



# WATER AND SEWER STANDARD DETAILS

THESE STANDARDS DETAILS ARE PROVIDED AS GENERAL GUIDELINES AND DO NOT RELIEVE DESIGN ENGINEERS FROM THEIR RESPONSIBILITIES TO PROVIDE SAFE, FUNCTIONAL, SYSTEM DESIGNS THAT MEET THE STANDARD OF CARE EXPECTED OF A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF COLORADO. THESE DETAILS PROVIDE EXAMPLES OF THE MINIMUM ALLOWED BY THE TOWN OF SILVERTHORNE WATER DEPARTMENT.

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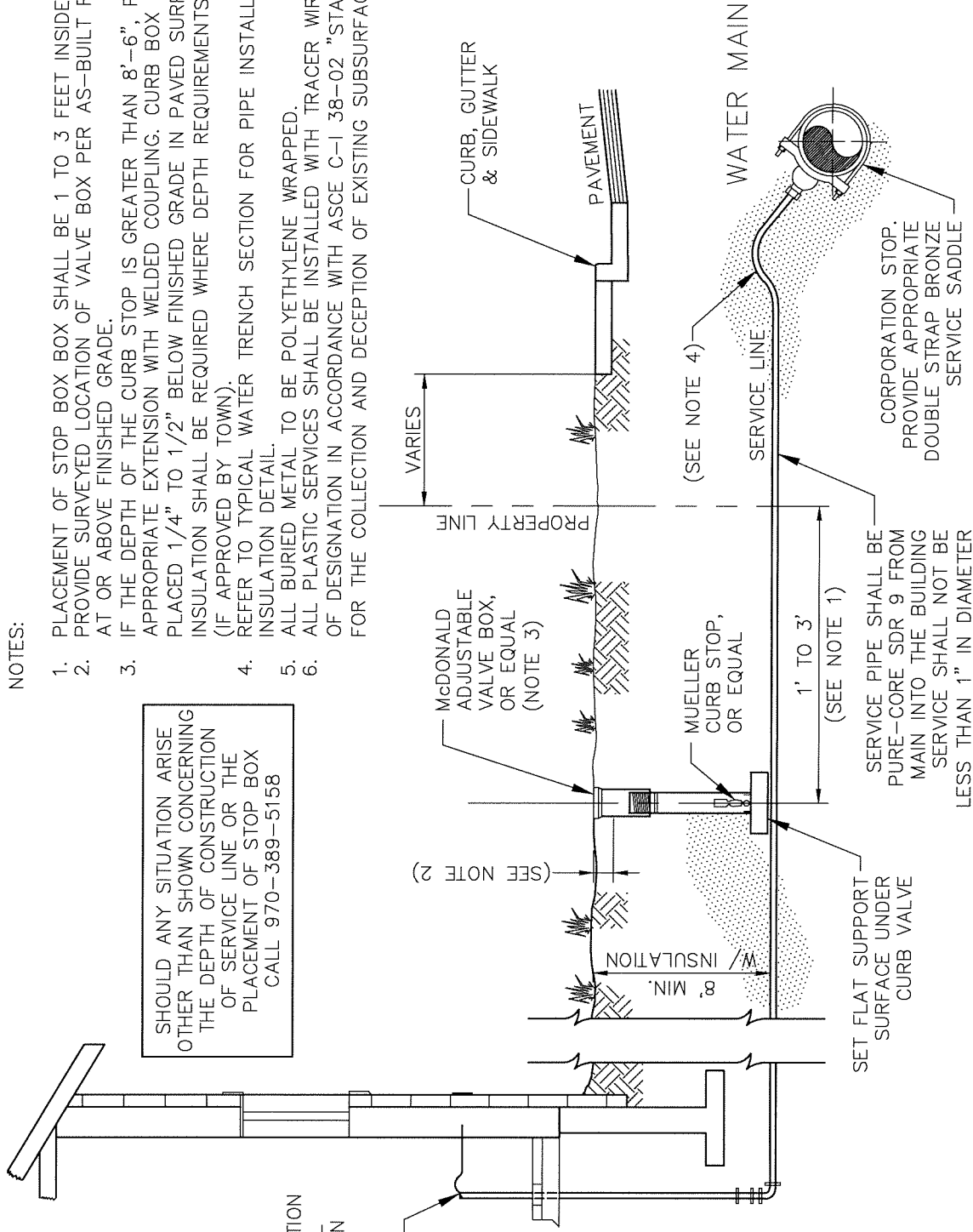
# WATER AND SEWER STANDARD DETAILS

NOTES:

1. PLACEMENT OF STOP BOX SHALL BE 1 TO 3 FEET INSIDE THE PROPERTY LINE.
2. PROVIDE SURVEYED LOCATION OF VALVE BOX PER AS-BUILT REQUIREMENTS. SET AT OR ABOVE FINISHED GRADE.
3. IF THE DEPTH OF THE CURB STOP IS GREATER THAN 8'-6", PROVIDE AN APPROPRIATE EXTENSION WITH WELDED COUPLING. CURB BOX CAP SHALL BE PLACED 1/4" TO 1/2" BELOW FINISHED GRADE IN PAVED SURFACES. BLUEBOARD INSULATION SHALL BE REQUIRED WHERE DEPTH REQUIREMENTS CAN'T BE ACHIEVED (IF APPROVED BY TOWN).
4. REFER TO TYPICAL WATER TRENCH SECTION FOR PIPE INSTALLATION AND INSULATION DETAIL.
5. ALL BURIED METAL TO BE POLYETHYLENE WRAPPED.
6. ALL PLASTIC SERVICES SHALL BE INSTALLED WITH TRACER WIRE OR OTHER METHOD OF DESIGNATION IN ACCORDANCE WITH ASCE C-1 38-02 "STANDARD GUIDELINES FOR THE COLLECTION AND DECEPTION OF EXISTING SUBSURFACE UTILITY DATA".

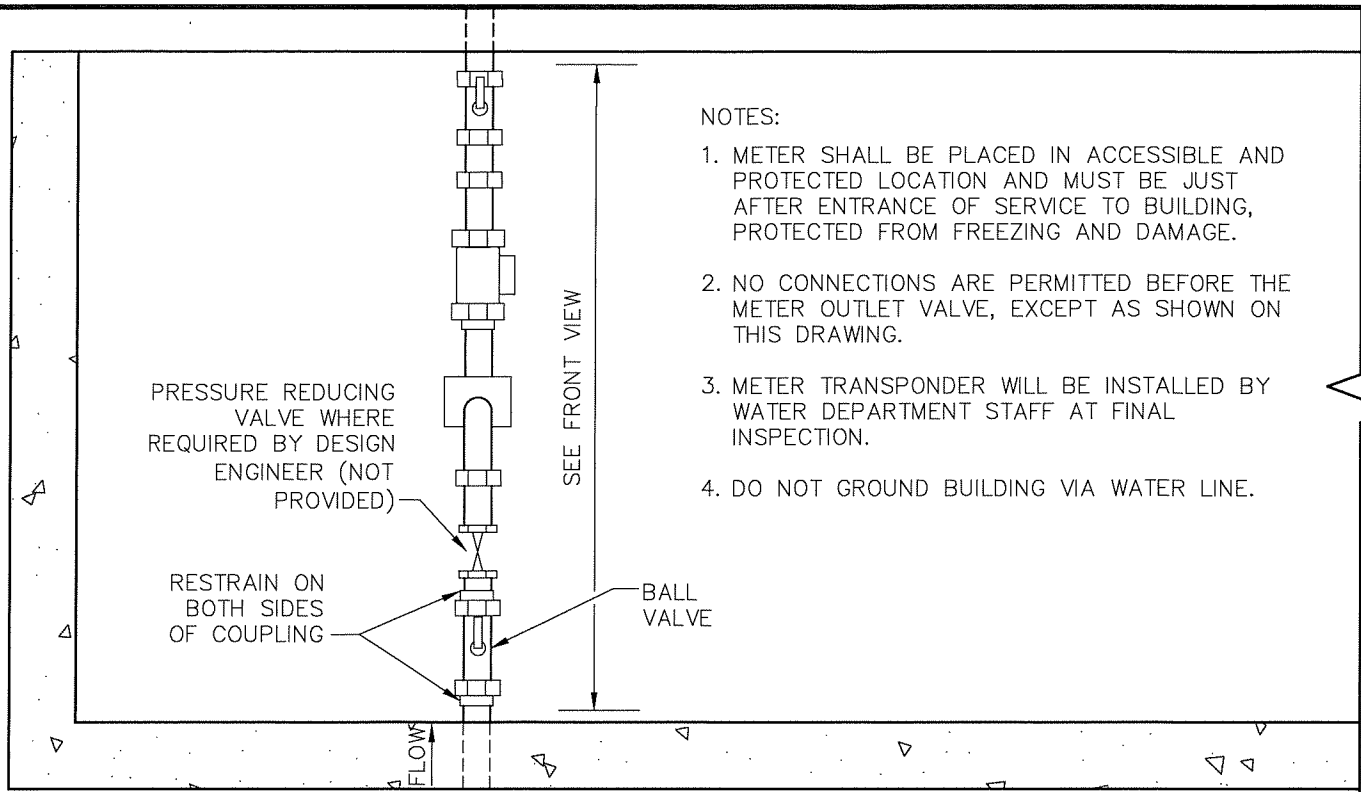
SHOULD ANY SITUATION ARISE OTHER THAN SHOWN CONCERNING THE DEPTH OF CONSTRUCTION OF SERVICE LINE OR THE PLACEMENT OF STOP BOX CALL 970-389-5158

SEE METER LOCATION SCHEMATIC DETAIL FOR CONTINUATION SEE DETAILS: 2A-RESIDENTIAL 2B-COMMERCIAL



NOTE: THIS DETAIL PROVIDES AN EXAMPLE OF THE MINIMUM STANDARD ALLOWED BY THE TOWN OF SILVERTHORNE WATER DEPARTMENT. ANY PROPOSED DEVIATIONS FROM OR CHANGES TO THESE STANDARDS MUST OTHERWISE BE APPROVED BY THE TOWN OF SILVERTHORNE WATER DEPARTMENT.

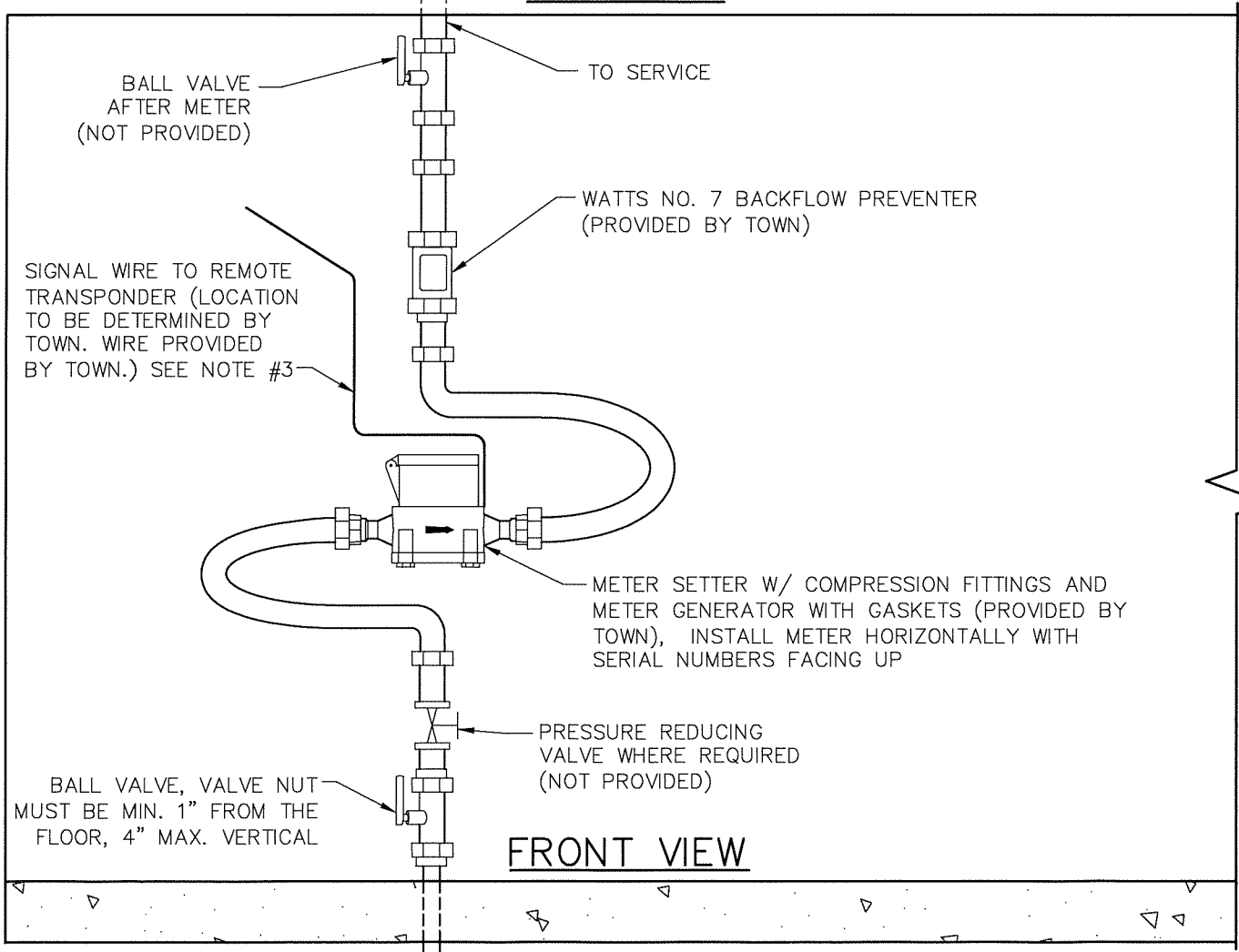
# WATER SERVICE LINE AND STOP BOX CONNECTION & INSTALLATION



NOTES:

1. METER SHALL BE PLACED IN ACCESSIBLE AND PROTECTED LOCATION AND MUST BE JUST AFTER ENTRANCE OF SERVICE TO BUILDING, PROTECTED FROM FREEZING AND DAMAGE.
2. NO CONNECTIONS ARE PERMITTED BEFORE THE METER OUTLET VALVE, EXCEPT AS SHOWN ON THIS DRAWING.
3. METER TRANSPONDER WILL BE INSTALLED BY WATER DEPARTMENT STAFF AT FINAL INSPECTION.
4. DO NOT GROUND BUILDING VIA WATER LINE.

