

"A" PIPE SIZE DIAMETER	"B" TRENCH WIDTH	"C" TRENCH HEIGHT	TRENCH AREA	PIPE AREA	WATER MAIN BEDDING MAT. AREA	WATER MAIN BEDDING MAT. **TONS/LF
4"	28"	16"	3.11 Sq.Ft.	0.09 Sq.Ft.	3.02 Sq.Ft.	0.18
6"	30"	18"	3.75 Sq.Ft.	0.20 Sq.Ft.	3.55 Sq.Ft.	0.21
8"	32"	20"	4.44 Sq.Ft.	0.35 Sq.Ft.	4.10 Sq.Ft.	0.25
10"	34"	22"	5.19 Sq. Ft.	0.55 Sq.Ft.	4.65 Sq.Ft.	0.28
12"	36"	24"	6.00 Sq.Ft.	0.79 Sq.Ft.	5.22 Sq.Ft.	0.31
16"	40"	28"	7.78 Sq.Ft.	1.40 Sq.Ft.	6.38 Sq.Ft.	0.38
20"	44"	32"	9.78 Sq.Ft.	2.18 Sq.Ft.	7.60 Sq.Ft.	0.46
24"	48"	36"	12.00 Sq.Ft.	3.14 Sq.Ft.	8.86 Sq.Ft.	0.53
30"	60"	42"	17.50 Sq.Ft.	4.91 Sq.Ft.	12.59 Sq.Ft.	0.76

\* IF  $\geq 30"$  USE DIA./2 ON EACH SIDE OF WATER MAIN PIPE.

\* LENGTH BASED ON ONE (1) FOOT OF WATER PIPE.

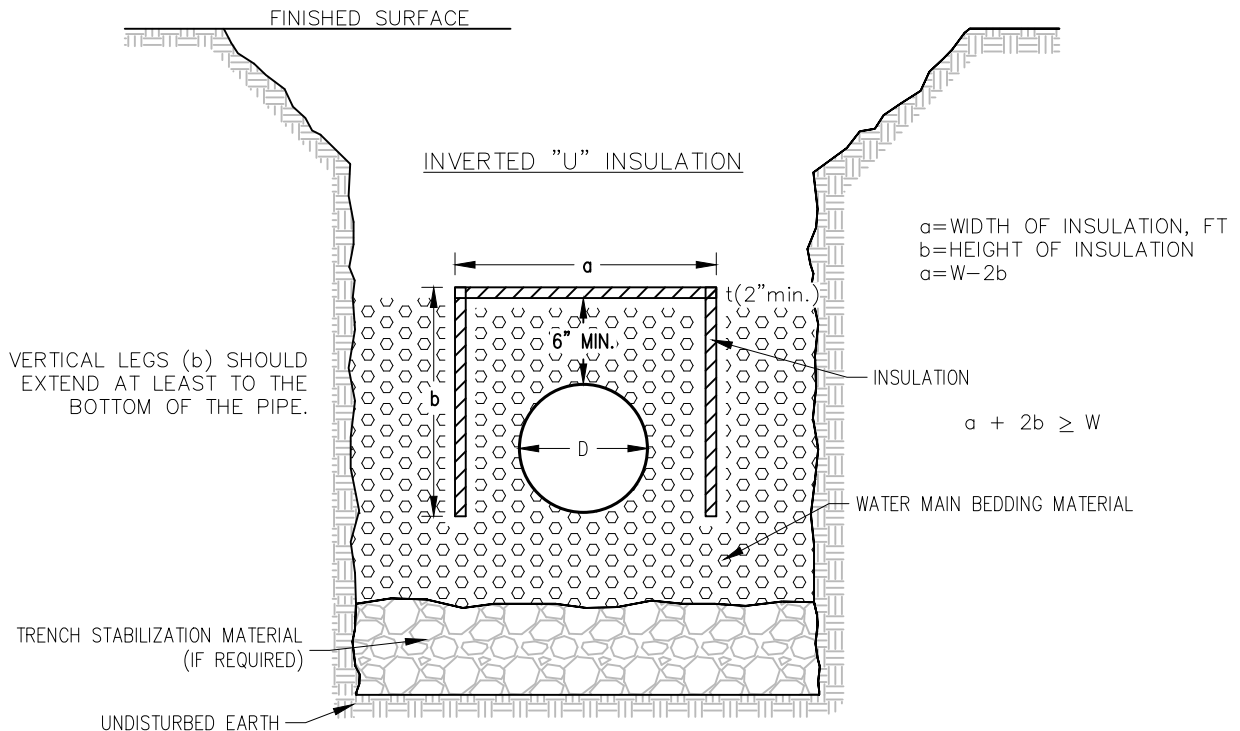
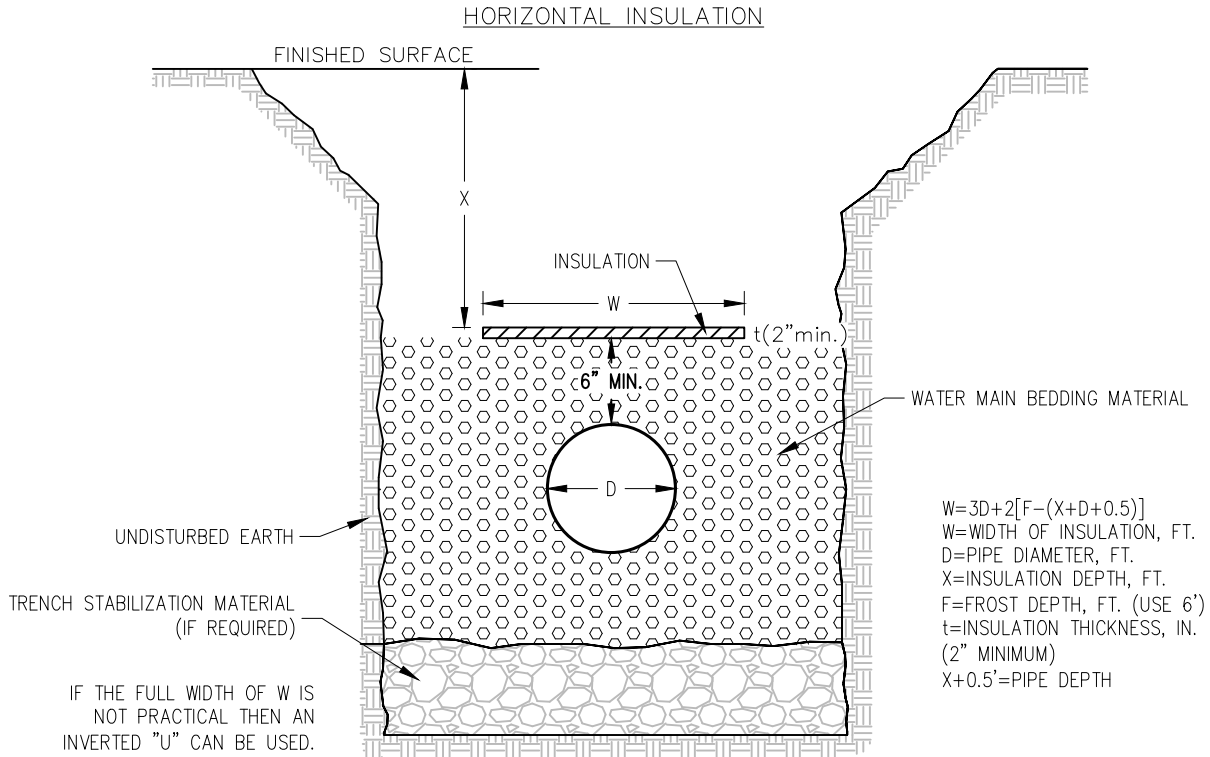
\*\* TONS PER LF IS BASED ON (120 LBS/FT<sup>3</sup>)

