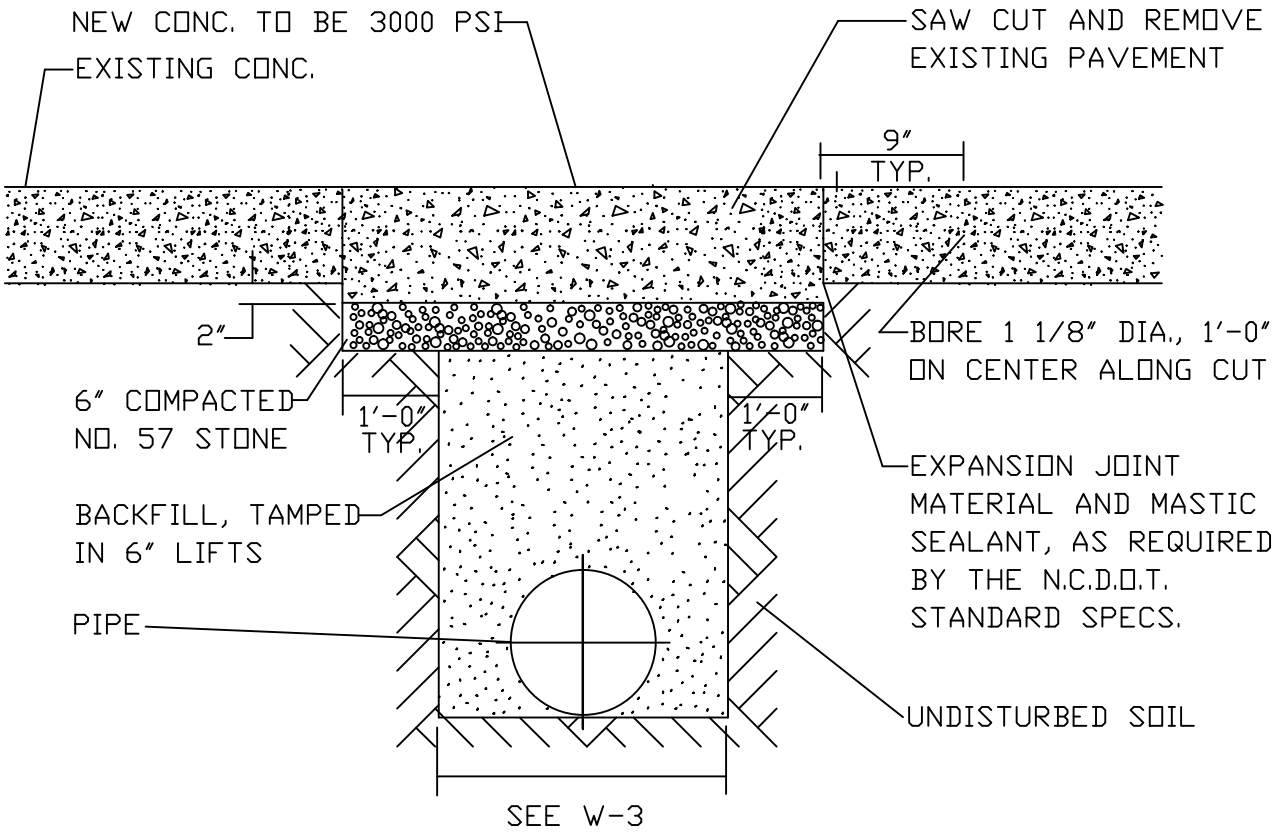


NOTES:

1. See W3 standards for trenches and pipe bedding for additional details

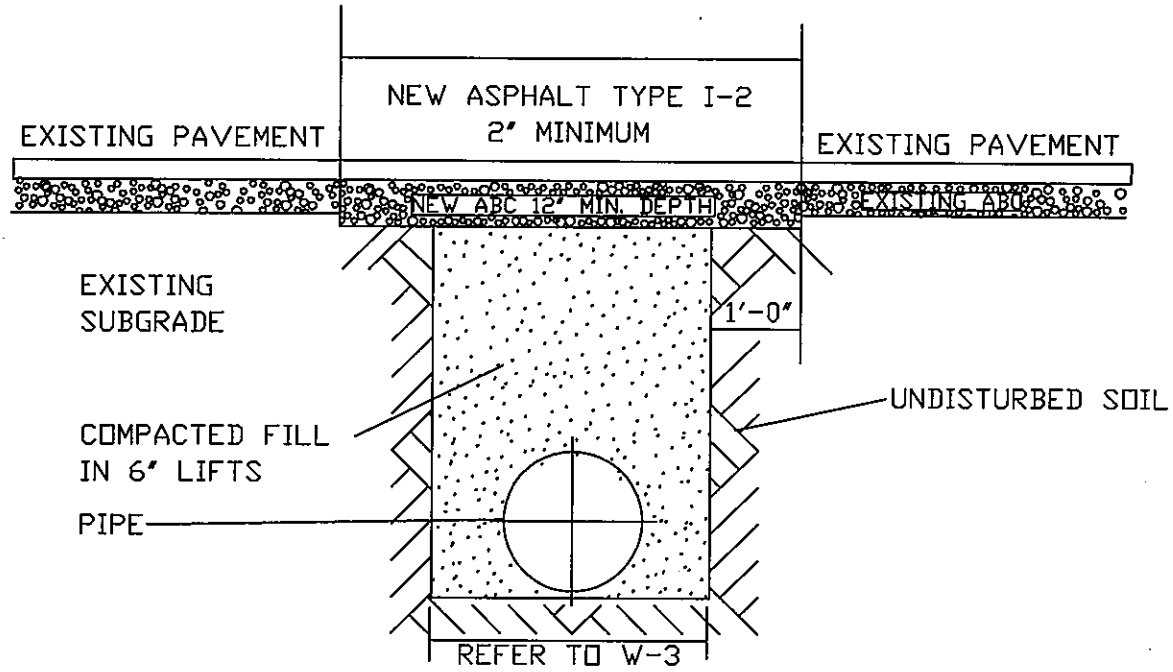
2. Pavement cuts over 5′-0″ width shall be reinforced to N.C.D.O.T. standards.

SGWASA

UTILITY DEPARTMENT

STANDARD CONCRETE PAVEMENT PATCH DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-1				



NOTES:

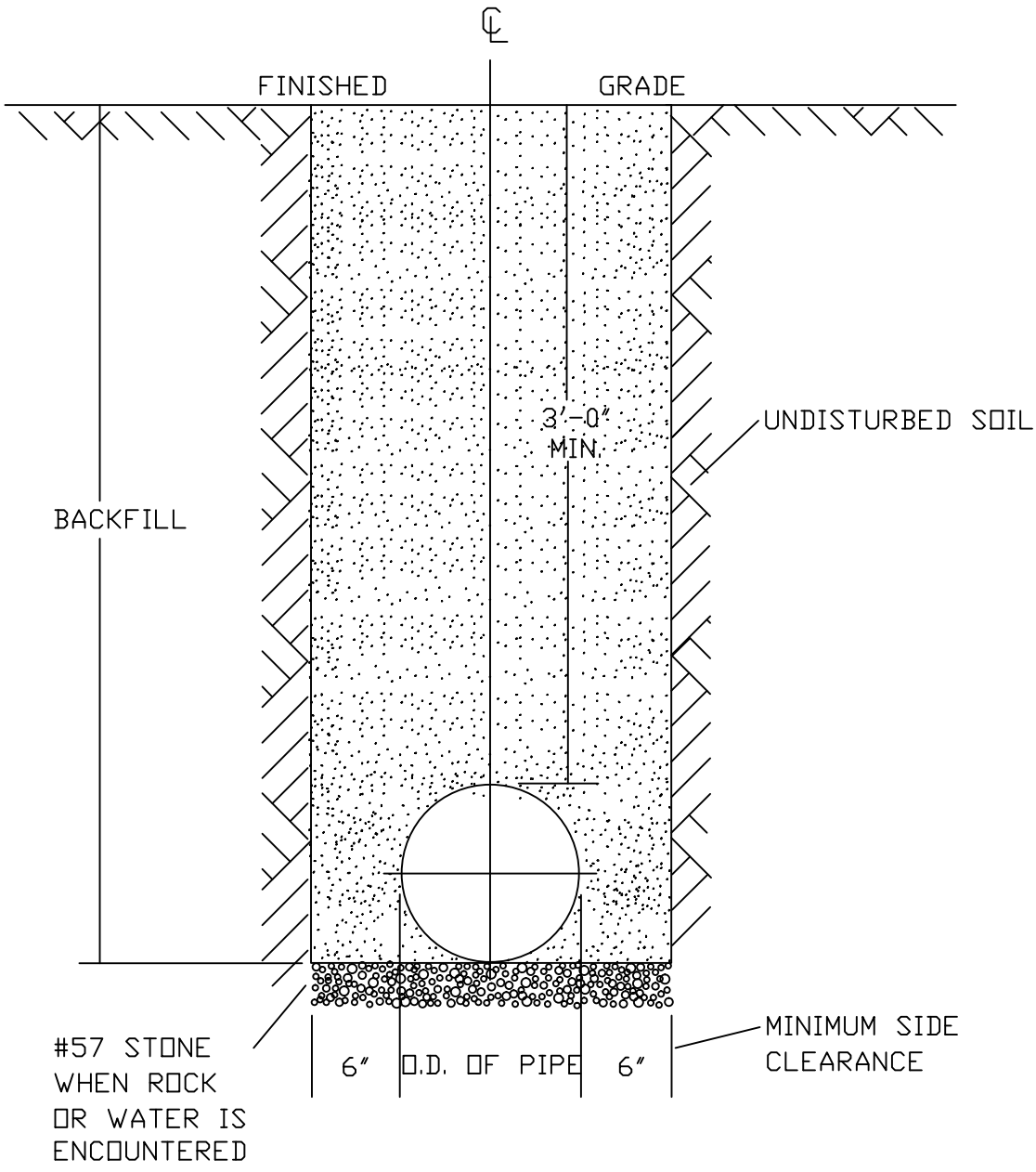
1. The pavement cut shall be defined by a straight edge preferably a machine saw cut.
2. The trench subgrade material shall be backfilled with suitable material and compacted to a density of at least 95% of that obtained by compacting a sample of the material in accordance with AASHTO T-99 as modified by NCDOT.
3. The final 1' of fill shall consist of ABC material compacted to a density equal to 100% of that obtained by compacting a sample of the material in accordance with AASHTO T-80 as modified by NCDOT.
4. The entire thickness/ vertical edge of cut shall be tacked.
5. The same depth of pavement material which exists shall be reinstalled, but in no case shall the asphalt be less than 2" thick.
6. The asphalt pavement material shall be installed and compacted thoroughly to achieve a smooth level patch.
7. Refer to SGWASA standards for trenches and pipe bedding, W-3. for additional details.