SIDE VIEW

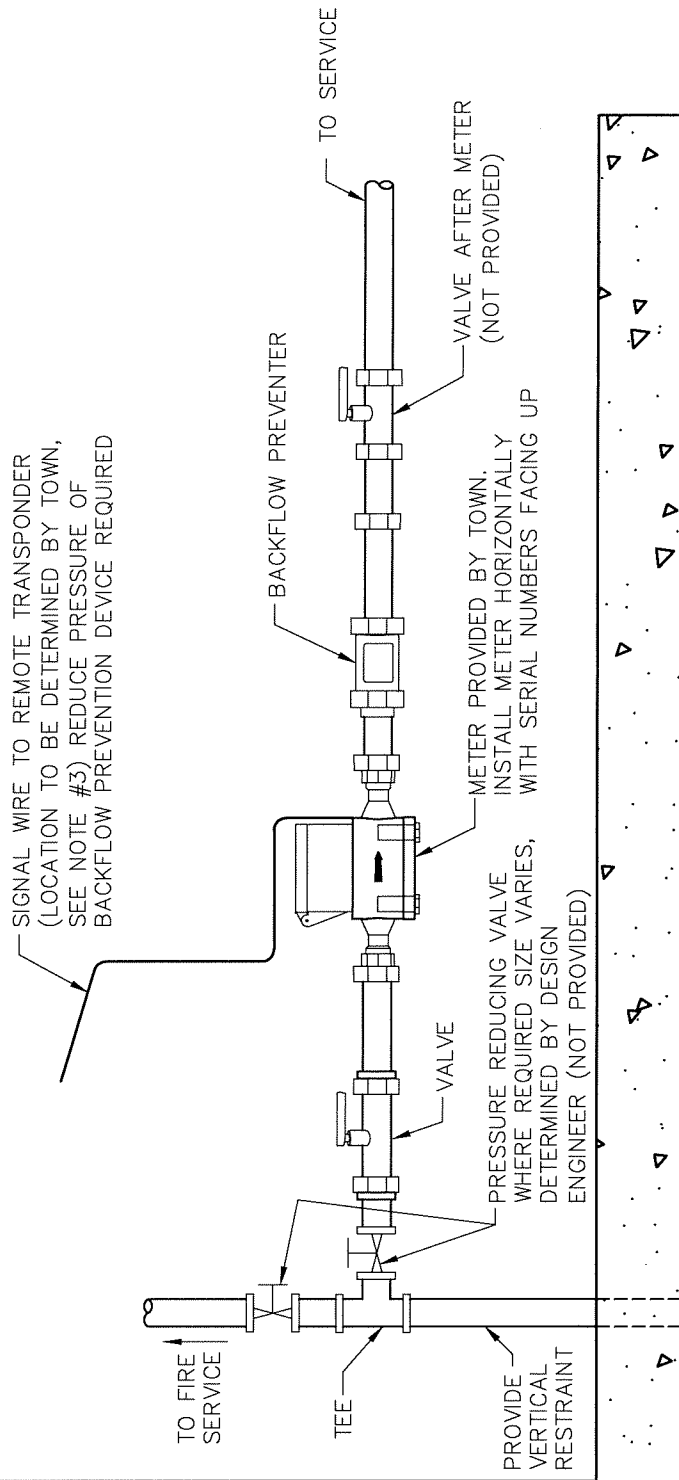


FRONT VIEW

# RESIDENTIAL WATER METER INSTALLATION

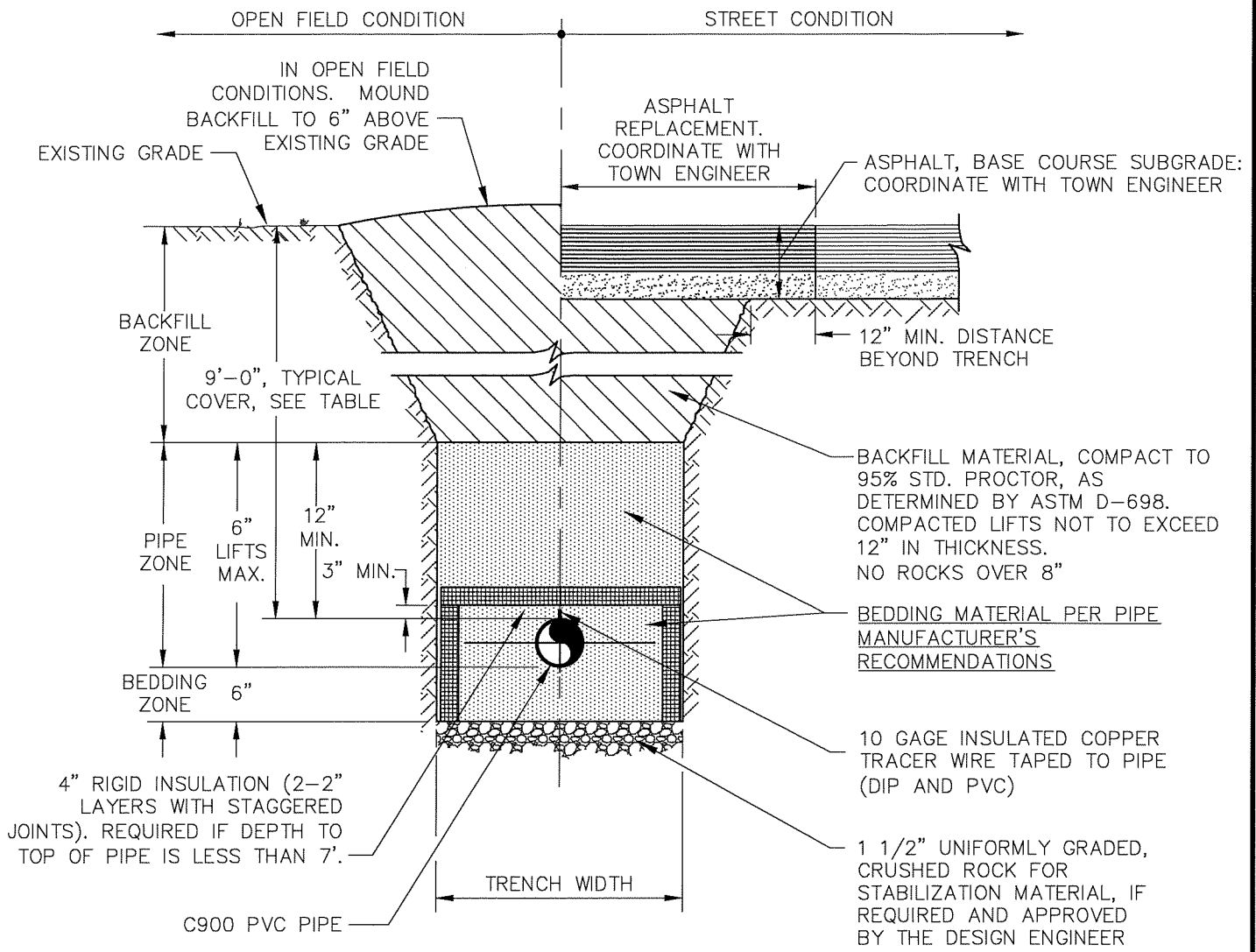
NOTES:

1. METER SHALL BE PLACED IN ACCESSIBLE AND PROTECTED LOCATION AND MUST BE JUST AFTER ENTRANCE OF SERVICE TO BUILDING, PROTECTED FROM FREEZING AND DAMAGE.
2. NO CONNECTIONS ARE PERMITTED BEFORE THE METER OUTLET VALVE, EXCEPT AS SHOWN ON THIS DRAWING.
3. METER TRANSDUCER WILL BE INSTALLED BY WATER DEPARTMENT STAFF AT FINAL INSPECTION.
4. DO NOT GROUND BUILDING VIA WATER LINE.
5. ALL FITTINGS BEFORE BACKFLOW PREVENTERS SHALL BE NSF APPROVED AND NON-CORROSIVE.



FRONT VIEW

# COMMERCIAL WATER METER INSTALLATION



## WATERLINE

TRENCH WIDTH SHALL CONFIRM TO THE FOLLOWING:

PIPE I.D.	MIN. WD.	MAX. WD.
4" & SMALLER	1'-4"	2'-4"
6"	1'-6"	2'-6"
8"	1'-8"	2'-8"
12"	2'-0"	3'-0"
16"	2'-4"	3'-4"
20"	2'-8"	3'-8"
24"	3'-0"	4'-0"

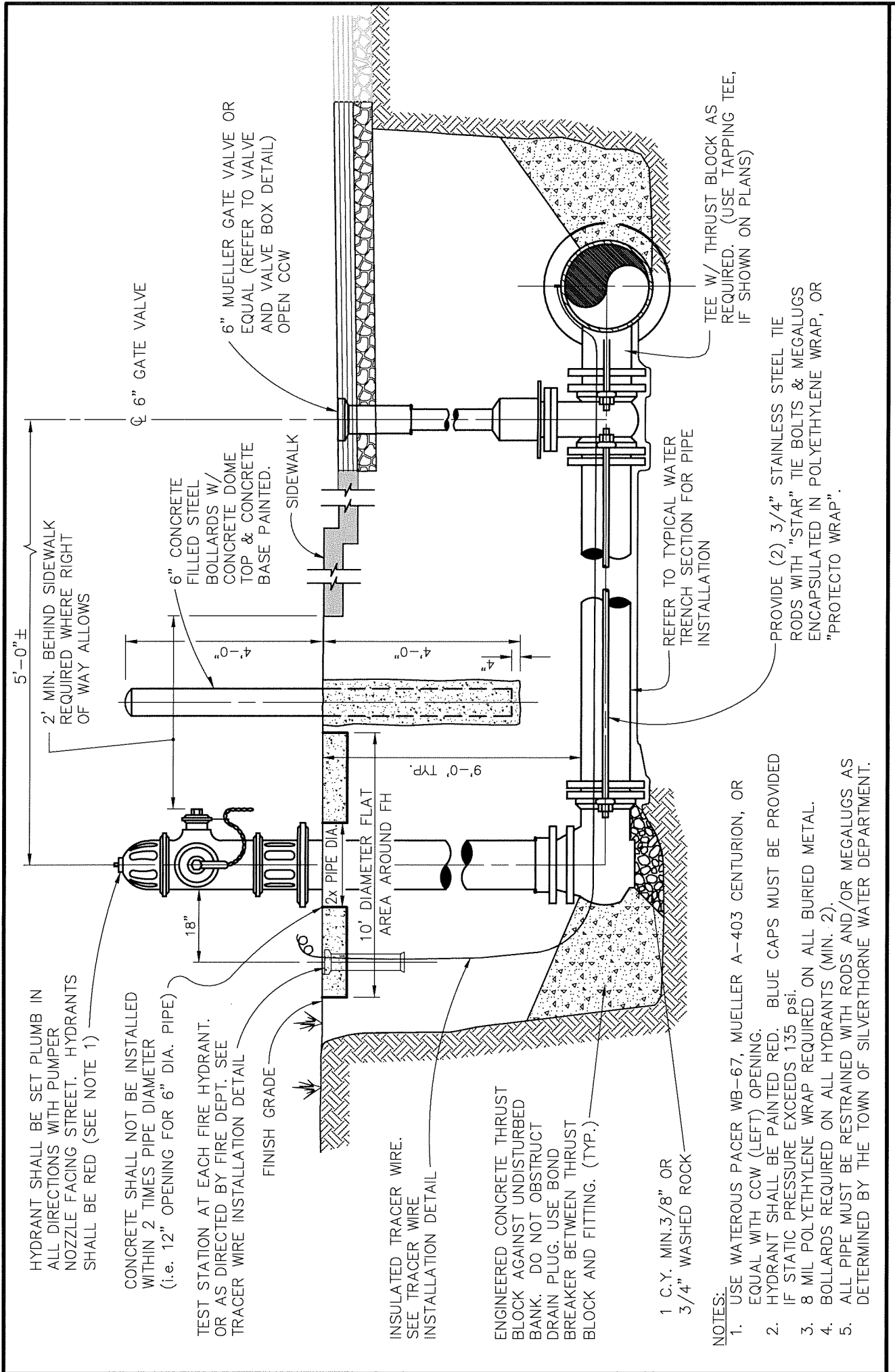
INSULATION REQUIREMENTS:

PIPE COVER	REQUIRED
>8'-0"	NO INSULATION
>7'-0" TO 8'-0"	TOP INSULATION
5'-0" TO 7'-0"	TOP AND SIDES
<5'-0" COVER	NOT PERMITTED

NOTES:

- INSULATION SHALL BE HIGHLOAD EXTRUDED POLYSTYRENE INSULATION BY DOW CHEMICAL OR EQUAL. TYPE HI-100, AT PIPE CROSSINGS, UNDER FOUNDATIONS AND UNDER EXISTING OR FUTURE ROADS. TYPE HI-60 IN UNPLOWED/UNDRIVEN FIELDS OR OPEN AREAS.
- BEDDING MATERIAL SHALL BE INSTALLED TO NOT PROVIDE HYDRAULIC PERMEABILITY IN EXCESS OF THE NATURAL SOILS. DESIGNING THE PREVENTION OF THE TRANSPORT OF WATER WITHIN THE TRENCH IS THE RESPONSIBILITY OF THE DESIGN ENGINEER.

# TYPICAL WATER TRENCH SECTION



HYDRANT SHALL BE SET PLUMB IN ALL DIRECTIONS WITH PUMPER NOZZLE FACING STREET. HYDRANTS SHALL BE RED (SEE NOTE 1)

CONCRETE SHALL NOT BE INSTALLED WITHIN 2 TIMES PIPE DIAMETER (i.e. 12" OPENING FOR 6" DIA. PIPE)

TEST STATION AT EACH FIRE HYDRANT. OR AS DIRECTED BY FIRE DEPT. SEE TRACER WIRE INSTALLATION DETAIL

FINISH GRADE

INSULATED TRACER WIRE. SEE TRACER WIRE INSTALLATION DETAIL

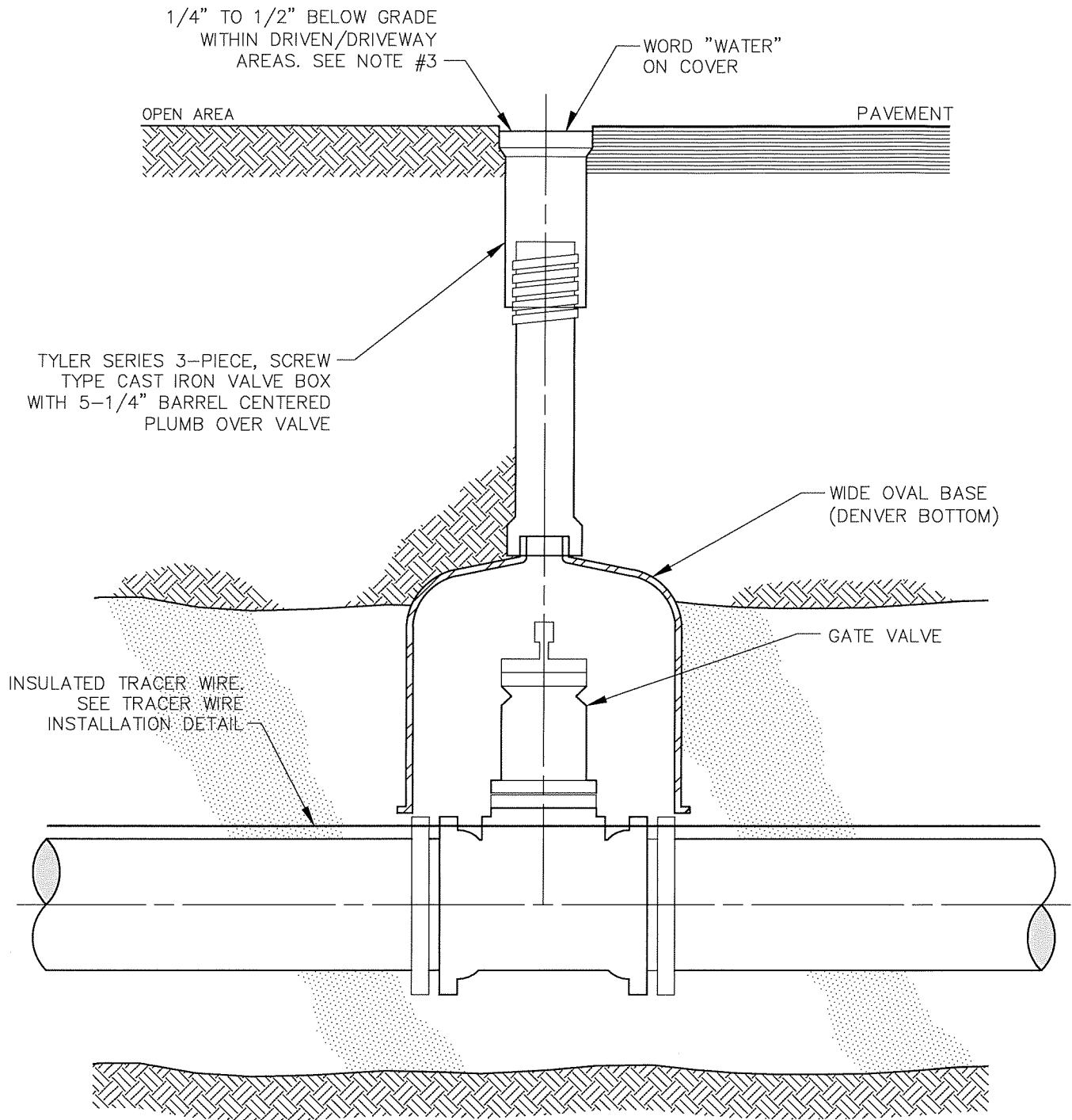
ENGINEERED CONCRETE THRUST BLOCK AGAINST UNDISTURBED BANK. DO NOT OBSTRUCT DRAIN PLUG. USE BOND BREAKER BETWEEN THRUST BLOCK AND FITTING. (TYP.)

1 C.Y. MIN. 3/8" OR 3/4" WASHED ROCK

**NOTES:**

1. USE WATEROUS PACER WB-67, MUELLER A-403 CENTURION, OR EQUAL WITH CCW (LEFT) OPENING.
2. HYDRANT SHALL BE PAINTED RED. BLUE CAPS MUST BE PROVIDED IF STATIC PRESSURE EXCEEDS 135 psi.
3. 8 MIL POLYETHYLENE WRAP REQUIRED ON ALL BURIED METAL.
4. BOLLARDS REQUIRED ON ALL HYDRANTS (MIN. 2).
5. ALL PIPE MUST BE RESTRAINED WITH RODS AND/OR MEGALUGS AS DETERMINED BY THE TOWN OF SILVERTHORNE WATER DEPARTMENT.

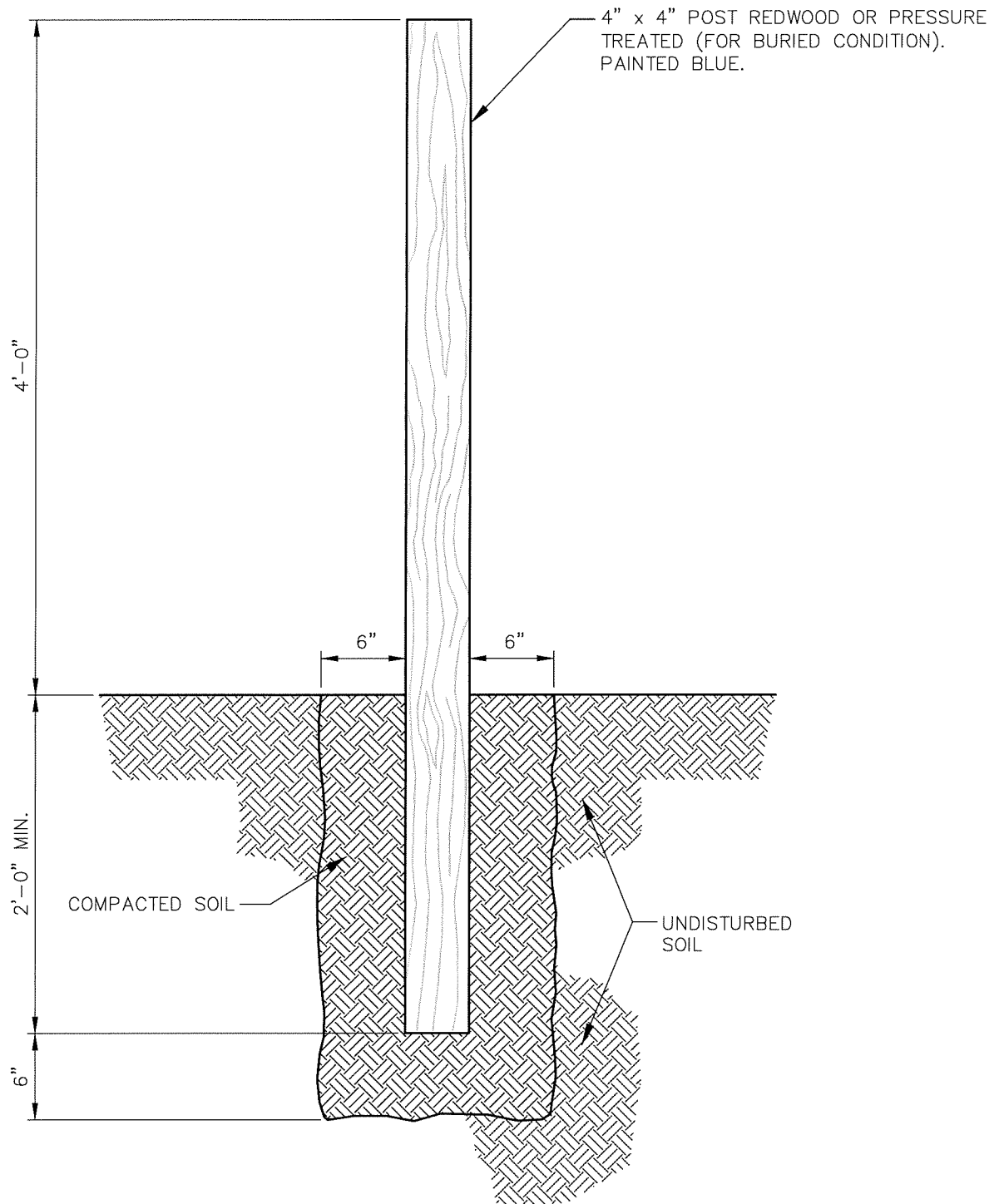
**TYPICAL FIRE HYDRANT ASSEMBLY**



**NOTES:**

1. GATE VALVES SHALL OPEN CCW AND SHALL BE RESILIENT SEAT.
2. FITTINGS SHALL BE WRAPPED WITH 8 MIL MINIMUM THICKNESS POLYETHYLENE AND ALL VALVES AND FITTINGS SHALL BE EPOXY COATED.
3. VALVE BOX SHALL BE SET 1/4" TO 1/2" BELOW FINAL ASPHALT PAVEMENT GRADE IN DRIVEN AREAS. INSTALL AT GRADE IN NON-PAVED AREAS IF NOT IN R.O.W..
4. PROVIDE MARKER POSTS WHERE NECESSARY, AS DETERMINED BY SILVERTHORNE WATER DEPARTMENT OUTSIDE R.O.W. OR DRIVE.
5. SEE TYPICAL WATER TRENCH SECTION FOR PIPE INSTALLATION.
6. VALVE BOX AND ROD SHALL BE INSTALLED PLUMB AND STRAIGHT.
7. VALVE AND BOX SHALL BE MADE IN USA UNLESS OTHERWISE APPROVED BY THE TOWN OF SILVERTHORNE WATER DEPARTMENT.
8. ALL BURIED METAL TO BE WRAPPED.