CITY OF BROOKINGS  
BROOKINGS MUNICIPAL UTILITIES  
**WATER MAIN BEDDING**



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NUMBER  
**WM-01**



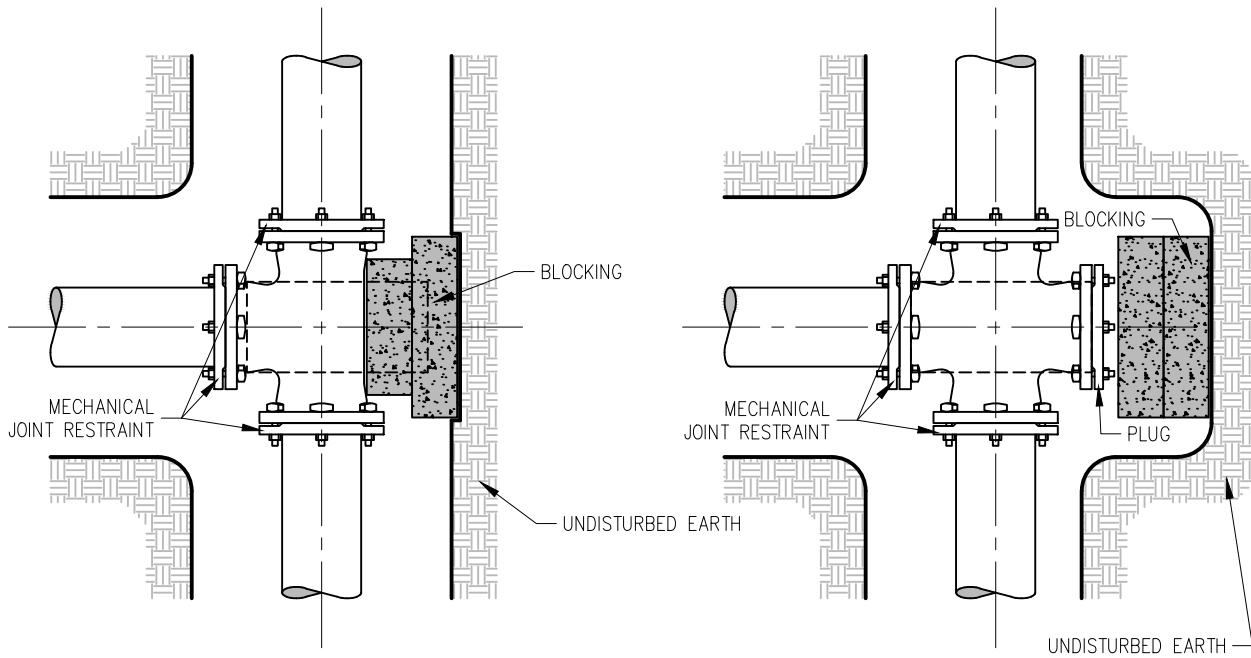
NOTE:  
 THIS DETAIL IS A GENERAL GUIDELINE. INSULATION OF WATER MAIN WILL BE DETERMINED ON A CASE BY CASE SITUATION DEPENDING ON THE FOLLOWING FACTORS: DEPTH, PIPE DIAMETER, FLOW, AND LOCATION.

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**WATER MAIN INSULATION**

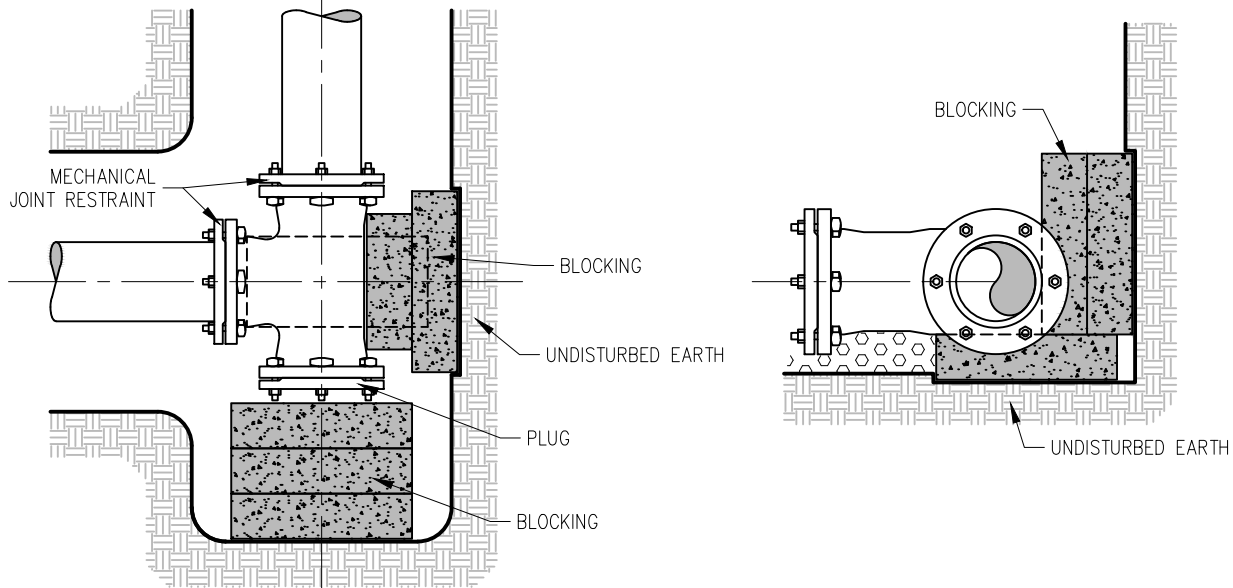


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PLAN VIEW



PLAN VIEW

SECTION VIEW

TEE / CROSS

NOTE:

ALL MECHANICAL JOINT FITTINGS SHALL BE INSTALLED WITH MECHANICAL JOINT RESTRAINT (I.E. MEGALUGS) IN ADDITION TO PRECAST CONCRETE BLOCKING.

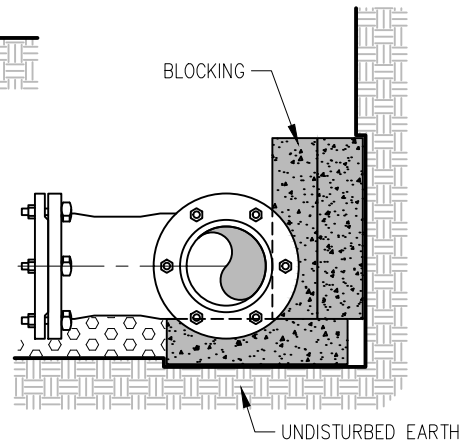
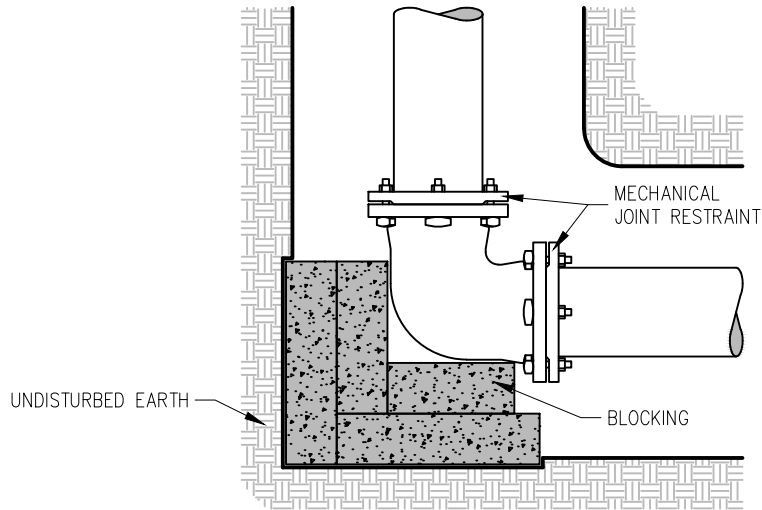
ALL MECHANICAL JOINTS FITTINGS 14 INCH AND LARGER SHALL BE RESTRAINED USING JOINT RESTRAINTS BASED ON CALCULATED RESTRAINT JOINT LENGTH UPSTREAM AND DOWNSTREAM OF FITTING, VALVE, ETC. DESIGN CRITERIA SHALL USE TYPE 5 LAYING CONDITION, APPROPRIATE SOIL DESIGNATION, DESIGN PRESSURE OF 120 PSI AND A SAFETY FACTOR OF 2.0.