SGWASA

UTILITY DEPARTMENT

STANDARD ASPHALT PAVEMENT PATCH DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-2				



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.

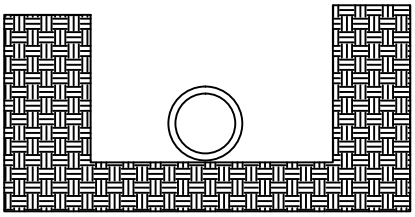
SGWASA

UTILITIES DEPARTMENT

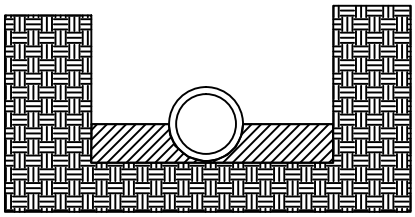
TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON & C-900

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-3				

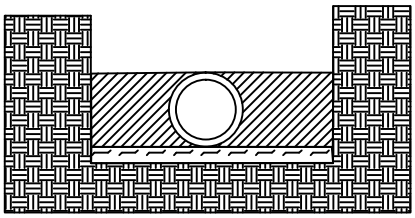
STANDARD LAYING CONDITIONS FOR DUCTILE IRON AND C900 PIPE



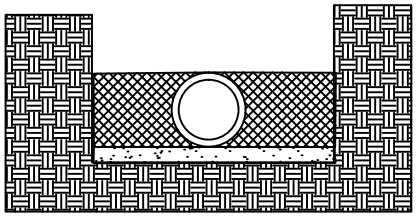
TYPE 1
FLAT-BOTTOM TRENCH.
LOOSE BACKFILL



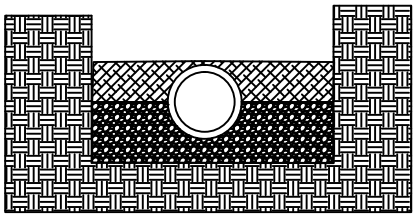
TYPE 2
FLAT-BOTTOM TRENCH.
BACKFILL LIGHTLY CONSOLIDATED TO CENTERLINE OF PIPE.



TYPE 3
PIPE BEDDED IN 4-INCH MINIMUM LOOSE SOIL.
BACKFILL LIGHTLY CONSOLIDATED TO TOP OF PIPE.



TYPE 4
PIPE BEDDED IN SAND, GRAVEL, OR CRUSHED STONE TO DEPTH OF $\frac{1}{8}$ PIPE DIAMETER, 4 - INCH MINIMUM.
BACKFILL COMPACTED TO TOP OF PIPE (APPROX. 90% STANDARD PROCTOR, AASHTO T-99)

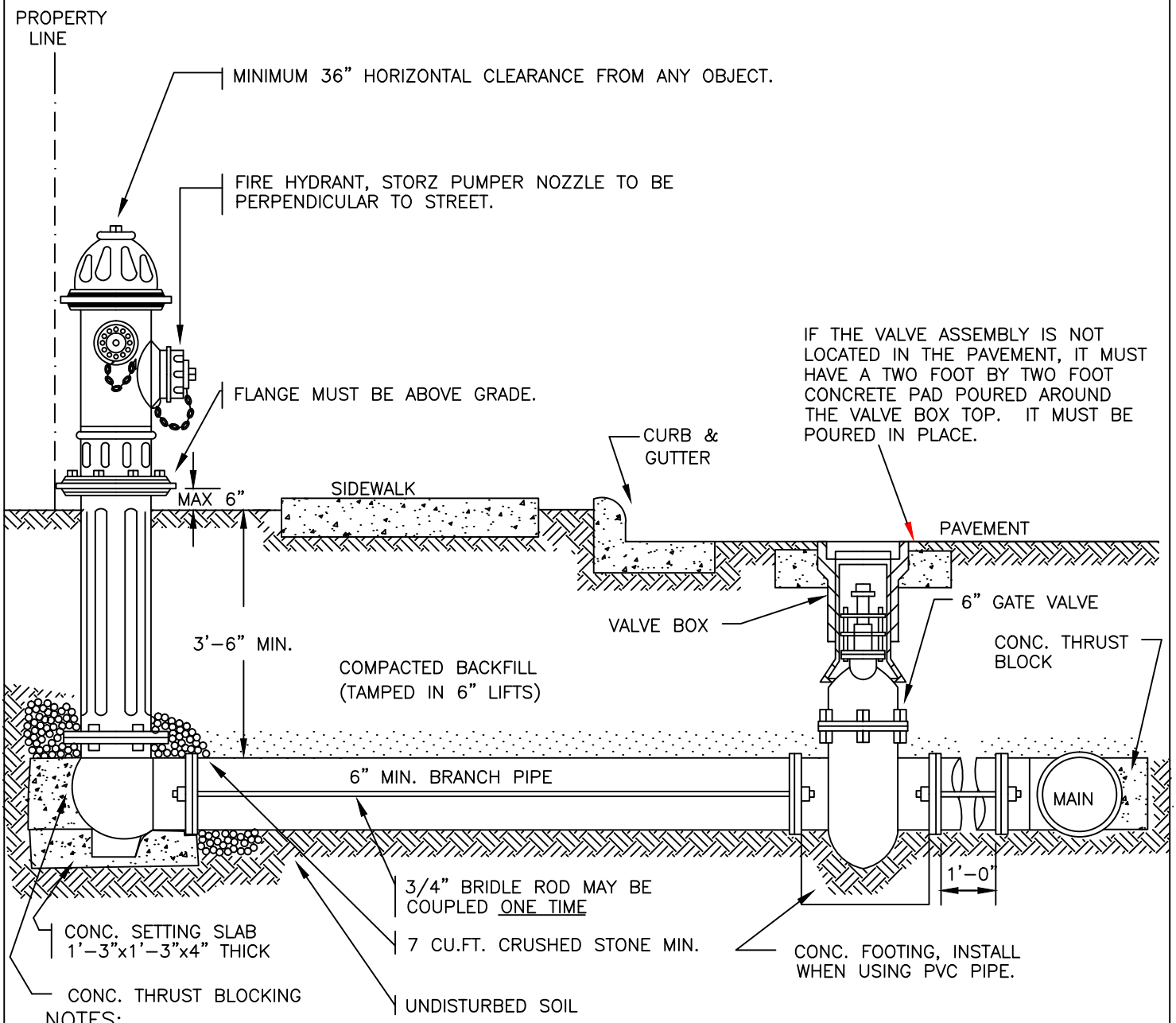


TYPE 5
PIPE BEDDED TO ITS CENTERLINE IN COMPACTED GRANULAR MATERIAL, 4 - INCH MINIMUM UNDER PIPE.
COMPACTED GRANULAR OR SELECT MATERIAL TO TOP OF PIPE (APPROX. 90% STANDARD PROCTOR, AASHTO T-99.)

NOTES:
FOR 14-INCH AND LARGER PIPE, TYPE 1 SHALL NOT BE USED.

"FLAT-BOTTOM" IS DEFINED AS "UNDISTURBED EARTH"

"LOOSE SOIL" OR "SELECT MATERIAL" IS DEFINED AS "NATIVE SOIL EXCAVATED FROM TRENCH, FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH".



NOTES:

FIRE HYDRANT– SHALL BE A CLOW MEDALLION WITH A 5 1/4" MAIN VALVE OPENING
PUMPER CONNECTION SHALL BE A STORZ CONNECTION

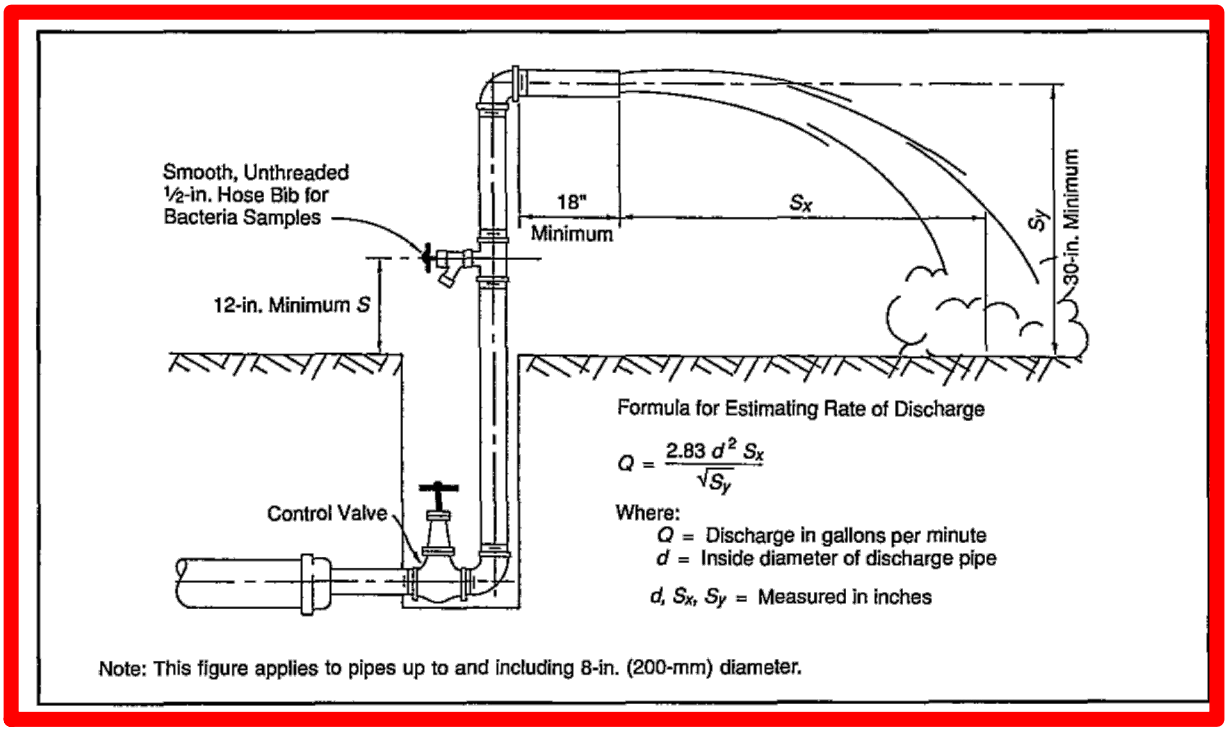
BRANCH PIPE– SHALL BE A MINIMUM OF DUCTILE IRON CLASS 50 OR PVC AWWA C900 CLASS 200
6" GATE VALVE –SHALL BE AWWA C500–86 OPEN LEFT.
CONCRETE– SHALL ALL BE 4000 PSI MINIMUM AND TRANSIT MIXED FOR# PVC PIPE BEDDING SHALL CONFORM TO STANDARD DETAIL W–3.
RODS AND BOLTS– MUST BE HOT DIPPED GALVANIZE OR STAINLESS STEEL

FIRE HYDRANTS WILL BE INSTALLED IN TRUE VERTICAL POSITIONS AS DETECTED BY THE "NAKED" EYE.

