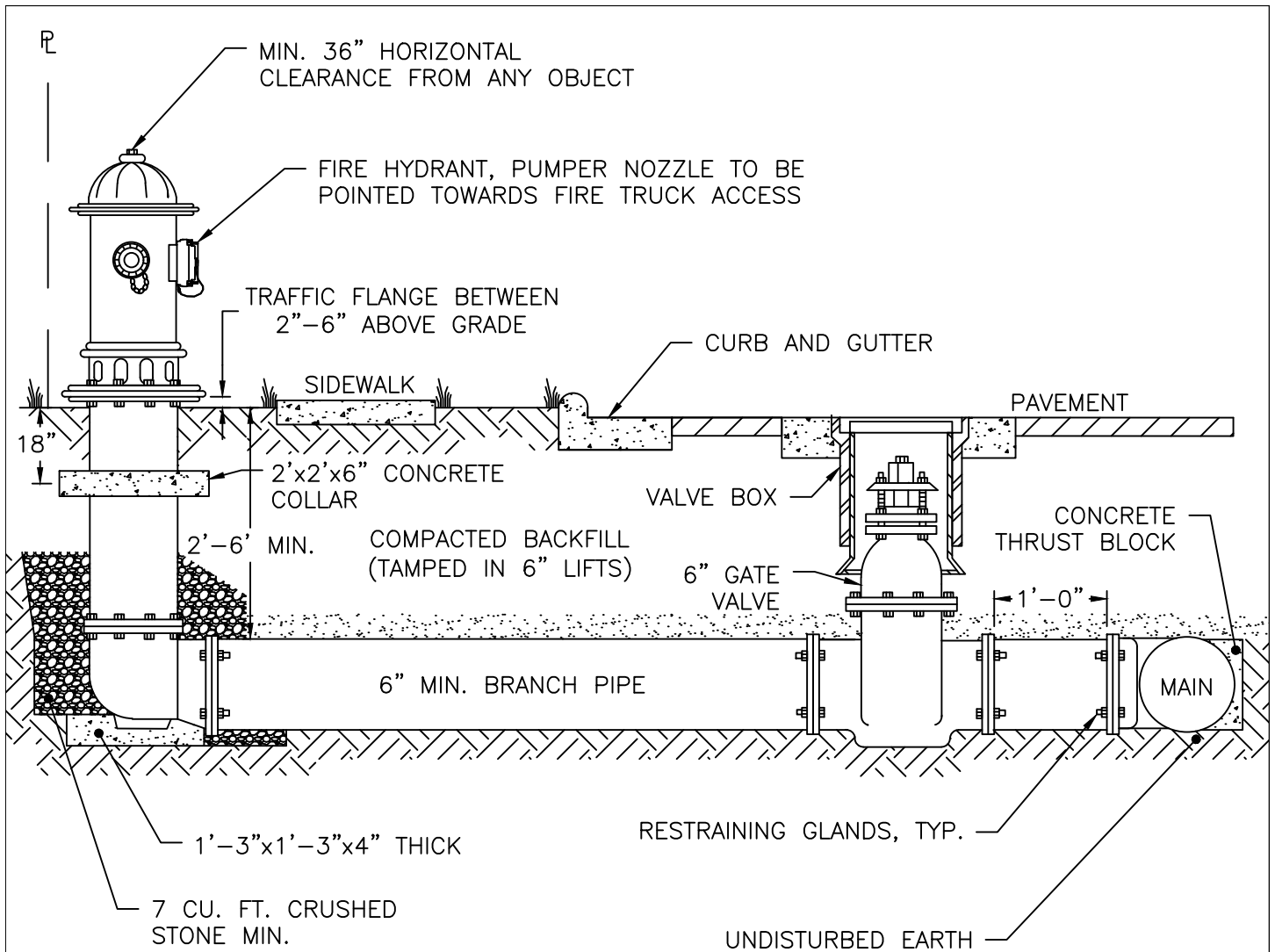


6" #67 STONE WHEN ROCK OR WATER IS ENCOUNTERED

NOTES:

1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS.
5. ACHIEVE 95% COMPACTION IN BACKFILL.

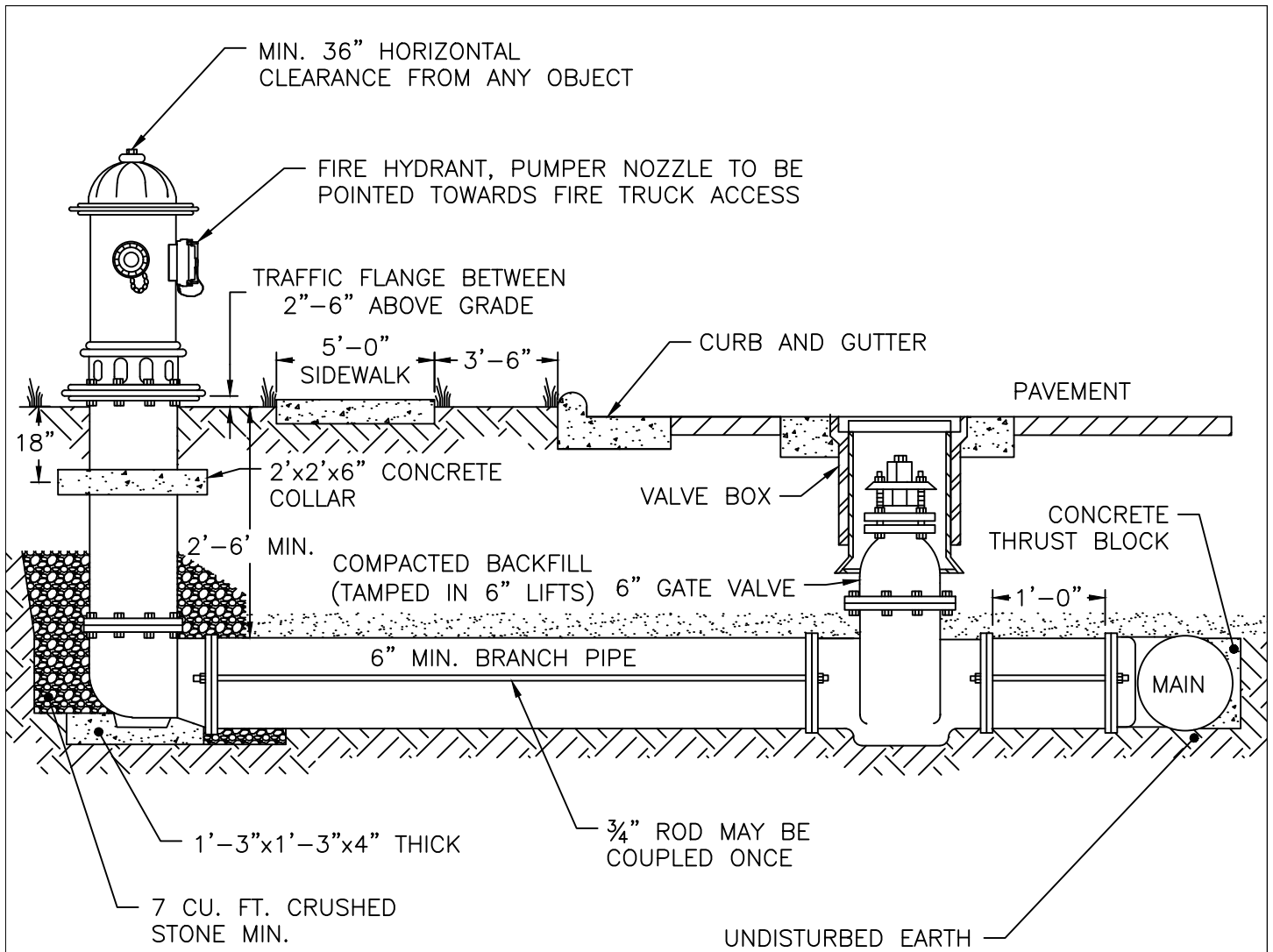
CITY OF RALEIGH		
STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS FOR DUCTILE IRON	
W-3		



NOTES:

1. FIRE HYDRANT SHALL BE AS MANUFACTURED: MUELLER, AMERICAN DARLING, KENNEDY OR CLOW.
2. BRANCH PIPE SHALL BE DUCTILE IRON AWWA C150.
3. 6" GATE VALVE SHALL BE AWWA C500 OPEN LEFT.
4. RODS AND BOLTS SHALL BE $\frac{3}{4}$ " 316 STAINLESS STEEL.
5. FIRE HYDRANTS WILL BE INSTALLED IN TRUE VERTICAL POSITION.
6. RODS SHALL NOT BE COUPLED MORE THAN ONCE. IF THE LENGTH FROM THE VALVE TO THE HYDRANT EXCEEDS 20' THEN A MECHANICAL RESTRAINING GLAND WITH A REBAR CAGE SHALL BE INSTALLED NO MORE THAN 10' FROM HYDRANT AND POURED IN CONCRETE.
7. FIRE HYDRANTS TO BE LOCATED IN ROW OR 2.5 FOOT EASEMENT (ON ALL SIDES OF HYDRANT) FOOT EASEMENT ADJACENT TO ROW.
8. ANYTIME SITE WORK, CONSTRUCTION, ROAD WORK, OR ANY OTHER WORK CHANGES THE GRADE OF THE FIRE HYDRANT, THE PERSON RESPONSIBLE FOR THE WORK IS RESPONSIBLE FOR ADJUSTING THE FIRE HYDRANT TO STAY WITHIN COMPLIANCE.

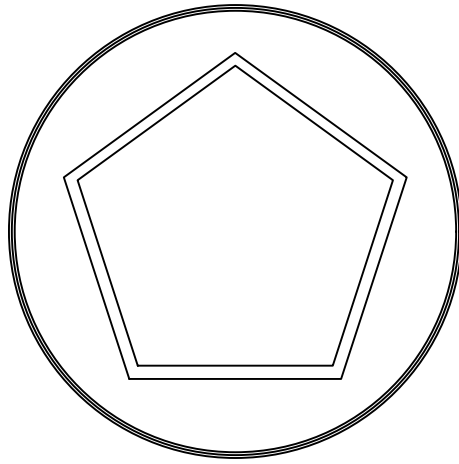
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD FIRE HYDRANT INSTALLATION (RESTRAINT GLANDS)	
	W-4	



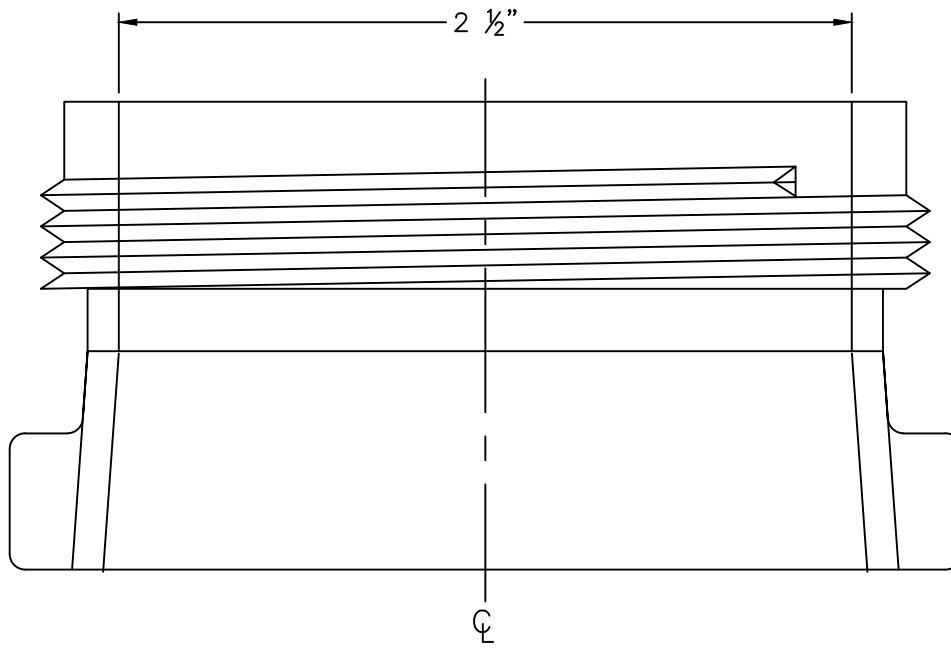
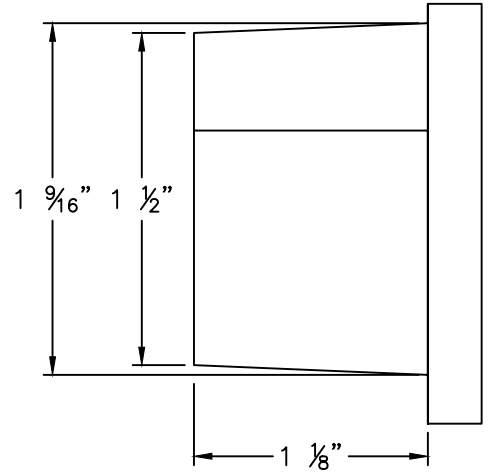
NOTES:

1. FIRE HYDRANT SHALL BE AS MANUFACTURED: MUELLER, AMERICAN DARLING, KENNEDY OR CLOW.
2. BRANCH PIPE SHALL BE DUCTILE IRON AWWA C150.
3. 6" GATE VALVE SHALL BE AWWA C500 OPEN LEFT.
4. RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.
5. FIRE HYDRANTS WILL BE INSTALLED IN TRUE VERTICAL POSITION.
6. RODS SHALL NOT BE COUPLED MORE THAN ONCE. IF THE LENGTH FROM THE VALVE TO THE HYDRANT EXCEEDS 20' THEN A MECHANICAL RESTRAINING GLAND WITH A REBAR CAGE SHALL BE INSTALLED NO MORE THAN 10' FROM HYDRANT AND POURED IN CONCRETE.
7. FIRE HYDRANTS TO BE LOCATED IN ROW OR 2.5 FOOT EASEMENT (ON ALL SIDES OF HYDRANT) FOOT EASEMENT ADJACENT TO ROW.
8. ANYTIME SITE WORK, CONSTRUCTION, ROAD WORK, OR ANY OTHER WORK CHANGES THE GRADE OF THE FIRE HYDRANT, THE PERSON RESPONSIBLE FOR THE WORK IS RESPONSIBLE FOR ADJUSTING THE FIRE HYDRANT TO STAY WITHIN COMPLIANCE.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD FIRE HYDRANT INSTALLATION (RESTRAINT RODS)	
	W-4A	



1 $\frac{9}{16}$ " OPERATION NUT



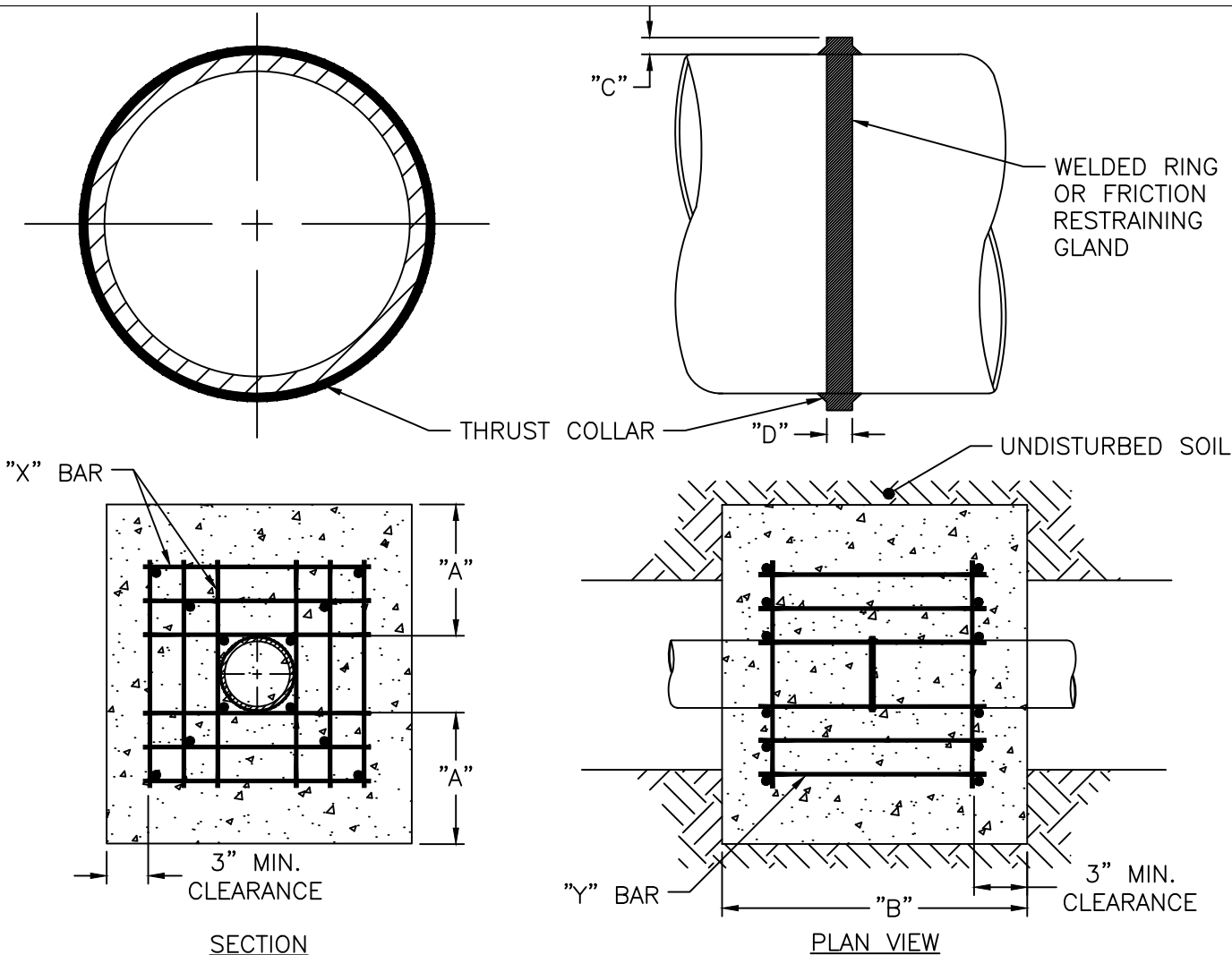
2 $\frac{1}{2}$ " NATIONAL STANDARD OUTLET THREADS

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 01/18/2025 NOT TO SCALE

HYDRANT OPERATING NUT
AND 2 $\frac{1}{2}$ "
OUTLET THREADS

W-6



SECTION

PLAN VIEW

REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6"-36"	#5	2'-2"+ O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24 Y-12
≥48"	#6	3'-0"+ O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24 Y-12

THRUST COLLAR AND THRUST SCHEDULE

I.D. PIPE	"A"	"B"	"C"	"D"
6"-16"	1'-4"	1'-7"	2"	3/8"
20"-24"	1'-4"	1'-7"	3"	1/2"
30"-36"	1'-4"	1'-7"	4"	5/8"
≥48"	1'-8"	1'-9"	6"	7/8"

NOTES:

1. SEE DETAIL W-9 FOR THRUST BLOCK LOCATIONS.
2. CONCRETE SHALL BE 3,000 PSI AND TRANSIT MIXED.
3. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
4. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON DETAIL W-3.
5. BACKFILL TAMPED IN 6" LIFTS, SEE DETAIL W-3.
6. THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE.