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 CONCRETE THRUST BLOCK

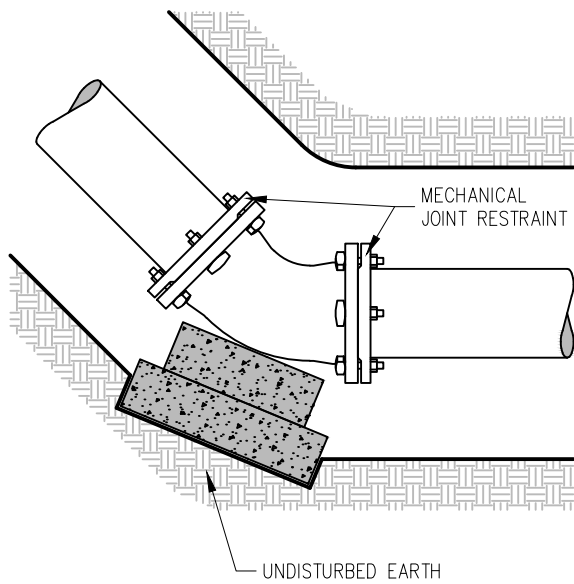


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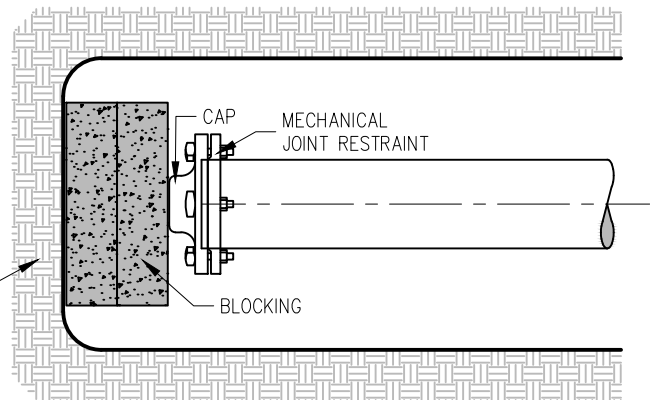
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SECTION VIEW



BENDS



M.J. CAP

NOTE:

ALL MECHANICAL JOINT FITTINGS SHALL BE INSTALLED WITH MECHANICAL JOINT RESTRAINT (I.E. MEGALUGS) IN ADDITION TO PRECAST CONCRETE BLOCKING.

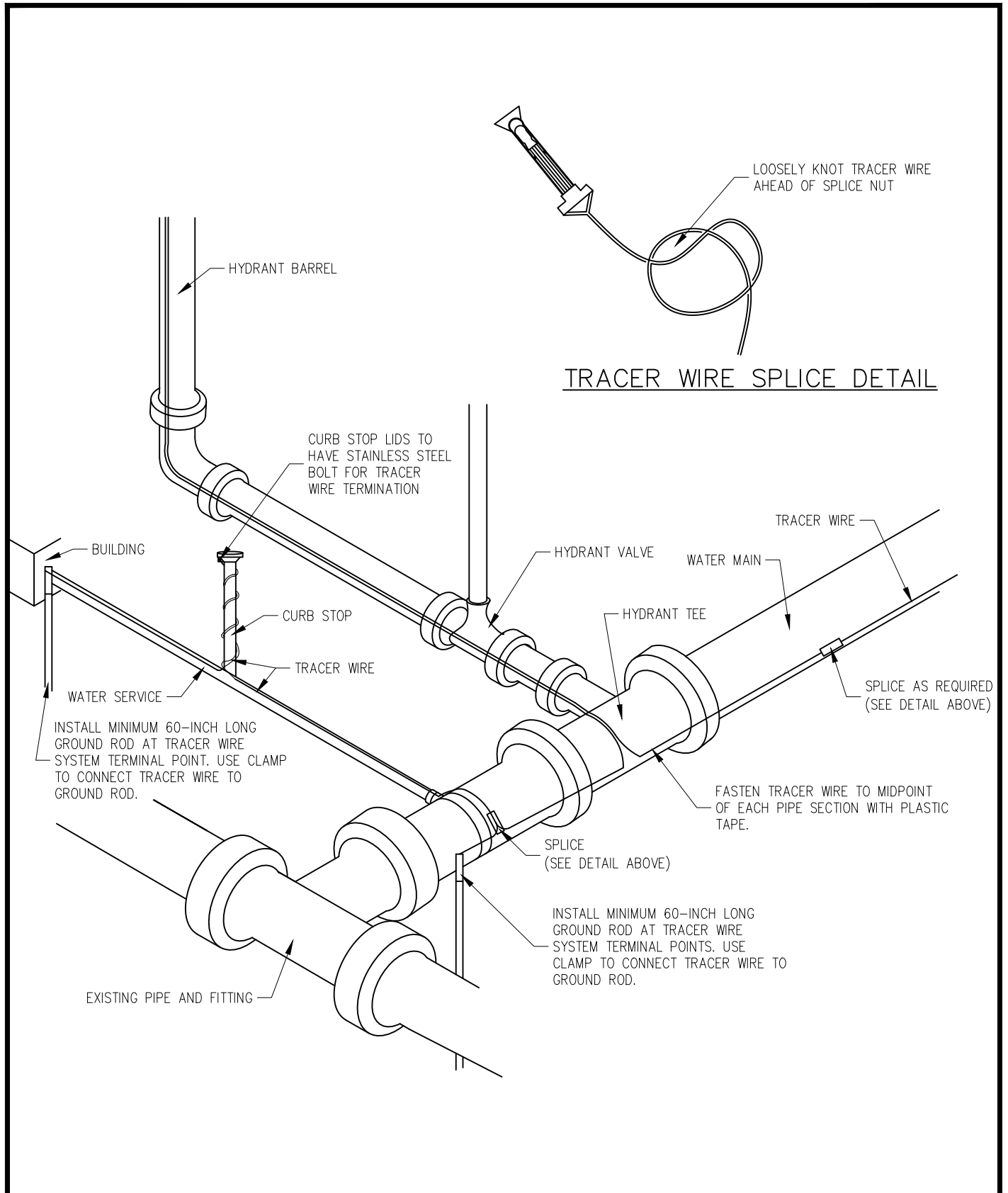
ALL MECHANICAL JOINTS FITTINGS 14 INCH AND LARGER SHALL BE RESTRAINED USING JOINT RESTRAINTS BASED ON CALCULATED RESTRAINT JOINT LENGTH UPSTREAM AND DOWNSTREAM OF FITTING, VALVE, ETC. DESIGN CRITERIA SHALL USE TYPE 5 LAYING CONDITION, APPROPRIATE SOIL DESIGNATION, DESIGN PRESSURE OF 120 PSI AND A SAFETY FACTOR OF 2.0.