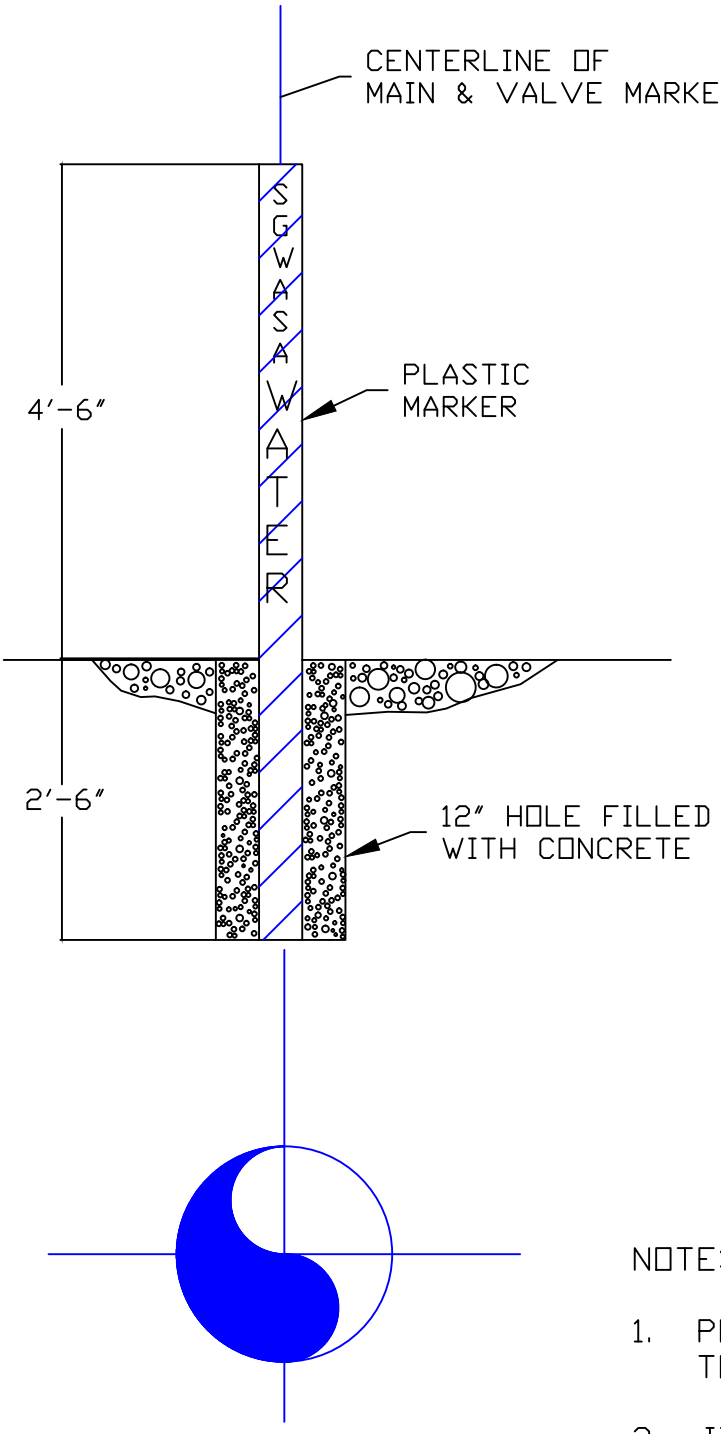
ANYTIME SITE WORK, CONSTRUCTION, ROAD WORK, OR ANY OTHER WORK CHANGES THE GRADE OF THE FIRE HYDRANT, THE PERSON RESPONSIBLE FOR FOR THE WORK IS RESPNSIBLE FOR ADJUSTING THE FIRE HYDRANT TO STAY WITHIN COMPLIANCE

SGWASA STANDARD FIRE HYDRANT INSTALLATION DETAIL.

W–4



SOUTH GRANVILLE WATER AND SEWER AUTHORITY				
UTILITIES DEPARTMENT				
SUGGESTED BLOWOFF AND SAMPLING TAP				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-5				



NOTES:

1. PLASTIC MARKER NEEDS TO BE RED IN COLOR.

2. IT SHALL BE LABELED "SGWASA WATER"

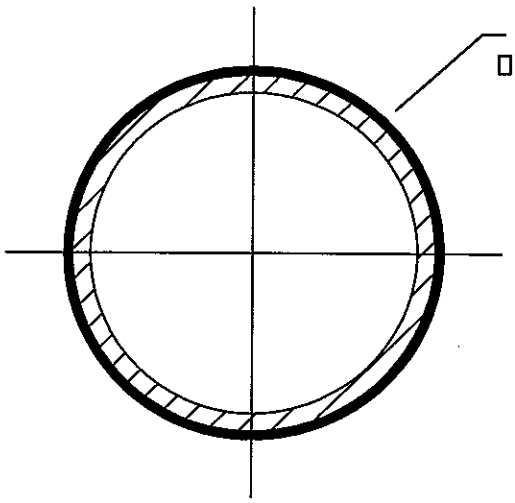
3. MARKERS ARE TO BE PLACED AT THE EDGE OF THE 2 FOOT SQUARE CONCRETE VALVE BOX PAD AT EACH VALVE AND EVERY 300 FEET ON WATER MAINS NOT LOCATED WITHIN PUBLIC RIGHT OF WAY.

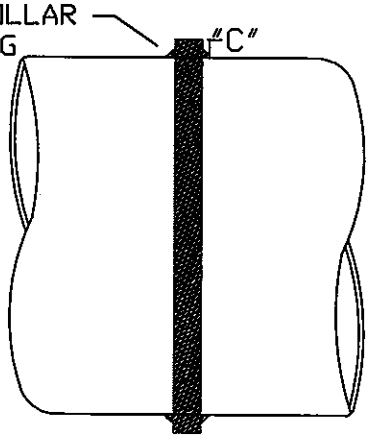
SGWASA

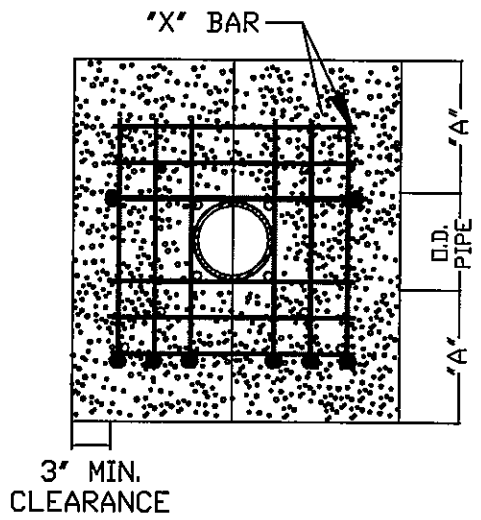
UTILITY DEPARTMENT

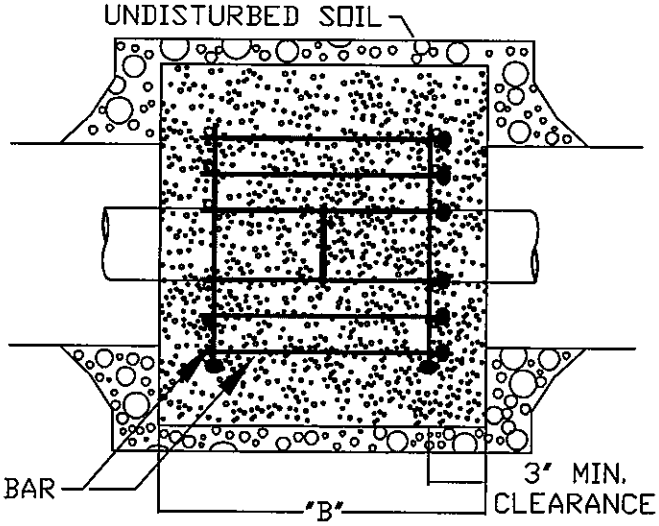
STANDARD MAIN MARKER FOR WATER MAINS NOT LOCATED IN PUBLIC RIGHT OF WAY

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-6				









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" & greater	#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-6"-16", 20"-24", 30"-36", 48"
6" - 36"	1'-4"	1'-7"	2" 3" 4"
48" & greater	1'-8"	1'-9"	6"

NOTES:

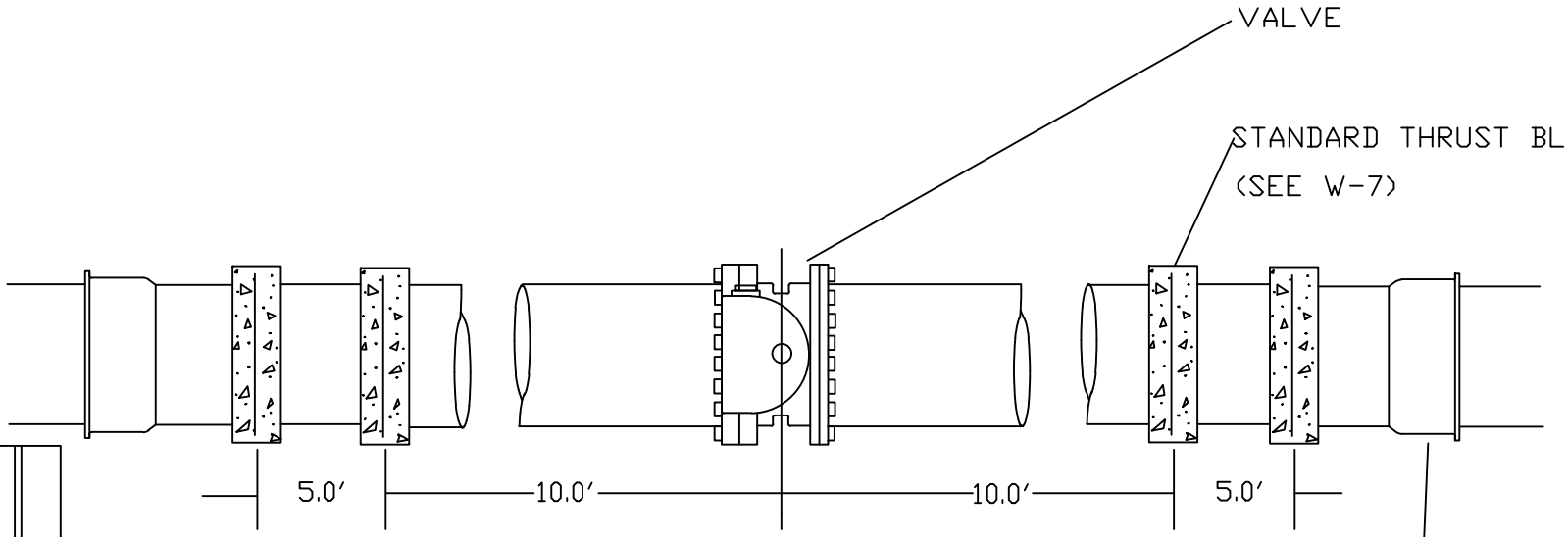
1. SEE STANDARD DETAIL W-9 FOR THRUST BLOCK LOCATIONS.
2. CONCRETE SHALL BE 3000 PSI AND TRANSIT MIXED.
3. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
4. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON STANDARD DETAIL W-3.
5. BACKFILL TAMPED IN 6" LIFTS PER STANDARD DETAIL W-3.
6. THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE, OR MEGA-LUG

SOUTH GRANVILLE WATER AND SEWER AUTHORITY

UTILITIES DEPARTMENT

THRUST BLOCKING DESIGN DATA FOR WATER MAINS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-7				



THRUST BLOCKING AT VALVES
6" AND LARGER

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

SGWASA

UTILITY DEPARTMENT

STANDARD THRUST BLOCK INSTALLATION FOR VALVES

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-8				

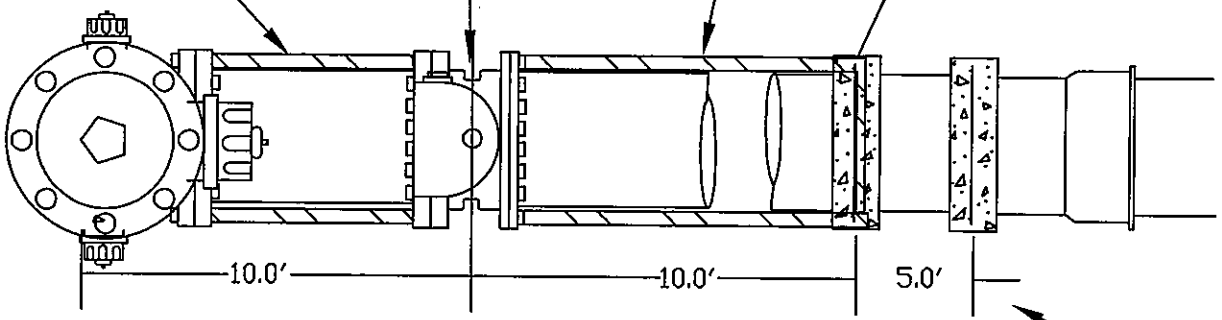
3/4" THREADED ROD SECURED FROM THE VAVLE TO THE HYDRANT

THE ROD MUST NOT BE CONTINUOUS. THE VALVE IS RODDED TO THE THRUST AND THEN THE HYDRANT IS RODDED TO THE VALVE.

3/4" THREADED ROD SECURED BEHIDE THE REBAR IN THE THRUST BLOCKING

STANDARD THRUST BLOCK (SEE W-7)

VALVE



THRUST BLOCKING AT DEAD ENDS 6" AND LARGER

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

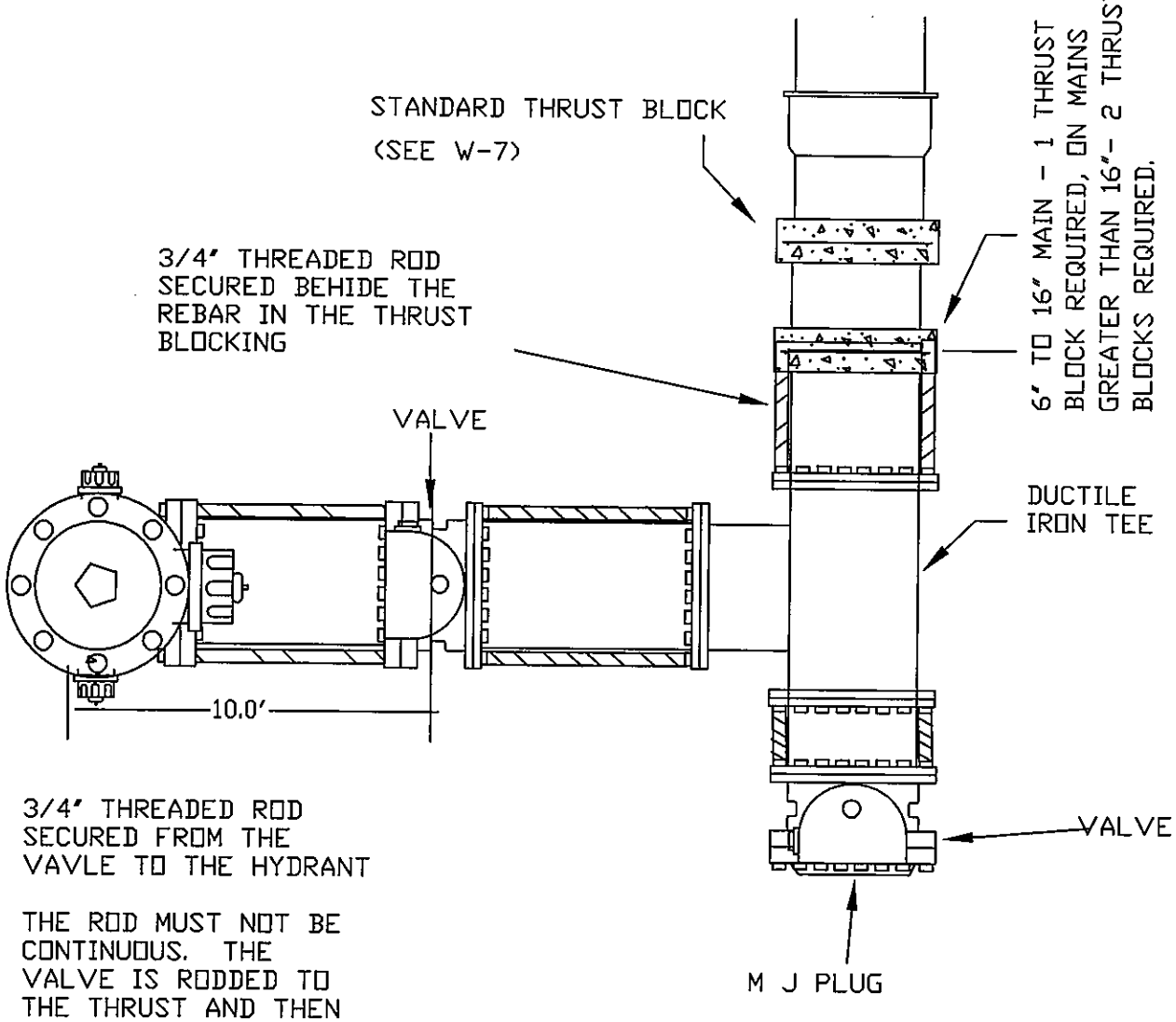
AT THE DESCRESION OF THE UTILITY DEPARTMENT, A DEAD END MAY BE CONSTRUCTED FOR FUTURE EXTENSION. SEE W8-B

SGWASA

UTILITIES DEPARTMENT

STANDARD THRUST BLOCK INSTALLATION FOR DEAD END MAINS NOT TO BE EXTENDED

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-8A				

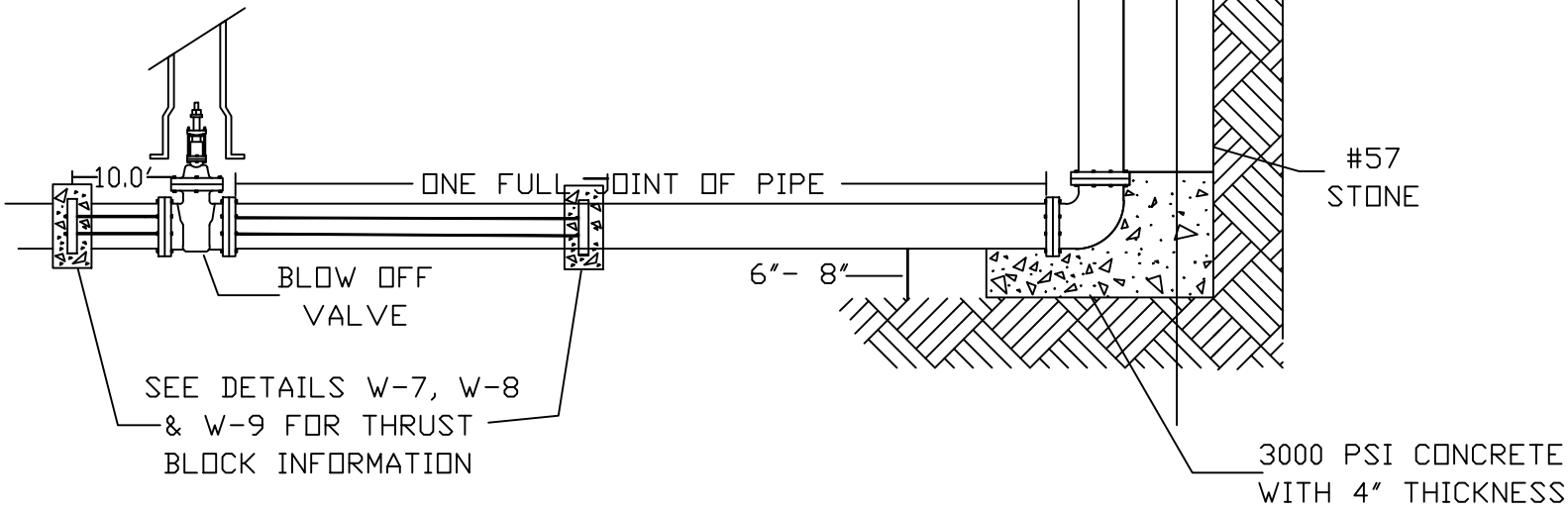


THRUST BLOCKING AT DEAD ENDS
6" AND LARGER

A STANDARD FIRE HYDRANT ASSEMBLY WILL BE ATTACHED TO THE "T" (SEE W-4).