## VALVE AND VALVE BOX DETAIL

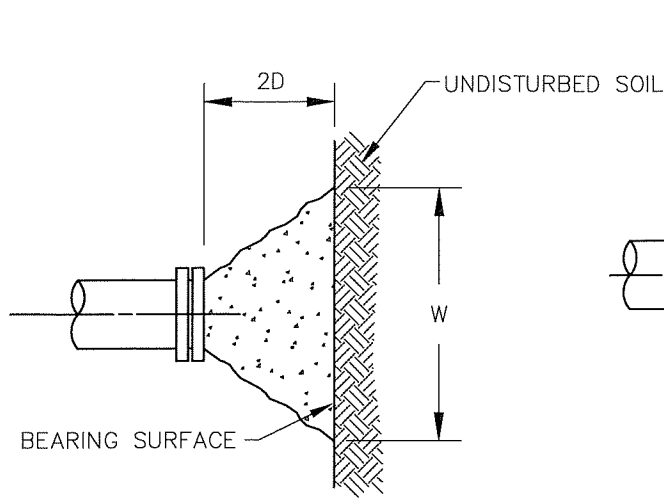


NOTE:

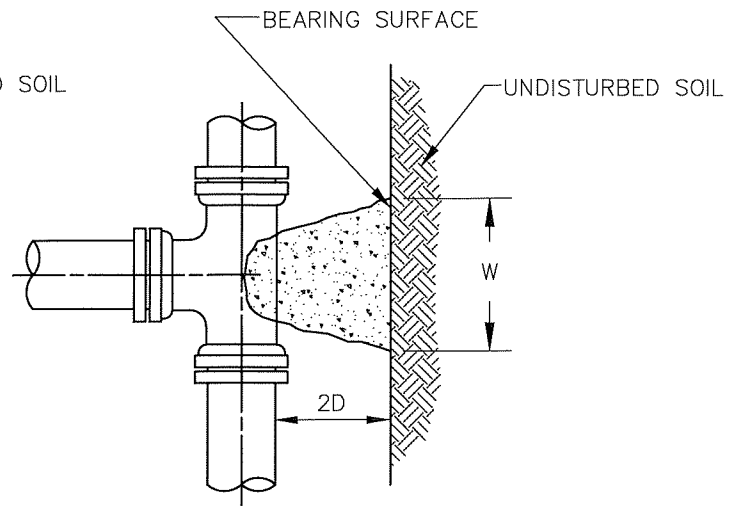
1. PROVIDE IF MAINLINE OR SERVICE VALVE NOT IN TRAVELED WAY.

## VALVE MARKER POST

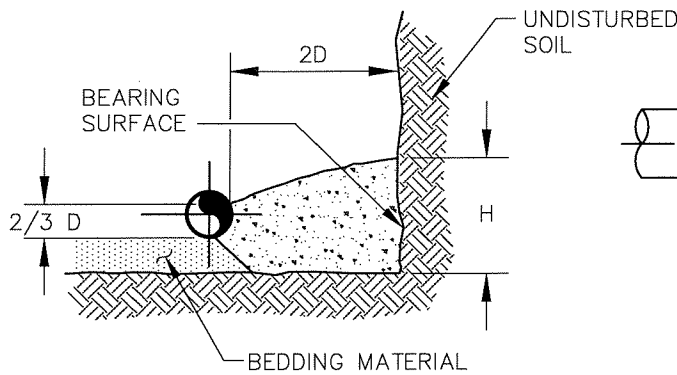




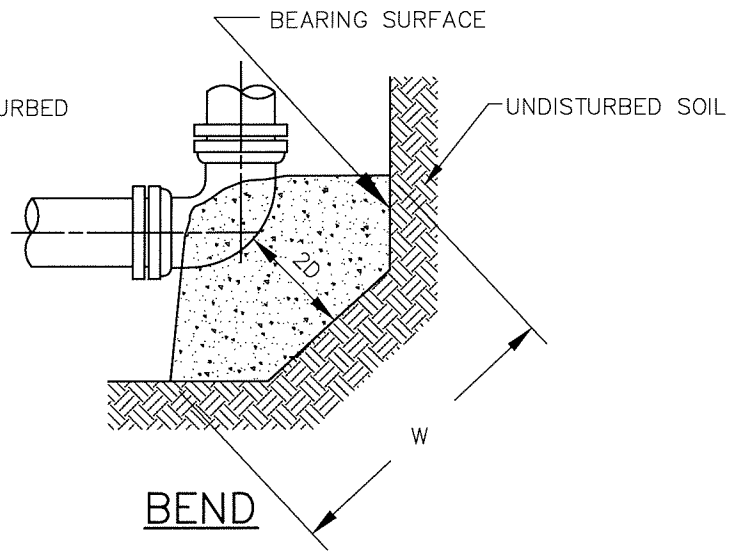
CAP (OR PLUG)



TEE



SECTION



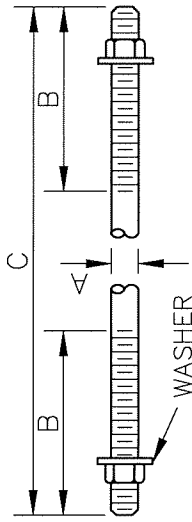
BEND

MINIMUM THRUST AREA AGAINST UNDISTURBED SOIL REQUIRED – SQUARE FEET					
SIZE	11-1/4° BEND	22-1/2° BEND	45° BEND	90° BEND	TEE (BRANCH SIZE OR CAP)
4"	0.5	1.0	1.5	2.5	2.0
6"	1.0	1.5	3.0	5.5	4.0
8"	1.5	2.5	5.0	9.0	6.5
12"	3.0	5.5	10.5	19.5	14.0
16"	5.0	9.5	18.5	34.0	24.0

NOTES:

1. D = PIPE DIAMETER
2. AREA AGAINST UNDISTURBED SOIL = H x W
3. DO NOT COVER FITTING BOLTS WITH CONCRETE.
4. PLACE MIXED CONCRETE AGAINST UNDISTURBED SOIL. USE FORMS.
5. ALL FITTINGS ARE TO BE WRAPPED IN 8 MIL POLYETHYLENE SHEETING.
6. USE BOND BREAKER BETWEEN THRUST BLOCK AND FITTING. (TYP.)
7. PROVIDE MINIMUM 3,000 PSI CONCRETE.
8. SIZES SHOWN FOR 1,500 PSF SOIL BEARING PRESSURE AND AN INTERNAL TEST PRESSURE OF 150 PSI. DESIGN ENGINEER MUST VERIFY DESIGN FOR ACTUAL SOIL CONDITIONS AND INTERNAL PRESSURE.
9. DO NOT COVER THRUST BLOCK FOR MINIMUM OF 24 HOURS
10. ALL BURIED METAL TO BE POLYETHYLENE WRAPPED.

# THRUST BLOCK

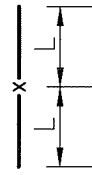


### TIE ROD DETAILS

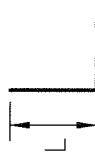
NOT TO SCALE

TIE RODS		WASHERS	
A	B	D	E
ROD DIAMETER	THREAD LENGTH	HOLE DIAMETER	THICKNESS
3/4" - 1"	6"	1/8" LARGER THAN ROD Ø	1/2"
3/4" - 1-1/2"	ALL THREAD	1/8" LARGER THAN ROD Ø	5/8"
	ROD LENGTH		
	1' - 11" & 20'		
	1' - 11" & 20'		

RESTRAINT JOINT		8"		12"	
PIPE SIZE	FITTING	D	L	D	L
90° BEND, TEE, PLUG OR VALVE	3/4"	60"	S.S. 3/4"	86"	S.S.
45° BEND	3/4"	18"	S.S. 3/4"	25"	S.S.
22-1/2° BEND	3/4"	5"	S.S. 3/4"	7"	S.S.
11-1/4° BEND	3/4"	1.0'	S.S. 3/4"	2'	S.S.



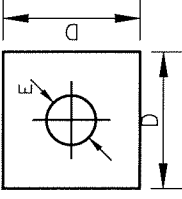
TEE OR VALVE



90° BEND



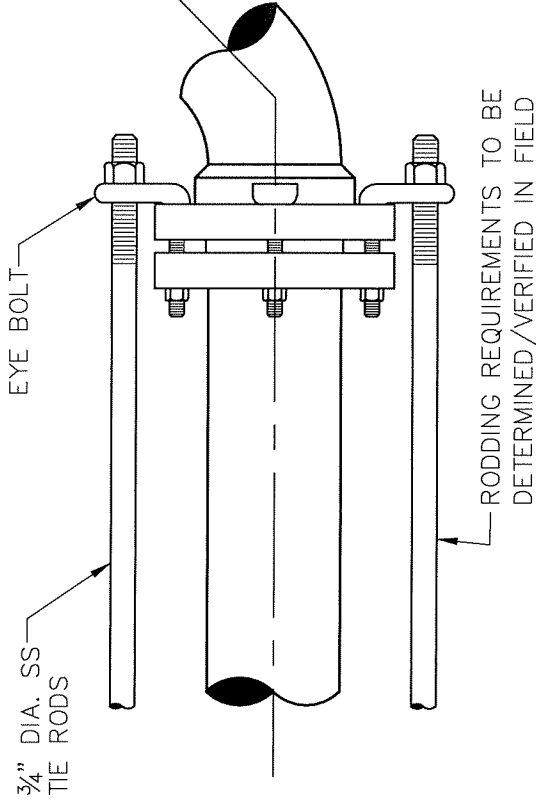
BENDS



- SEE TIED JOINTS ROD DIMENSIONS THIS SHEET.
- SEE CLAMP DETAILS AND DIMENSION (SHEET 24, DENVER WATER DEPARTMENT STANDARDS) FOR PROPER PLACEMENT OF WASHERS.
- RODS, NUTS, COUPLING NUTS & WASHERS ARE 304 OR 316 STAINLESS STEEL.

### WASHER DETAIL

NOT TO SCALE

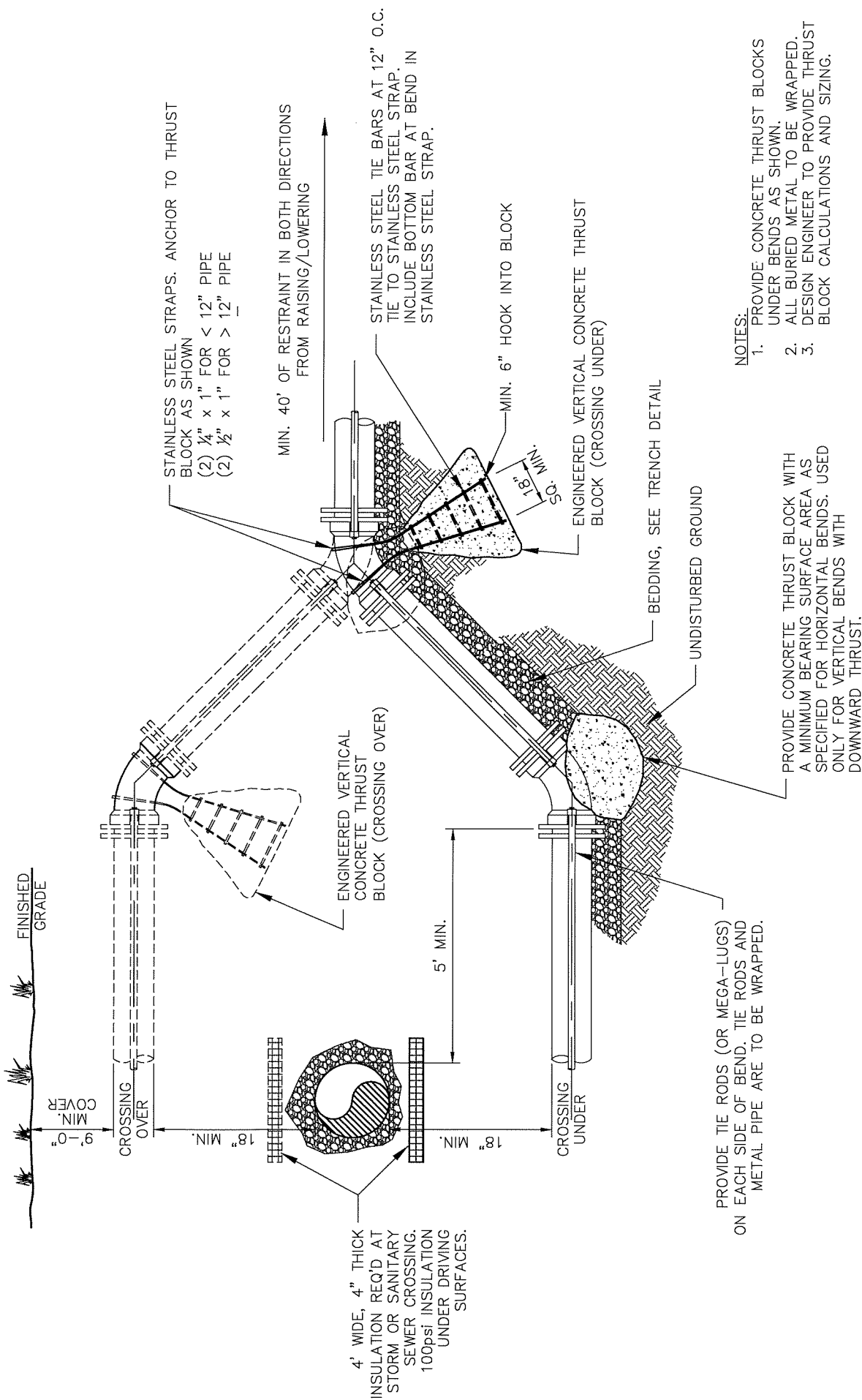


### TYPICAL RESTRAINED JOINT

NOT TO SCALE

- LENGTH OF TIED PIPE MEASURED EACH WAY FROM VALVES AND BENDS.
- D=DIAMETER, L=LENGTH, G=GRADE, S.S.=STAINLESS STEEL
- BASED ON 150 PSI INTERNAL PRESSURE, FOR L AND PRESSURES LISTED SEE TIE ROD & WASHER DETAIL.
- S.S. MEANS STAINLESS STEEL ROD A.S.T.M. STANDARD DESIGNATION A304 MIN.
- NUTS SHALL BE A.S.T.M. STANDARD DESIGNATION A-304 GRADE A OR B HEXAGON HEAVY SERIES.
- SEE TIE ROD DETAIL DRAWING ALSO TIE ROD COUPLING DETAILS, CLAMP DETAILS AND SET CLAMP DETAILS.
- LENGTH REFERS TO THE AMOUNT OF PIPE WHICH MUST BE TIED TOGETHER AND IS NOT NECESSARILY THE LENGTH OF THE RODS.
- LENGTH OF TIED PIPE CHART IS ALSO FOR THE LENGTH OF JOINT RESTRAINT FOR MEGALUGS.
- CROSSES MUST BE RESTRAINED IN ALL DIRECTIONS.
- 12" AND SMALLER IN LINE VALVES AND TEES SHALL HAVE A MECHANICAL JOINT RESTRAINT DEVICE ON EACH SIDE OF THE FITTING OR VALVE WHERE SPECIFICALLY REQUESTED BY THE TOWN OF SILVERTHORNE OR DESIGN ENGINEER, MECHANICAL JOINT RESTRAINT DEVICE SHALL BE
- MEGALUG 1100 SERIES MANUFACTURED BY EBBA IRON, INC
- ALL FITTINGS MUST BE RESTRAINED WITH TWO (2) OF THE FOLLOWING METHODS: MEGALUGS (OR EQUAL), TIE RODS, THRUST BLOCKS.
- A SECOND VALVE WILL BE REQUIRED TO BE CLOSED WHEN EXCAVATING NEXT TO A EXISTING VALVE.
- TR FLEX OR EQUAL ACCEPTABLE ALSO.
- ~~ALL BURIED METAL TO BE WRAPPED.~~