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 CONCRETE THRUST BLOCK



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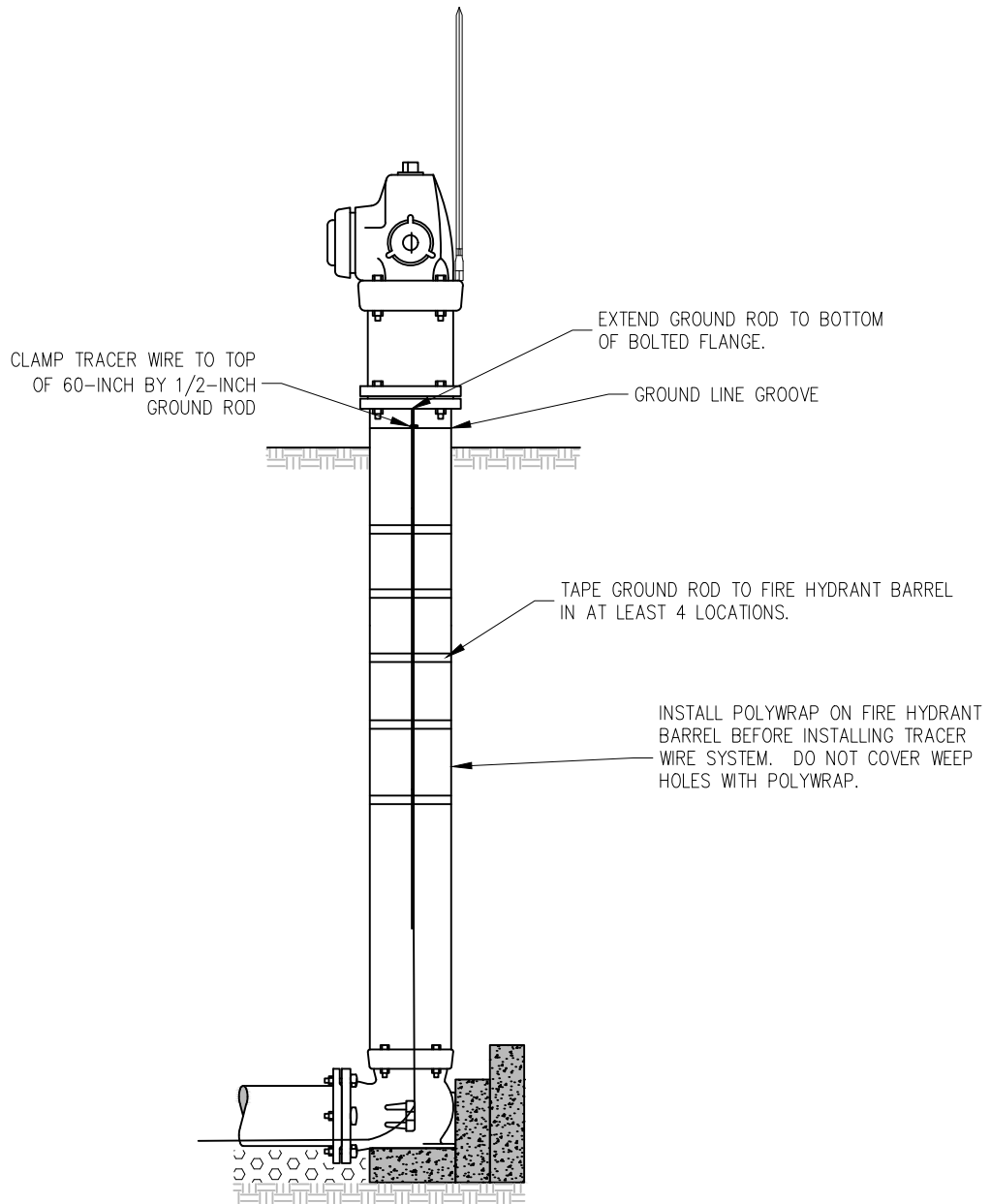
TRACER WIRE SPLICE DETAIL

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**TRACER WIRE SYSTEM**



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**WM-05**



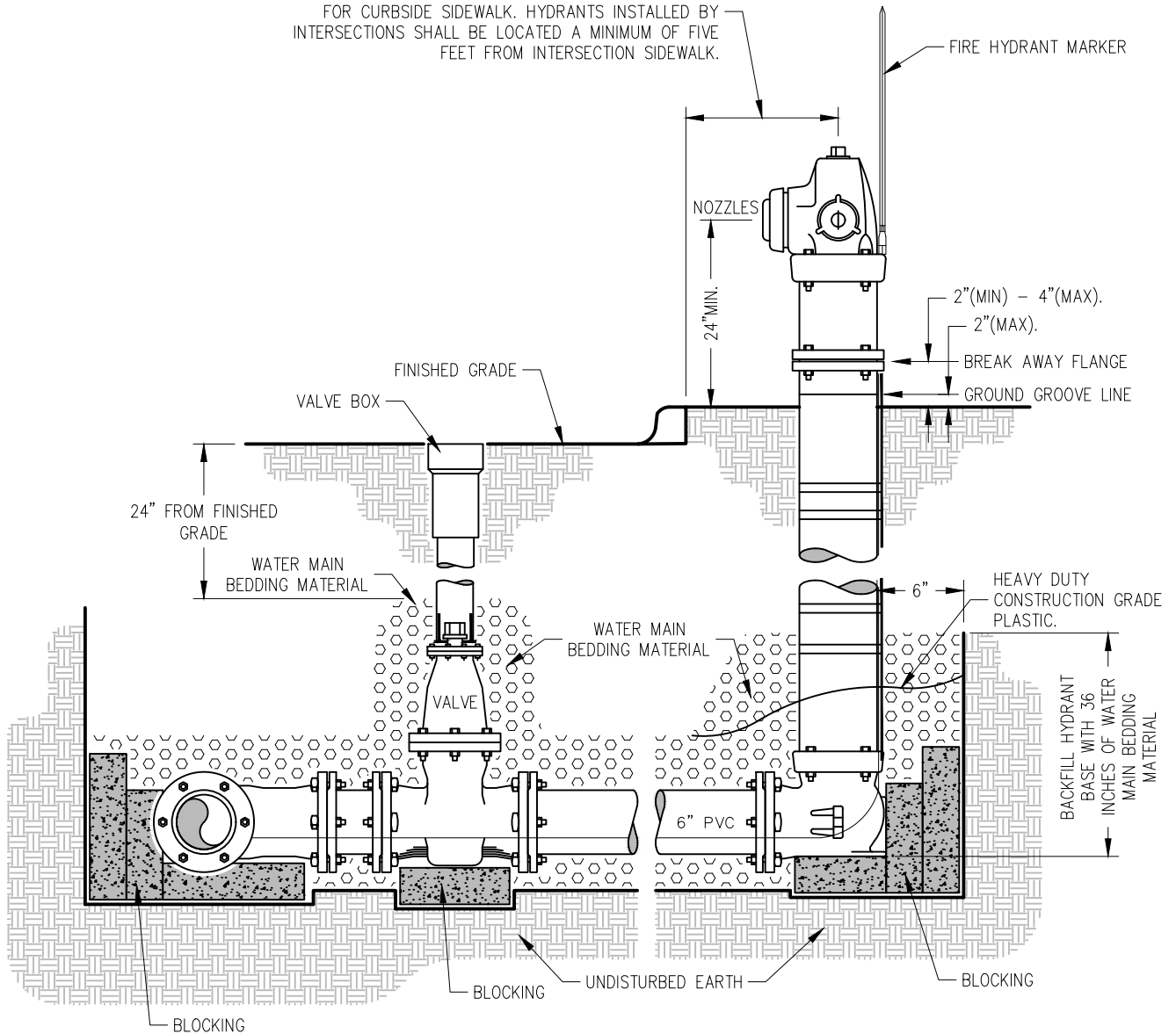
CITY OF BROOKINGS  
 BROOKINGS MUNICIPAL UTILITIES  
**TRACER WIRE SYSTEM**  
 AT FIRE HYDRANT