SGWASA				
UTILITY DEPARTMENT				
STANDARD DETAIL FOR MAIN ENDS THAT MAY BE EXTENDED				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-8B				

MAIN SIZE	END PIPE SIZE
2″	SAME DIAMETER AS MAIN
2″< BUT >6″	APPROVED BY PUBLIC UTILITIES DEPT.



W-8C

DWG. NO.

REVISIONS DATE

REVISIONS DATE

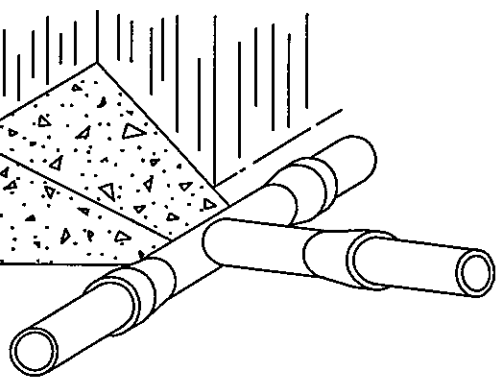
WATER MAIN BLOW OFF ASSEMBLY

MAIN SIZES LESS THAN 6 INCH

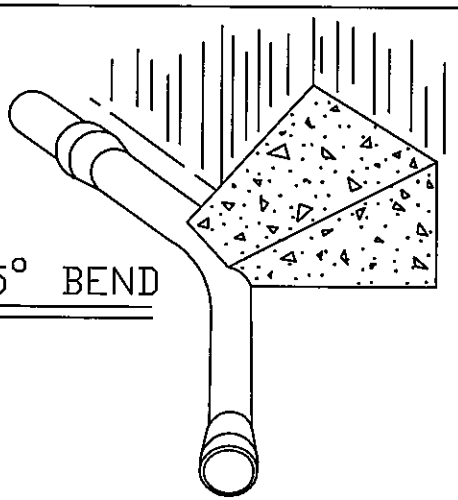
UTILITY DEPARTMENT

SGWASA

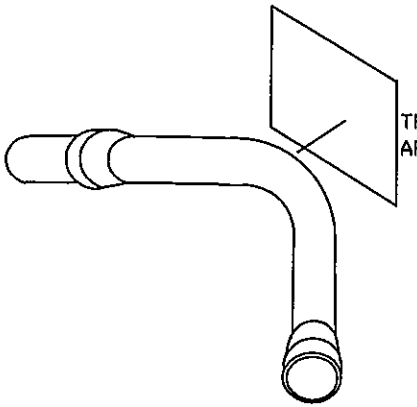
THRUST BLOCKING

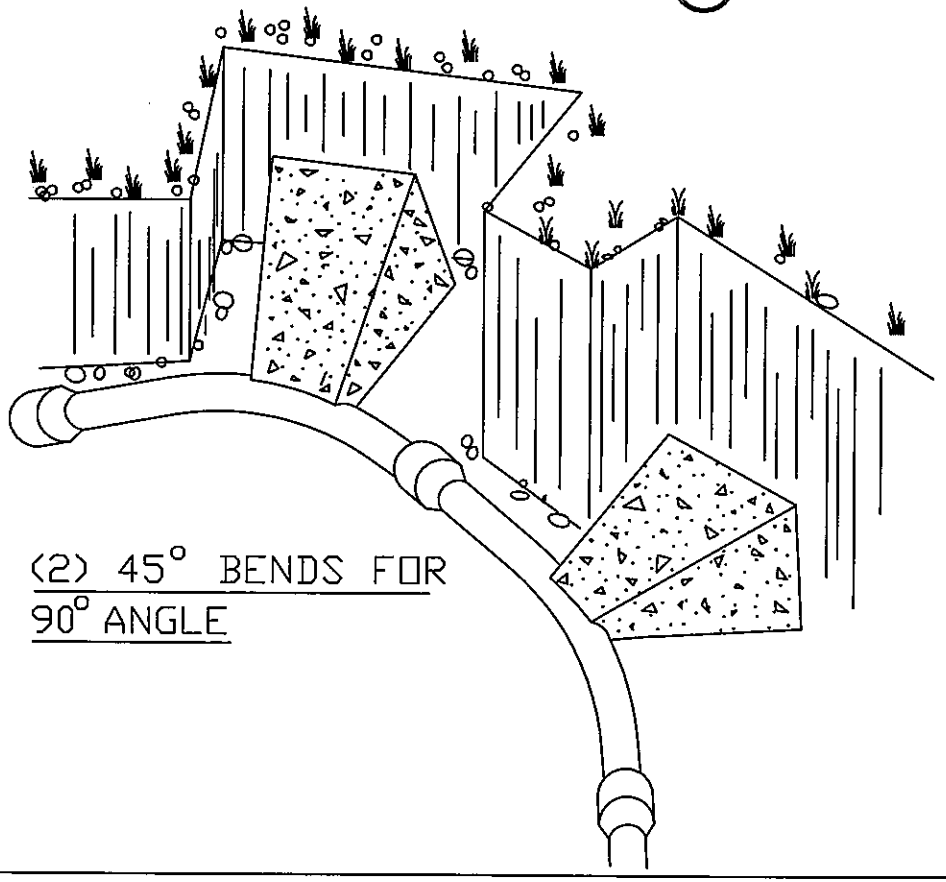


TEE INTERSECTION



45° BEND





(2) 45° BENDS FOR
90° ANGLE

NOTES:
1. CONCRETE SHALL BE 3000 PSI
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. TRENCHES SHALL CONFORM TO STANDARD DETAIL W-3.
4. SEE STANDARD THRUST BLOCK TABLES, W-10 THRU W-11, FOR AREA OF CONCRETE REQUIRED.
5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-9				

STANDARD THRUST BLOCKING VIEWS

UTILITIES DEPARTMENT

SGWASA

REACTION BEARING AREAS FOR WATER PIPE BENDS

BASED ON TEST PRESSURE OF 200 P.S.I.

ALL AREAS GIVEN IN SQUARE FEET.

SIZE AND DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY DRY CLAY 4000 LBS/FT²	SOFT CLAY 2000 LBS/FT²	GRAVEL / COARSE SAND 1600 LBS/FT²	DRY CLAY - ALWAYS DRY 8000 LBS/FT²	SAND, COMPACT FIRM 8000 LBS/FT²	SAND -CLEAN DRY 4000 LBS/FT²	QUICKSAND - VERY POOR SOIL 1000 LBS/FT²	ROCK - POOR 10,000 LBS/FT²
6″									
11 1/4°	1,108	1	1	1	1	1	1	2	1
22 1/2°	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 1/4°	1,970	1	1	2	1	1	1	2	1
22 1/2°	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 1/4°	4,433	2	3	3	1	1	2	5	1
22 1/2°	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 1/4°	7,881	2	4	5	1	1	2	8	1
22 1/2°	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

REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A PLANE IN THE TRENCH AT AN ANGLE OF 90° TO THE THRUST VECTOR.

USE 6″ - 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

SGWASA

UTILITY DEPARTMENT

THRUST BLOCKING DESIGN QUANTITY TABLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-10				

REACTION BEARING AREAS FOR WATER PIPE BENDS

BASED ON TEST PRESSURE OF 200 P.S.I.

ALL AREAS GIVEN IN SQUARE FEET.

SIZE AND DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY DRY CLAY 4000 LBS/FT²	SOFT CLAY 2000 LBS/FT²	GRAVEL/COARSE SAND 1600LBS/FT	DRY CLAY - ALWAYS DRY 8000 LBS/FT²	SAND, COMPACT FIRM 8000 LBS/FT²	SAND -CLEAN DRY 4000 LBS/FT²	QUICKSAND - VERY POOR SOIL 1000 LBS/FT²	ROCK - POOR 10,000 LBS/FT²
24″									
11 1/4°	17,734	5	9	11	3	3	5	18	2
22 1/2°	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	13
PLUG	90,478	23	46	55	12	12	23	91	10
30″									
11 1/4°	27,709	7	14	17	4	4	7	2	3
22 1/2°	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 1/4°	39,901	10	20	24	5	5	10	40	4
22 1/2°	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 1/4°	70,935	18	36	43	9	9	18	71	8
22 1/2°	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

REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A PLANE IN THE TRENCH AT AN ANGLE OF 90° TO THE THRUST VECTOR.