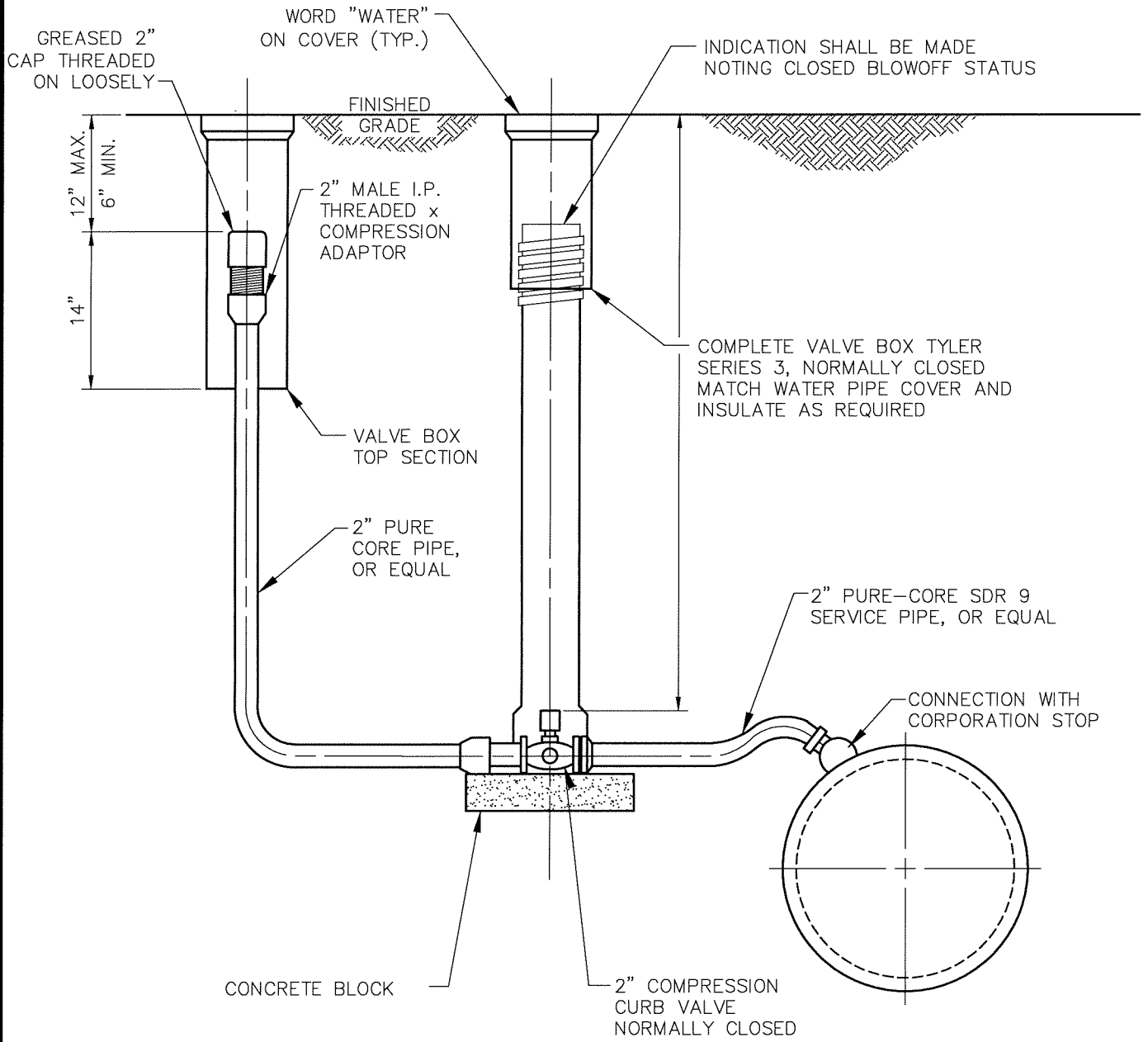
# TIE ROD AND WASHER DETAIL WITH LENGTH OF RESTRAINED PIPE



- NOTES:
1. PROVIDE CONCRETE THRUST BLOCKS UNDER BENDS AS SHOWN.
  2. ALL BURIED METAL TO BE WRAPPED.
  3. DESIGN ENGINEER TO PROVIDE THRUST BLOCK CALCULATIONS AND SIZING.

PROVIDE CONCRETE THRUST BLOCK WITH A MINIMUM BEARING SURFACE AREA AS SPECIFIED FOR HORIZONTAL BENDS. USED ONLY FOR VERTICAL BENDS WITH DOWNWARD THRUST.

# RESTRAINED JOINTS AND THRUST BLOCKS AT VERTICAL BENDS

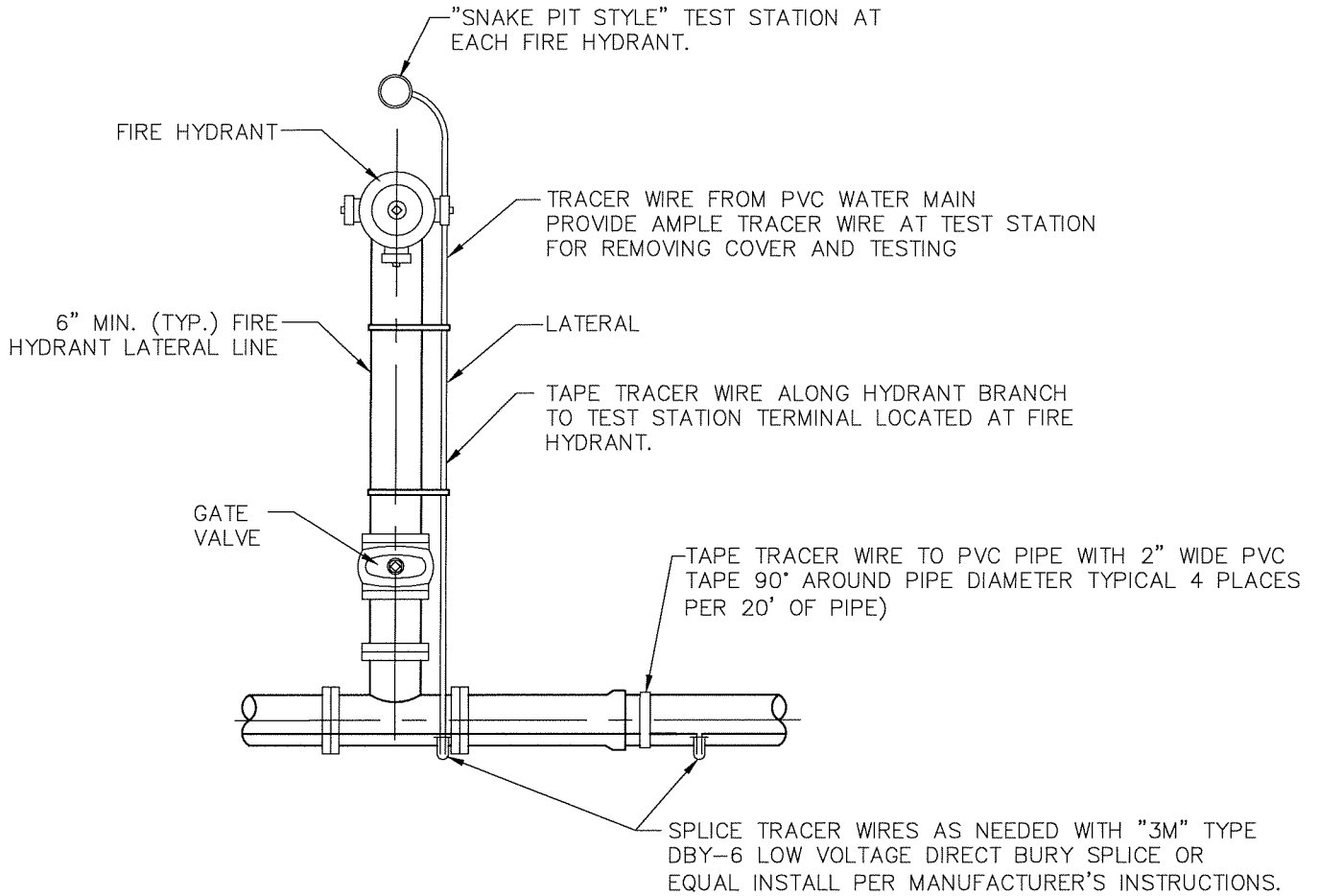


SECTION

NOTES:

- 1. ALL BURIED METAL TO BE WRAPPED PER SPEC.

BLOW-OFF INSTALLATION 12" AND SMALLER PIPE

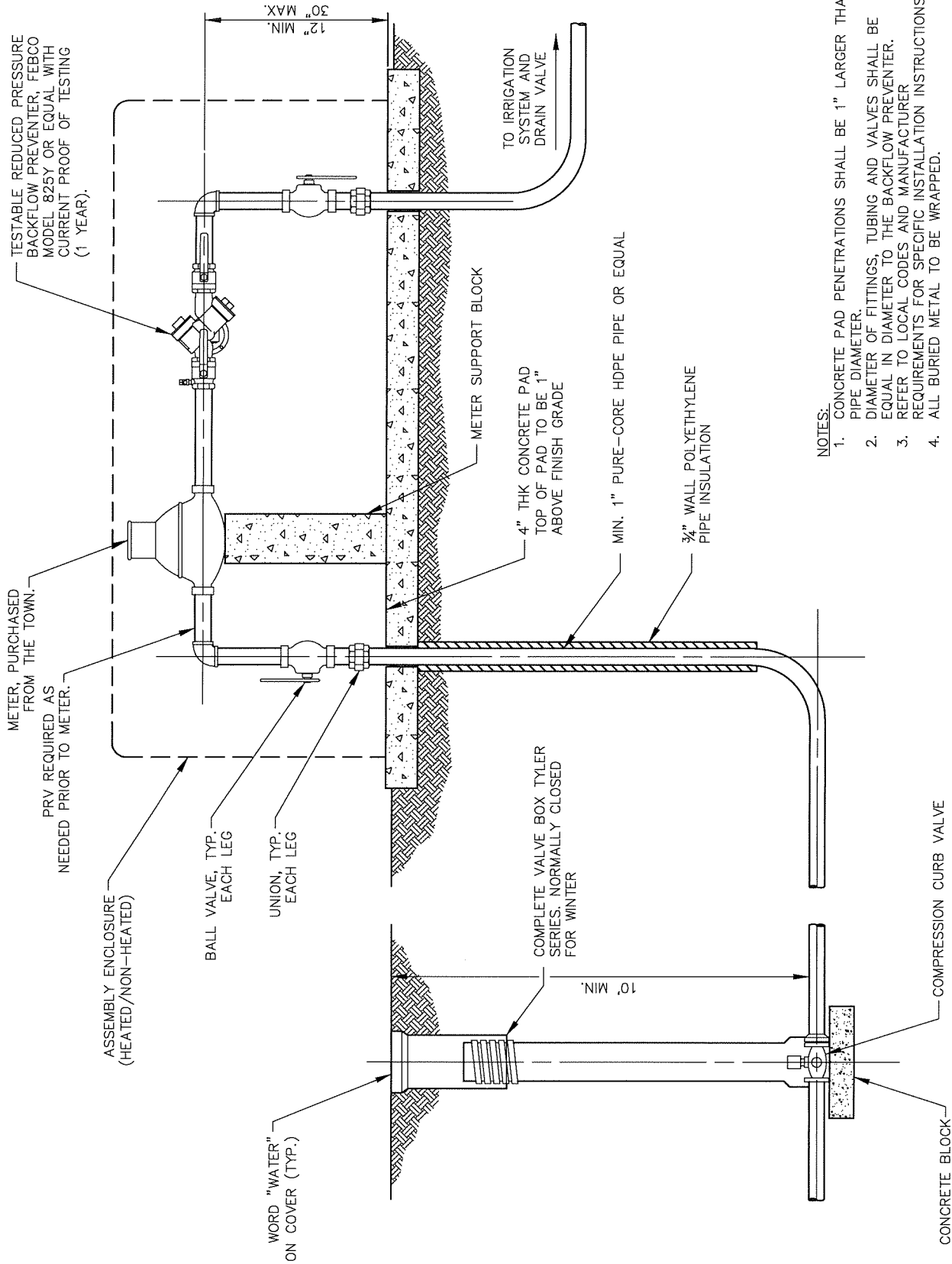


PLAN

NOTE:

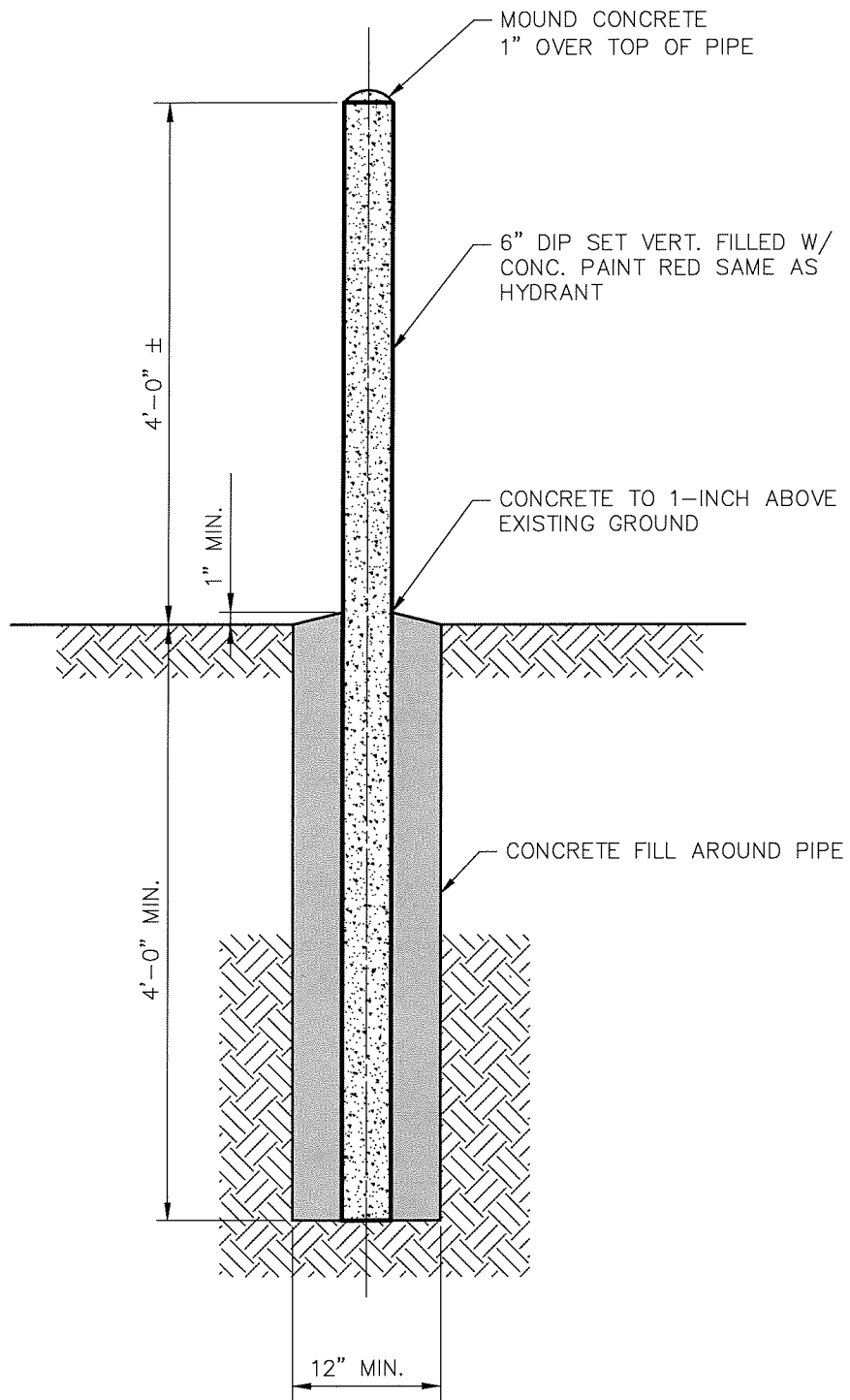
1. ALL BURIED METAL TO BE POLYETHYLENE WRAPPED.

TRACER WIRE INSTALLATION

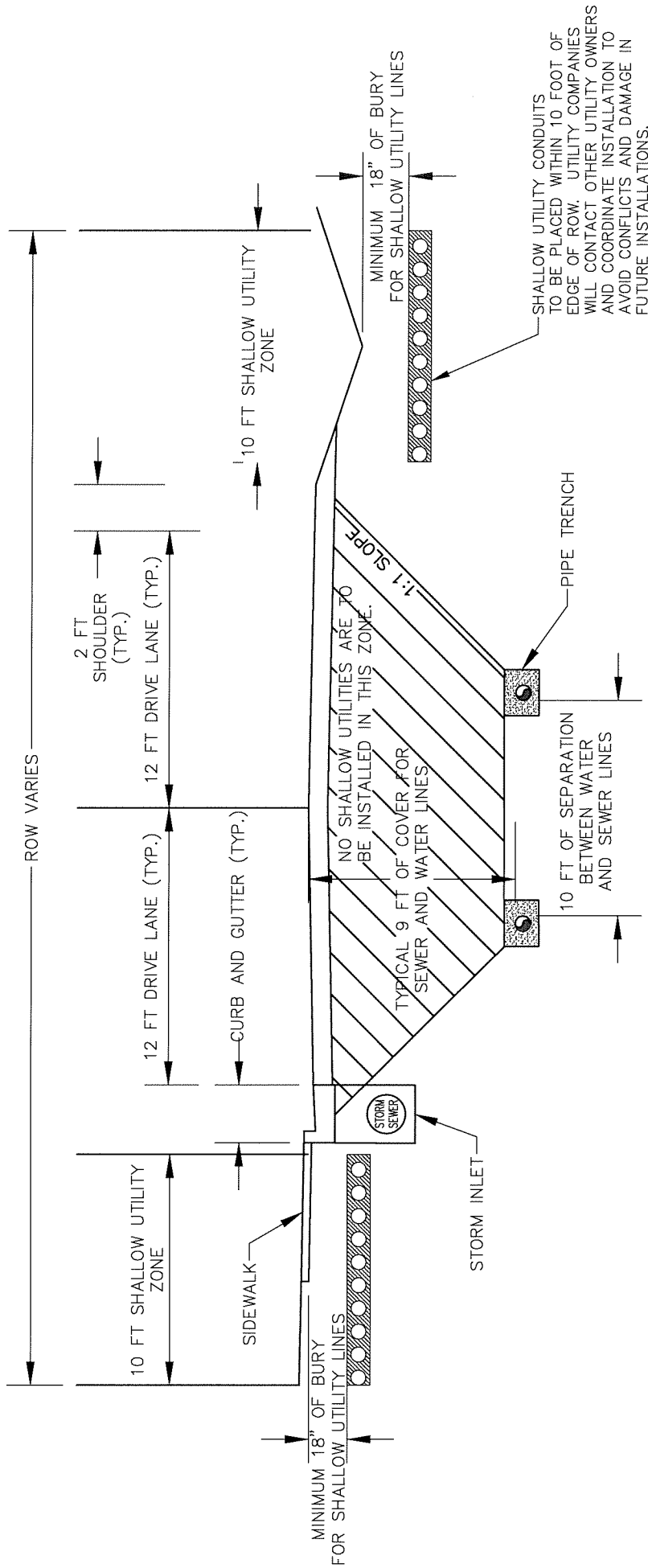


- NOTES:
1. CONCRETE PAD PENETRATIONS SHALL BE 1" LARGER THAN PIPE DIAMETER.
  2. DIAMETER OF FITTINGS, TUBING AND VALVES SHALL BE EQUAL IN DIAMETER TO THE BACKFLOW PREVENTER.
  3. REFER TO LOCAL CODES AND MANUFACTURER REQUIREMENTS FOR SPECIFIC INSTALLATION INSTRUCTIONS.
  4. ALL BURIED METAL TO BE WRAPPED.