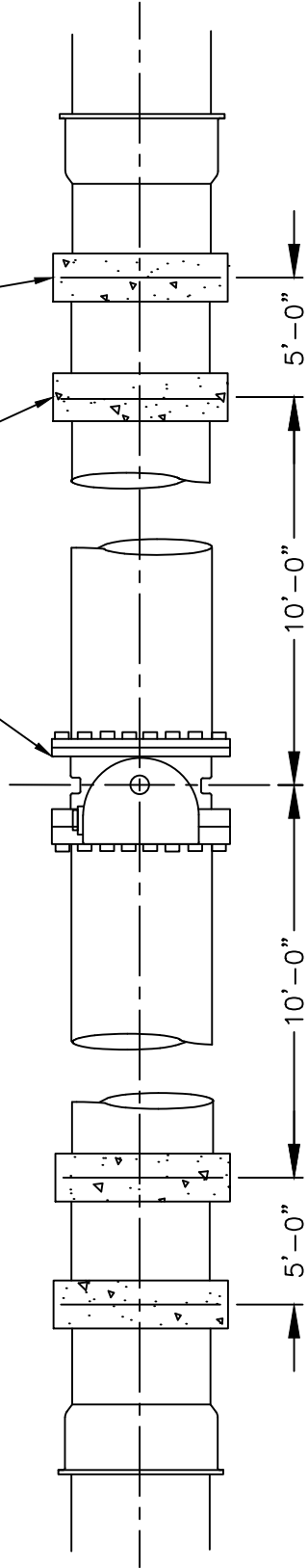
CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	THRUST BLOCKING DESIGN DATA FOR WATER MAINS	
	W-7	

16" MAIN - 1 THRUST BLOCK
 REQUIRED, ON MAINS GREATER THAN
 16" 2 THRUST BLOCKS REQUIRED

STANDARD THRUST BLOCK,
 SEE DETAIL W-7

VALVE



THRUST BLOCKING AT VALVES 16" AND LARGER

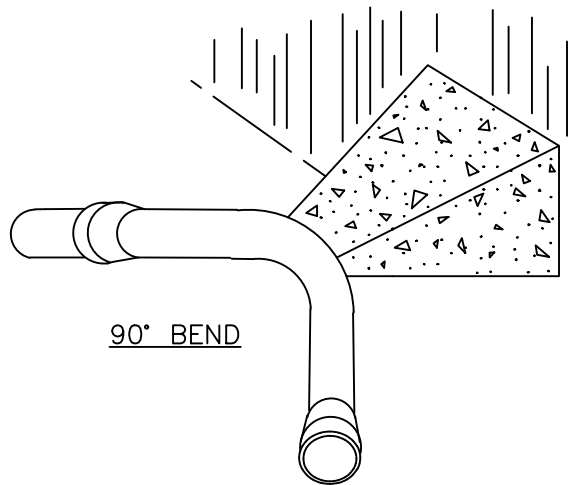
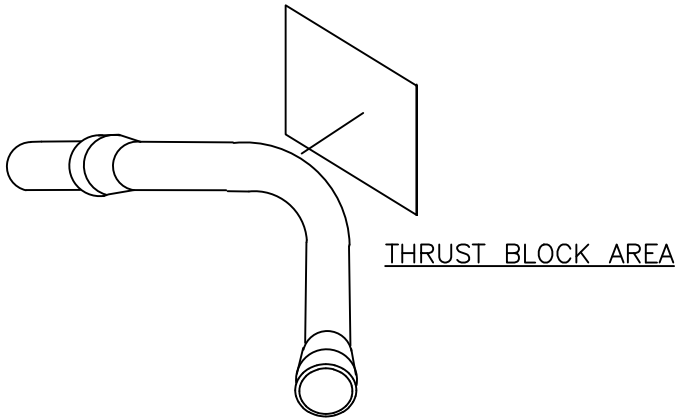
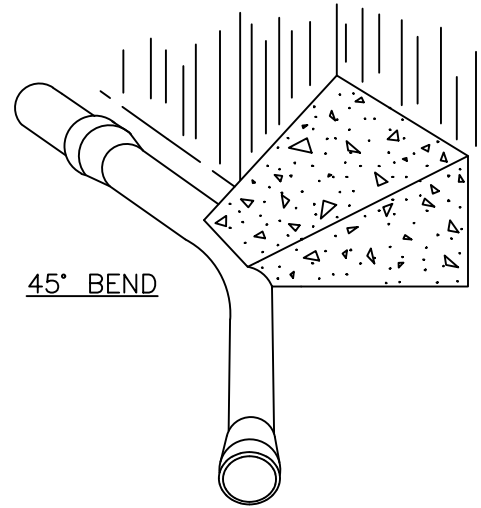
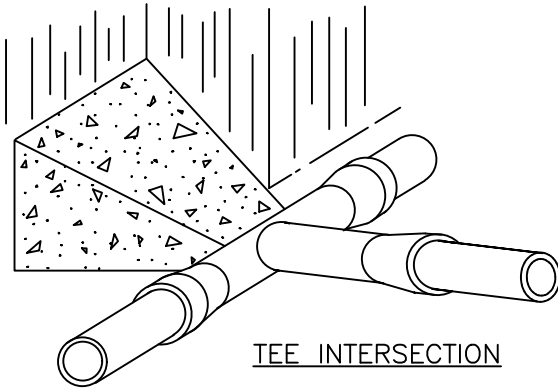
CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
-----------	------------------	--------------

STANDARD THRUST BLOCKING
 INSTALLATION FOR 16" AND LARGER
 VALVES AND DEAD END MAINS

W-8

THRUST BLOCKING



NOTES:

1. CONCRETE SHALL BE 3,000 PSI.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. TRENCHES SHALL CONFORM TO DETAIL W-3.
4. SEE DETAIL W-10 & W-11 (THRUST BLOCK TABLES) FOR AREA OF CONCRETE REQUIRED.
5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

CITY OF RALEIGH		
STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	THRUST BLOCKING VIEWS	
	W-9	

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS
BASED ON TEST PRESSURE OF 200 PSI

ALL AREAS GIVEN IN SQUARE FEET

SIZE OF BEND	DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY DRY CLAY 4,000 LBS/FT ²	SOFT CLAY 2,000 LBS/FT ²	1,600 LBS/FT ² GRAVEL/COARSE SAND	8,000 LBS/FT ² DRY CLAY (ALWAYS DRY)	SAND, COMPACT FIRM 8,000 LBS/FT ²	SAND-CLEAN DRY 4,000 LBS/FT ²	SOIL 1,000 LBS/FT ² QUICKSAND (VERY POOR)	ROCK-POOR 10,000 LBS/FT ²
6"	11 ¼°	1,108	1	1	1	1	1	1	2	1
	22 ½°	2,207	1	2	2	1	1	1	3	1
	45°	4,328	2	3	3	1	1	2	5	1
	90°	7,996	2	4	5	1	1	2	8	1
	PLUG	5,655	2	3	4	1	1	2	6	1
8"	11 ¼°	1,970	1	1	2	1	1	1	2	1
	22 ½°	3,922	1	2	3	1	1	1	4	1
	45°	7,694	2	4	5	1	1	2	8	1
	90°	14,215	4	8	9	2	2	4	15	2
	PLUG	10,053	3	5	6	2	2	3	10	1
12"	11 ¼°	4,433	2	3	3	1	1	2	5	1
	22 ½°	8,826	3	5	6	2	2	3	9	1
	45°	17,312	5	9	11	3	3	5	18	2
	90°	31,983	8	16	19	4	4	8	32	4
	PLUG	22,619	6	12	14	3	3	6	23	3
16"	11 ¼°	7,881	2	4	5	1	1	2	8	1
	22 ½°	15,691	4	8	10	2	2	4	16	2
	45°	30,779	8	16	19	4	4	8	31	4
	90°	56,861	15	29	35	8	8	15	57	6
	PLUG	40,213	10	21	25	5	5	10	41	5

NOTES:

- REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.
- USE 6" 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

**CITY OF RALEIGH
STANDARD DETAIL**

REVISIONS DATE: 01/18/2025 NOT TO SCALE

THRUST BLOCKING DESIGN
QUANTITY TABLE

W-10

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS
BASED ON TEST PRESSURE OF 200 PSI

ALL AREAS GIVEN IN SQUARE FEET

SIZE OF BEND	DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY DRY CLAY 4,000 LBS/FT ²	SOFT CLAY 2,000 LBS/FT ²	1,600 LBS/FT ² GRAVE/COARSE SAND	8,000 LBS/FT ² DRY CLAY (ALWAYS DRY)	SAND, COMPACT FIRM 8,000 LBS/FT ²	SAND-CLEAN DRY 4,000 LBS/FT ²	SOIL 1,000 LBS/FT ² QUICKSAND (VERY POOR)	ROCK-POOR 10,000 LBS/FT ²
24"	11 ¼°	17,734	5	9	11	3	3	5	18	2
	22 ½°	35,305	9	18	22	5	5	9	36	4
	45°	69,252	18	35	42	9	9	18	70	7
	90°	127,936	32	64	77	16	16	32	128	113
	PLUG	90,478	23	46	55	12	12	23	91	10
30"	11 ¼°	27,709	7	14	17	4	4	7	2	3
	22 ½°	55,163	14	28	34	7	7	14	56	6
	45°	108,206	28	55	65	14	14	28	109	11
	90°	199,900	50	100	120	25	25	50	200	20
	PLUG	141,372	36	71	85	18	18	36	142	15
36"	11 ¼°	39,901	10	20	24	5	5	10	40	4
	22 ½°	79,439	20	40	48	10	10	20	30	8
	45°	155,816	39	78	94	20	20	39	156	16
	90°	287,855	72	144	172	36	36	72	288	29
	PLUG	203,575	51	102	122	26	26	51	204	21
48"	11 ¼°	70,935	18	36	43	9	9	18	71	8
	22 ½°	141,218	36	71	85	18	18	36	142	15
	45°	277,007	70	139	166	35	35	70	277	28
	90°	511,742	128	256	320	64	64	128	512	52
	PLUG	361,911	91	181	217	46	46	91	362	37

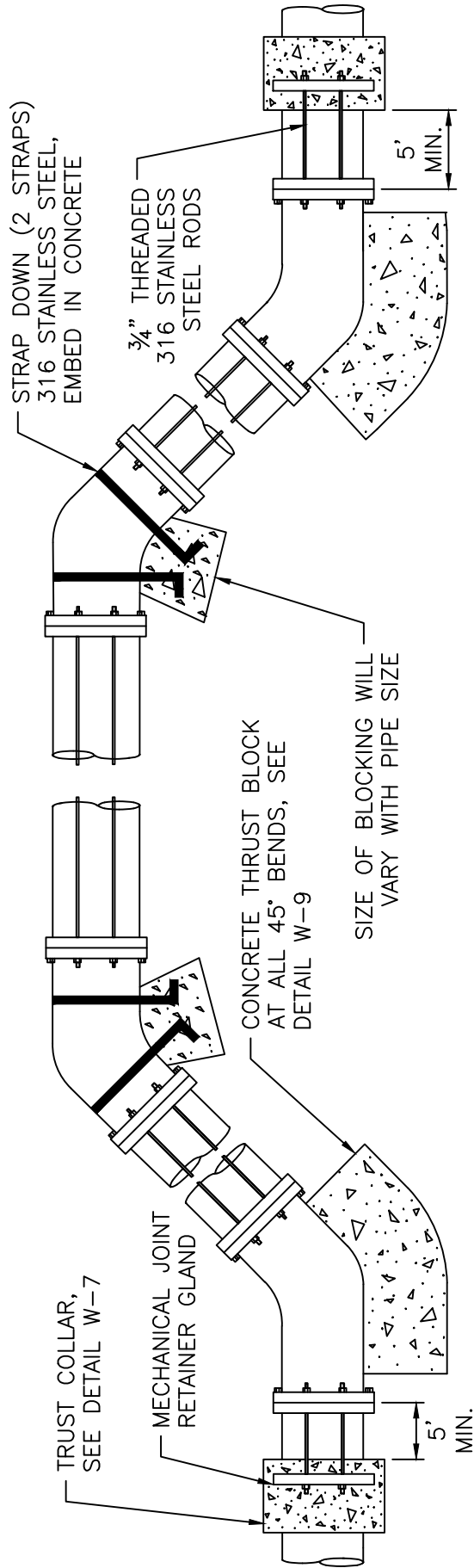
NOTES:

- REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.
- USE 6" 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

**CITY OF RALEIGH
STANDARD DETAIL**

<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	THRUST BLOCKING DESIGN QUANTITY TABLE	
	W-11	

TOP OF GROUND



STRAP REQUIREMENTS

SIZE OF 45° BEND	STATIC TRUST IN POUNDS	NO. OF RODS REQUIRED	STRAP WIDTH	STRAP THICKNESS
6"	4,328	2	1"	3/16"
8"	7,694	4	1.5"	3/16"
12"	17,312	4	2"	1/4"
16"	30,779	8	2"	1/2"
24"	69,252	8	4"	1/2"

ROD REQUIREMENTS

PIPE DIA	RODDING	RJ GLANDS	THRUST COLLAR	THRUST BLOCKING
<12"	X	X	X	
≥12"	X	X	X	X

RESTRAINT REQUIREMENTS

"X" DENOTES REQUIRED RESTRAINT.

NOTES:

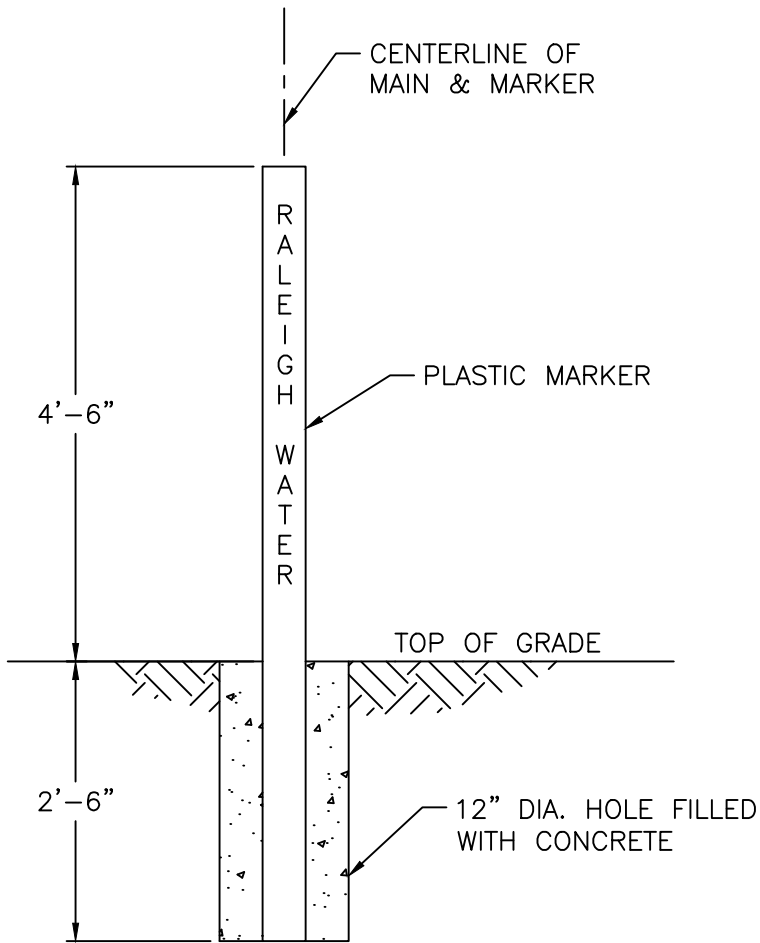
1. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.
5. 3' MINIMUM COVER MUST BE MAINTAINED.
6. EXTERNAL RESTRAINT REQUIRED. INTEGRAL BELL RESTRAINT REQUIRES DIRECTOR'S APPROVAL.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 01/18/2025 NOT TO SCALE

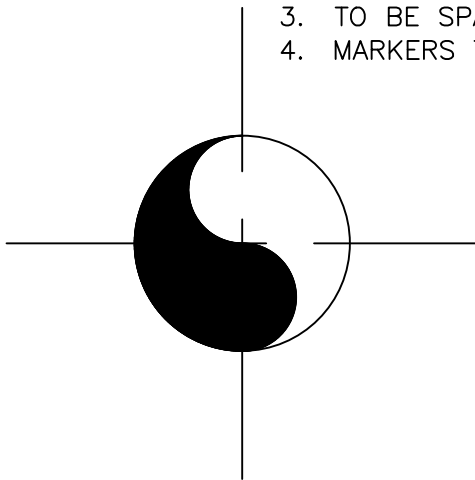
STANDARD VERTICAL BEND

W-12



NOTES:

1. POTABLE WATER MARKER TO BE BLUE IN COLOR.
2. POTABLE WATER MARKER TO BE LABELED "RALEIGH WATER"
3. TO BE SPACED ALONG CENTERLINE OF MAIN EVERY 300 FEET.
4. MARKERS TO BE ROUND AND 4" IN DIAMETER.



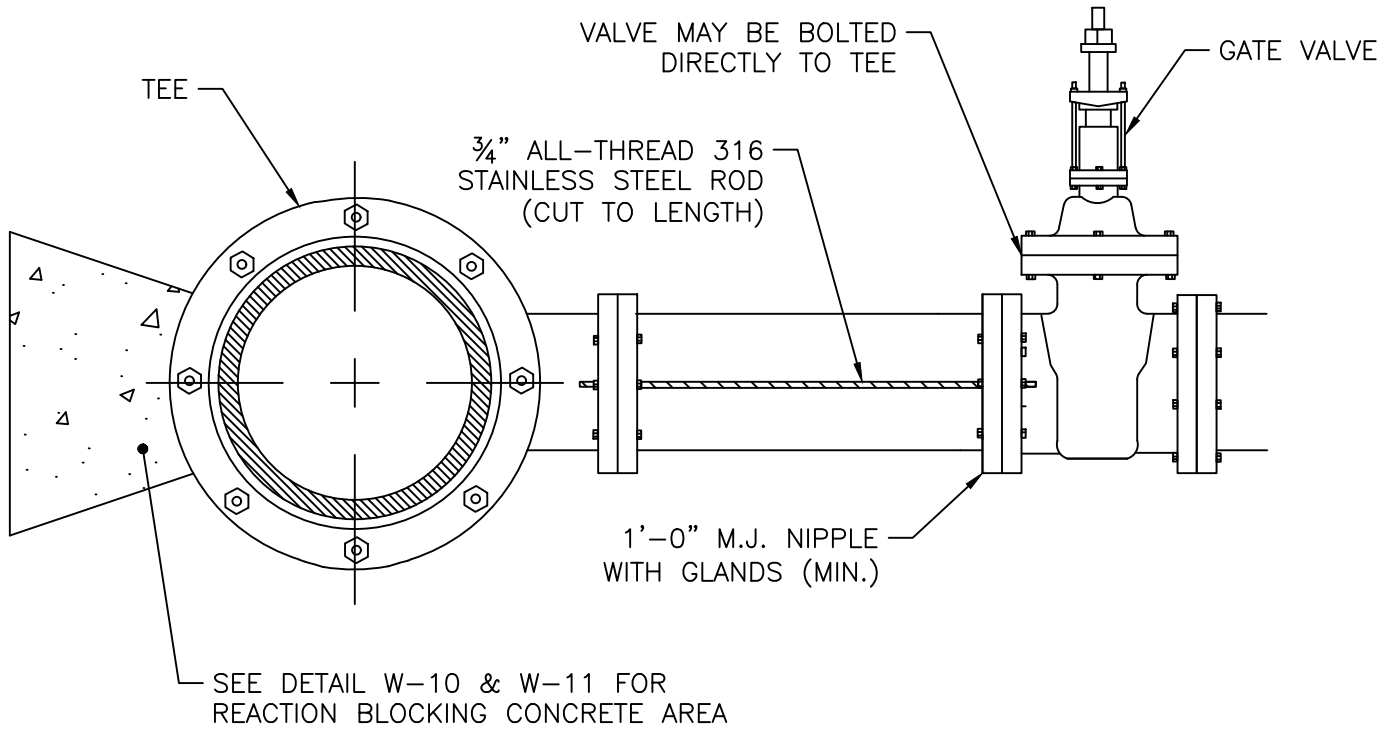
WATER MAIN

CITY OF RALEIGH
STANDARD DETAIL

<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
------------------	-------------------------	---------------------

	MAIN & VALVE MARKER FOR POTABLE WATER IN EASEMENTS
--	--

W-13



ROD REQUIREMENTS

BRANCH SIZE	NO. OF RODS
4"	2
6"	2
8"	4
12"	4
16"	6
24"	6
30"	8
36"	8

NOTES:

1. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.
2. SEE DETAIL W-10 AND W-11 (THRUST BLOCK TABLES) FOR CONCRETE.
3. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL FITTINGS.
4. THIS RODDING REQUIREMENT DOES NOT APPLY TO FIRE HYDRANTS.