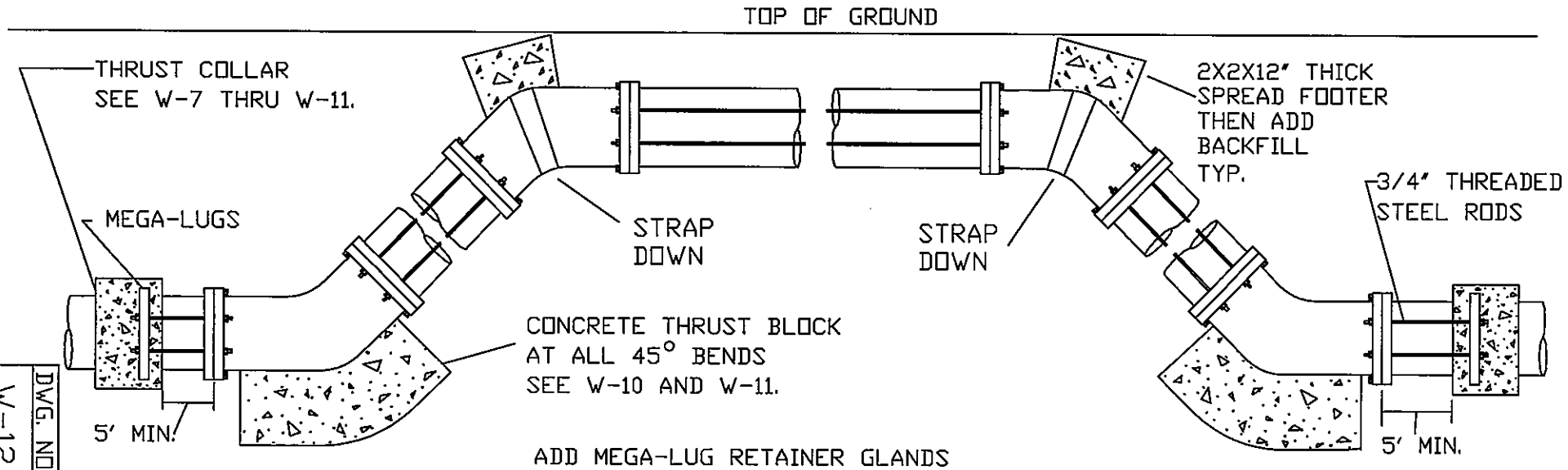
USE 6″ - 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

SGWASA

UTILITIES DEPARTMENT

THRUST BLOCKING DESIGN QUANTITY TABLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-11				



ROD REQUIREMENTS

SIZE OF 45 BEND	STATIC THRUST IN POUNDS	NO. OF RODS REQUIRED
6"	4,328	4
8"	7,694	4
12"	17,312	4
16"	30,779	8
24"	69,252	8

GENERAL NOTES:

1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
3. MEGA-LUGS TO BE USED AT ALL FITTINGS.
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.

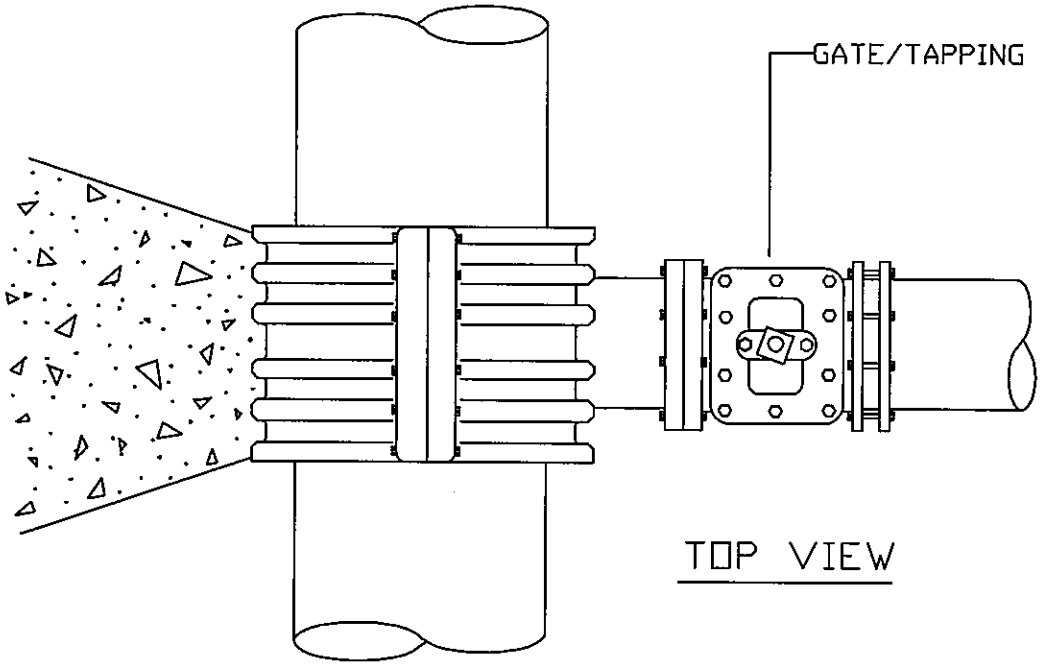
W-12

DWG. NO. | REVISIONS | DATE | REVISIONS | DATE

STANDARD VERTICAL BEND

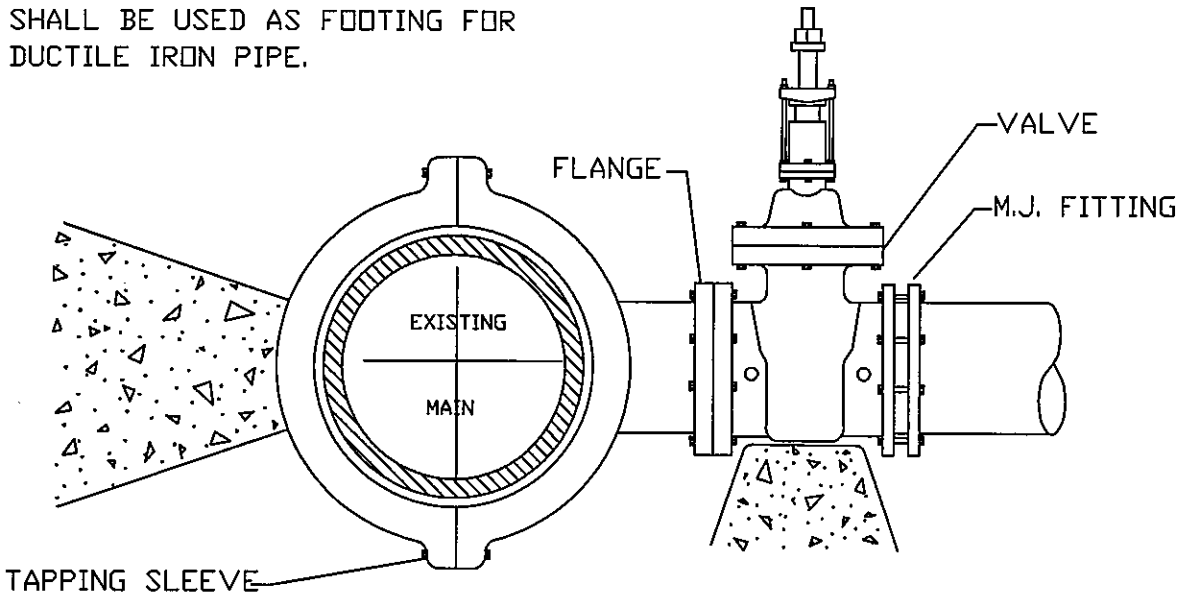
UTILITY DEPARTMENT

SGWASA



TOP VIEW

3000 PSI SOLID CONCRETE SHALL BE USED AS FOOTING FOR DUCTILE IRON PIPE.



SIDE VIEW

NOTES:

1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
2. SEE STANDARD REACTION BLOCK TABLES, W-10 AND W-11 FOR AREA OF CONCRETE REQUIRED.

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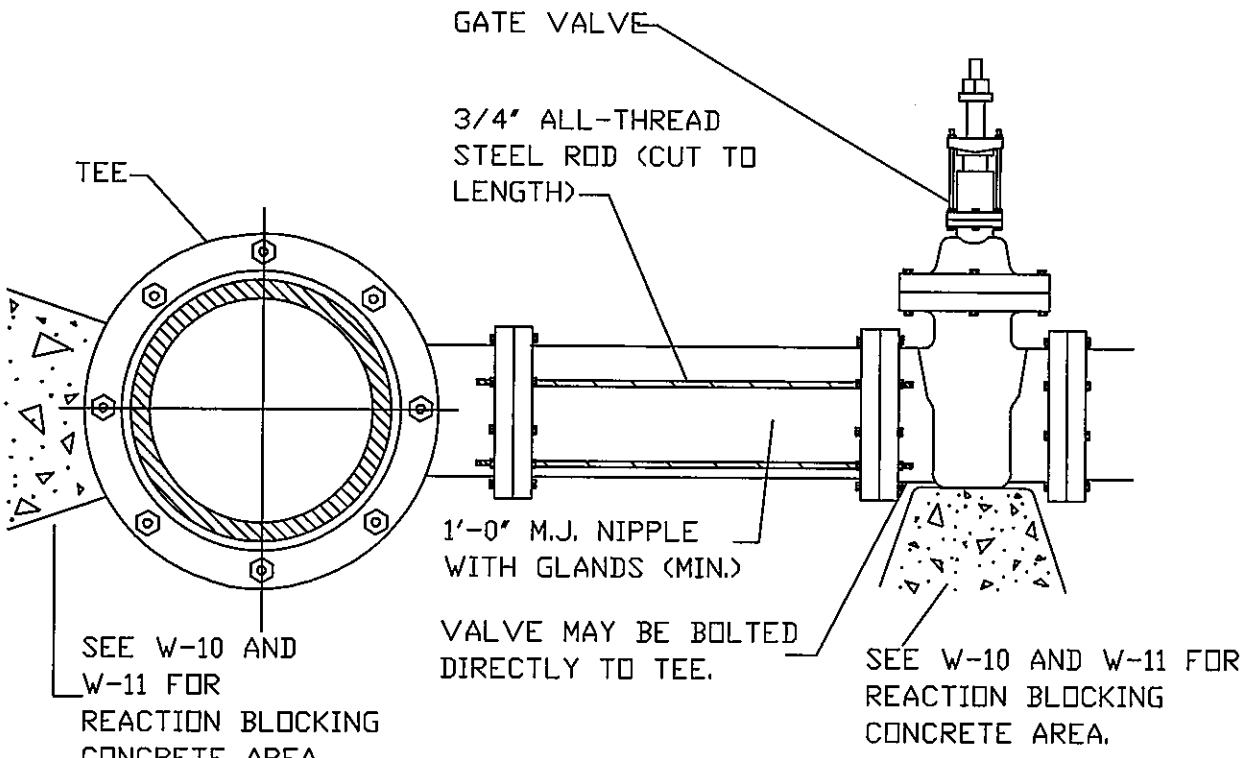
UTILITY DEPARTMENT

4" - 24" STANDARD TAPPING SLEEVE AND VALVE ASSEMBLY

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-14				



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

NOTES:

1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED OR SS.
2. SEE STANDARD THRUST BLOCK. TABLES W-10 AND W-11 FOR CONCRETE.
3. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL FITTINGS.
4. THIS RODDING REQUIREMENT DOES NOT APPLY TO FIRE HYDRANTS.