# OUTSIDE SETTING FOR IRRIGATION SERVICE



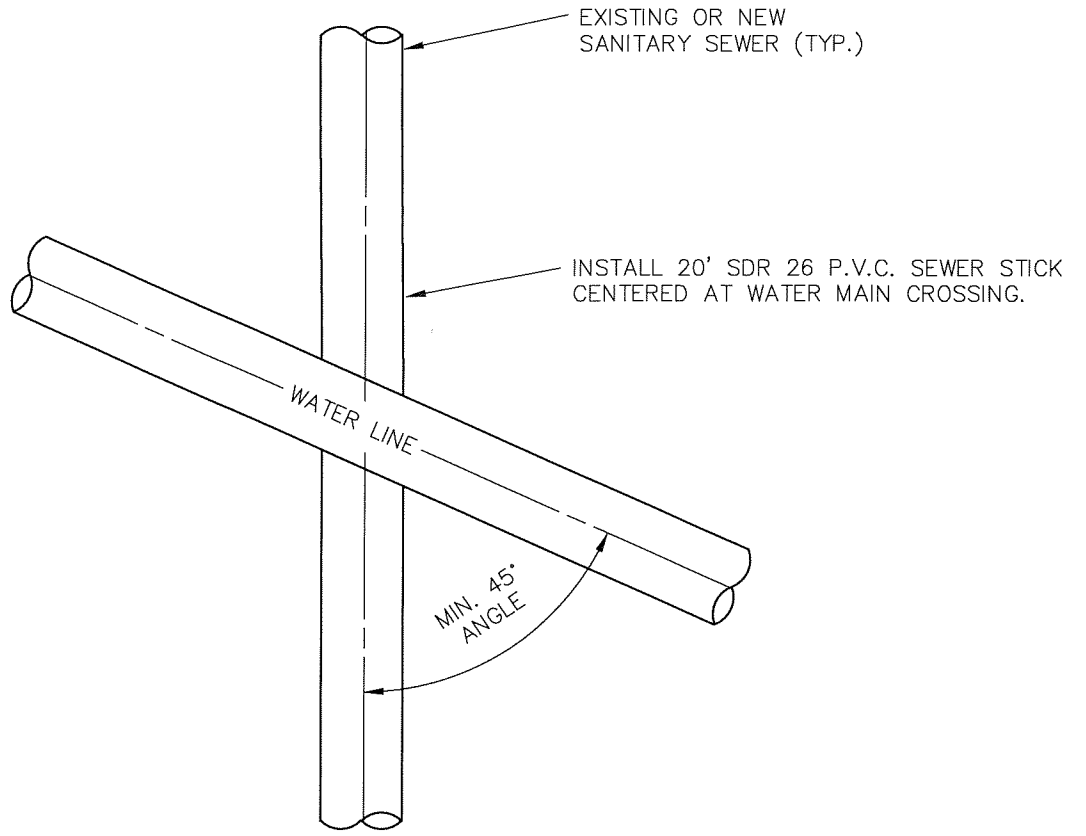
# BOLLARD



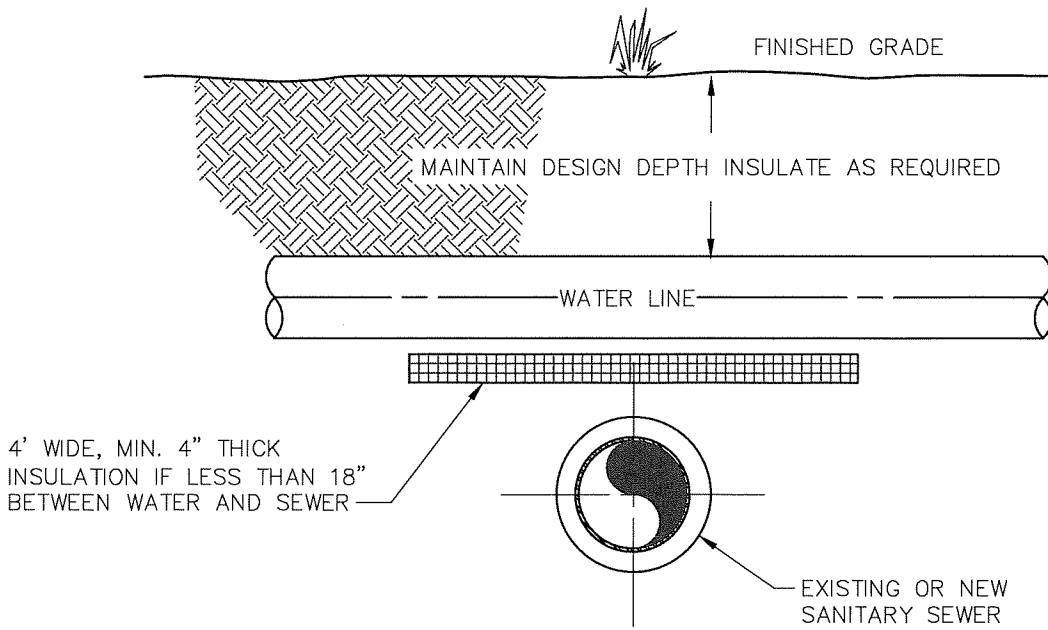
TOWN OF SILVERTHORNE  
 TYPICAL RIGHT OF WAY UTILITY PLACEMENT  
 (NOT TO SCALE)

TYPICAL RIGHT OF WAY UTILITY PLACEMENT





PLAN



SECTION

# SEWER/WATER CROSSING

4" THICK x 2' x 2'  
CONCRETE PAD WITH  
6 x 6 (10/10) WWF

TYLER SERIES 6855 SLIP TYPE  
VALVE BOX TOP SECTION WITH  
LOCKING LID MARKED "SEWER"

CLEANOUT  
ADAPTOR FITTING  
THREAD PLUG

SDR26 PVC  
RISER, PROVIDE  
6" x 4" REDUCER  
ON 6" CLEANOUT

REPLACE EXISTING  
PAVEMENT AND  
SUBGRADE AS SPECIFIED

PROVIDE EXPANSION  
JOINT MATERIAL  
WHEN PLACING PAD  
IN PAVEMENT

45° L.R. BEND

4" OR 6" SDR26  
PVC TO MATCH  
SERVICE SIZE

ADAPTOR COUPLINGS  
BEND AS REQUIRED

SCH40 OR  
SCH80 SEWER  
SERVICE FROM  
STRUCTURE.

INSTALL SDR26 CLEANOUT ASSEMBLY  
(WYE OR COMBINATION WYE-TEE) WITHIN  
5' OF BUILDING STRUCTURE. MUST USE  
DOUBLE SWEEP TO ALLOW CLEANING IN  
EITHER DIRECTION UNLESS CLEAN OUT IS  
PROVIDED IMMEDIATELY INSIDE STRUCTURE.  
PER APPLICABLE PLUMBING CODE.

## SECTION

SERVICE LINE TO BE INSTALLED AT 2%  
MINIMUM GRADE TOWARD MAIN

STAINLESS STEEL BANDS AND 3'  
SECTION PIPELINE

SLIP TYPE  
VALVE BOX

CLEANOUT ADAPTOR  
FITTING THREADED PLUG

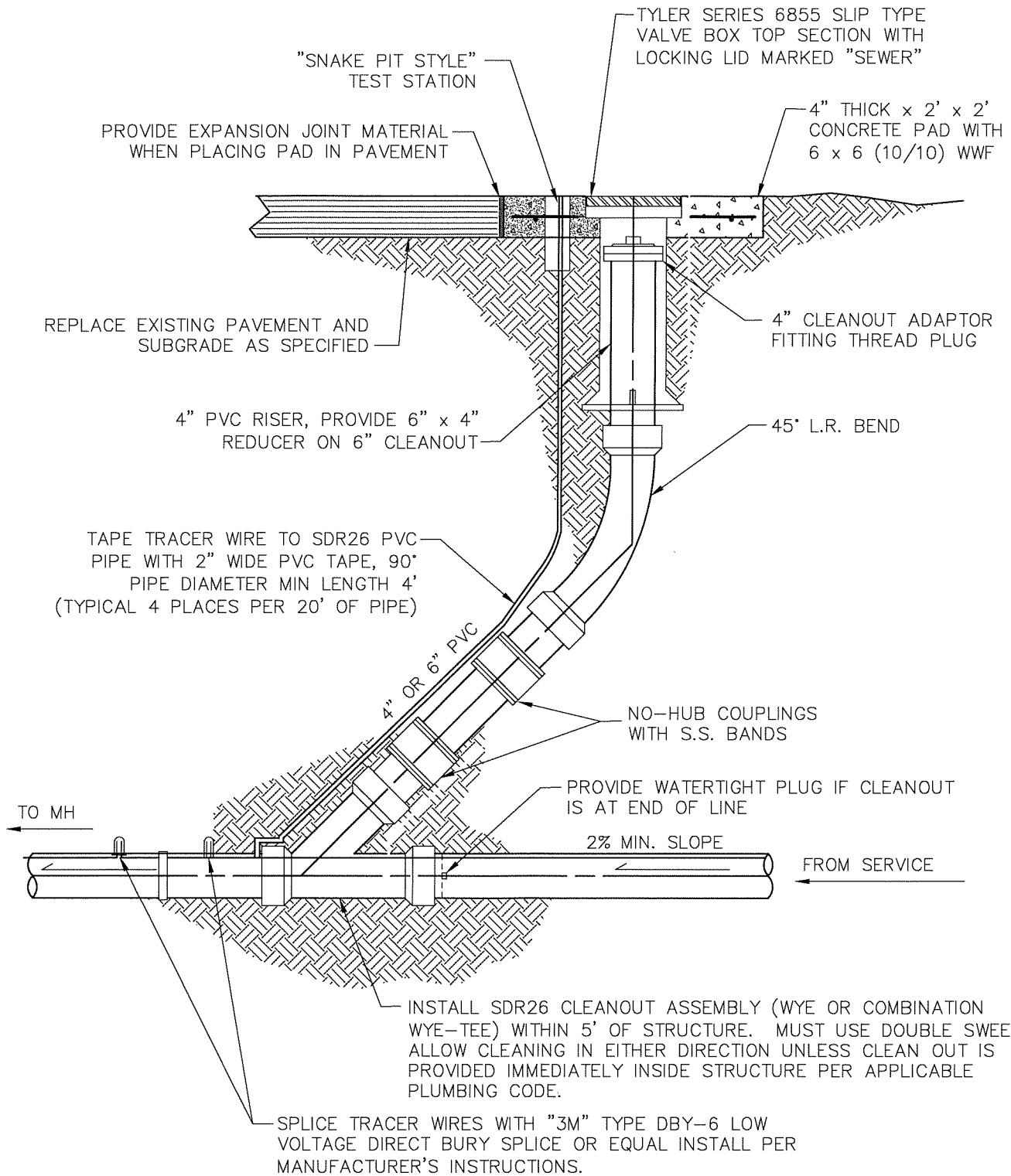
45° WYE, TEE OR  
APPROVED SADDLE WITH  
S.S. BANDS. ROTATE 45°  
AS SHOWN ABOVE.

## PLAN

### NOTES:

1. SEWER SERVICE TO BE ASTM 3034, SDR 26 PVC PIPE & FITTINGS
2. COMPACT GROUND ALONG SERVICE TO 95% MIN. STANDARD PROCTOR
3. ONLY WYE FITTINGS WILL BE ALLOWED ON NEW MAINS
4. ALL SERVICE LINES SHALL BE INSPECTED BY THE TOWN OF SILVERTHORNE DURING INSTALLATION AND MUST BE APPROVED BY THE TOWN OF SILVERTHORNE BEFORE BACKFILLED.

# SEWER SERVICE LINE CONNECTION



"SNAKE PIT STYLE" TEST STATION

PROVIDE EXPANSION JOINT MATERIAL WHEN PLACING PAD IN PAVEMENT

TYLER SERIES 6855 SLIP TYPE VALVE BOX TOP SECTION WITH LOCKING LID MARKED "SEWER"

4" THICK x 2' x 2' CONCRETE PAD WITH 6 x 6 (10/10) WWF

REPLACE EXISTING PAVEMENT AND SUBGRADE AS SPECIFIED

4" CLEANOUT ADAPTOR FITTING THREAD PLUG

4" PVC RISER, PROVIDE 6" x 4" REDUCER ON 6" CLEANOUT

45° L.R. BEND

TAPE TRACER WIRE TO SDR26 PVC PIPE WITH 2" WIDE PVC TAPE, 90° PIPE DIAMETER MIN LENGTH 4' (TYPICAL 4 PLACES PER 20' OF PIPE)

4" OR 6" PVC

NO-HUB COUPLINGS WITH S.S. BANDS

PROVIDE WATERTIGHT PLUG IF CLEANOUT IS AT END OF LINE

2% MIN. SLOPE

INSTALL SDR26 CLEANOUT ASSEMBLY (WYE OR COMBINATION WYE-TEE) WITHIN 5' OF STRUCTURE. MUST USE DOUBLE SWEEP TO ALLOW CLEANING IN EITHER DIRECTION UNLESS CLEAN OUT IS PROVIDED IMMEDIATELY INSIDE STRUCTURE PER APPLICABLE PLUMBING CODE.

SPLICE TRACER WIRES WITH "3M" TYPE DBY-6 LOW VOLTAGE DIRECT BURY SPLICE OR EQUAL INSTALL PER MANUFACTURER'S INSTRUCTIONS.

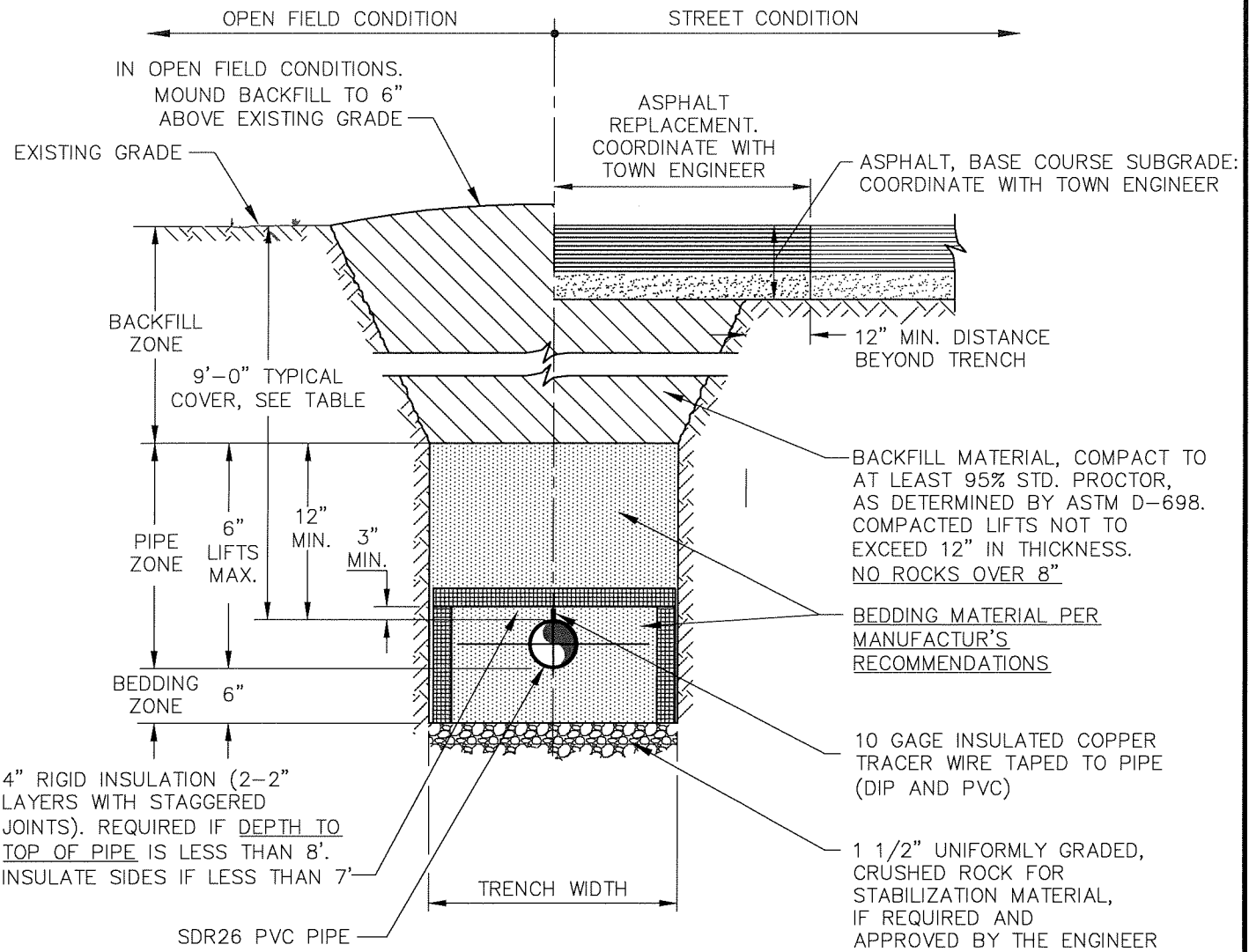
TO MH

FROM SERVICE

**NOTES:**

1. CLEANOUT FITTINGS AND PIPING TO BE SDR26 AND SAME SIZE AS SEWER SERVICE.
2. CLEANOUT REQUIRED WITHIN 5' OF BUILDING/STRUCTURE.
3. CLEANOUT REQUIRED AT EVERY 100' SPACING IN SERVICE LINE BEFORE MAIN.