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3-FEET TO 5-FEET FROM BACK OF CURB FOR  
SIDEWALK WITH BOULEVARD. 2-FEET BACK OF CURB  
FOR CURBSIDE SIDEWALK. HYDRANTS INSTALLED BY  
INTERSECTIONS SHALL BE LOCATED A MINIMUM OF FIVE  
FEET FROM INTERSECTION SIDEWALK.



NOTE:  
PROVIDE FITTING (IE. FOSTER ADAPTER) OR PIPE PIECE TO ACCOMMODATE APPROPRIATE VALVE PLACEMENT. ISOLATION VALVES LOCATED  
UNDER CURB AND GUTTER SHALL NO RELOCATED AT NO COST TO BMU.

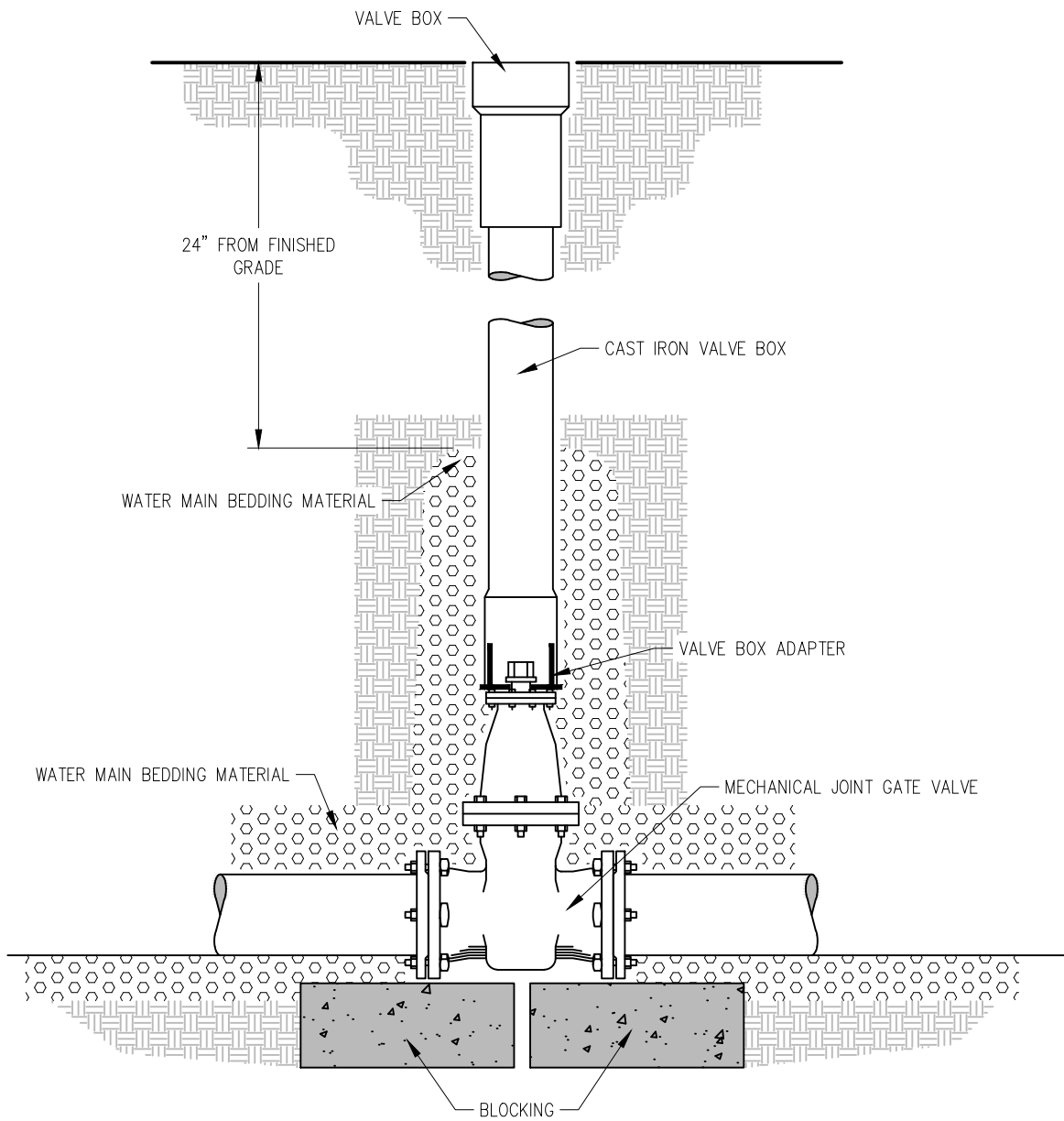
HYDRANT GRADE TO BE DETERMINED BY ENGINEER

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HYDRANT CONNECTION



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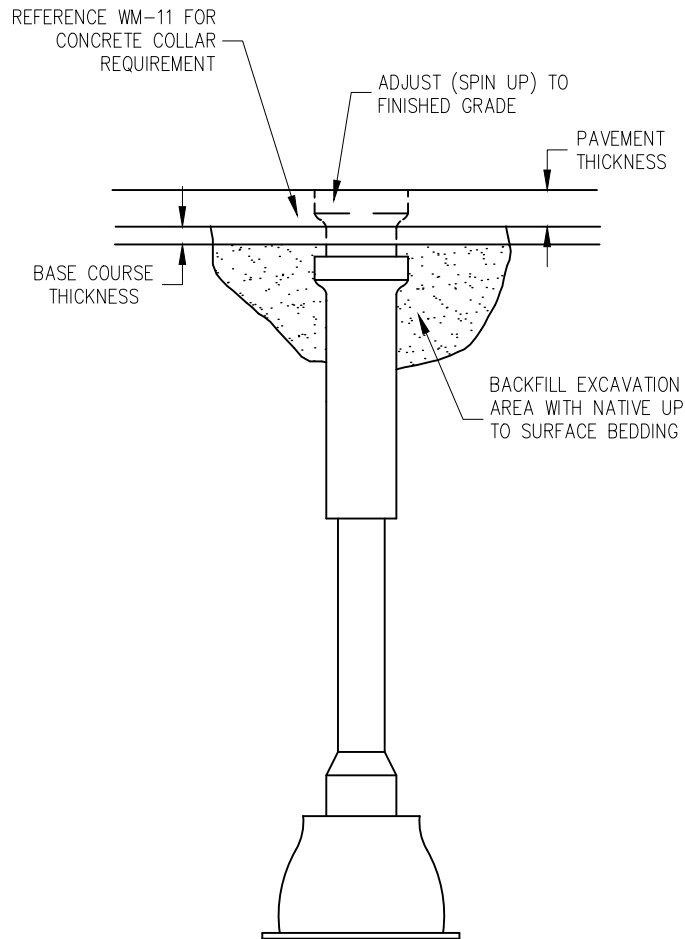
CITY OF BROOKINGS  
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 GATE VALVE INSTALLATION