CITY OF RALEIGH		
STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	VALVE RESTRAINT AT TEES AND CROSSES FOR LINES (4"-24")	
W-15		

VALVE SIZE	MH DIA.
16"	5'
24"	6'
≥30"	8'

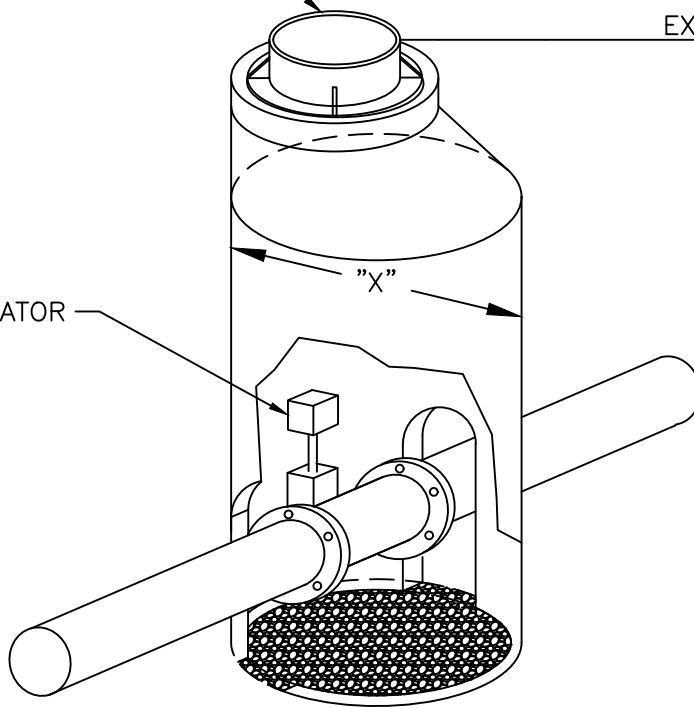
NOTES:

1. USE STANDARD PRECAST ECCENTRIC TOP.
2. BASE SECTION SHALL BE OF "DOG HOUSE" TYPE TO FIT OVER MAIN.
3. PROVIDE A MIN. OF 12" OF #67 STONE FOR POSITIVE DRAINAGE IN BOTTOM OF MANHOLE.
4. GROUT RISER/BASE SECTION AS NECESSARY.
5. MANHOLE LID SHALL SAY "WATER".
6. FLAT TOP MAY BE USED IN NON-PAVED AREAS WHEN NECESSARY TO MATCH GRADE.

ECCENTRIC TOP WITH COVER
OPENING OVER ACTUATOR

EXISTING GRADE

NUT TYPE ACTUATOR

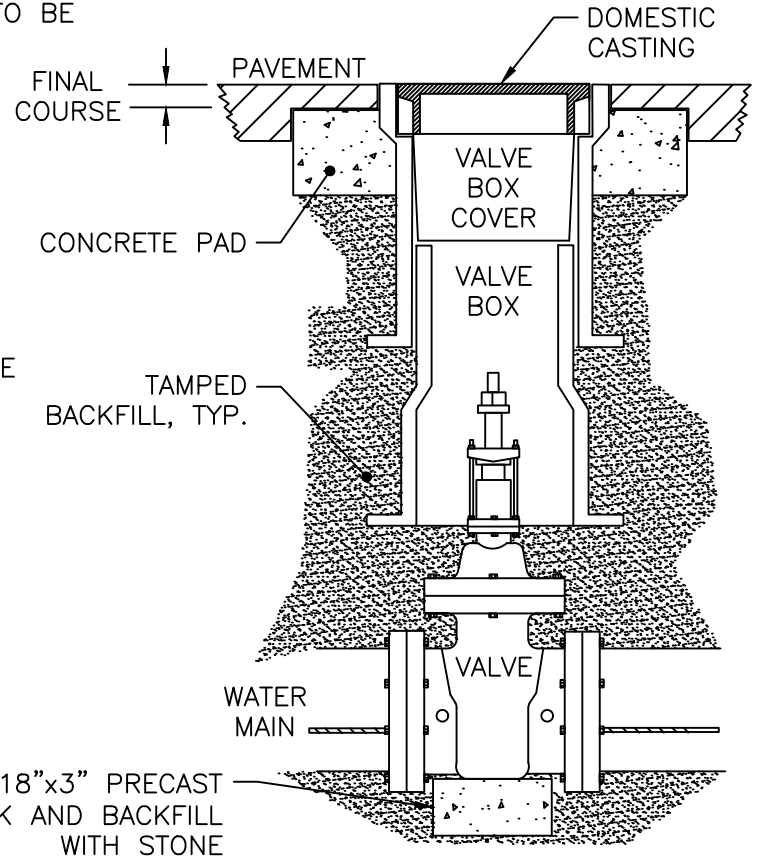
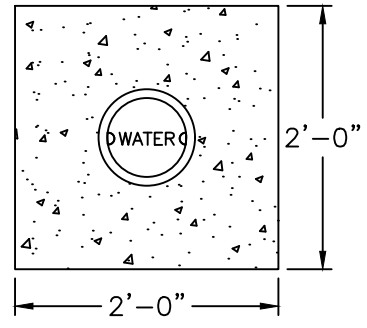
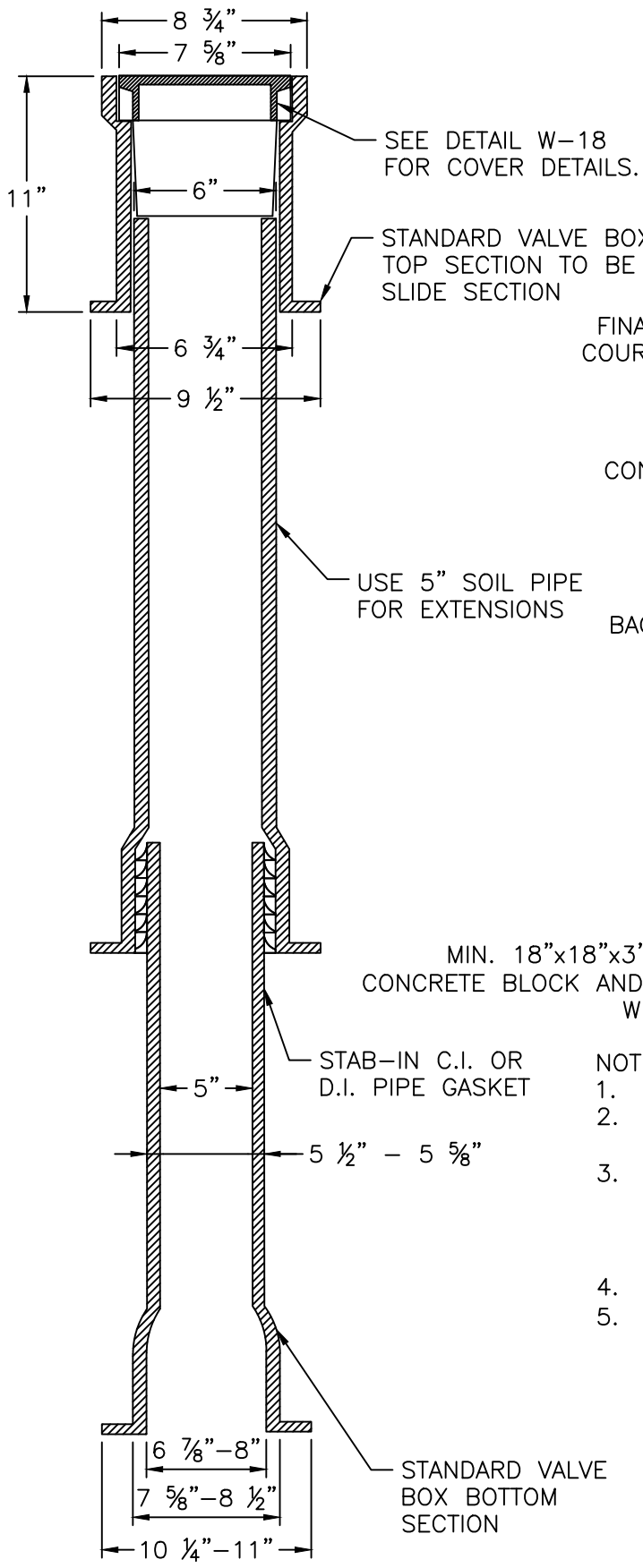


CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 01/18/2025 NOT TO SCALE

BUTTERFLY VALVE MANHOLE
FOR 16" & LARGER MAINS

W-16



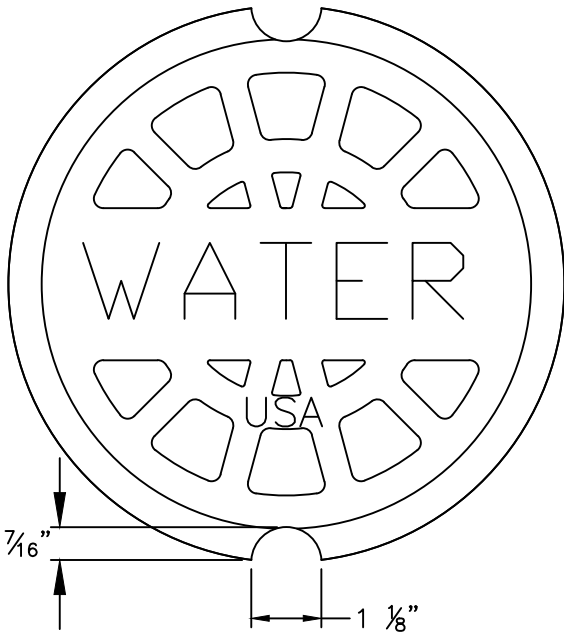
MIN. 18"x18"x3" PRECAST CONCRETE BLOCK AND BACKFILL WITH STONE

NOTES:

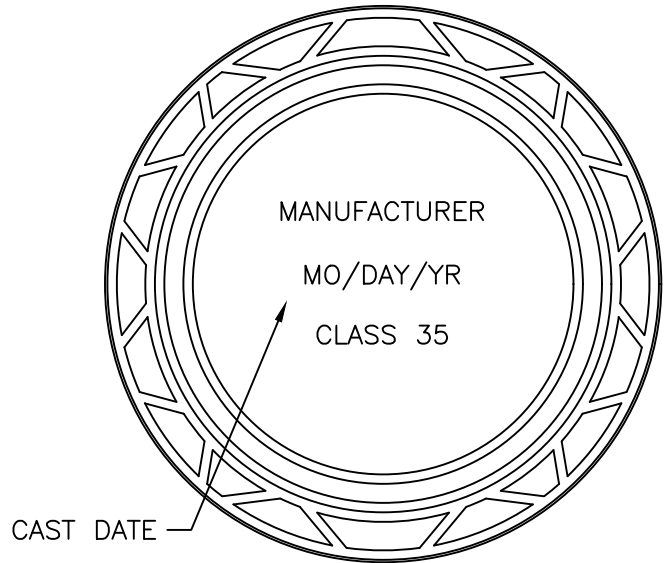
1. VALVE BOX NOT TO CONTACT WATER MAIN
2. ALL TRAFFIC CASTINGS MUST BE CLASS 35 OR GREATER.
3. FOR ALL VALVES OVER 10' DEEP, A VALVE STEM EXTENSION MUST BE USED TO BRING TO A DEPTH OF NO MORE THAN 5', EXTENSION MUST BE A MINIMUM OF 1" SOLID STOCK.
4. TOTAL VALVE BOX WEIGHT: MINIMUM OF 85 LBS.
5. 2'x2'x6" CONCRETE PAD REQUIRED ON ALL VALVES. NO PRECAST CONCRETE DOUGHNUT ALLOWED.

APPROVED METHOD FOR EXTENSION OF VALVE BOX

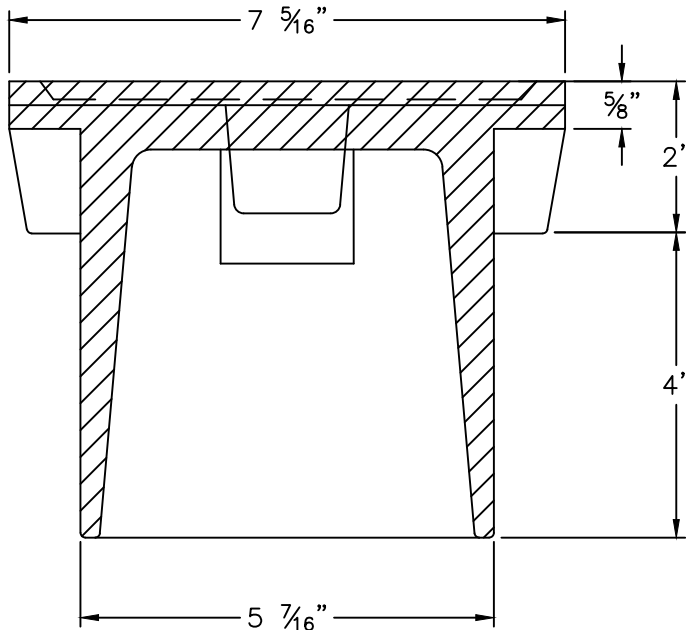
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	VALVE BOX INSTALLATION AND EXTENSION	
W-17		



PLAN VIEW



BOTTOM VIEW

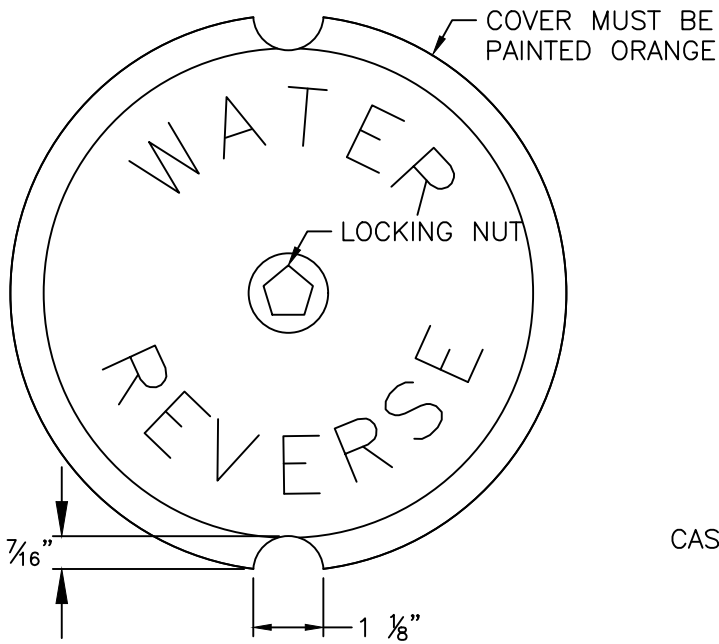


SECTION VIEW

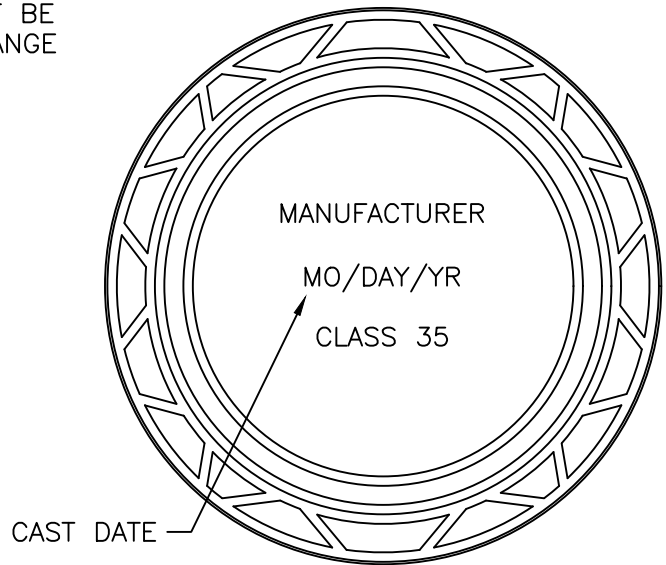
NOTE:

1. "WATER" LETTERING MUST BE 1" RAISED (RECESSED FLUSH).
2. VALVE COVER SHALL BE DOMESTICALLY CAST.
3. COVER MUST HAVE A MINIMUM WEIGHT OF 25 POUNDS.
4. COVER MUST BE CLASS 35 OR GREATER.
5. COVER MUST MEET OR EXCEED AASHTO H-20 LOAD REQUIREMENTS.