# SANITARY SEWER SERVICE IN-LINE CLEANOUT



## SEWER MAIN

TRENCH WIDTH SHALL CONFIRM TO THE FOLLOWING:

PIPE I.D.	MIN. WD.	MAX. WD.
4" & SMALLER	1'-4"	2'-4"
6"	1'-6"	2'-6"
8"	1'-8"	2'-8"
12"	2'-0"	3'-0"
16"	2'-4"	3'-4"
20"	2'-8"	3'-8"
24"	3'-0"	4'-0"

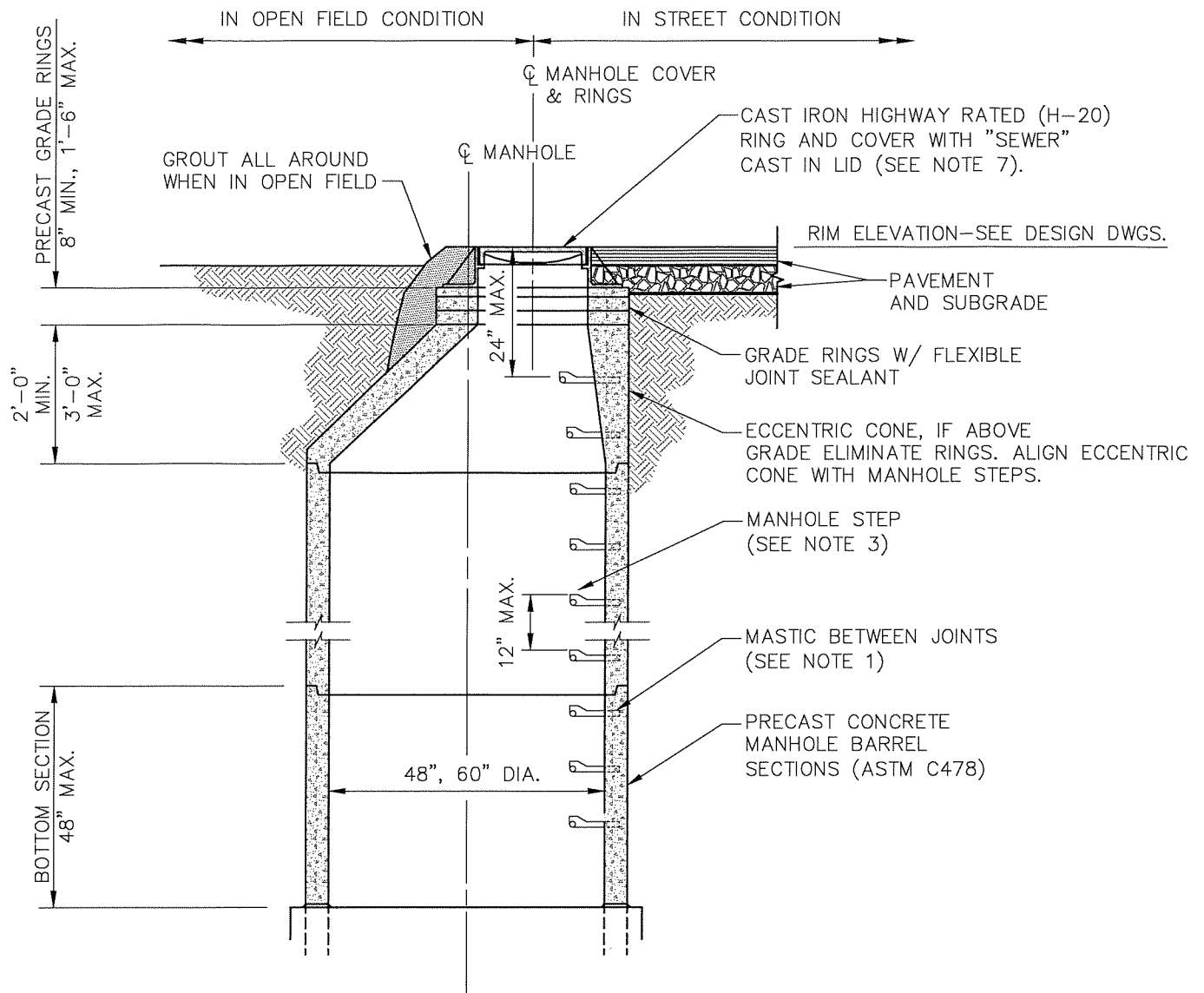
INSULATION REQUIREMENTS:

PIPE COVER	REQUIRED
>8'-0"	NO INSULATION
>7'-0" TO 8'-0"	TOP INSULATION
5'-0" TO 7'-0"	TOP AND SIDES
<5'-0" COVER	NOT PERMITTED

NOTE:

- INSULATION SHALL BE HIGHLOAD EXTRUDED POLYSTYRENE INSULATION BY DOW CHEMICAL OR EQUAL. TYPE HI-100, AT PIPE CROSSINGS, UNDER FOUNDATIONS AND UNDER EXISTING OR FUTURE ROADS PLOWED AND/OR DRIVEN SURFACES. TYPE HI-60 IN UNPLOWED/UNDRIVEN FIELDS OR OPEN AREAS.
- BEDDING MATERIAL SHALL BE INSTALLED TO NOT PROVIDE HYDRAULIC PERMEABILITY IN EXCESS OF THE NATURAL SOILS. DESIGNING THE PREVENTION OF THE TRANSPORT OF WATER WITHIN THE TRENCH IS THE RESPONSIBILITY OF THE DESIGN ENGINEER.

# TYPICAL SANITARY SEWER MAIN TRENCH SECTION

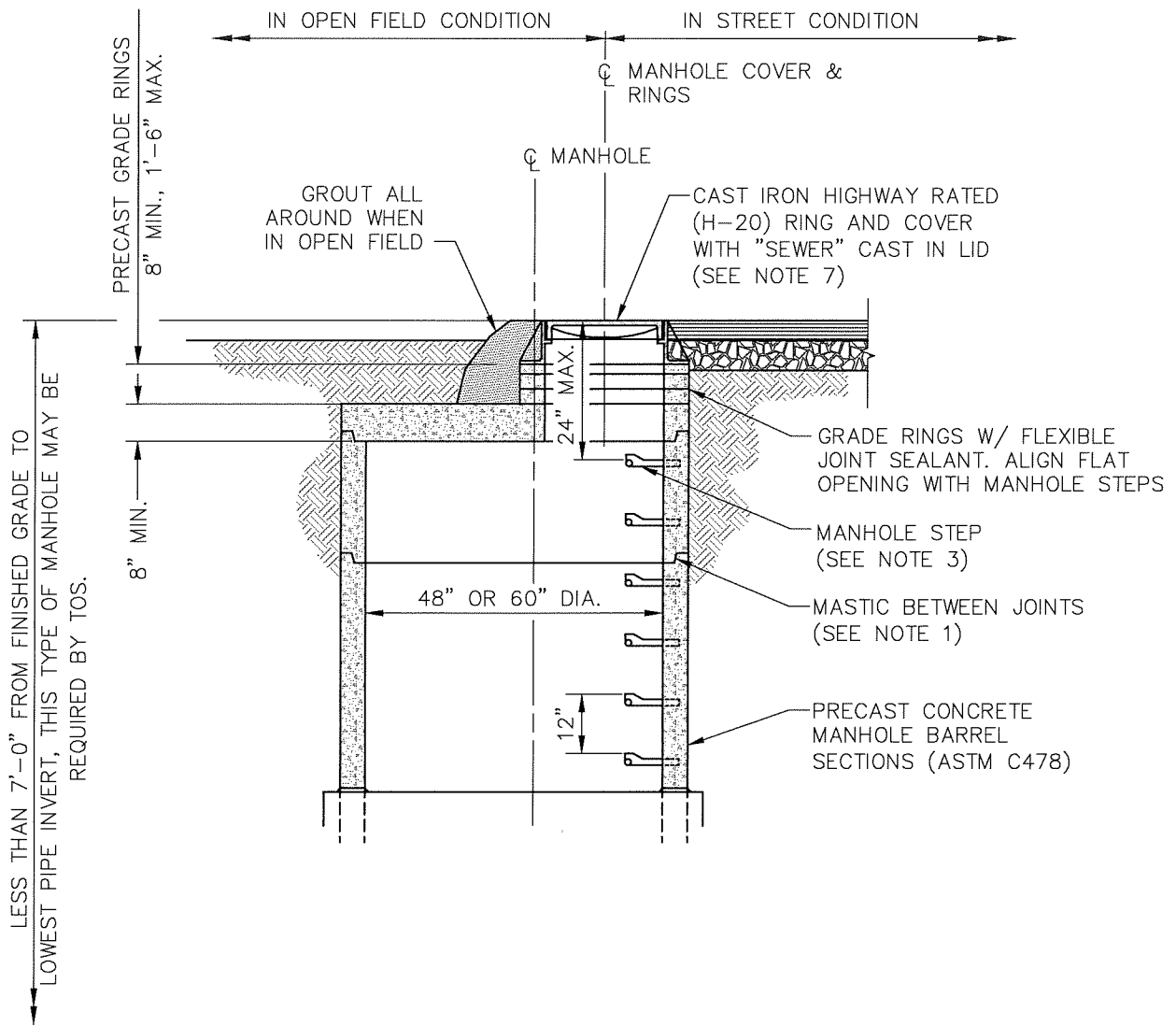


## MANHOLE SECTION WITH ECCENTRIC CONE

### NOTES:

1. ALL JOINTS TO BE DOUBLE BAND RUB-R-NEK OR APPROVED EQUAL. ANY MATERIAL EXTRUDED INTO MANHOLE MUST BE TRIMMED OFF AT FACE OF CONCRETE BELOW WATER TABLE DEFINE DISTANCE (AT END OF WARRANTY).
2. ALL MANHOLES PLACED IN "OPEN SPACE" OR FIELDS SHALL BE INSTALLED WITH A RING AND COVER THAT IS 6" ABOVE FINAL GRADE WITH A COLLAR OF CONCRETE. A MARKER POST SHALL BE INSTALLED NEAR BY. SEE MARKER POST DETAIL.
3. STEPS INSTALLED OVER DOWNSTREAM INVERT OF MANHOLE AND SHALL BE COPOLYMER COATED PLASTIC 1/2" GRADE 60 STEEL REINFORCED, SIMILAR TO PS2-PF MANUFACTURED BY MA INDUSTRIES.
4. SEE EITHER CAST IN PLACE OR PRECAST MANHOLE BASE DETAIL.
5. WRAP ALL BARREL SECTIONS AND CONE WITH BITUTHANE WRAP - 6" OVERLAP IS REQUIRED.
6. AVOID 12" HIGH BARREL SECTIONS IF POSSIBLE.
7. 60" OR LARGER DIAMETER MANHOLES REQUIRE A 30" OPENING.

# STANDARD MANHOLE RISER AND COVER

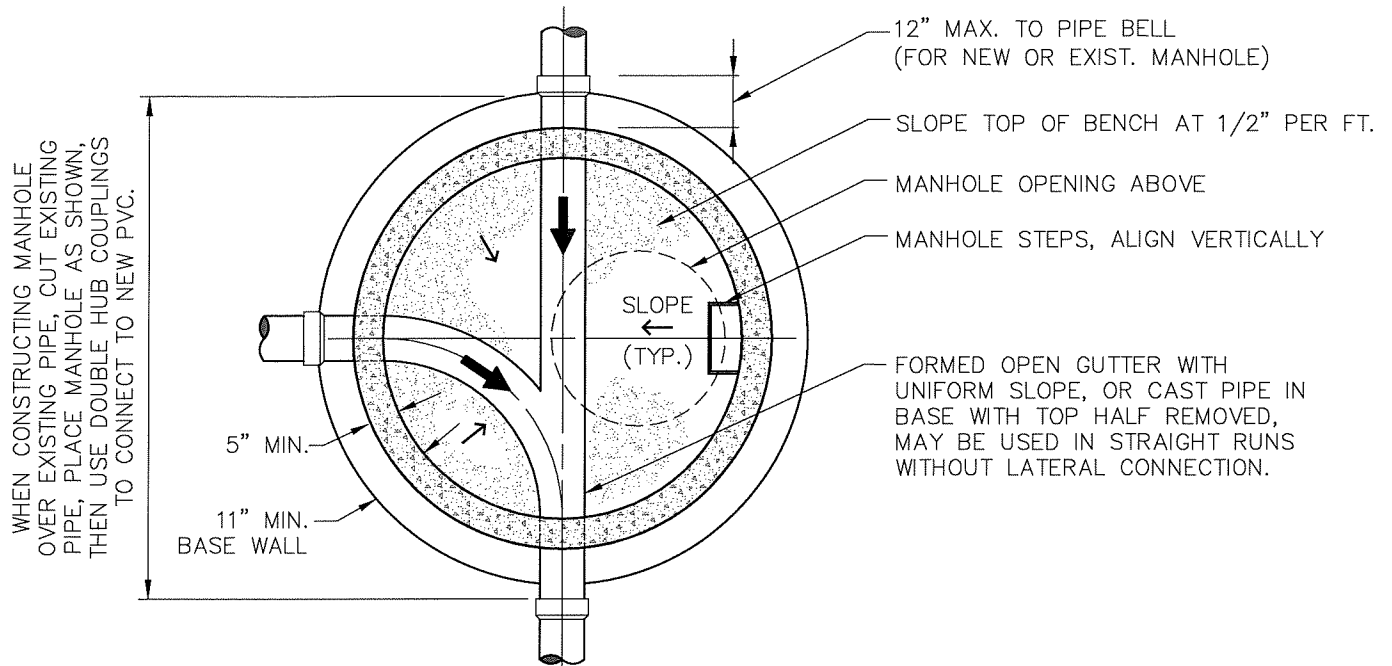


## MANHOLE SECTION WITH FLAT TOP

NOTES:

1. ALL JOINTS TO BE DOUBLE BAND RUB-R-NEK OR APPROVED EQUAL. ANY MATERIAL EXTRUDED INTO MANHOLE MUST BE TRIMMED OFF AT FACE OF CONCRETE BELOW WATER TABLE.
2. ALL MANHOLES PLACED IN "OPEN SPACE" OR FIELDS SHALL BE INSTALLED WITH A RING AND COVER THAT IS 6" ABOVE FINAL GRADE WITH A COLLAR OF CONCRETE. A MARKER POST SHALL BE INSTALLED NEAR BY. SEE MARKER POST DETAIL.
3. STEPS INSTALLED OVER DOWNSTREAM INVERT OF MANHOLE AND SHALL BE COPOLYMER COATED PLASTIC 1/2" GRADE 60 STEEL REINFORCED, SIMILAR TO PS2-PF MANUFACTURED BY MA INDUSTRIES.
4. SEE EITHER CAST IN PLACE OR PRECAST MANHOLE BASE DETAIL.
5. WRAP ALL BARREL SECTIONS AND CONE WITH BITUTHANE WRAP - 6" OVERLAP IS REQUIRED.
6. AVOID 12" HIGH BARREL SECTIONS IF POSSIBLE.
7. 60" OR LARGER DIAMETER MANHOLES REQUIRE A 30" OPENING.