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NOTE:

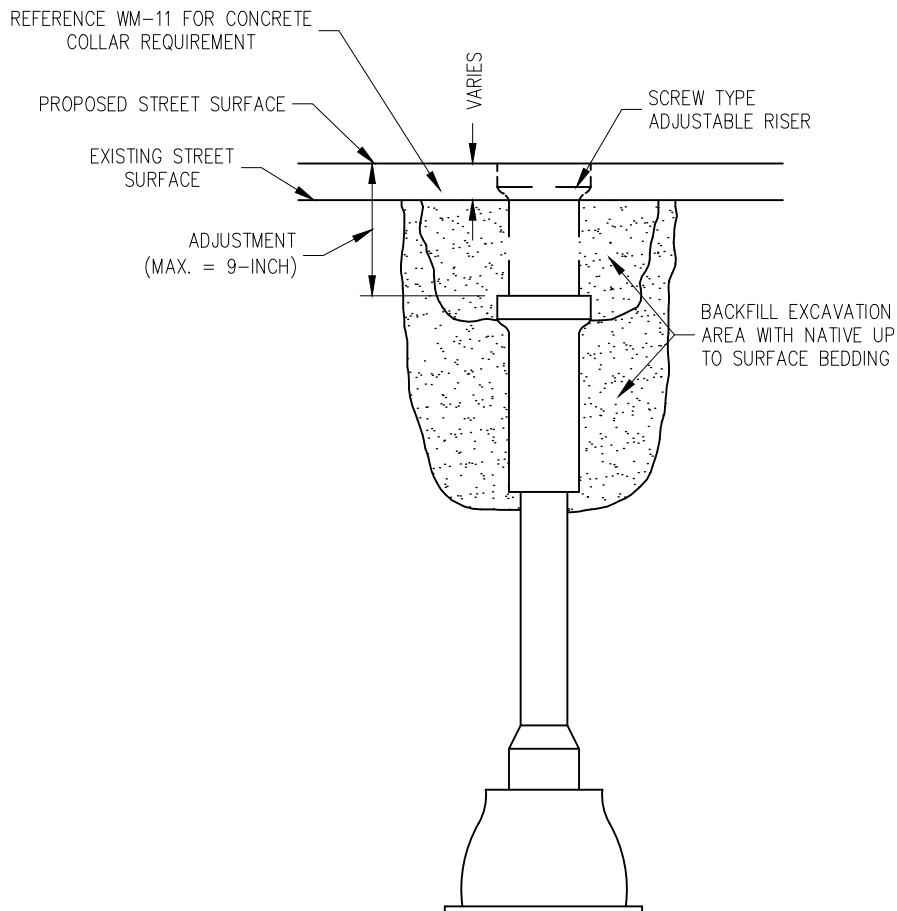
1. ADJUST TOP OF VALVE BOX TO MATCH STREET SURFACE.
2. VALVE BOX SHALL BE ADJUSTED TO FINAL GRADE PRIOR TO PLACEMENT OF THE PAVEMENT SURFACING.
3. ALL VALVE BOXES SHALL BE ADJUSTED TO BE FLUSH WITH THE PAVEMENT SURFACE. THE ALLOWABLE VERTICAL TOLERANCE BETWEEN THE PAVEMENT SURFACE AND ANY PART OF THE VALVE BOX SHALL BE 0-INCHES TO 1/2-INCH LOW. IN NO CASE SHALL THE VALVE BOX BE ABOVE THE SURFACE OF THE PAVEMENT.
4. IF THE 0-INCHES TO 1/2-INCH TOLERANCE CANNOT BE MET BY THE "SPIN UP" METHOD ON ASPHALT STREETS, THEN THE CONTRACTOR SHALL BE REQUIRED TO ADJUST THE VALVE BOX BY THE CIRCULAR CUTOUT METHOD. THIS ADDITIONAL WORK, IF REQUIRED, SHALL BE INCIDENTAL TO THE "VALVE BOX ADJUSTMENT" BID ITEM.
5. IF THE 0-INCHES TO 1/2-INCH TOLERANCE CAN NOT BE MET BY THE "SPIN UP" METHOD ON CONCRETE STREETS, THE REPAIR METHOD WILL BE DETERMINED BY THE ENGINEER. THIS ADDITIONAL WORK SHALL BE INCIDENTAL TO THE "VALVE BOX ADJUSTMENT" BID ITEM.
6. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE A SYSTEM TO PREVENT MATERIAL FROM ENTERING THE VALVE BOX DURING THE WORK.
7. ALL ADJUSTMENTS SHALL BE COMPLETED PRIOR TO OPENING UP THE STREET TO TRAFFIC.
8. IF THE VALVE BOX NEEDS MINOR ADJUSTMENT, A MINIMAL AMOUNT OF HEAT CAN BE APPLIED TO BREAK THE BOND BETWEEN THE VALVE BOX AND THE ASPHALT. FULL DEPTH HEATING OF THE ASPHALT WILL NOT BE ALLOWED. IF THE ASPHALT APPEARS TO SHOW SIGNS OF DETERIORATION, IT WILL BE AT THE DISCRETION OF THE ENGINEER TO REQUIRE THE CUT OUT METHOD.

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 BROOKINGS MUNICIPAL UTILITIES  
**VALVE BOX ADJUSTMENT  
 SPIN UP METHOD**



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NOTE:

1. USE THIS METHOD IF TOP SECTION OF VALVE BOX CANNOT BE EXTENDED TO MEET PROPOSED GRADE.
2. IF MAXIMUM EXTENSION OF VALVE BOX IS LOWER THAN 9" BELOW PROPOSED STREET SURFACE, REMOVE TOP SECTION SCREW-TYPE CENTER & ADD A SECTION. RE-USE TOP SECTION.
3. ADJUST TOP OF VALVE BOX TO MATCH PROPOSED STREET GRADE.
4. IF THE TOP SECTION OF VALVE BOX WILL NOT ACCEPT THE RISER, REPLACE THE TOP & CENTER SECTION AS SHOWN IN DETAIL FOR VALVE BOX REPLACEMENT.