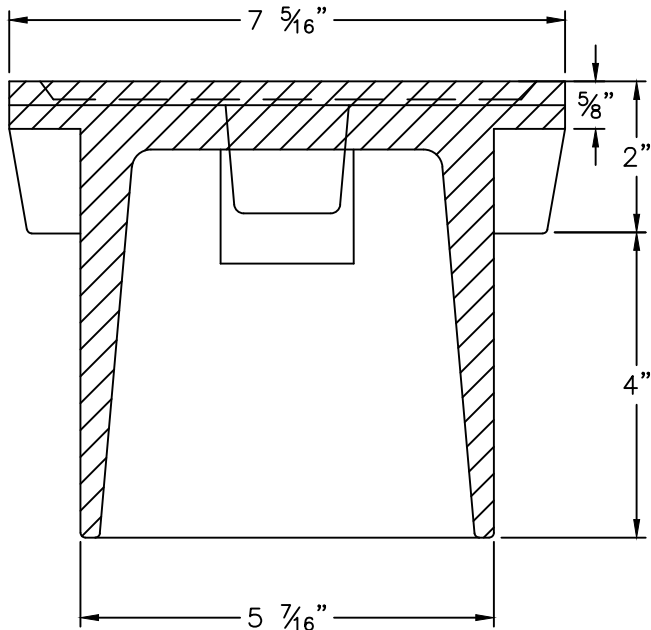
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	5 1/4" VALVE BOX DROP LID WITH 4" SKIRT	
	W-18	



PLAN VIEW



BOTTOM VIEW



SECTION VIEW

NOTE:

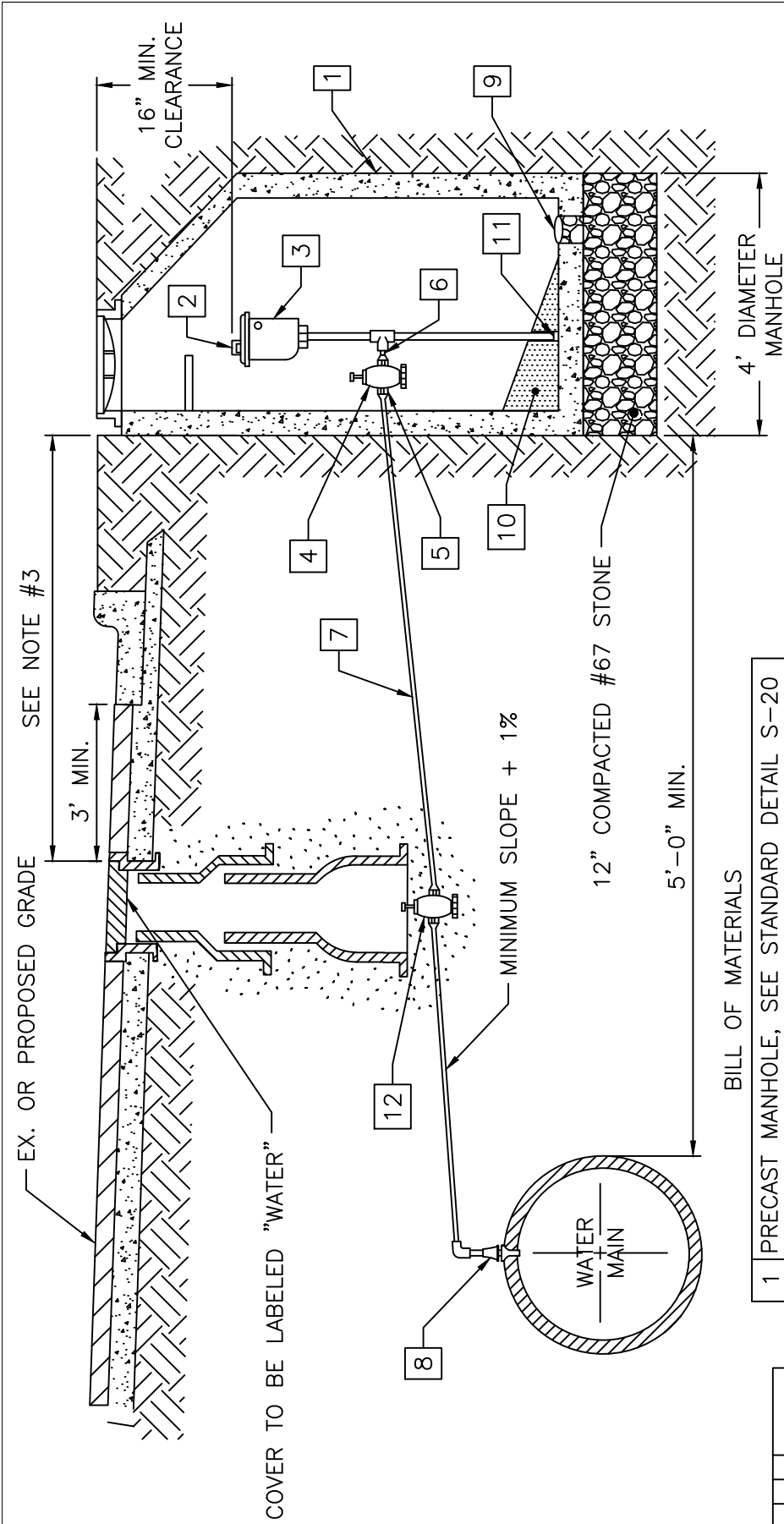
1. "WATER" AND "REVERSE" LETTERING MUST BE 1" RAISED (RECESSED FLUSH).
2. VALVE COVER SHALL BE DOMESTICALLY CAST.
3. COVER MUST HAVE A MINIMUM WEIGHT OF 25 POUNDS.
4. COVER MUST BE CLASS 35 OR GREATER.
5. COVER MUST MEET OR EXCEED AASHTO H-20 LOAD REQUIREMENTS.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 01/18/2025 NOT TO SCALE

REVERSE TAP 5 1/4"
VALVE BOX DROP LID
WITH 4" SKIRT

W-18A



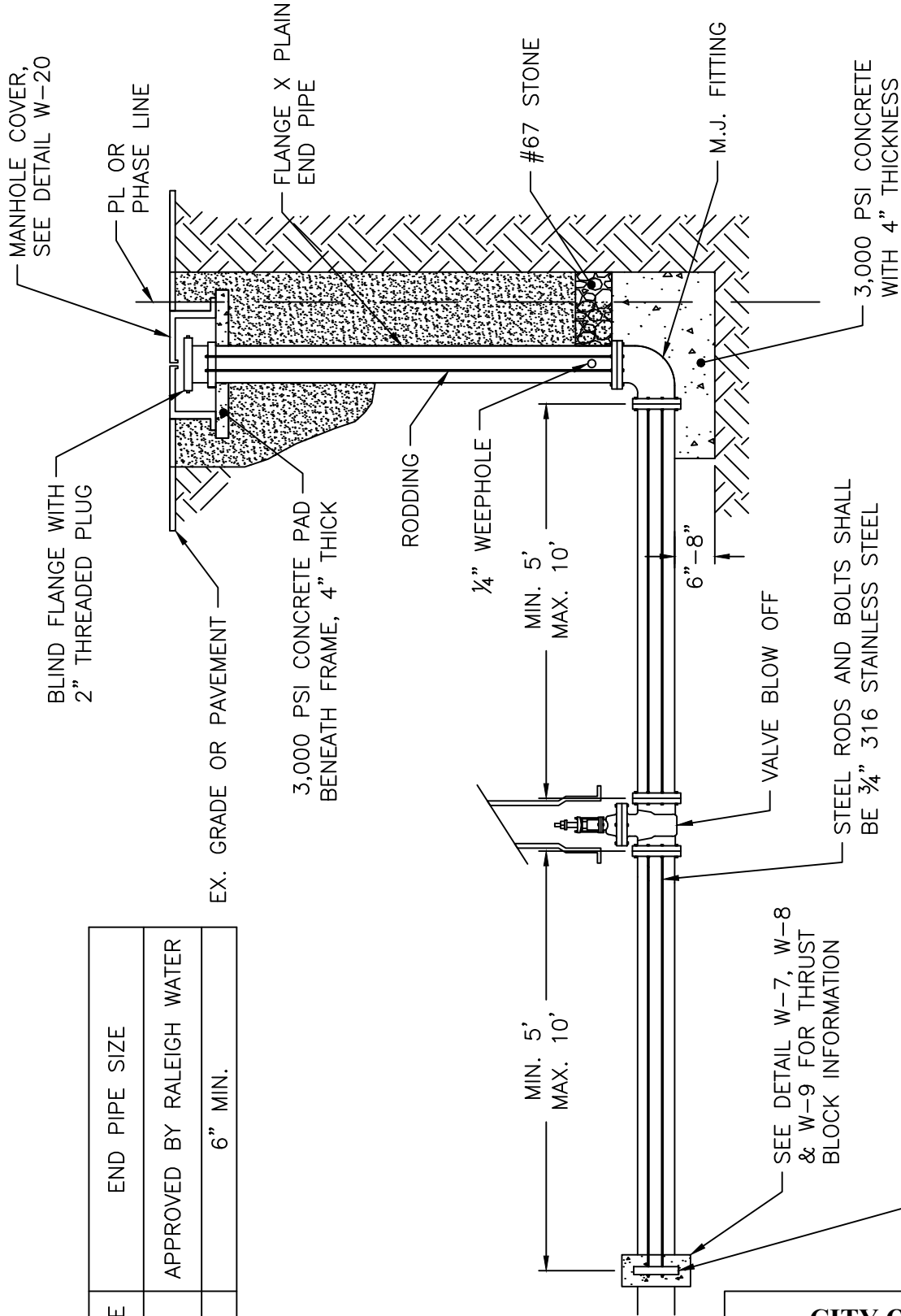
- NOTE:
1. AIR VALVE TO BE P-20 WITH VACUUM CHECK BY CRISPIN OR VAL MATIC VM 45.
 2. THE AIR RELEASE MANHOLE SHALL BE INSTALLED IN THE SHOULDER OR AS DIRECTED BY THE ENGINEER.
 3. FOR MAINS LOCATED OUTSIDE OF STREET RIGHT-OF-WAYS THE MAXIMUM DISTANCE BETWEEN THE MANHOLE AND THE VALVE BOX SHOULD BE 3 FEET.
 4. MAIN SHALL BE DEEP ENOUGH TO ACCOMMODATE INSTALLATION AS SHOWN.
 5. SEE DETAIL W-3 TO INSURE PROPER BACKFILL.

BILL OF MATERIALS

1	PRECAST MANHOLE, SEE STANDARD DETAIL S-20
2	TRASH HOOD
3	2" AIR RELEASE VALVE
4	2" CURB STOP BALL VALVE
5	ADAPTER
6	2" MECHANICAL JOINT BRASS PIPE AND FITTINGS
7	2" TYPE "k", SOFT COPPER WITH FLARED ELBOW
8	CORPORATION COCK
9	6" DIAMETER DRAIN
10	GROUT, 1/8" TO 1'-0" MIN. SLOPE TO DRAIN
11	PIPE CAP
12	2" GATE VALVE

CITY OF RALEIGH		
STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	WATER AIR RELEASE VALVE	
W-19		

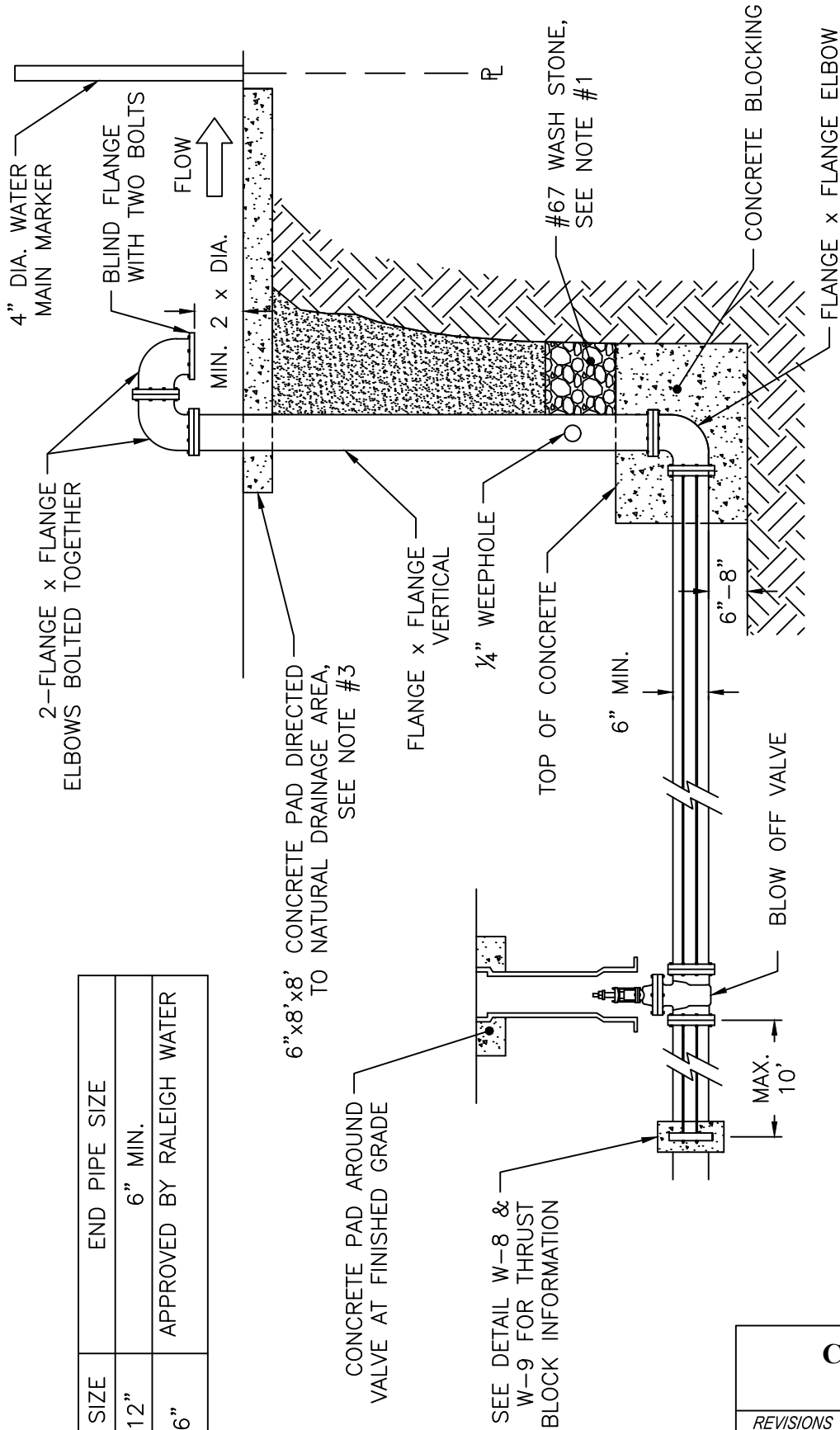
MAIN SIZE	END PIPE SIZE
6"-12"	APPROVED BY RALEIGH WATER
≥16"	6" MIN.



NOTE:
NO ROD COUPLINGS ALLOWED.

CITY OF RALEIGH		
STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	TEMPORARY WATER MAIN BLOW OFF ASSEMBLY	
W-21		

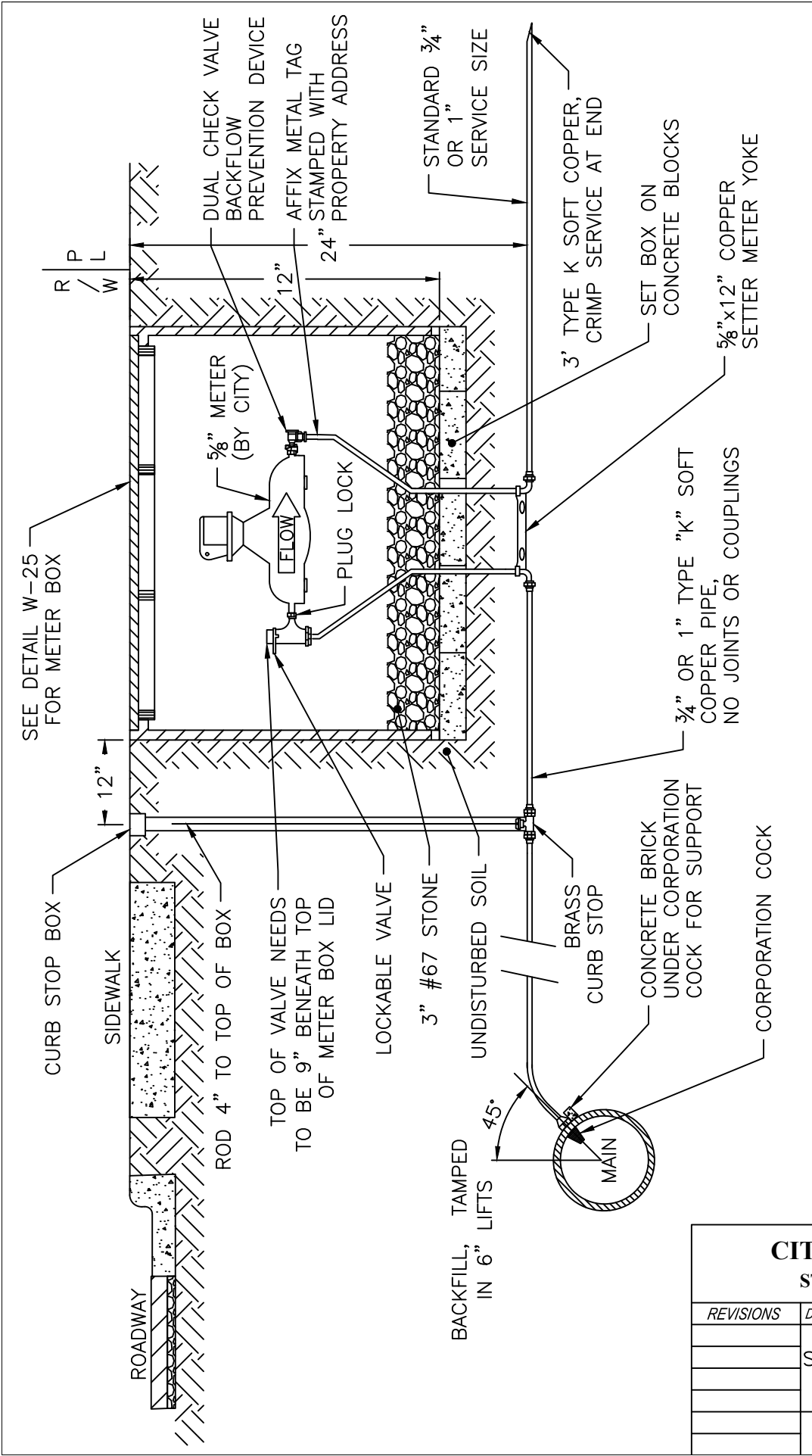
MAIN SIZE	END PIPE SIZE
6"-12"	6" MIN.
≥16"	APPROVED BY RALEIGH WATER



NOTES:

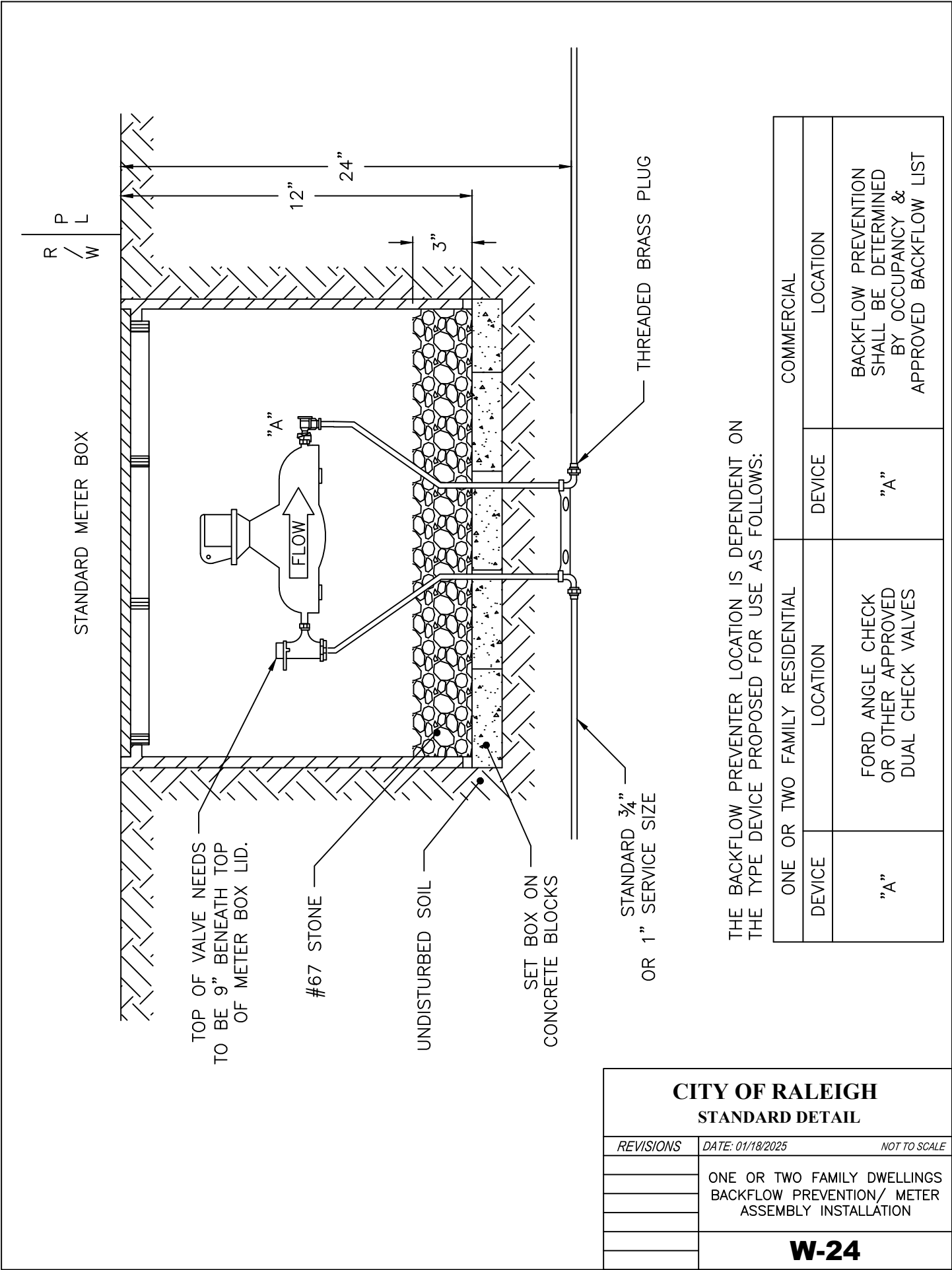
1. DRILL 1/4" WEEP HOLE FOR STACK DRAINAGE INTO STONE.
2. DOUBLE 3/4" BRIDLE RODS ON BOTH SIDES.
3. A RIP-RAP SWALE FROM FROM CONCRETE SPLASH PAD TO POSITIVE DRAINAGE AREA IS REQUIRED.
4. BOTTOM 90° ELBOW SHALL HAVE BLIND FLANGE ATTACHED WITH TWO BOLTS.
5. INSTALL WATER MAIN MARKER AT R/W OR P/L TO LOCATE MAIN.
6. BURIED 3/4" RODS AND BOLTS TO BE 316 STAINLESS STEEL.
7. END PIPE SIZE 6" MIN. OR AS APPROVED BY PUBLIC UTILITIES.

CITY OF RALEIGH		
STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
PERMANENT WATER MAIN BLOW OFF ASSEMBLY		
W-22		



- NOTES:
1. WATER METER AS MANUFACTURED BY SENSUS, OR SCHLUMBERGER. METER TO BE PROVIDED BY RALEIGH WATER.
 2. DIRECT TAP ALLOWED ON MAINS NO LARGER THAN 16" LINE.
 3. METER BOX TO BE LOCATED IN R/W ADJACENT TO PROPERTY OR IN APPROVED EASEMENT ADJACENT TO R/W.
 4. WHEN THE GRADE CHANGES ON EXISTING SERVICES, A COPPER RESETTER CAN BE USED TO ADJUST TO GRADE. COPPER RESETTERS ARE PROHIBITED ON NEW SERVICES.
 5. CURB STOP BOX SHALL HAVE PLUG STYLE LID WITH PENTAGON BOLT, 1-1/4" STEEL UPPER SECTION, AND ARCH STYLE BASE. STEEL STATIONARY ROD TO BE PROVIDED FOR CURB STOP OPERATION.

CITY OF RALEIGH		
STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD 3/4" & 1" WATER	
	SERVICE INSTALLATION	
W-23		

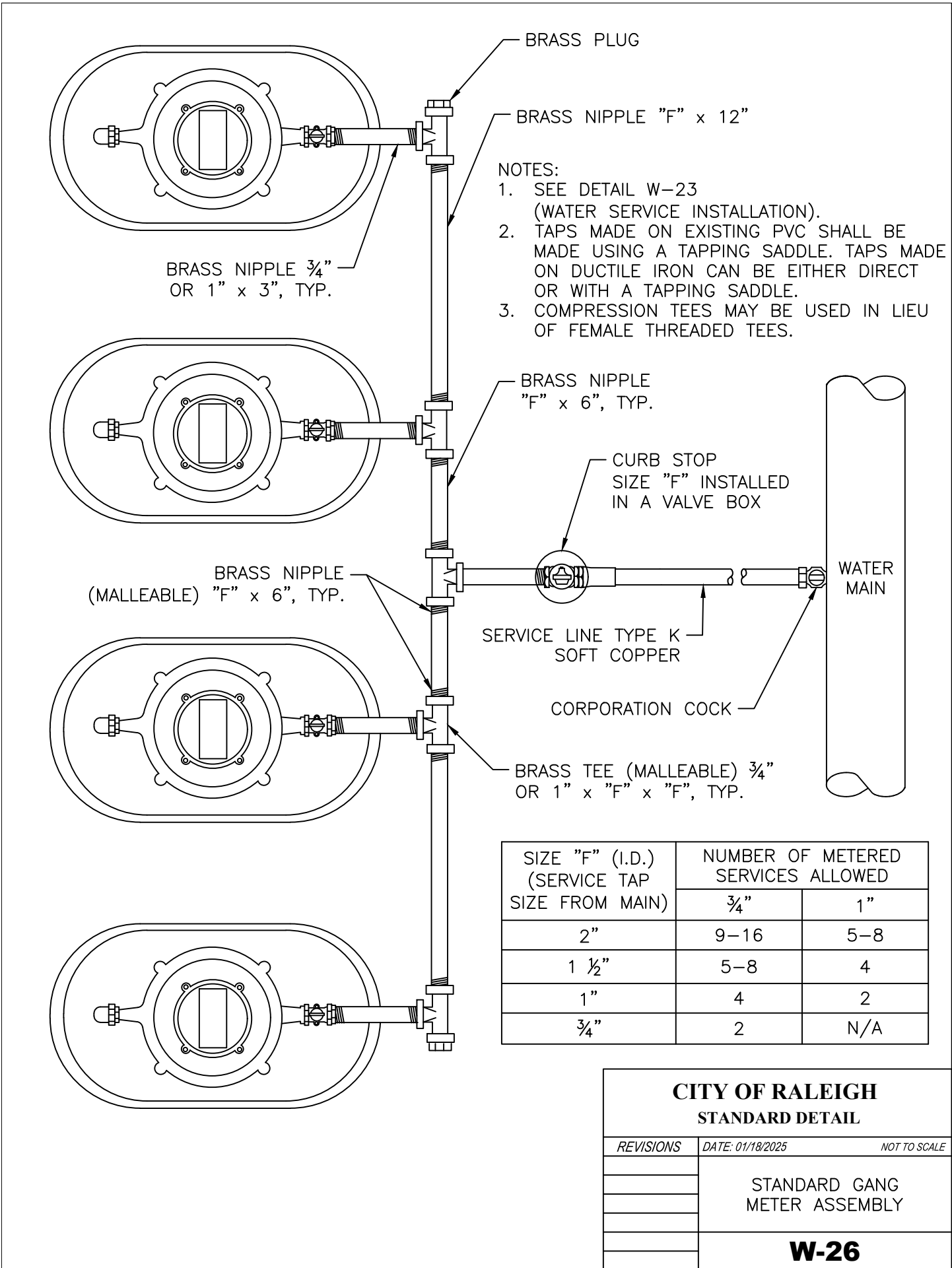


THE BACKFLOW PREVENTER LOCATION IS DEPENDENT ON THE TYPE DEVICE PROPOSED FOR USE AS FOLLOWS:

ONE OR TWO FAMILY RESIDENTIAL		COMMERCIAL	
DEVICE	LOCATION	DEVICE	LOCATION
"A"	FORD ANGLE CHECK OR OTHER APPROVED DUAL CHECK VALVES	"A"	BACKFLOW PREVENTION SHALL BE DETERMINED BY OCCUPANCY & APPROVED BACKFLOW LIST

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
ONE OR TWO FAMILY DWELLINGS BACKFLOW PREVENTION/ METER ASSEMBLY INSTALLATION		
W-24		



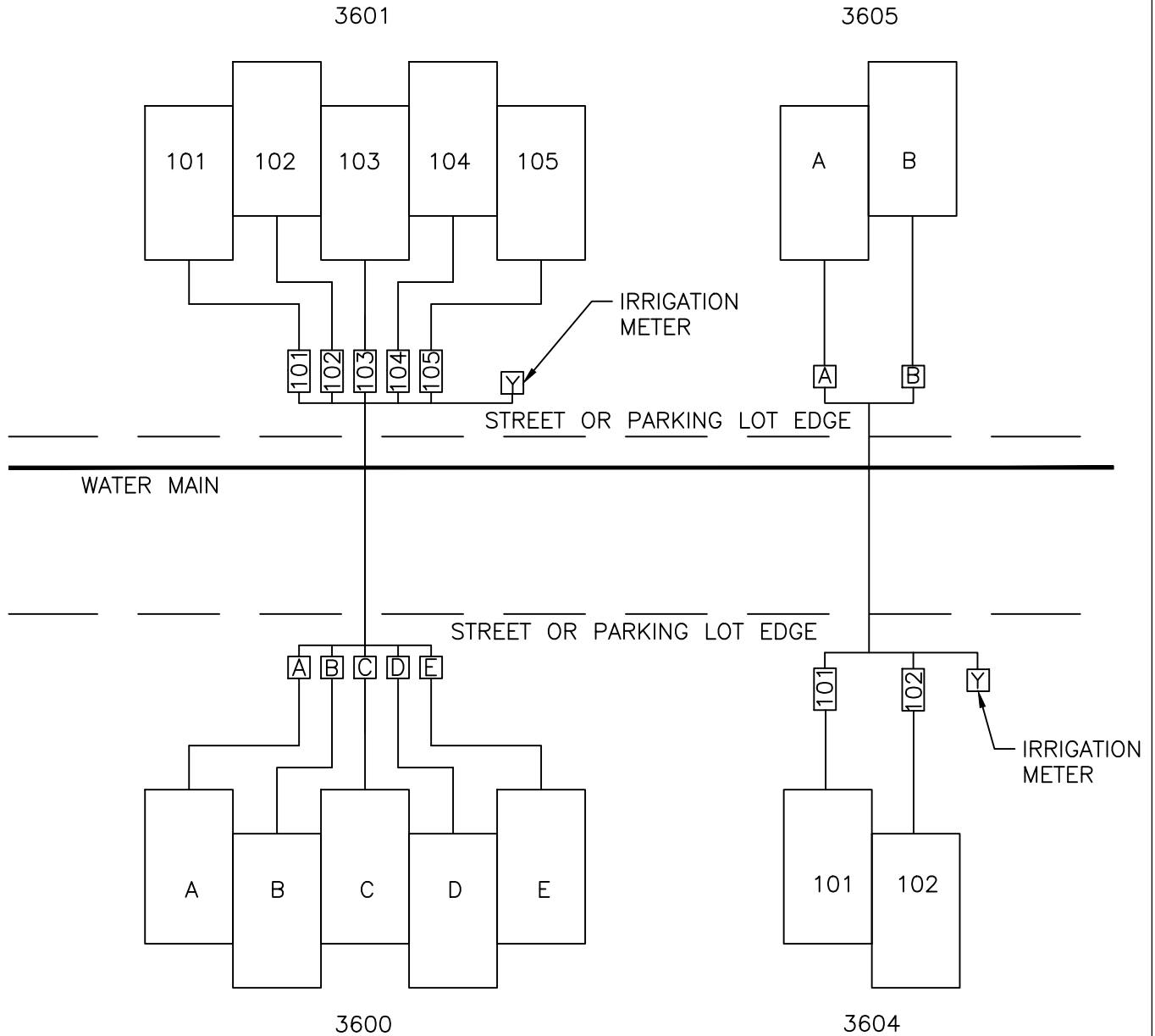
- NOTES:
1. SEE DETAIL W-23 (WATER SERVICE INSTALLATION).
 2. TAPS MADE ON EXISTING PVC SHALL BE MADE USING A TAPPING SADDLE. TAPS MADE ON DUCTILE IRON CAN BE EITHER DIRECT OR WITH A TAPPING SADDLE.
 3. COMPRESSION TEES MAY BE USED IN LIEU OF FEMALE THREADED TEES.

SIZE "F" (I.D.) (SERVICE TAP SIZE FROM MAIN)	NUMBER OF METERED SERVICES ALLOWED	
	3/4"	1"
2"	9-16	5-8
1 1/2"	5-8	4
1"	4	2
3/4"	2	N/A

CITY OF RALEIGH
STANDARD DETAIL

<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	STANDARD GANG METER ASSEMBLY	
	W-26	

ODD NUMBERED ADDRESS

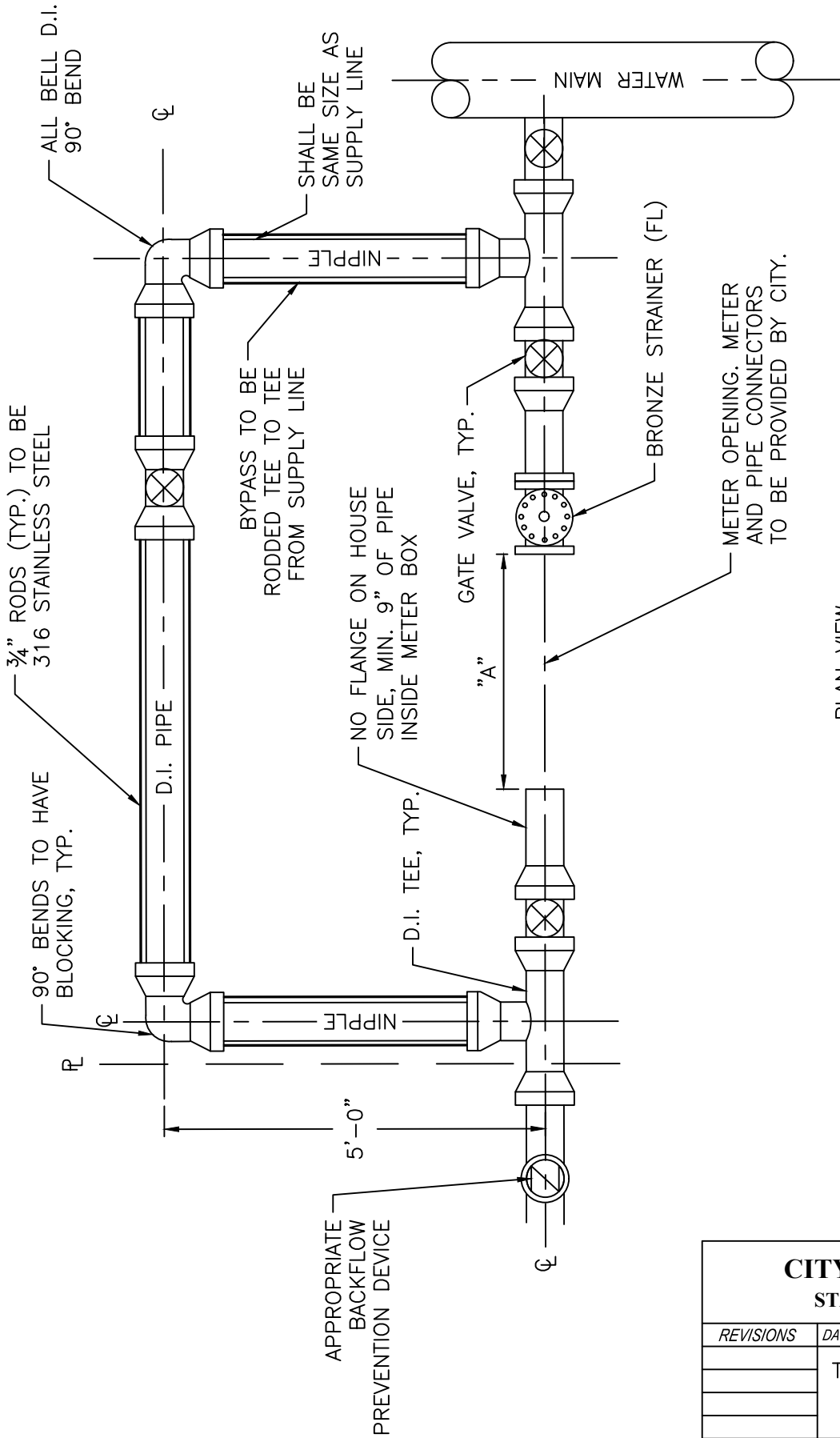


EVEN NUMBERED ADDRESS

NOTES:

1. EVEN NUMBERED UNITS: METERS SHALL BE SET TO BE READ RIGHT TO LEFT (WHEN FACING BUILDING).
2. ODD NUMBERED UNITS: METERS SHALL BE SET TO BE READ LEFT TO RIGHT (WHEN FACING BUILDING).
3. IF IRRIGATION METER IS INCLUDED, IT SHALL BE THE LAST METER IN NUMBERING SEQUENCE.
4. UNIT 'Y' (FOR YARD METER) SHALL BE USED TO INDICATE IRRIGATION METER.