# SHALLOW MANHOLE RISER AND COVER

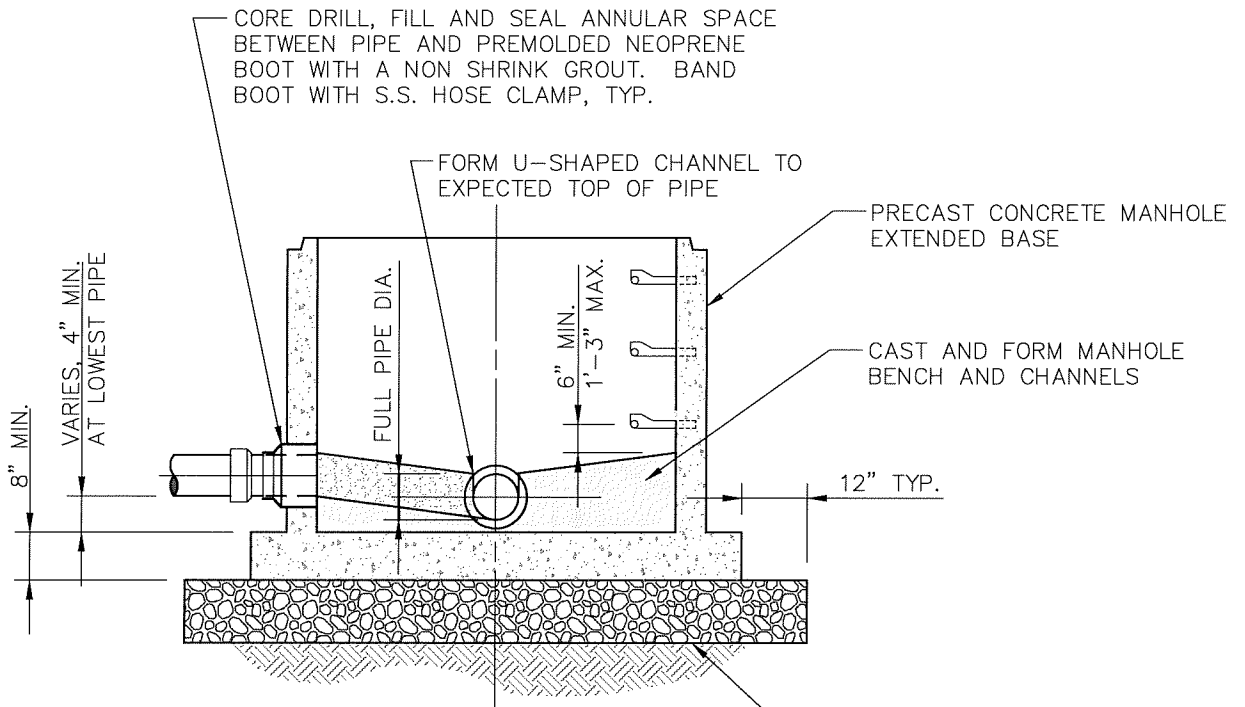


MANHOLE BASE  
PLAN VIEW

NOTES:

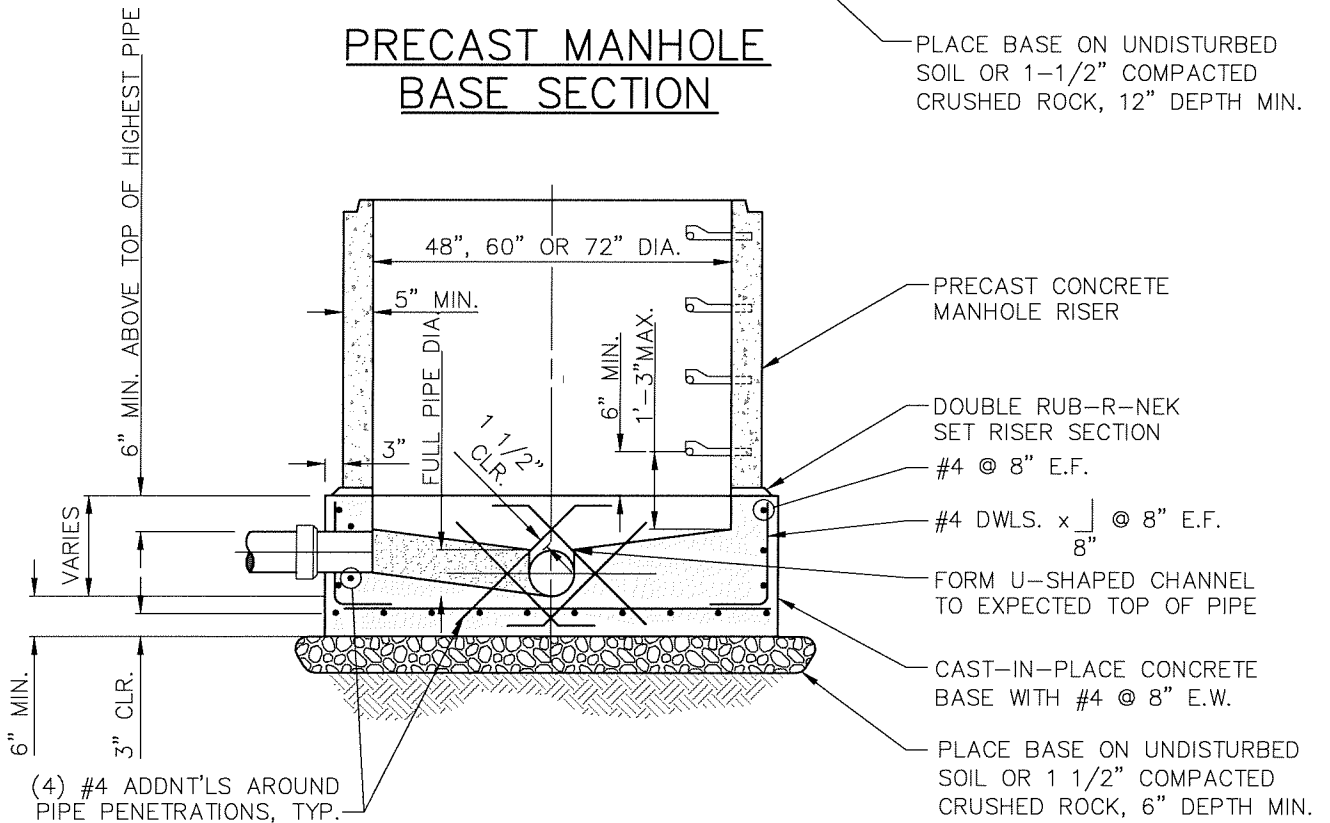
1. CONCRETE BASE AND/OR INTERIOR CONCRETE FILL SHALL BE MINIMUM 3,000 PSI CONCRETE.
2. SEE CAST-IN-PLACE OR PRECAST MANHOLE BASE FOR SECTION.

MANHOLE BASE INTERIOR



**PRECAST MANHOLE  
BASE SECTION**

PLACE BASE ON UNDISTURBED SOIL OR 1-1/2" COMPACTED CRUSHED ROCK, 12" DEPTH MIN.



**CAST-IN-PLACE MANHOLE  
BASE SECTION**

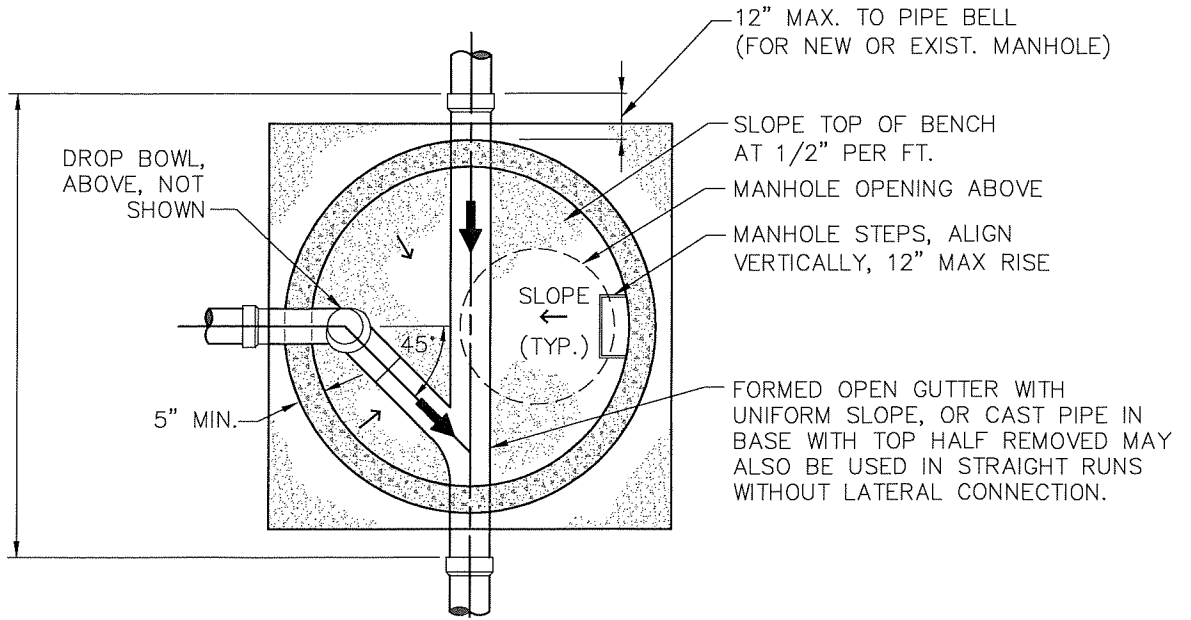
**NOTES:**

1. PRECAST CONCRETE SHALL MEET OR EXCEED STRENGTH OF 3,000 PSI.
2. APPLY BONDING AGENT TO PRECAST BASE SECTION BEFORE PLACING CONCRETE FILL AND INVERTS.

**MANHOLE BASE SECTIONS**

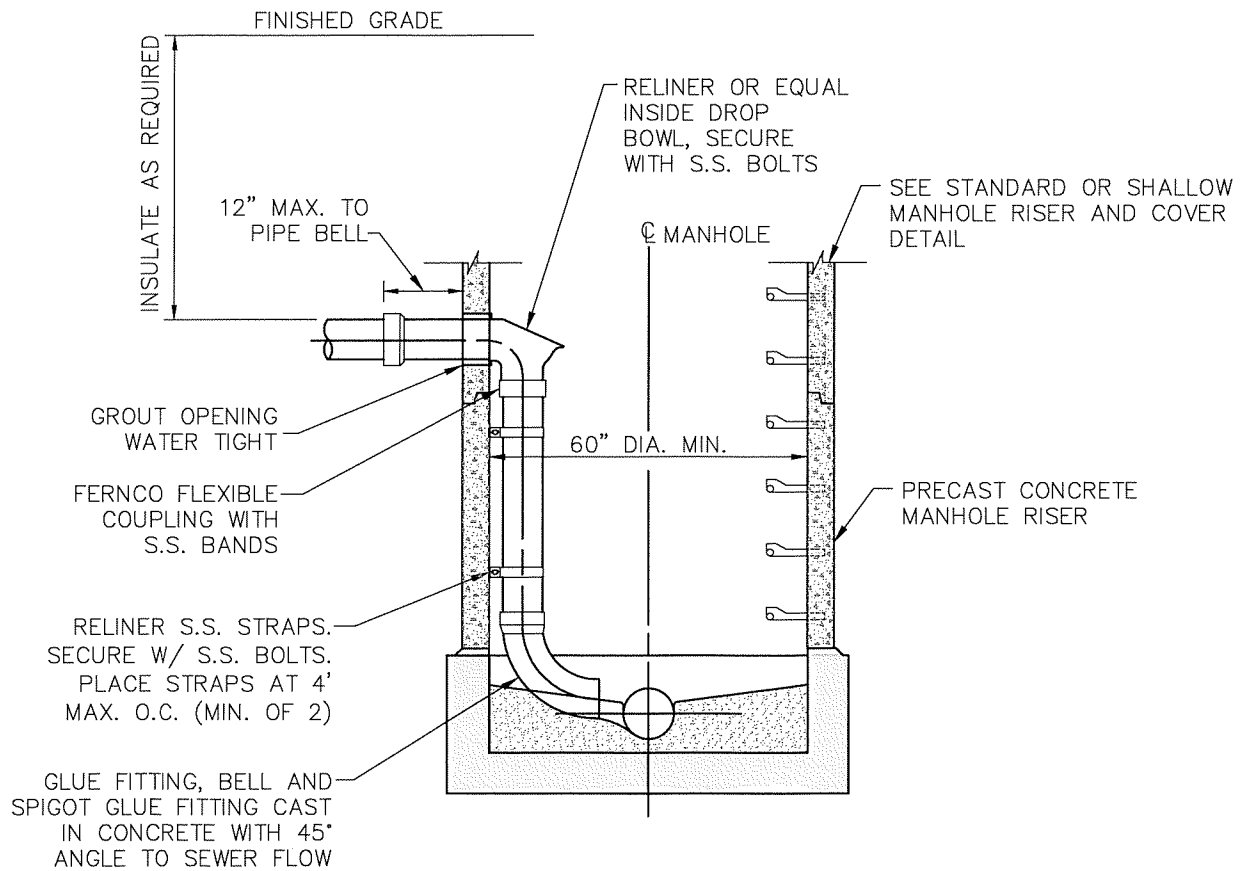


WHEN CONSTRUCTING MANHOLE OVER EXISTING PIPE, CUT EXISTING PIPE AND USE DOUBLE HUB COUPLINGS TO CONNECT TO NEW PVC, THEN PLACE MANHOLE AS SHOWN.



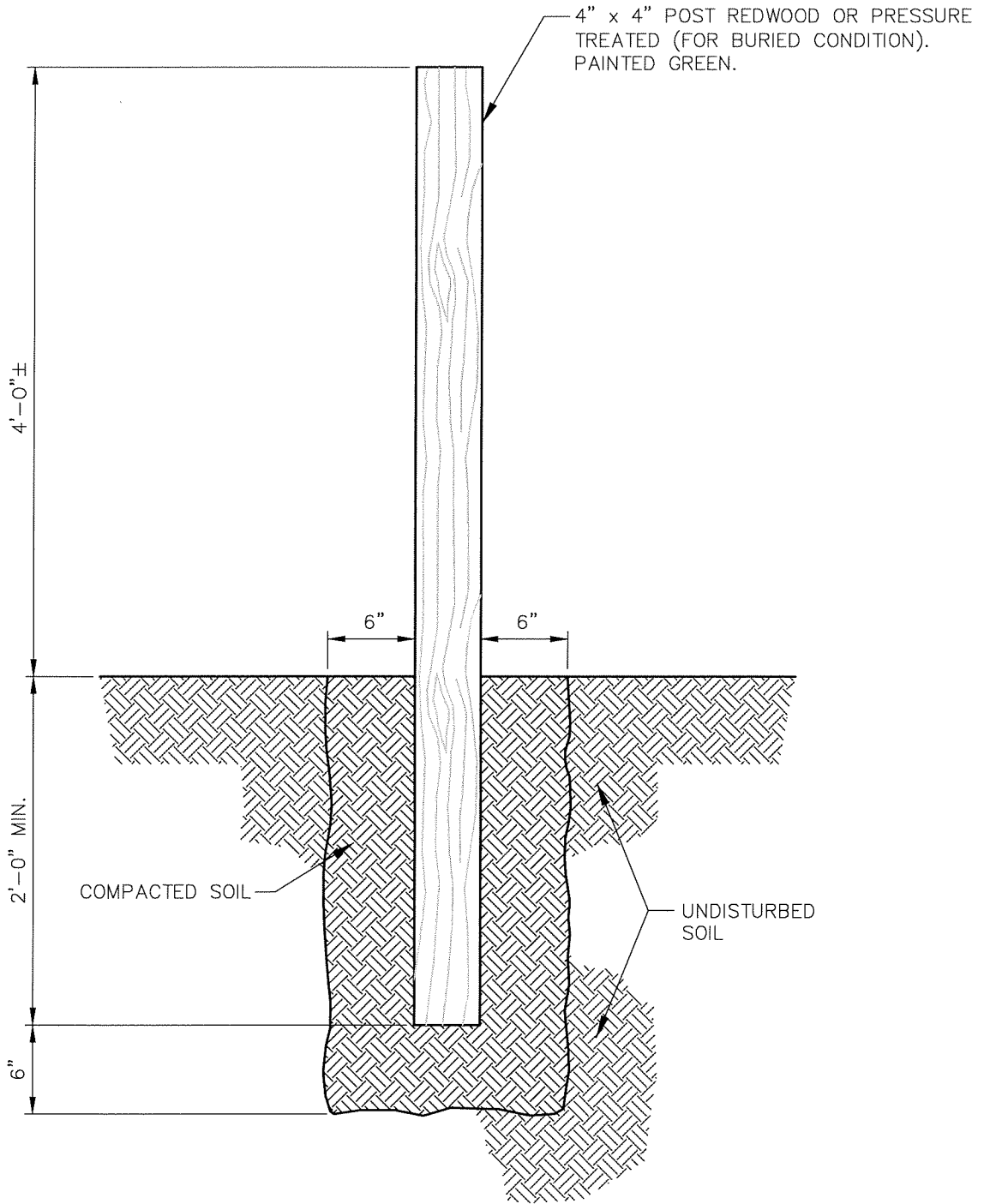
PLAN VIEW

NOTE:  
ANY DROP OF GREATER THAN 18" REQUIRES DROP MANHOLE.