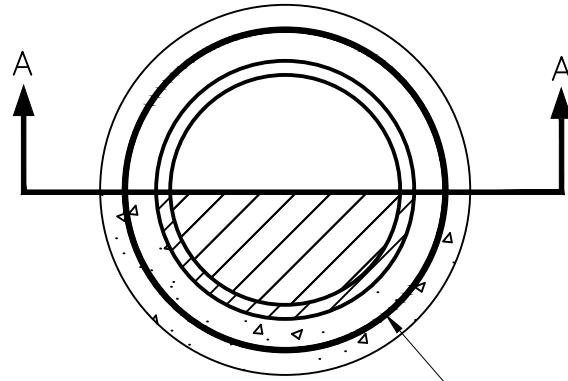
VALVE BOX EXTENSION  
(OR REPLACEMENT OF TOP SECTION)

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**VALVE BOX ADJUSTMENT  
EXTENSION**

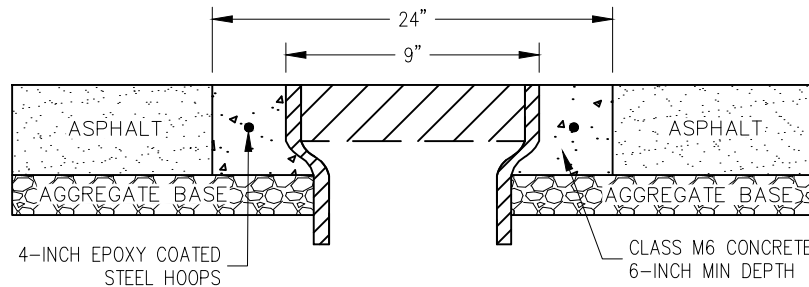


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#4 EPOXY COATED STEEL HOOPS PLACE AT MID-SLAB



SECTION A-A

NOTE:

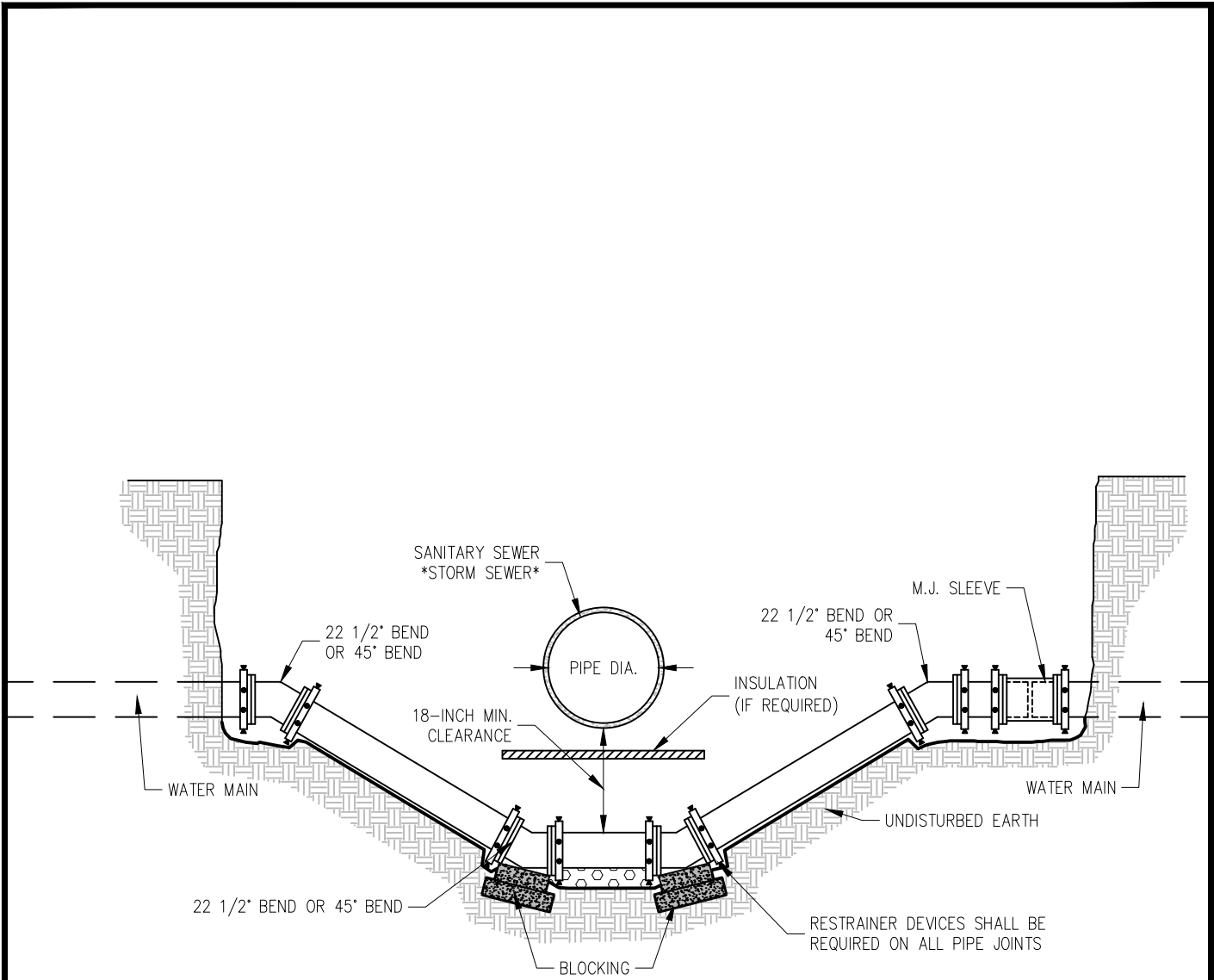
1. IF VALVE BOX IS ADJUSTED TO FINAL GRADE PRIOR TO PLACEMENT OF ASPHALT SURFACING, CIRCULAR CONCRETE COLLAR WILL NOT BE REQUIRED.
2. THE CIRCULAR CONCRETE CUTOUT SHALL BE CENTERED ON THE VALVE BOX FRAME.
3. THE CIRCULAR CONCRETE COLLAR SHALL BE CONSTRUCTED AFTER THE INSTALLATION OF THE TOP LIFT OF ASPHALT. THE PAVEMENT SHALL BE SAWED FULL DEPTH WITH A VERTICAL FACE. THE CONTRACTOR SHALL ENSURE THAT THE ADJACENT ASPHALT SURFACE IS LEFT INTACT AND UNDAMAGED WHEN REMOVING THE CIRCULAR CUTOUT.
4. ALL VALVE BOXES SHALL BE ADJUSTED TO BE FLUSH WITH THE PAVEMENT SURFACE. THE ALLOWABLE VERTICAL TOLERANCE BETWEEN THE ASPHALT SURFACE AND ANY PART OF THE VALVE BOX SHALL BE 0-INCHES TO 1/2-INCH LOW. IN NO CASE SHALL THE VALVE BOX BE ABOVE THE SURFACE OF THE ASPHALT.
5. THE CIRCULAR CONCRETE CUTOUT DIAMETER SHALL BE 24-INCHES.
6. APPLY TACK COAT TO THE VERTICAL ASPHALT SURFACES PRIOR TO PLACEMENT OF CONCRETE CUTOUT.
7. CLASS M6 CONCRETE SHALL BE USED FOR THE CUTOUT. FAST TRACK CONCRETE MAY BE USED AT THE DISCRETION OF THE ENGINEER.
8. STEEL REINFORCING SHALL BE EPOXY COATED GRADE 40.
9. STEEL REINFORCING SHALL CONSISTS OF #4 HOOPS (VARIABLE LENGTHS) SUPPORTED BY APPROVED CHAIRS.
10. MAINTAIN A MINIMUM OF 2-INCH CLEARANCE ON ALL STEEL REINFORCING.
11. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE A SYSTEM TO PREVENT MATERIAL FROM ENTERING THE VALVE BOX DURING THE WORK.
12. ALL ADJUSTMENTS WILL BE COMPLETED PRIOR TO OPENING UP THE STREET TO TRAFFIC.