CITY OF RALEIGH		
STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	GANG METER ADDRESSING SINGLE STORY BUILDING	
	W-27	



PLAN VIEW

"A"

METER SIZE	METER OPENING
4" METER	28"
6" METER	35"
8" METER	39"

NOTES:

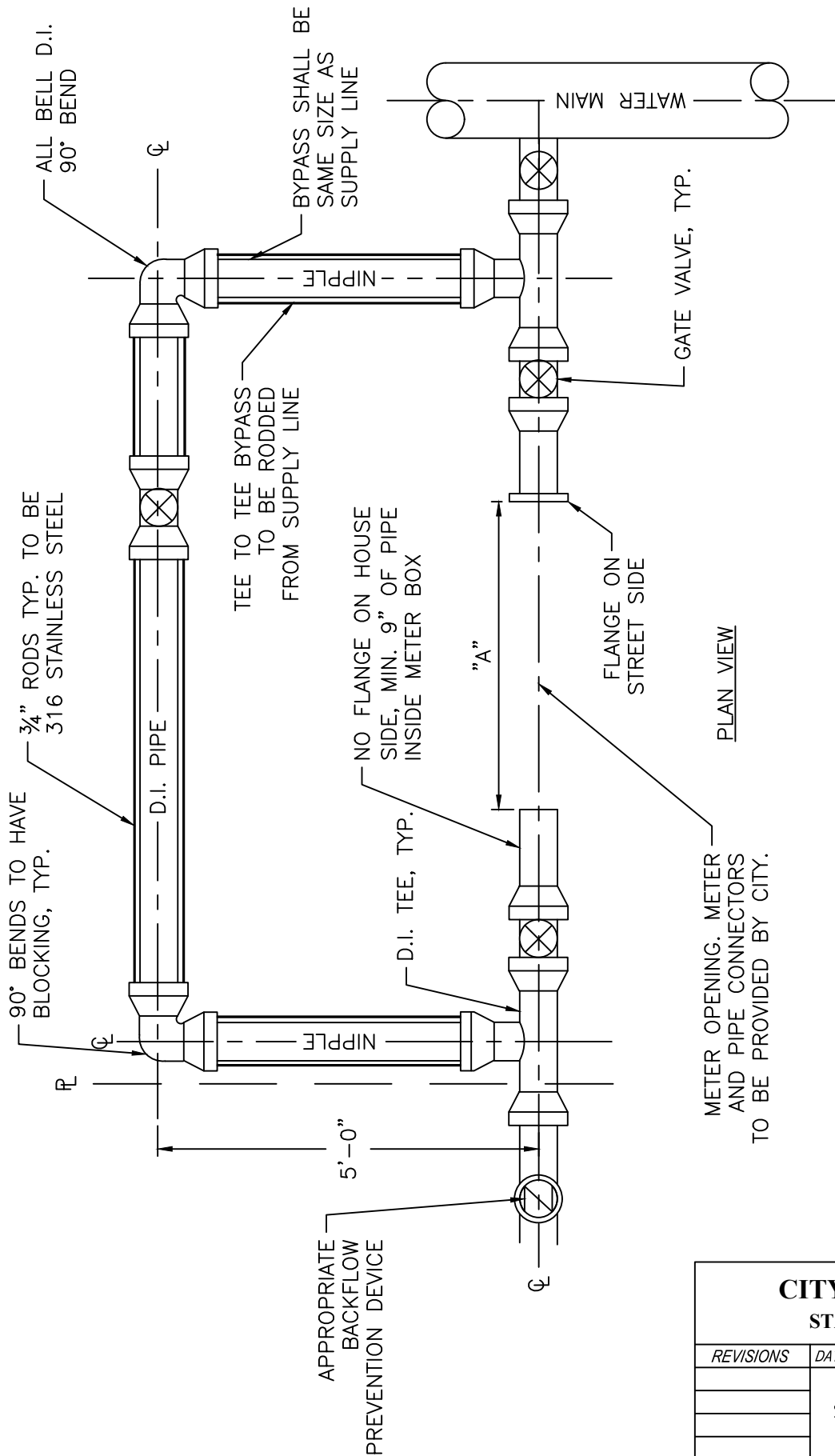
1. DOMESTIC METERS ONLY.
2. ALL FITTINGS ARE TO BE MECHANICAL JOINT, U.N.O.
3. BRONZE STRAINERS SHALL HAVE NON-THREADED BOLT HOLES.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 01/18/2025 NOT TO SCALE

TYPICAL 4"-8" DOMESTIC
WATER METER
BYPASS INSTALLATION

W-29



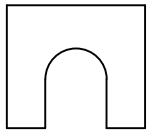
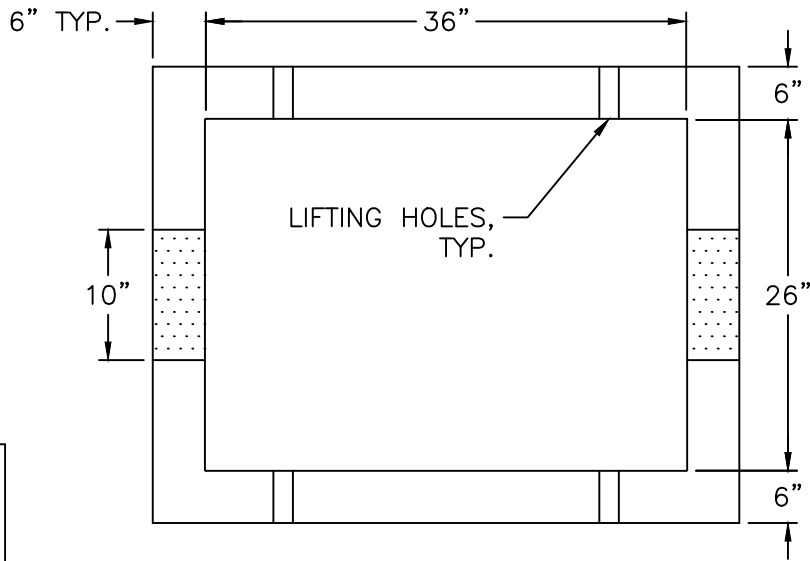
"A"

METER SIZE	METER OPENING
6" METER	46"
8" METER	54"
10" METER	69"

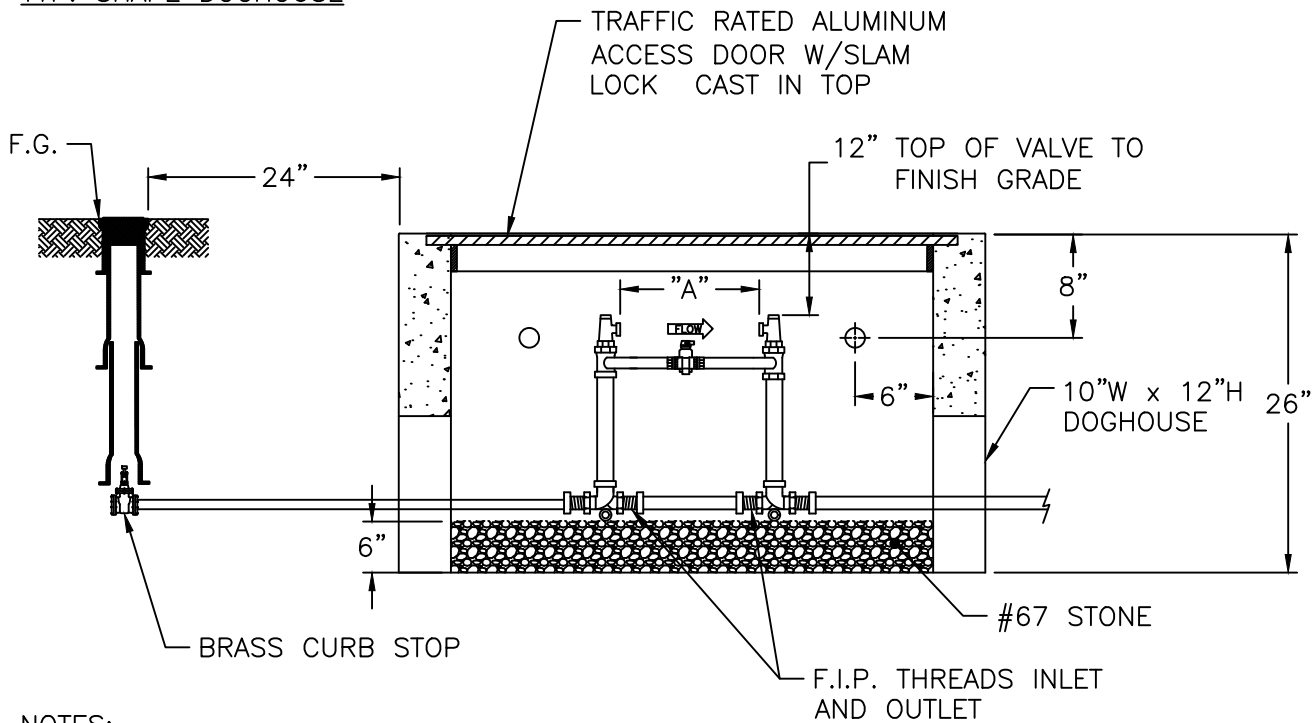
METER OPENING. METER AND PIPE CONNECTORS TO BE PROVIDED BY CITY.

- NOTES:
1. ALL FITTINGS ARE TO BE MECHANICAL JOINT.
 2. SERVICE LINE FOR 10" METER SHALL BE 12".

CITY OF RALEIGH		
STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	TYPICAL 6"-10" FIRE SERVICE AND DOMESTIC METER W/ BYPASS	
W-30		



TYP. SHAPE DOGHOUSE



NOTES:

1. METER AS MANUFACTURED BY SENSUS OR NEPTUNE. METER TO BE PROVIDED BY RALEIGH WATER.
2. BACKFILL TAMPED IN 6" LIFTS.
3. REINFORCEMENT: #4 @ 6" O.C.E.W.
4. CONCRETE: 4,000 PSI @ 28 DAYS.
5. ALL RPZ BACKFLOW PREVENTION DEVICES MUST BE INSTALLED PRIOR TO METER BEING SET.
6. ALL COPPER SETTERS ARE TO HAVE A BALL TYPE SHUT OFF VALVE ON BOTH SIDES OF COPPER SETTER WITH HIGH RISE BYPASS THAT IS MANUFACTURED BY FORD, MUELLER, OR AY McDONALD (NO EXCEPTIONS).
7. HEIGHT ADJUSTMENTS ALLOWED BY PRECAST RISERS OR BRICK AND MORTAR. DRY STACKING OF BLOCK IS NOT ALLOWED.

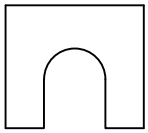
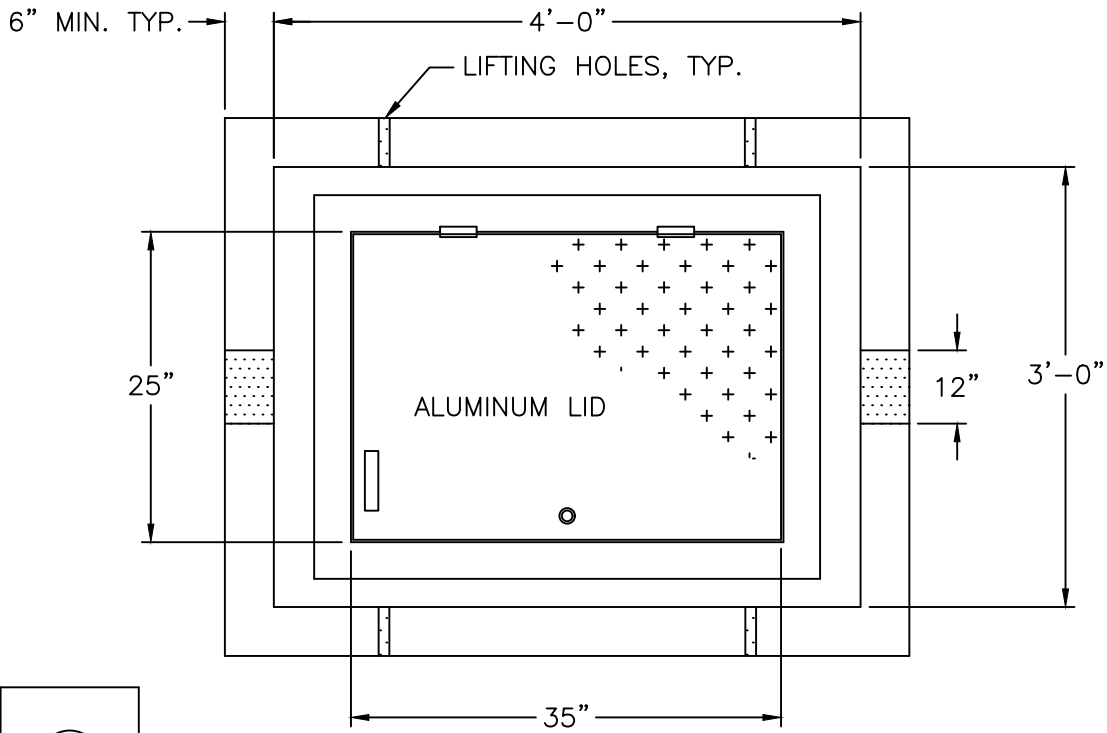
"A"

1 1/2" METER	13 1/4"
2" METER	17 1/4"

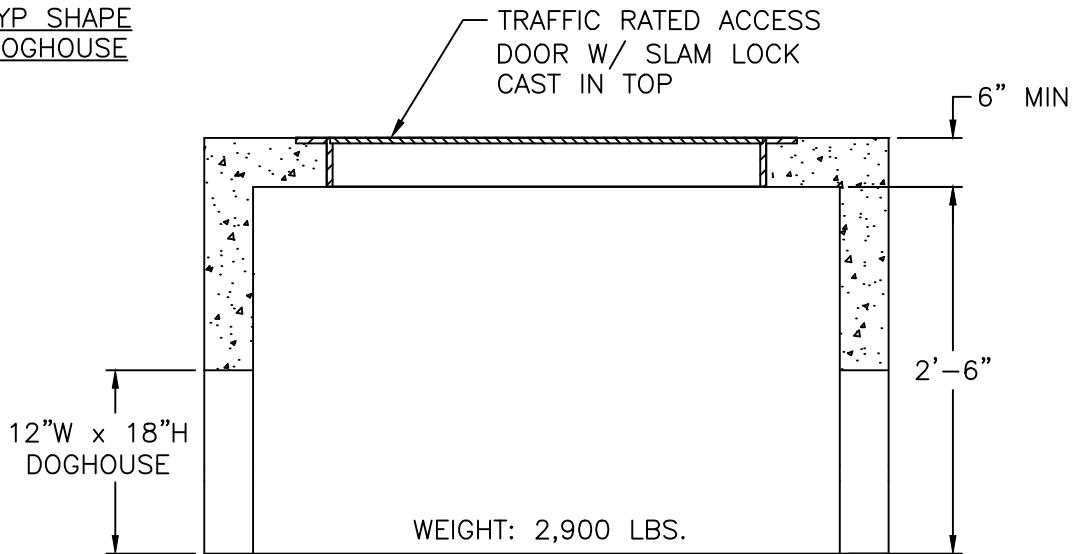
**** TRAFFIC RATED VAULT WALL THICKNESS**

**CITY OF RALEIGH
STANDARD DETAIL**

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
TYPICAL 1 1/2"-2" WATER METER BOX INSTALLATION		
W-31		



TYP SHAPE
DOGHOUSE



NOTES:

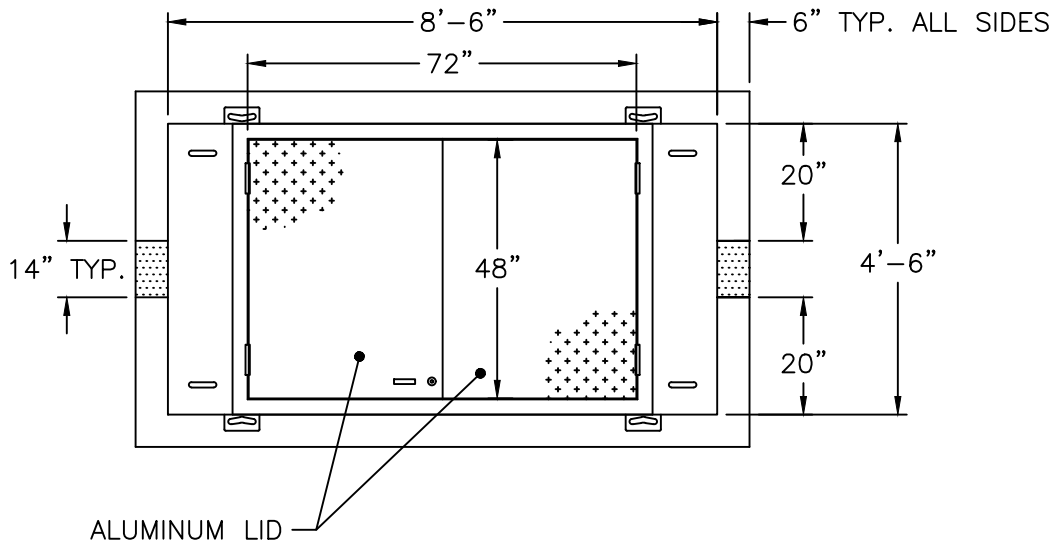
1. REINFORCEMENT: #4 @ 6" O.C.E.W.
2. CONCRETE: 4,000 PSI @ 28 DAYS.
3. 6" OF #67 STONE SHALL BE PLACED IN BOTTOM OF VAULT.
4. METER FLANGE SHALL BE PLACED 42" BELOW FINISHED GRADE.
5. HEIGHT ADJUSTMENTS ALLOWED BY PRECAST RISERS OR BRICK AND MORTAR. DRY STACKING OF BLOCK IS NOT ALLOWED.