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UTILITY DEPARTMENT

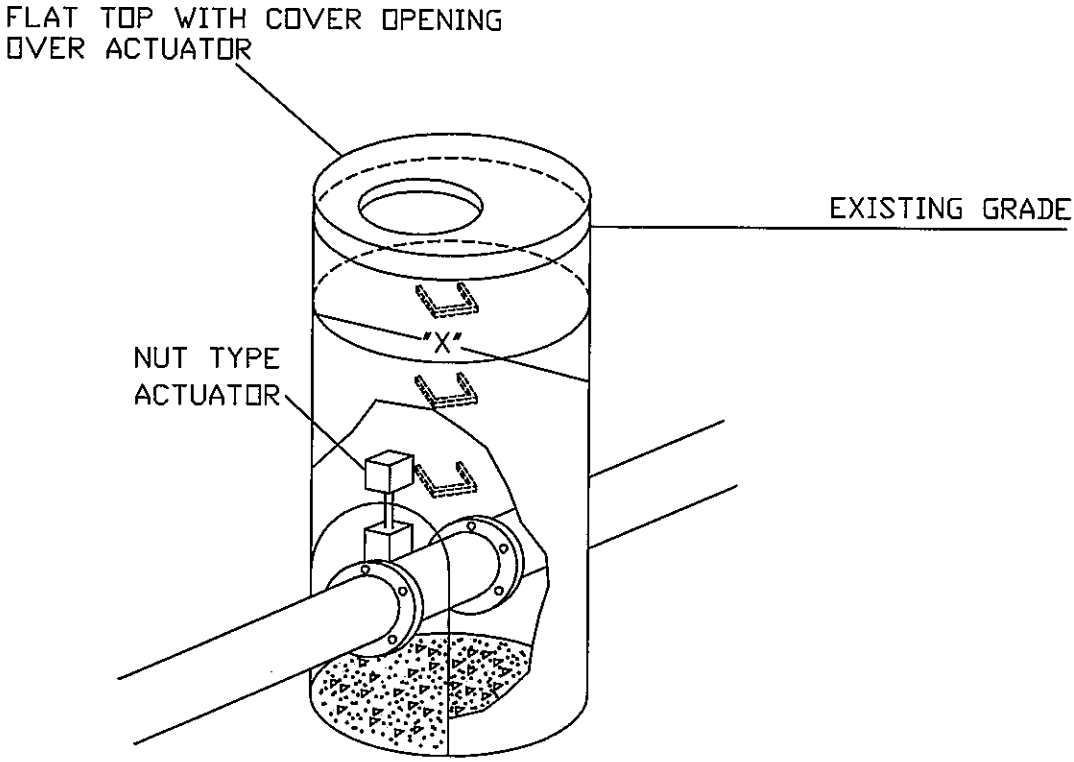
RESTRAINED TEE AND VALVE INSTALLATION ON DEAD END LINES (4"-24")

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-15				

VALVE SIZE	"X"
16"	5' M.H.
24"	6' M.H.
30" OR GREATER	8' M.H.

NOTES:

1. USE STANDARD PRECAST FLAT 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.



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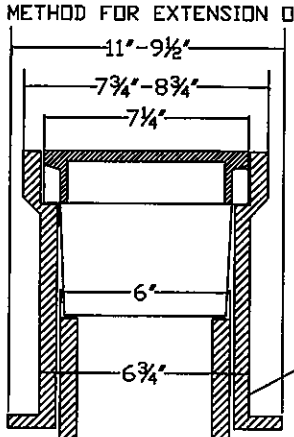
BUTTERFLY VALVE MANHOLE DETAIL FOR 16" & LARGER MAINS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-16				

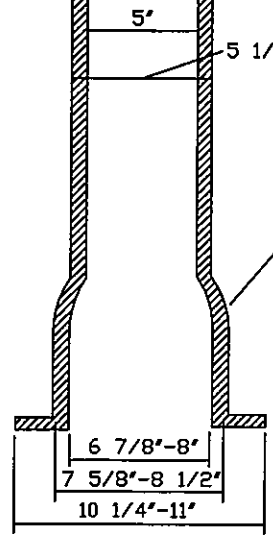
APPROVED METHOD FOR EXTENSION OF VALVE BOX



STANDARD VALVE BOX TOP SECTION TO BE 80 LBS. HEAVY WEIGHT

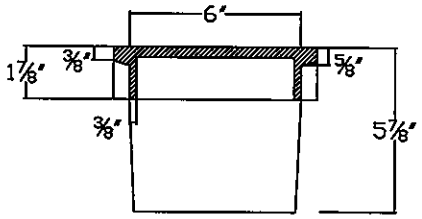
USE 5" DUCTILE IRON PIPE FOR EXTENSIONS

STAB-IN C.I. OR D.I. PIPE GASKET

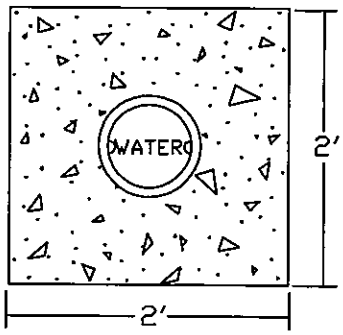


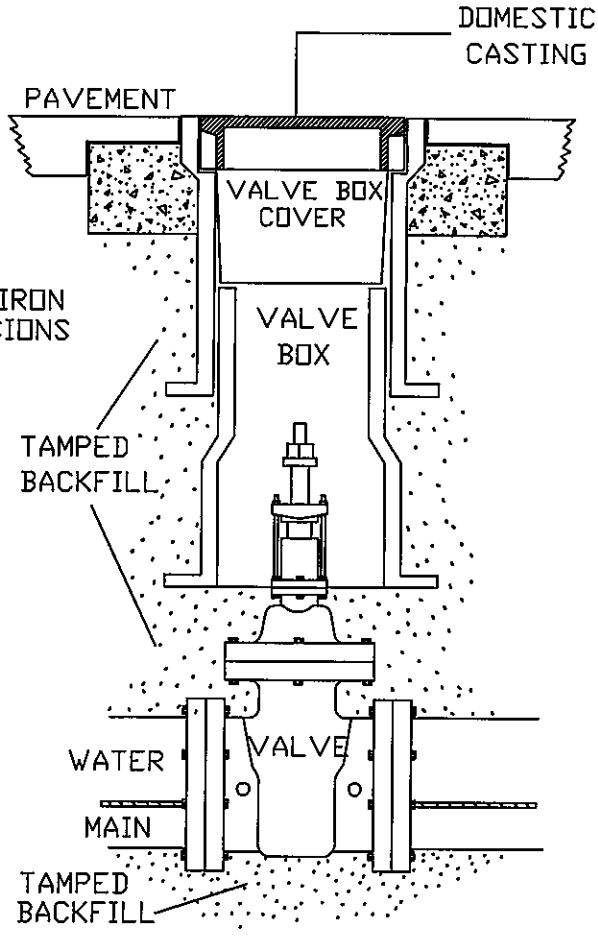
STANDARD VALVE BOX BOTTOM SECTION

COVER



NOTE: 2'x 2'x 6" CONCRETE PAD REQUIRED ON ALL VALVES. NO PRECAST CONCRETE DOUGHNUT ALLOWED.





NOTE: VALVE BOX NOT TO CONTACT WATER MAIN NOR VALVE.
ALL TRAFFIC CASTINGS MUST BE CLASS 35 OR GREATER.

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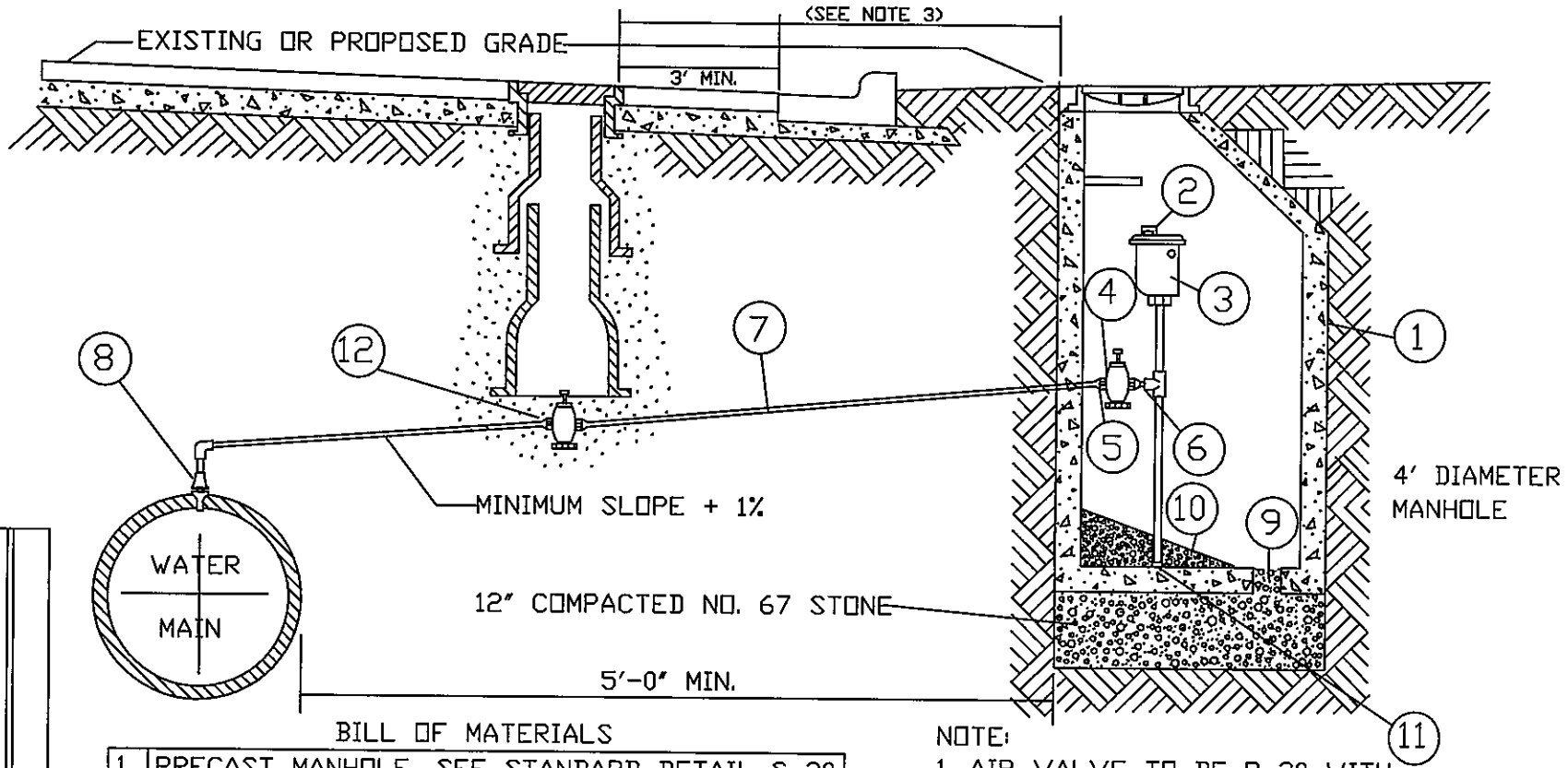
VALVE BOX INSTALLATION AND EXTENSION DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-17				