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**VALVE BOX CONCRETE COLLAR  
 CIRCULAR CUTOUT METHOD**



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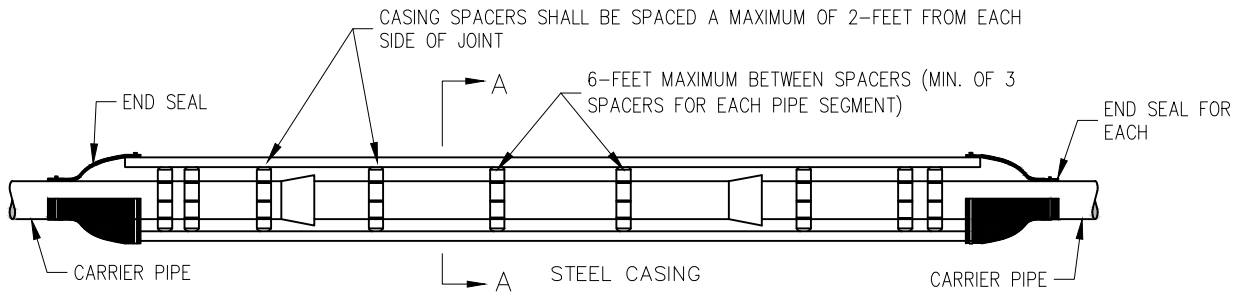
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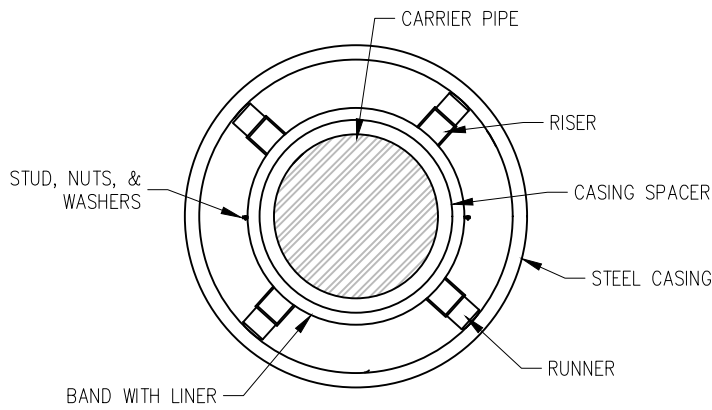
**\* WATER MAIN TO STORM SEWER CLEARANCES \***

STORM SEWER PIPE DIAMETER	MIN. CLEARANCE (PIPE TO PIPE)
SMALLER THAN 18"	18"
18" TO 24"	24"
27" TO 36"	36"
LARGER THAN 36"	BMU ENGINEER DETERMINED
ALL SIZES OF BOX CULVERTS	BMU ENGINEER DETERMINED

**NOTE:**  
 RCP STORM SEWER ABOVE A WATER MAIN REQUIRES JOINT SEALING WITHIN 10.0'  
 ON EACH SIDE OF THE WATER MAIN (SEE BMU WATER MAIN SPECIFICATIONS).



ELEVATION



SECTION A-A

PIPE SIZE	CASING SIZE
4"	10"
6"	12"
8"	16"
10"	18"
12"	20"
16"	24"
20"	30"
24"	36"
30"	42"
>36"	*

\* AS RECOMMENDED BY MANUFACTURER

NOTE:  
CASING PIPE MUST CONFORM TO AWWA C-200 WITH ASTM GRADE A36 PLATE STEEL MINIMUM YIELD STRENGTH OF 35,000 POUNDS PER SQUARE INCH

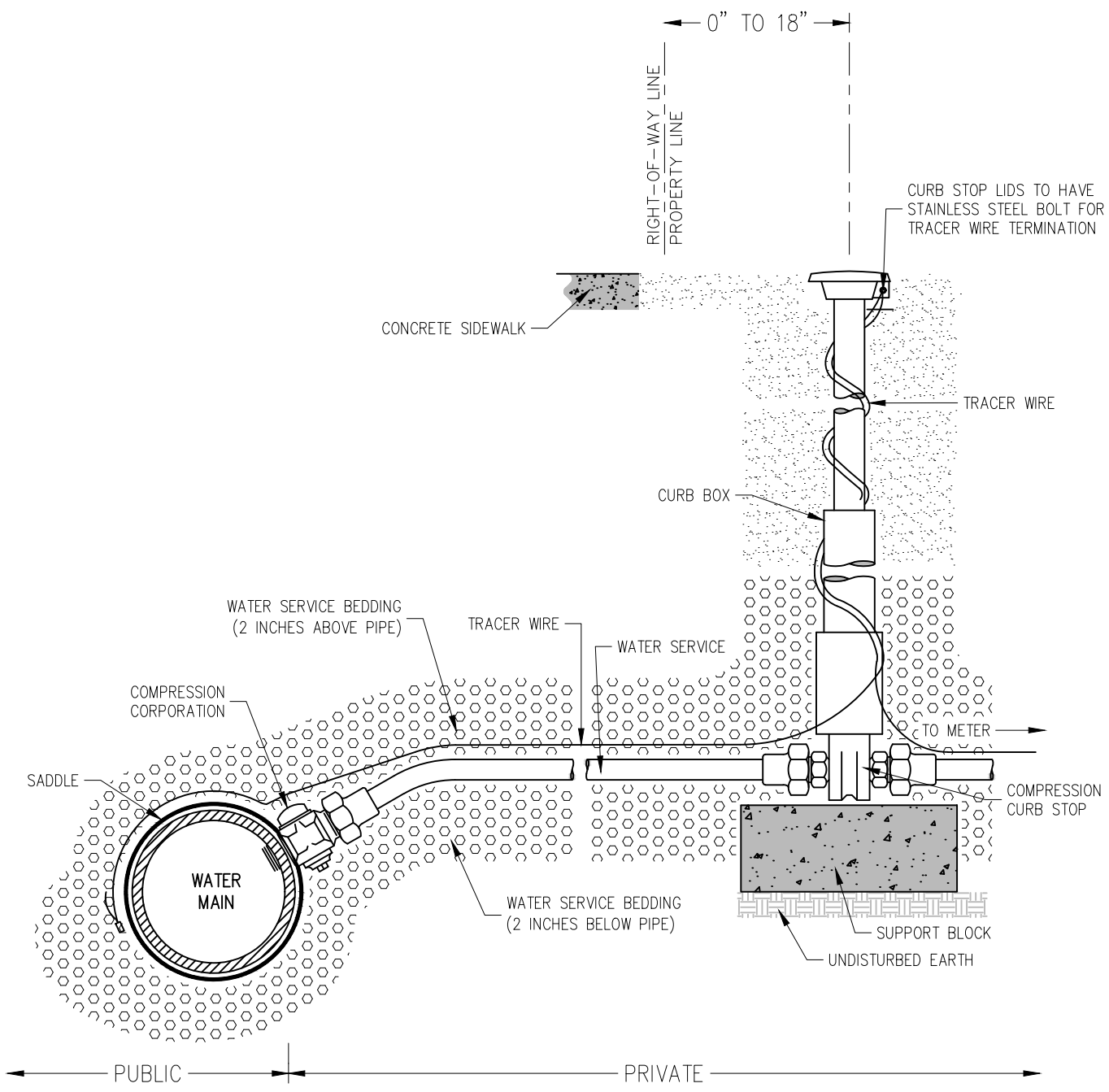
GROUTING OF THE ANNULAR SPACE WILL NOT BE REQUIRED UNLESS OTHERWISE NOTED

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**STANDARD CASING/CARRIER  
FOR WATER PIPE**



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NOTE:  
 WATER SERVICE SHALL BE INSTALLED IN ONE CONTINUOUS LENGTH BETWEEN THE CORPORATION AND THE CURB STOP, FREE OF ANY COUPLERS.

BMU PERSONNEL SHALL PERFORM ALL SERVICE TAPS INTO WATER MAIN.

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**TYPICAL 1"–2" WATER SERVICE**



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