CITY OF RALEIGH
STANDARD DETAIL

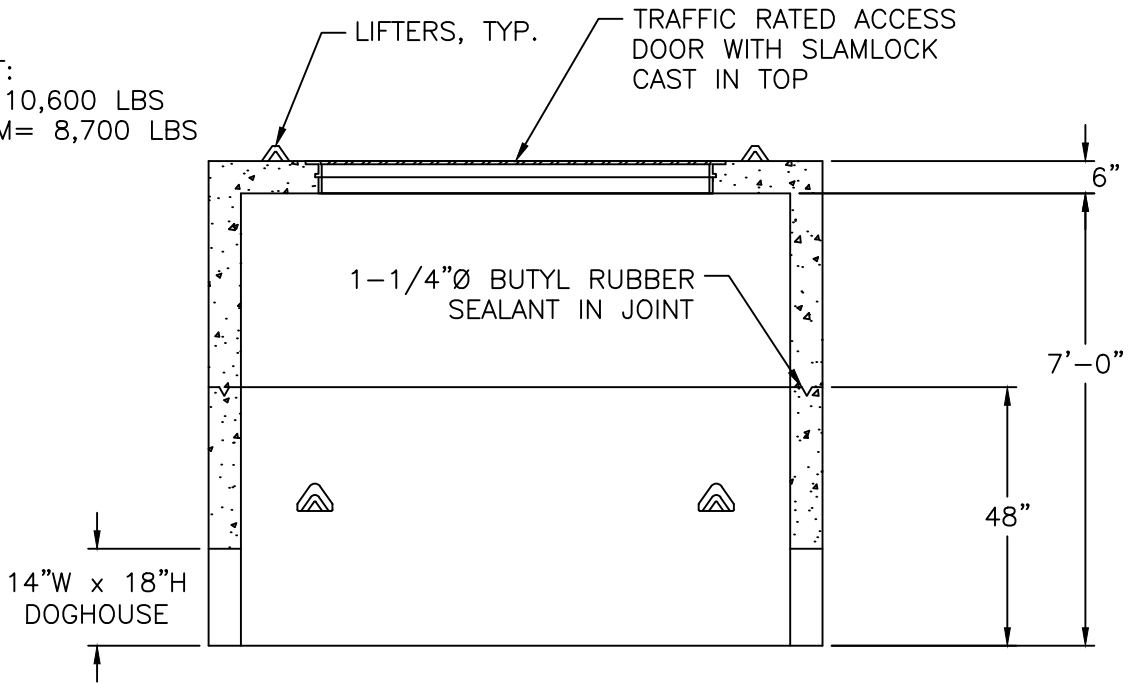
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
------------------	-------------------------	---------------------

	TYPICAL 4" WATER METER VAULT
--	---------------------------------

W-32



WEIGHT:
 TOP= 10,600 LBS
 BOTTOM= 8,700 LBS



NOTES:

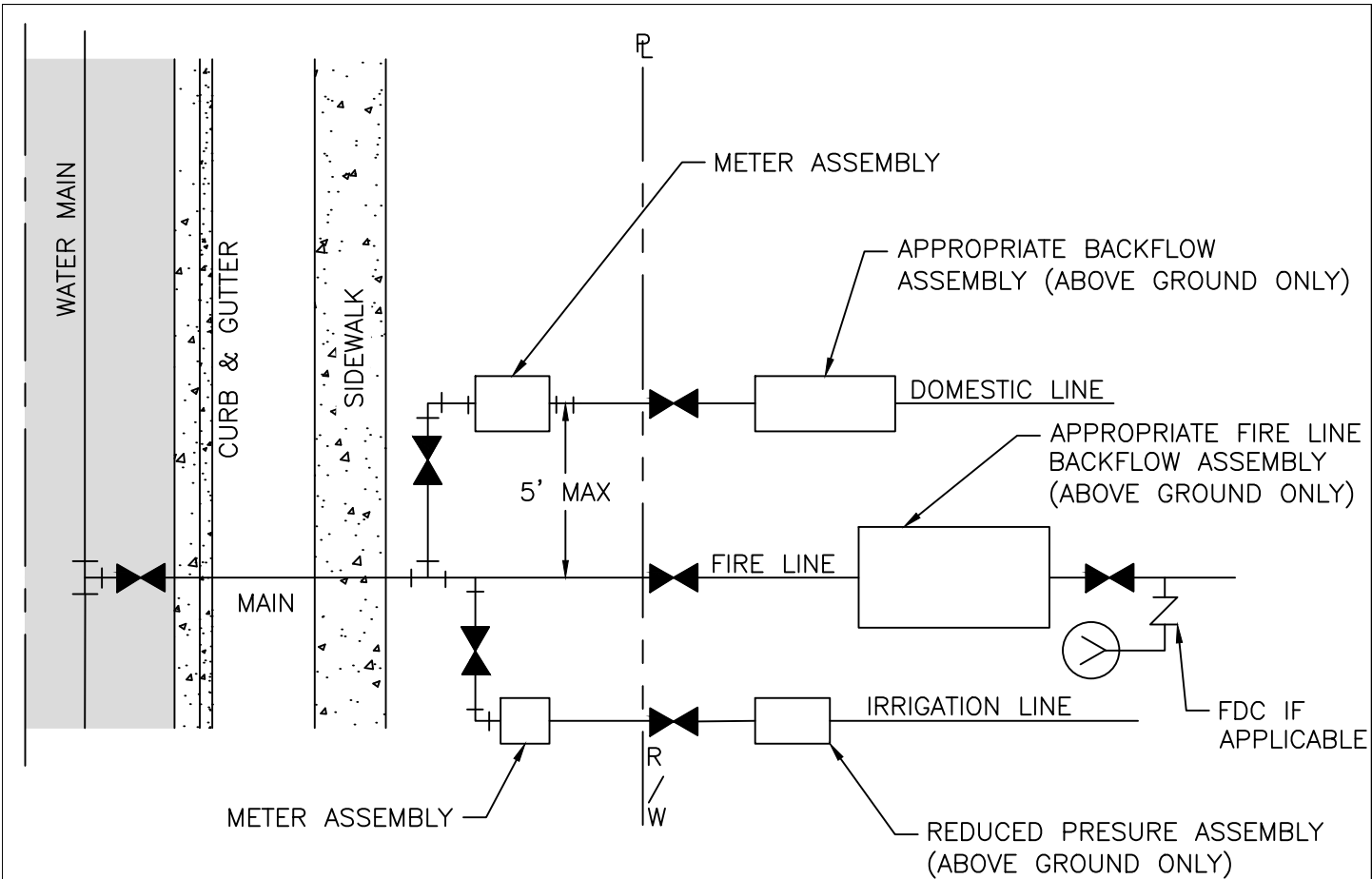
1. REINFORCEMENT: #4 @ 6" O.C.E.W.
2. CONCRETE: 4,000 PSI @ 28 DAYS.
3. 6" OF #67 STONE SHALL BE PLACED IN BOTTOM OF VAULT.
4. METER FLANGE SHALL BE PLACED 49" BELOW FINISHED GRADE.
5. HEIGHT ADJUSTMENTS ALLOWED BY PRECAST RISERS OR BRICK AND MORTAR.
 DRY STACKING OF BLOCK IS NOT ALLOWED.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 01/18/2025 NOT TO SCALE

TYPICAL 6" THRU 10"
 WATER METER VAULT

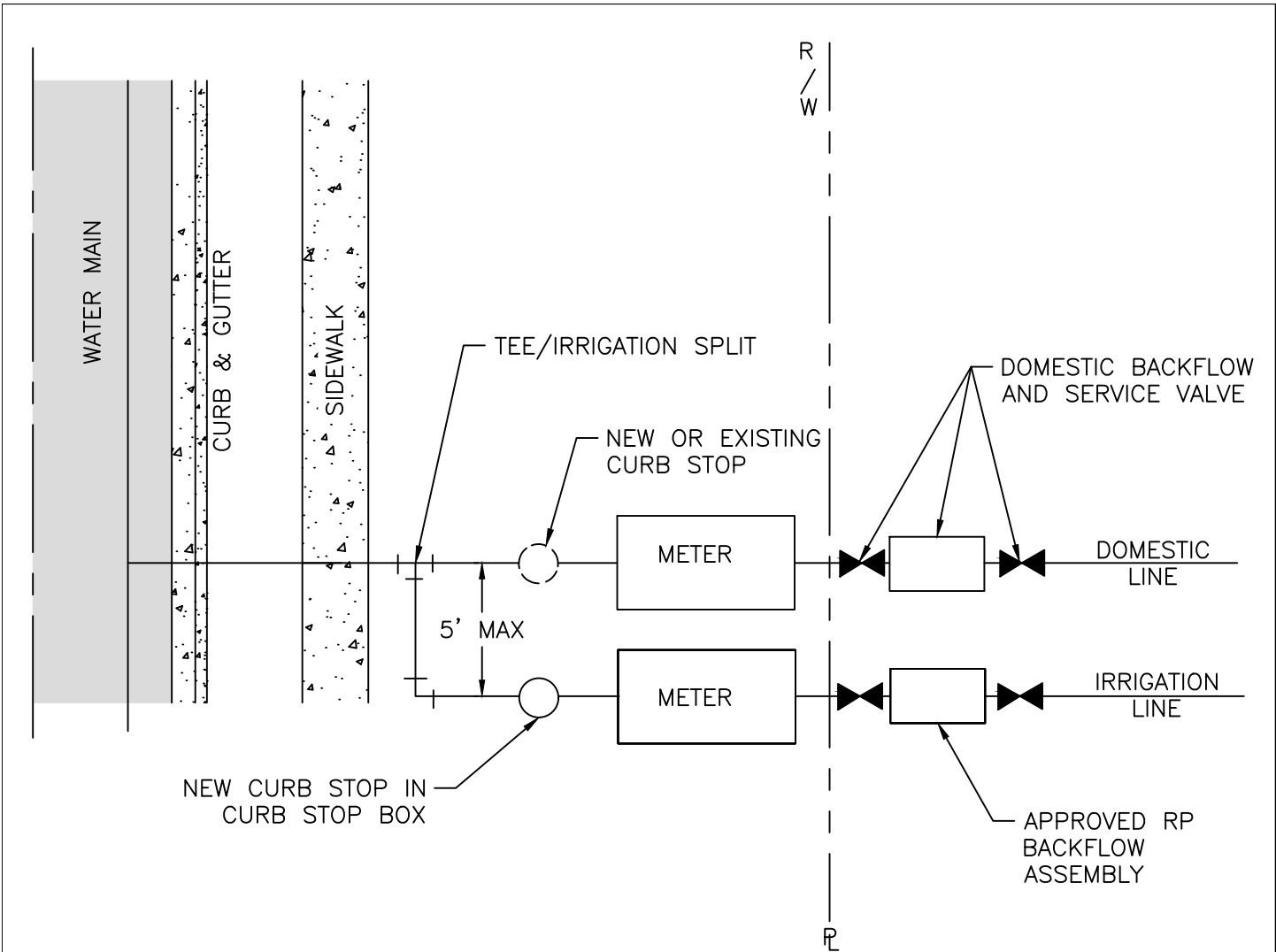
W-33



NOTES:

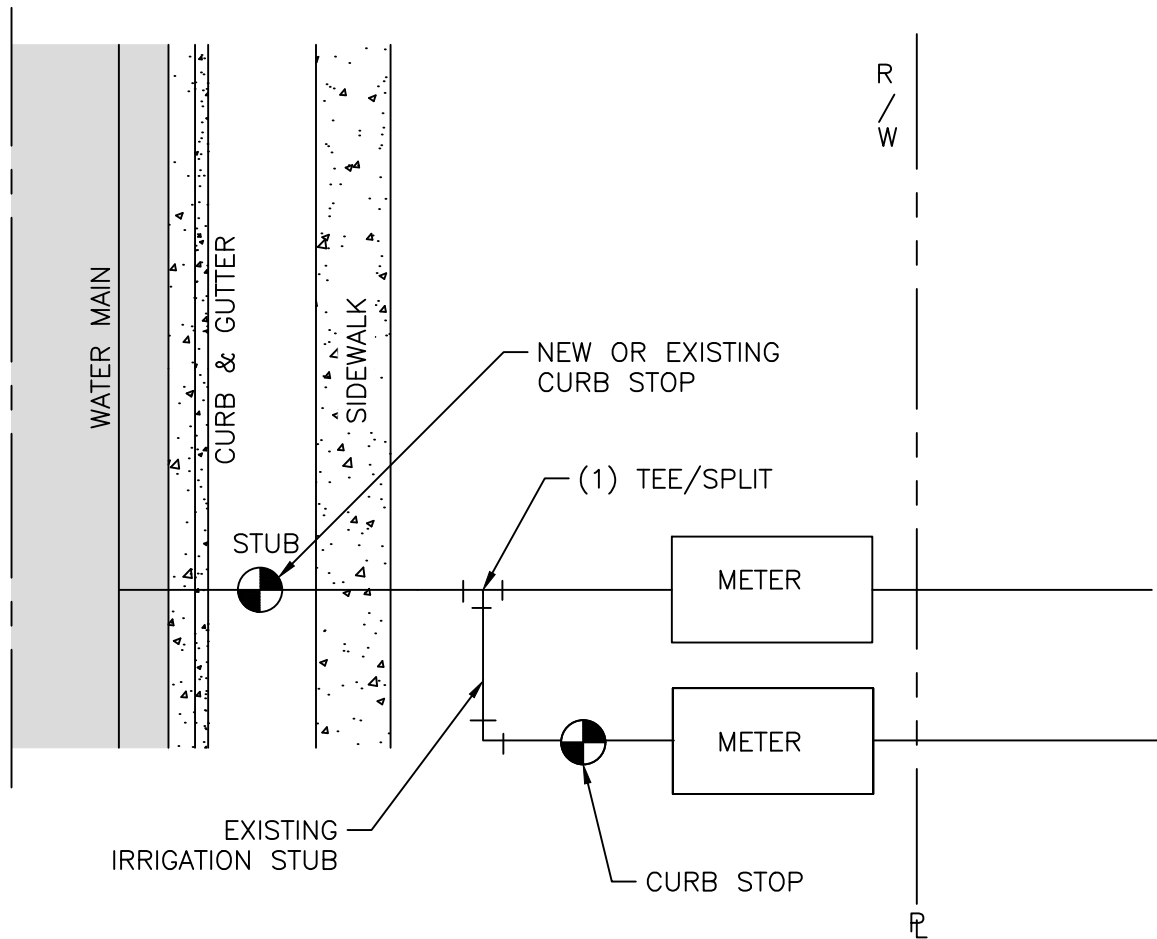
1. SERVICE TAPS FOR 2" AND SMALLER DOMESTIC SERVICES MAY BE BY CORPORATION COCKS. LARGER SERVICES WILL REQUIRE A TEE AND GATE VALVE OR TAPPING SLEEVE AND VALVE ASSEMBLY AND 90° BEND.
2. DOMESTIC SERVICE TAPS SHALL BE ALLOWED ONLY ON 6" OR LARGER FIRE LINES BEFORE THE BACKFLOW ASSEMBLY.
3. ONE DOMESTIC TAP PER FIRE LINE ON STREET SIDE OF BACKFLOW.
4. FIRE LINE SHALL HAVE A FIRE HYDRANT OR BLOW OFF ASSEMBLY AT ITS END TO FACILITATE FLUSHING WHEN NEEDED.
5. IRRIGATION METER SHALL BE LOCATED ON THE SIDE OF DOMESTIC METER WITH INCREASING ADDRESSES.
6. THE CONTAINMENT BACKFLOW ASSEMBLY SHALL BE INSTALLED WITHIN 50 LINEAR PIPING FEET OF THE METER OR RIGHT-OF-WAY FOR FIRE SERVICE LINES.
7. DOMESTIC/IRRIGATION BACKFLOW RISER/STANDPIPE SHALL BE OF APPROVED MATERIALS AS LISTED IN NC PLUMBING CODE.
8. THE RP RELIEF VALVE SHALL BE A MINIMUM OF 12" ABOVE ANY MATERIAL (MULCH INCLUDED) OR GRADE.
9. A SERVICE VALVE IS REQUIRED AFTER THE METER BUT BEFORE THE BACKFLOW ASSEMBLY FOR MAINTENANCE AND REPLACEMENT PURPOSES.
10. THE INSTALLATION MUST ALSO MEET ALL CODE REQUIREMENTS PER THE NC PLUMBING CODE.

CITY OF RALEIGH		
STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	FIRE, DOMESTIC & IRRIGATION OPTIONS SCHEMATIC	
	W-34	



- NOTES:
1. IRRIGATION METER SHALL BE LOCATED ON THE SIDE OF DOMESTIC METER WITH INCREASING ADDRESSES.
 2. REQUIRED CONTAINMENT BACKFLOWS ARE TO BE INSTALLED WITHIN 50 LINEAR PIPING FEET OF THE METER OR RIGHT-OF-WAY FOR FIRE SERVICE LINES AND MEET INSTALLATION REQUIREMENTS AS LISTED IN APPENDIX A: GUIDELINES AND REQUIREMENTS OF THE CROSS CONNECTION AND HYDRANT METER PROGRAM.
 3. BACKFLOW RISER/STANDPIPE SHALL BE OF COPPER OR BRASS.
 4. THE RP RELIEF VALVE SHALL BE A MINIMUM OF 12" ABOVE ANY MATERIAL (MULCH INCLUDED) OR GRADE.
 5. A SERVICE VALVE IS REQUIRED BEFORE AND AFTER THE BACKFLOW ASSEMBLY FOR MAINTENANCE AND REPLACEMENT PURPOSES.
 6. ENCLOSURE MUST BE ASSE 1060 APPROVED AND HAVE ADEQUATE DRAINAGE.

CITY OF RALEIGH		
STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	IRRIGATION TAP ON NEW AND EXISTING SERVICES	
W-35		

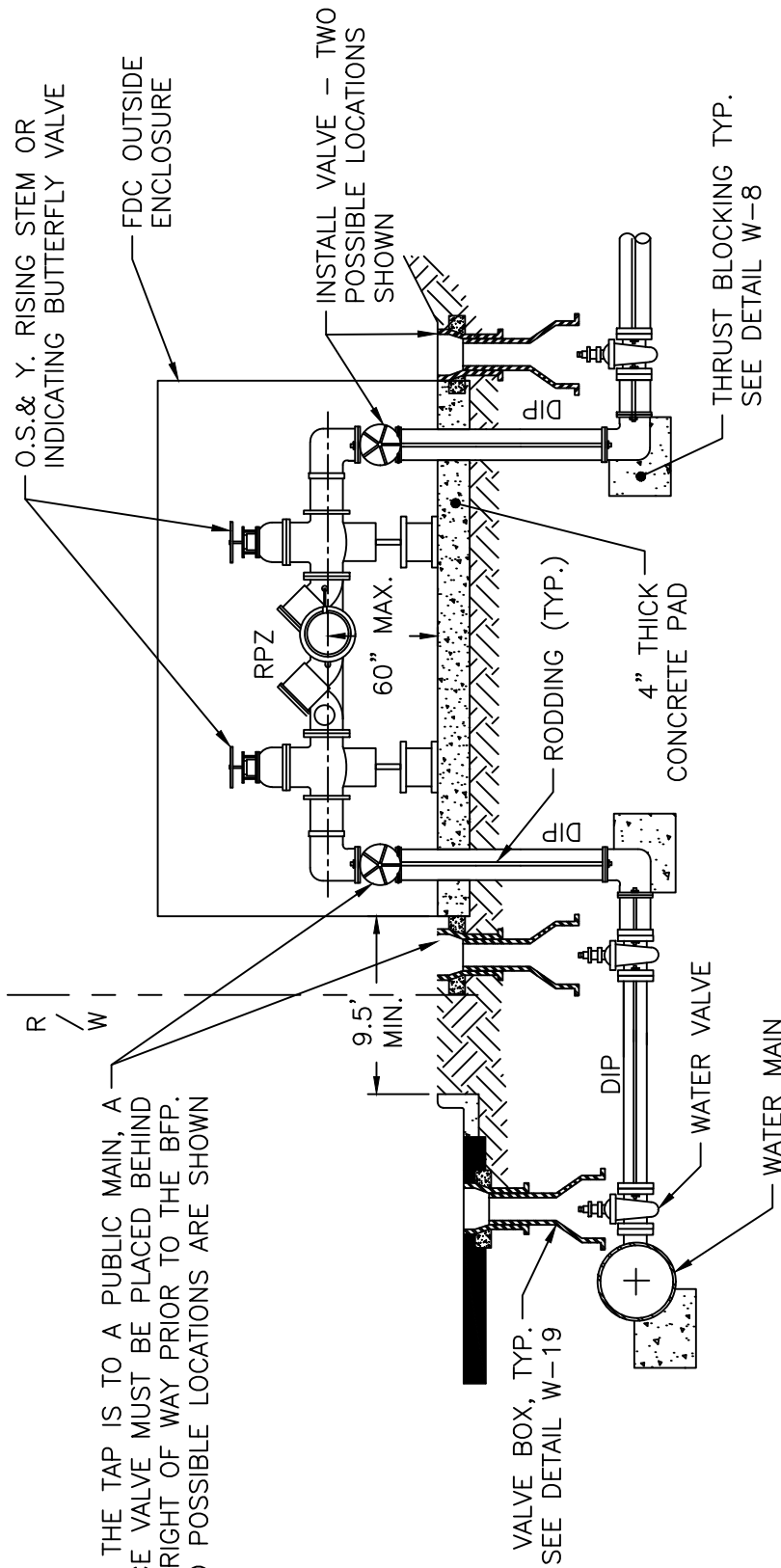


NOTES:

1. REMOVE TEE FITTINGS AND REPAIR STUB WITH CURB STOP & VALVE BOX IF NOT EXISTING.
2. WORK TO BE PERFORMED BY LICENSED UTILITY CONTRACTOR, STUB PERMIT INSPECTION REQUIRED.
3. FOR REPAIR OF EXISTING SERVICE, ONE BRASS COMPRESSION COUPLING AND TYPE K COPPER TO BE USED AS NEEDED FOR REPAIR.
4. REMOVE METER BOX AND PIPING. PRIOR TO TERMINATION THE METER DIVISION/UTILITY BILLING MUST BE CONTACTED FOR METER REMOVAL & ACCOUNT CLOSURE.