STANDARD WATER AIR RELEASE VALVE

UTILITY DEPARTMENT

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DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-18				

BILL OF MATERIALS

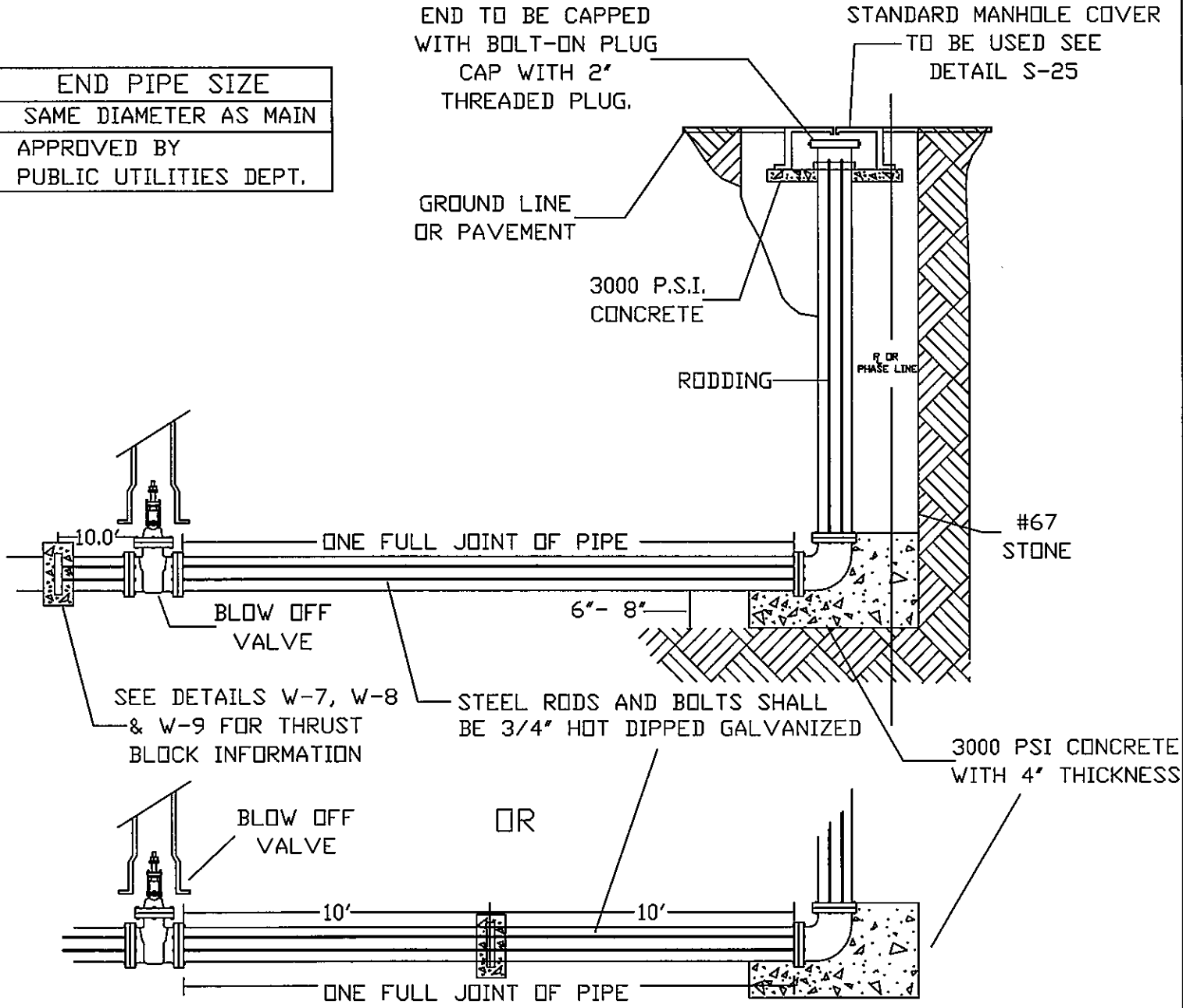
1	PRECAST MANHOLE, SEE STANDARD DETAIL S-20
2	TRASH HOOD
3	2" AIR RELEASE VALVE
4	2" CURB STOP BALL VALVE
5	ADAPTER
6	2" MECHANICAL JOINT BRASS PIPE AND FITTINGS
7	2" TYPE "K", SOFT COPPER WITH FLARED ELBOW
8	CORPORATION COCK
9	6" DIAMETER DRAIN
10	GROUT, 1/8" TO 1'-0" MIN. SLOPE TO DRAIN
11	PIPE CAP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

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 THREE (3) FEET.
4. MAIN SHALL BE DEEP ENOUGH TO ACCOMODATE INSTALLATION AS SHOWN

SEE STANDARD DETAIL W-3 TO INSURE PROPER BACKFILL.

MAIN SIZE	END PIPE SIZE
6" - 12"	SAME DIAMETER AS MAIN
16" & GREATER	APPROVED BY PUBLIC UTILITIES DEPT.



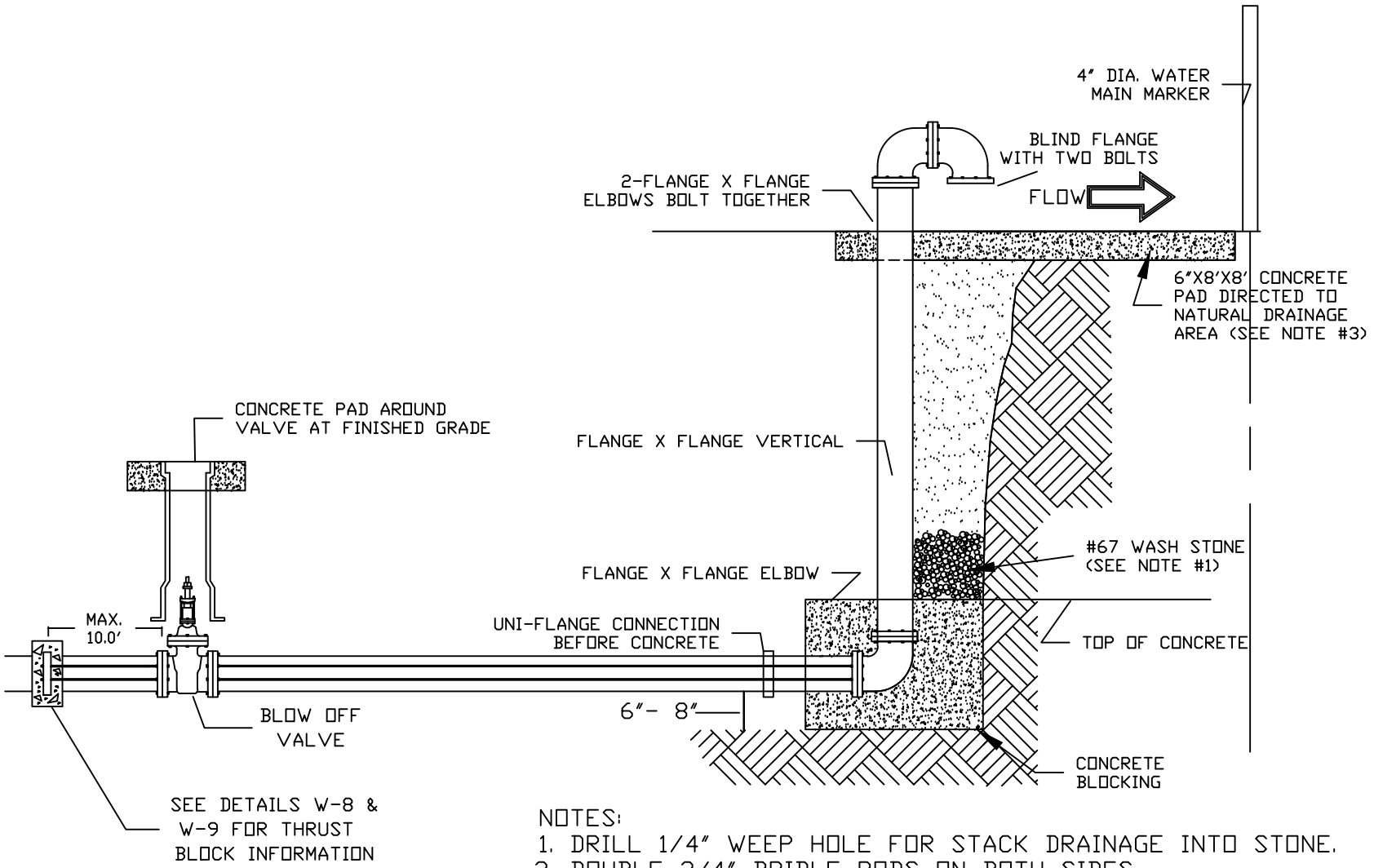
W-19

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE

TEMPORARY WATER MAIN
BLOW OFF ASSEMBLY

UTILITY DEPARTMENT

SGWASA



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 FOR POSITIVE DRAINAGE.
4. THE LAST 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. 3/4" RODS AND BOLTS TO BE HOT DIPPED GALVANIZED.
7. END PIPE SIZE SHALL BE SAME AS MAIN SIZE.

PERMANENT WATER MAIN BLOW OFF ASSEMBLY

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UTILITY DEPARTMENT

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-20				