CITY OF RALEIGH		
STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	IRRIGATION METER TERMINATION	
	W-35A	

IF THE TAP IS TO A PUBLIC MAIN, A SERVICE VALVE MUST BE PLACED BEHIND THE RIGHT OF WAY PRIOR TO THE BFP. TWO POSSIBLE LOCATIONS ARE SHOWN



NOTES:

1. ENCLOSURE MUST BE ASSE 1060 APPROVED AND HAVE ADEQUATE DRAINAGE.
2. CONTAINMENT RPZ/RPDA BACKFLOW ASSEMBLIES ARE TO BE INSTALLED WITHIN 50 LINEAR PIPING FEET OF THE METER OR RIGHT-OF-WAY FOR FIRE SERVICE LINES AND MEET INSTALLATION REQUIREMENTS AS LISTED IN APPENDIX A: GUIDELINES AND REQUIREMENTS OF THE CROSS CONNECTION AND HYDRANT METER PROGRAM.
3. NO VALVE IN THE EXISTING SYSTEM SHALL BE OPERATED WITHOUT FOLLOWING THE PROCEDURE OUTLINED IN THE RALEIGH WATER PUBLIC UTILITY DESIGN MANUAL. THE CONTRACTOR SHALL NOTIFY RALEIGH WATER'S DISTRIBUTION DIVISION AT 919-996-3245 TO REQUEST THE OPERATION OF ANY VALVE.
4. RESIDENTIAL LAWN IRRIGATION R.P. ASSEMBLIES THAT ARE REMOVED TO PREVENT FREEZING IN THE WINTER MONTHS MUST BE CAPPED OFF. ALL ABOVE GROUND ASSEMBLIES, EXCEPT RESIDENTIAL LAWN IRRIGATION ASSEMBLIES, MUST BE PROTECTED FROM FROST.
5. ALL CONTAINMENT BACKFLOW ASSEMBLIES MUST BE ASSE AND USC APPROVED.
6. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.

CITY OF RALEIGH
STANDARD DETAIL

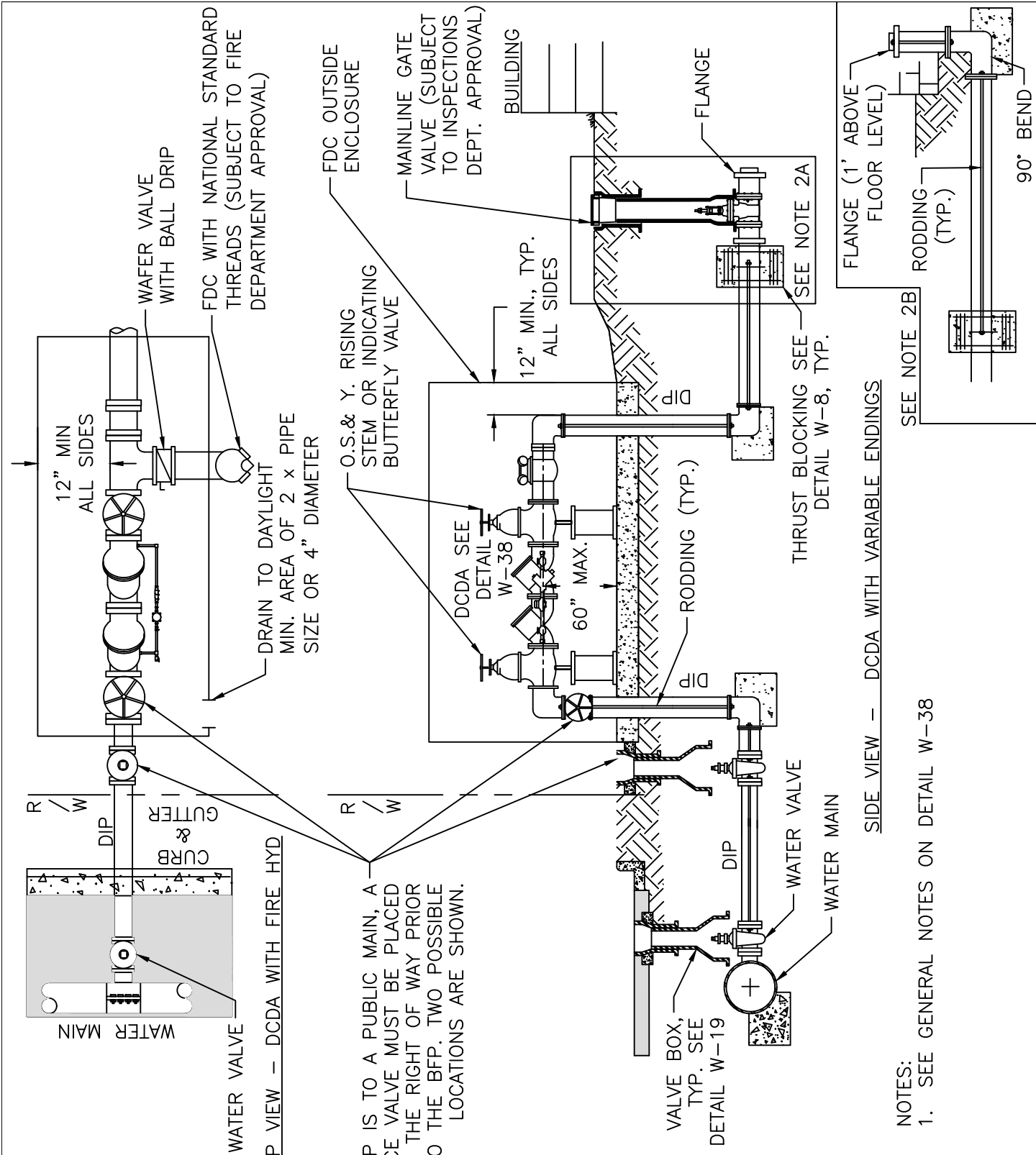
REVISIONS

DATE: 01/18/2025

NOT TO SCALE

REDUCED PRESSURE ZONE
AND REDUCED PRESSURE
DETECTOR ASSEMBLY

W-36



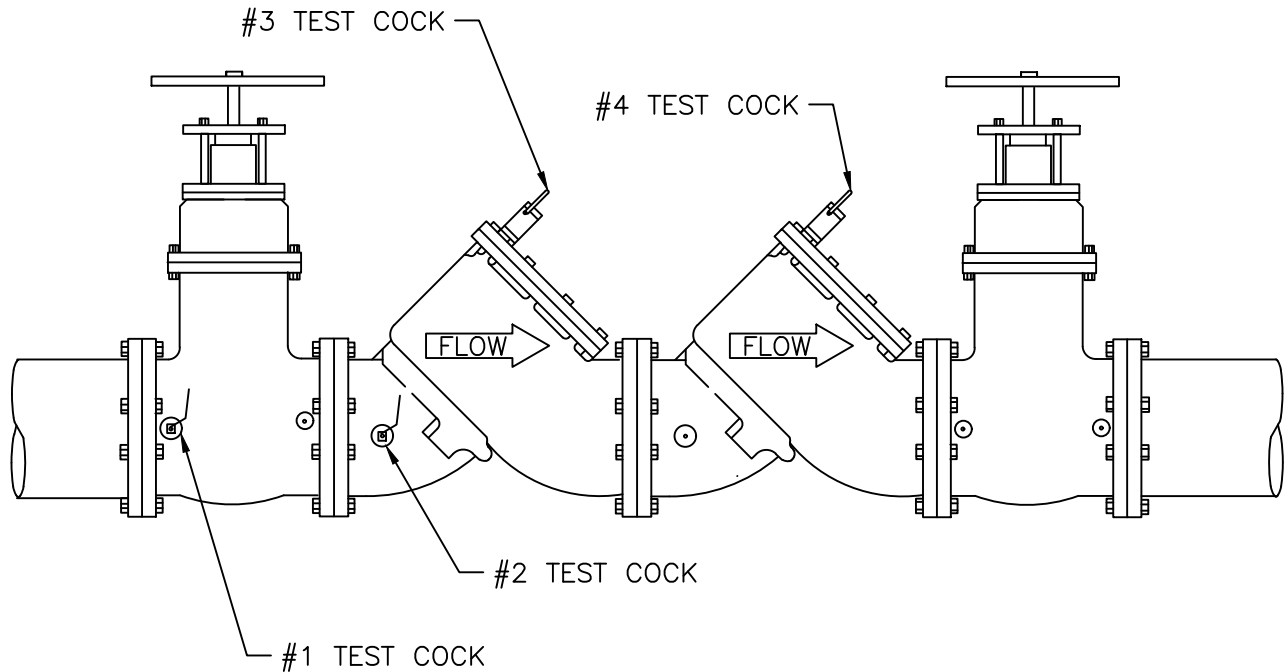
TOP VIEW - DCDA WITH FIRE HYD

IF THE TAP IS TO A PUBLIC MAIN, A SERVICE VALVE MUST BE PLACED BEHIND THE RIGHT OF WAY PRIOR TO THE BFP. TWO POSSIBLE LOCATIONS ARE SHOWN.

SIDE VIEW - DCDA WITH VARIABLE ENDINGS

NOTES:
1. SEE GENERAL NOTES ON DETAIL W-38

CITY OF RALEIGH		
STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
TYPICAL DOUBLE CHECK VALVE AND DOUBLE CHECK DETECTOR ASSEMBLY		
W-37		



GENERAL NOTES:

1. SHUT-OFF VALVES, CHECK VALVES, AND TEST COCKS SHALL BE STANDARD TO THE APPROVED BACKFLOW ASSEMBLY.
2. ALL LARGE (2 1/2"–10") ASSEMBLIES TO BE SUPPORTED BY A CRADLE.
3. ENCLOSURE FOUNDATIONS SHALL BE CONSTRUCTED OF 4" OF CONCRETE OR 6" OF STONE.
4. ASSEMBLIES MUST BE ON CURRENT APPROVAL LIST.
5. 2 1/2" AND LARGER ASSEMBLIES SHALL BE FUSION BONDED EPOXY COATED INCLUDING SHUTOFF VALVES.
6. ENCLOSURE MUST BE ASSE 1060 APPROVED AND HAVE ADEQUATE DRAINAGE.
7. CONTAINMENT RPZ/RPDA BACKFLOWS ARE TO BE INSTALLED WITHIN 50 LINEAR PIPING FEET OF THE METER OR RIGHT-OF-WAY FOR FIRE SERVICE LINES AND MEET INSTALLATION REQUIREMENTS AS LISTED IN APPENDIX A: GUIDELINES AND REQUIREMENTS OF THE CROSS CONNECTION AND HYDRANT METER PROGRAM.
8. NO VALVE IN THE EXISTING SYSTEM SHALL BE OPERATED WITHOUT FOLLOWING THE PROCEDURE OUTLINED IN THE RALEIGH WATER PUBLIC UTILITY DESIGN MANUAL. THE CONTRACTOR SHALL NOTIFY RALEIGH WATER'S DISTRIBUTION DIVISION AT 919-996-3245 TO REQUEST THE OPERATION OF ANY VALVE.
9. ALL CONTAINMENT BACKFLOW ASSEMBLIES MUST BE ASSE AND USC APPROVED.
10. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	STANDARD DOUBLE CHECK VALVE ASSEMBLY	
W-38		

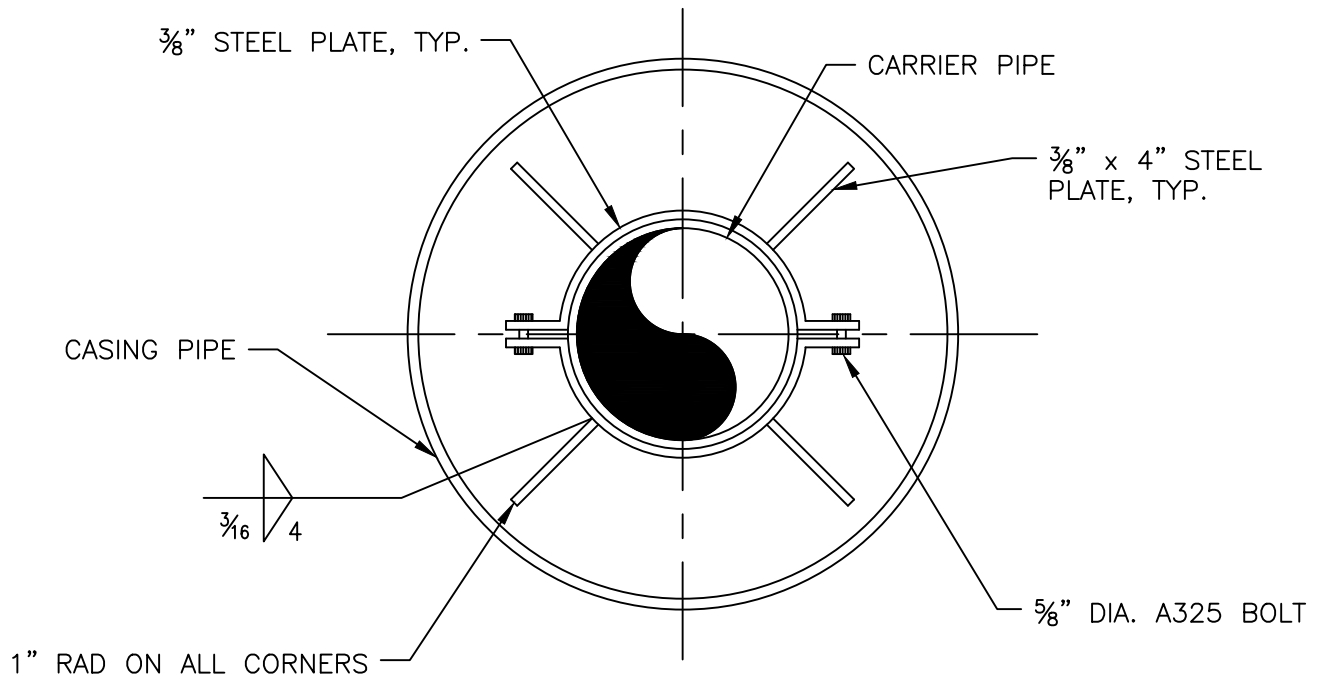
NOT USED

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS *DATE: 01/18/2025* *NOT TO SCALE*

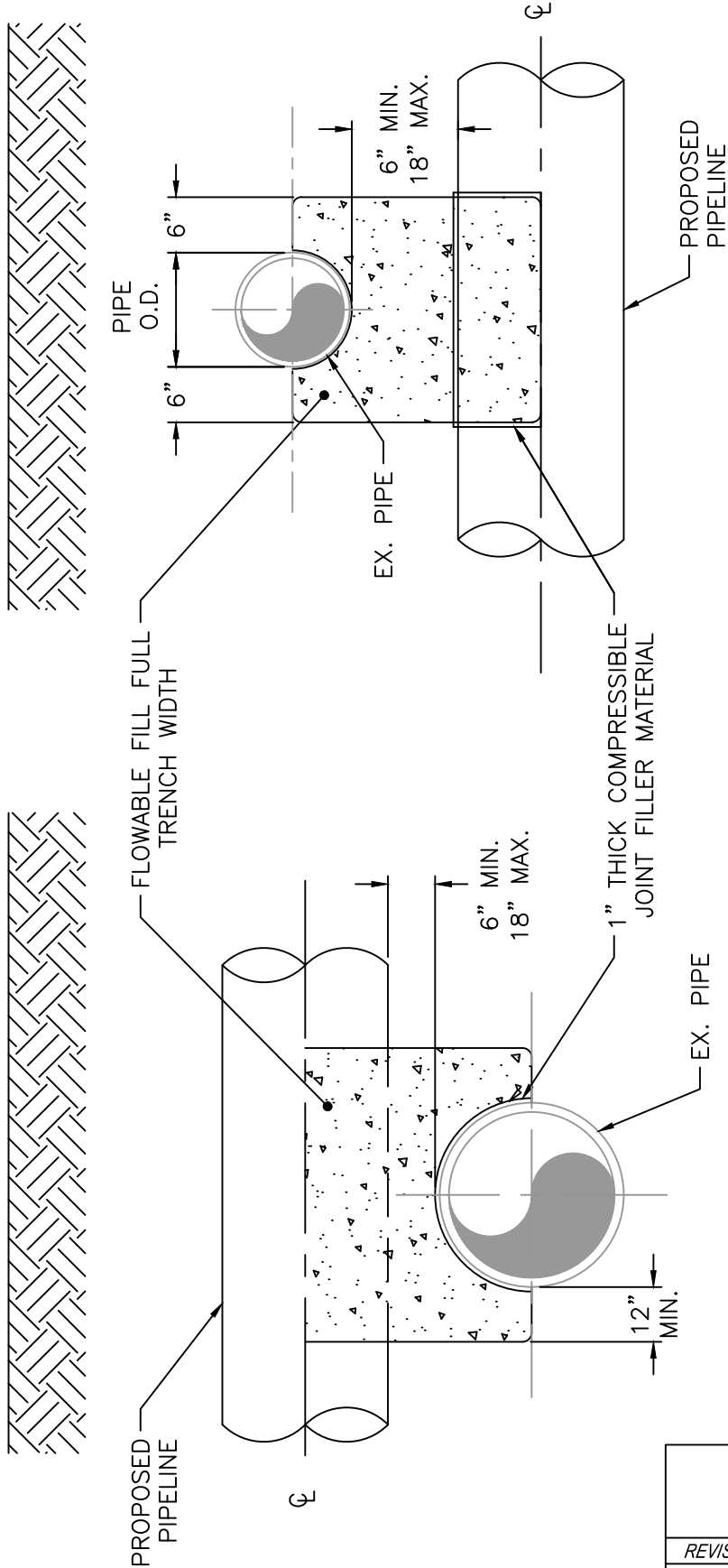
NOT USED

W-39



NOTE:
 USE A MINIMUM OF TWO SPIDERS PER PIPE JOINT ONE FOURTH OF THE PIPE JOINT LENGTH IN FROM BOTH THE BELL AND SPIGOT ENDS.

CITY OF RALEIGH		
STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	PIPE ALIGNMENT GUIDE	
	W-40	



PROPOSED PIPELINE UNDER EXISTING PIPE

PROPOSED PIPELINE OVER EXISTING PIPE

NOTE:
NO ENCASEMENT REQUIRED FOR SPACE
GREATER THAN 18" FOR WATER LINES.

CITY OF RALEIGH	
STANDARD DETAIL	
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i> <i>NOT TO SCALE</i>
	CONCRETE CRADLE PROTECTION FOR WATER LINE CROSSINGS
W-41	