SECTION VIEW

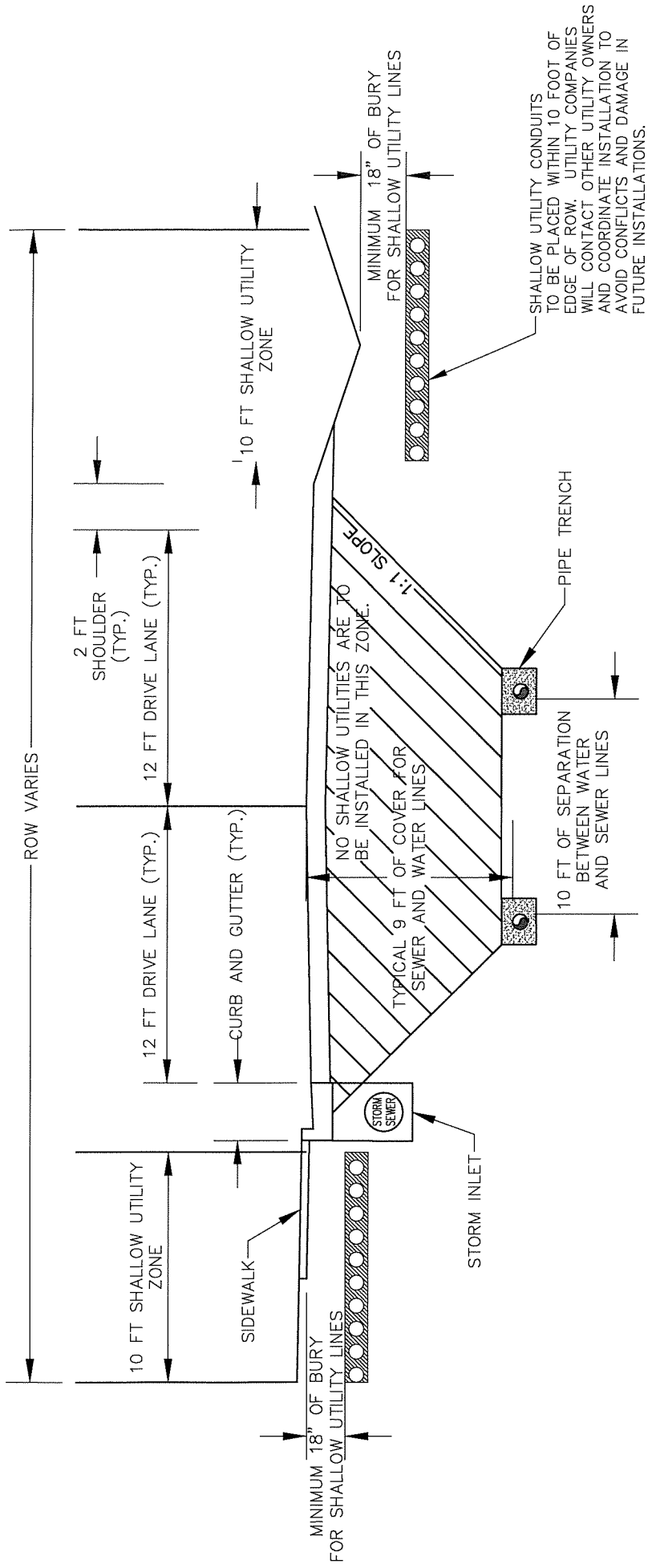
# INSIDE DROP MANHOLE



NOTES:

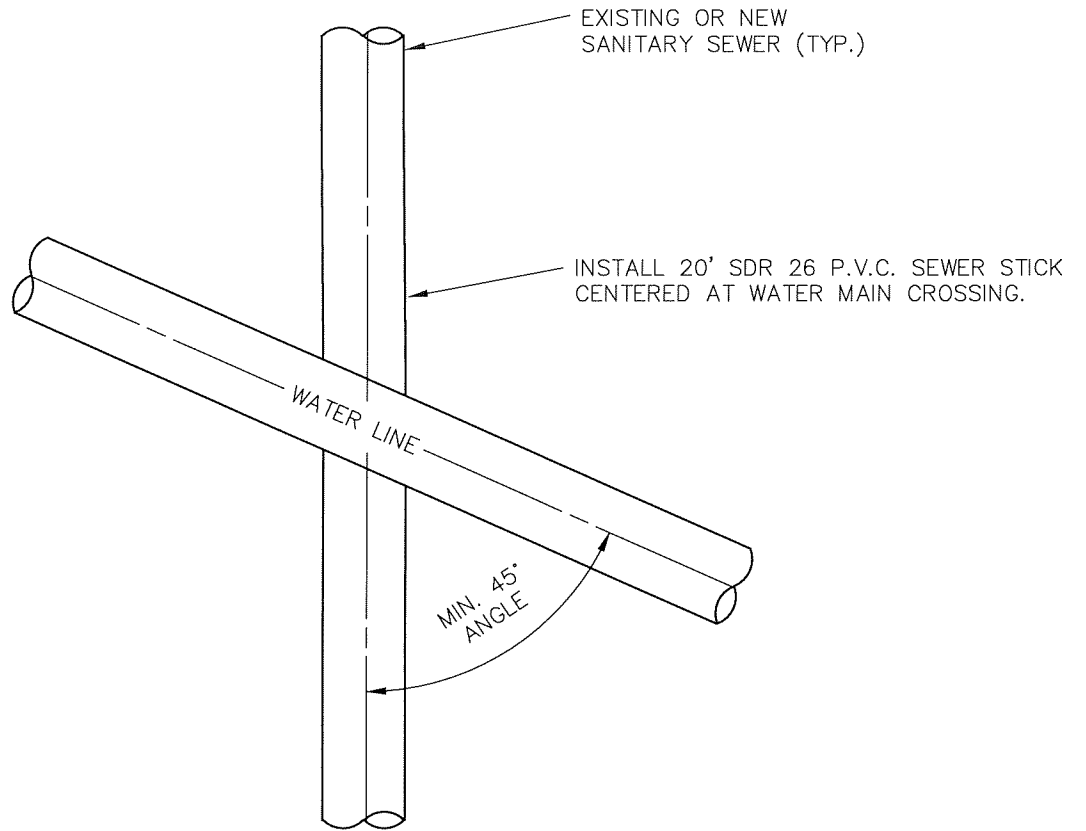
1. PROVIDE ONLY IF MANHOLE NOT IN TRAVELED WAY.

# SANITARY SEWER MANHOLE MARKER POST

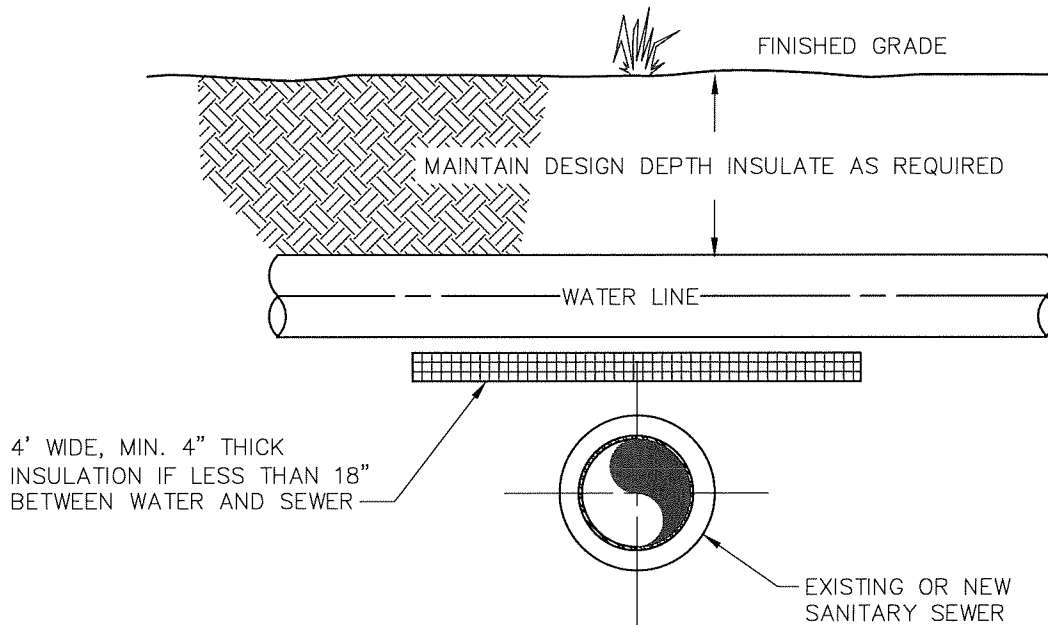


TOWN OF SILVERTHORNE  
 TYPICAL RIGHT OF WAY UTILITY PLACEMENT  
 (NOT TO SCALE)

TYPICAL RIGHT OF WAY UTILITY PLACEMENT



PLAN



SECTION

# SEWER/WATER CROSSING



# WATER AND SEWER STANDARD DETAILS

THESE STANDARDS DETAILS ARE PROVIDED AS GENERAL GUIDELINES AND DO NOT RELIEVE DESIGN ENGINEERS FROM THEIR RESPONSIBILITIES TO PROVIDE SAFE, FUNCTIONAL, SYSTEM DESIGNS THAT MEET THE STANDARD OF CARE EXPECTED OF A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF COLORADO. THESE DETAILS PROVIDE EXAMPLES OF THE MINIMUM ALLOWED BY THE TOWN OF SILVERTHORNE WATER DEPARTMENT.

## WATER STANDARDS

- W1 WATER SERVICE LINE AND STOP BOX CONNECTION AND INSTALLATION
- W2A RESIDENTIAL WATER INSTALLATION
- W2B COMMERCIAL WATER METER INSTALLATION
- W3 TYPICAL WATER TRENCH SECTION
- W4 TYPICAL FIRE HYDRANT ASSEMBLY
- W5 VALVE AND VALVE BOX DETAIL
- W6 VALVE MARKER POST
- W7 THRUST BLOCK
- W8 TIE ROD AND WASHER DETAIL WITH LENGTH OF RESTRAINED PIPE
- W9 RESTRAINED JOINTS AND THRUST BLOCKS AT VERTICAL BENDS
- W10 BLOW-OFF INSTALLATION 12" AND SMALLER PIPE
- W11 TRACER WIRE INSTALLATION
- W12 OUTSIDE SETTING FOR IRRIGATION SERVICE
- W13 BOLLARD
- W14 TYPICAL RIGHT OF WAY UTILITY PLACEMENT
- W15 SEWER WATER CROSSING

## SEWER STANDARDS

- S1 SEWER SERVICE LINE CONNECTION
- S2 SANITARY SEWER SERVICE IN-LINE CLEANOUT
- S3 TYPICAL SANITARY SEWER MAIN TRENCH SECTION
- S4 STANDARD MANHOLE RISER AND COVER
- S5 SHALLOW MANHOLE RISER AND COVER
- S6 MANHOLE BASE INTERIOR
- S7 MANHOLE BASE SECTIONS
- S8 INSIDE DROP MANHOLE
- S9 SANITARY SEWER MANHOLE MARKER POST
- S10 TYPICAL RIGHT OF WAY UTILITY PLACEMENT
- S11 SEWER WATER CROSSING

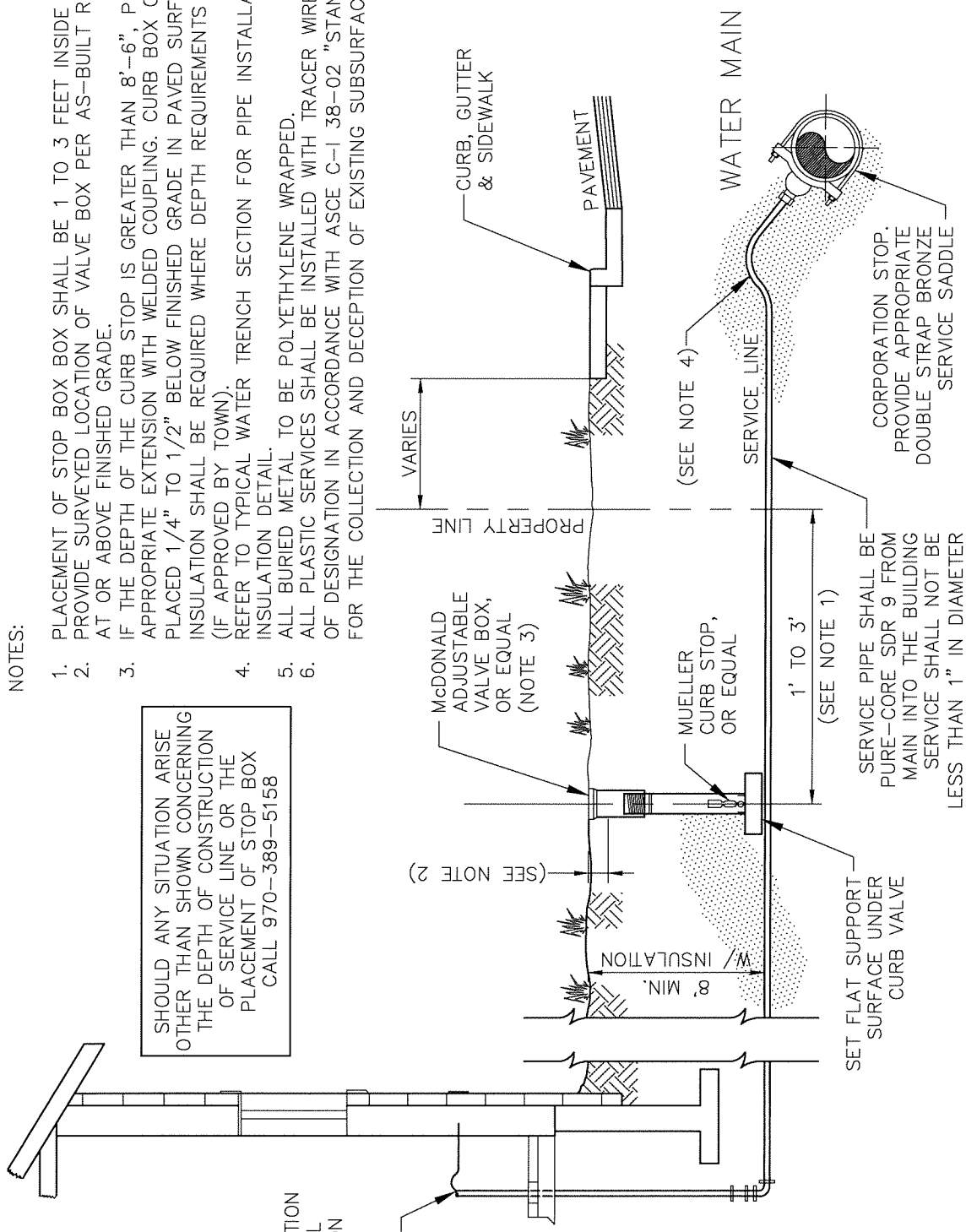
# WATER AND SEWER STANDARD DETAILS

NOTES:

1. PLACEMENT OF STOP BOX SHALL BE 1 TO 3 FEET INSIDE THE PROPERTY LINE.
2. PROVIDE SURVEYED LOCATION OF VALVE BOX PER AS-BUILT REQUIREMENTS. SET AT OR ABOVE FINISHED GRADE.
3. IF THE DEPTH OF THE CURB STOP IS GREATER THAN 8'-6", PROVIDE AN APPROPRIATE EXTENSION WITH WELDED COUPLING. CURB BOX CAP SHALL BE PLACED 1/4" TO 1/2" BELOW FINISHED GRADE IN PAVED SURFACES. BLUEBOARD INSULATION SHALL BE REQUIRED WHERE DEPTH REQUIREMENTS CAN'T BE ACHIEVED (IF APPROVED BY TOWN).
4. REFER TO TYPICAL WATER TRENCH SECTION FOR PIPE INSTALLATION AND INSULATION DETAIL.
5. ALL BURIED METAL TO BE POLYETHYLENE WRAPPED.
6. ALL PLASTIC SERVICES SHALL BE INSTALLED WITH TRACER WIRE OR OTHER METHOD OF DESIGNATION IN ACCORDANCE WITH ASCE C-1 38-02 "STANDARD GUIDELINES FOR THE COLLECTION AND DECEPTION OF EXISTING SUBSURFACE UTILITY DATA".

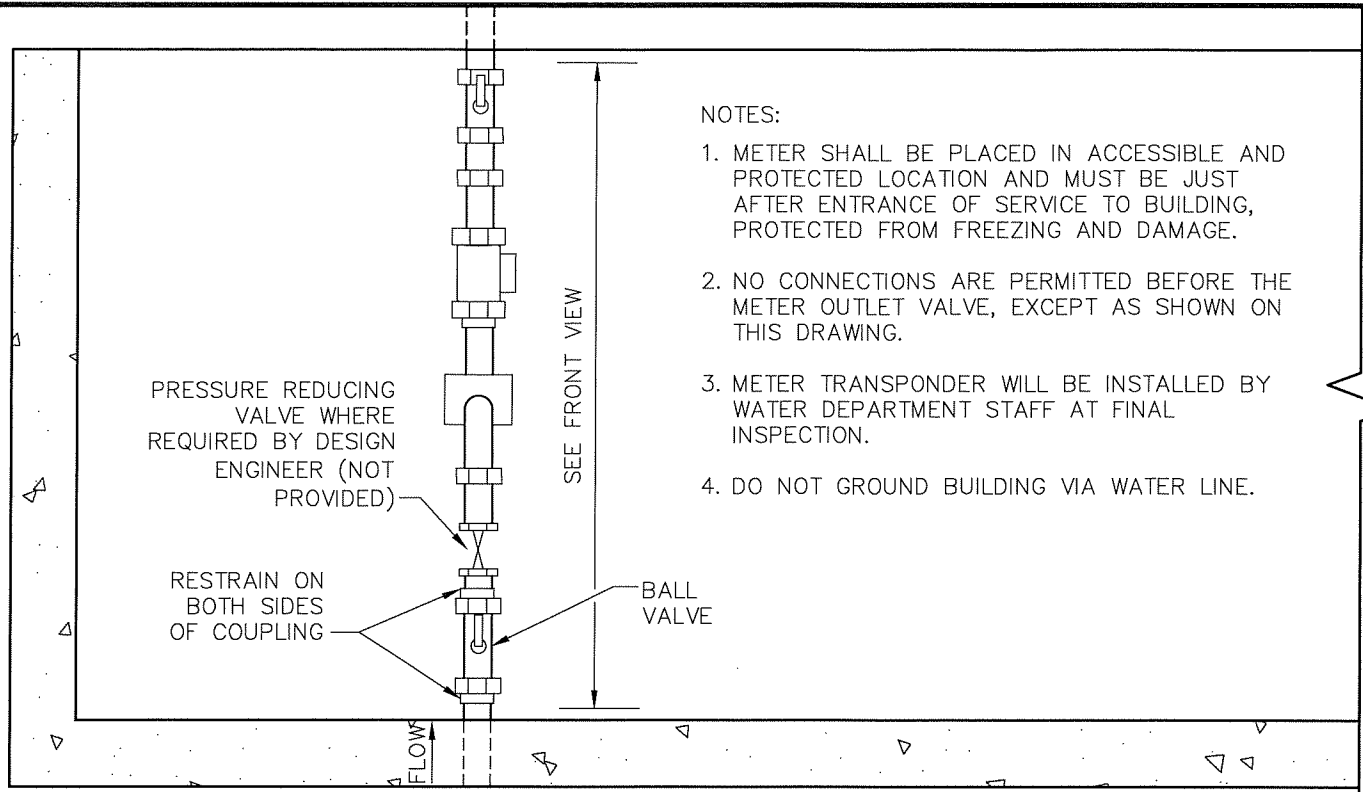
SHOULD ANY SITUATION ARISE OTHER THAN SHOWN CONCERNING THE DEPTH OF CONSTRUCTION OF SERVICE LINE OR THE PLACEMENT OF STOP BOX CALL 970-389-5158

SEE METER LOCATION SCHEMATIC DETAIL FOR CONTINUATION SEE DETAILS: 2A--RESIDENTIAL 2B--COMMERCIAL



NOTE: THIS DETAIL PROVIDES AN EXAMPLE OF THE MINIMUM STANDARD ALLOWED BY THE TOWN OF SILVERTHORNE WATER DEPARTMENT. ANY PROPOSED DEVIATIONS FROM OR CHANGES TO THESE STANDARDS MUST OTHERWISE BE APPROVED BY THE TOWN OF SILVERTHORNE WATER DEPARTMENT.

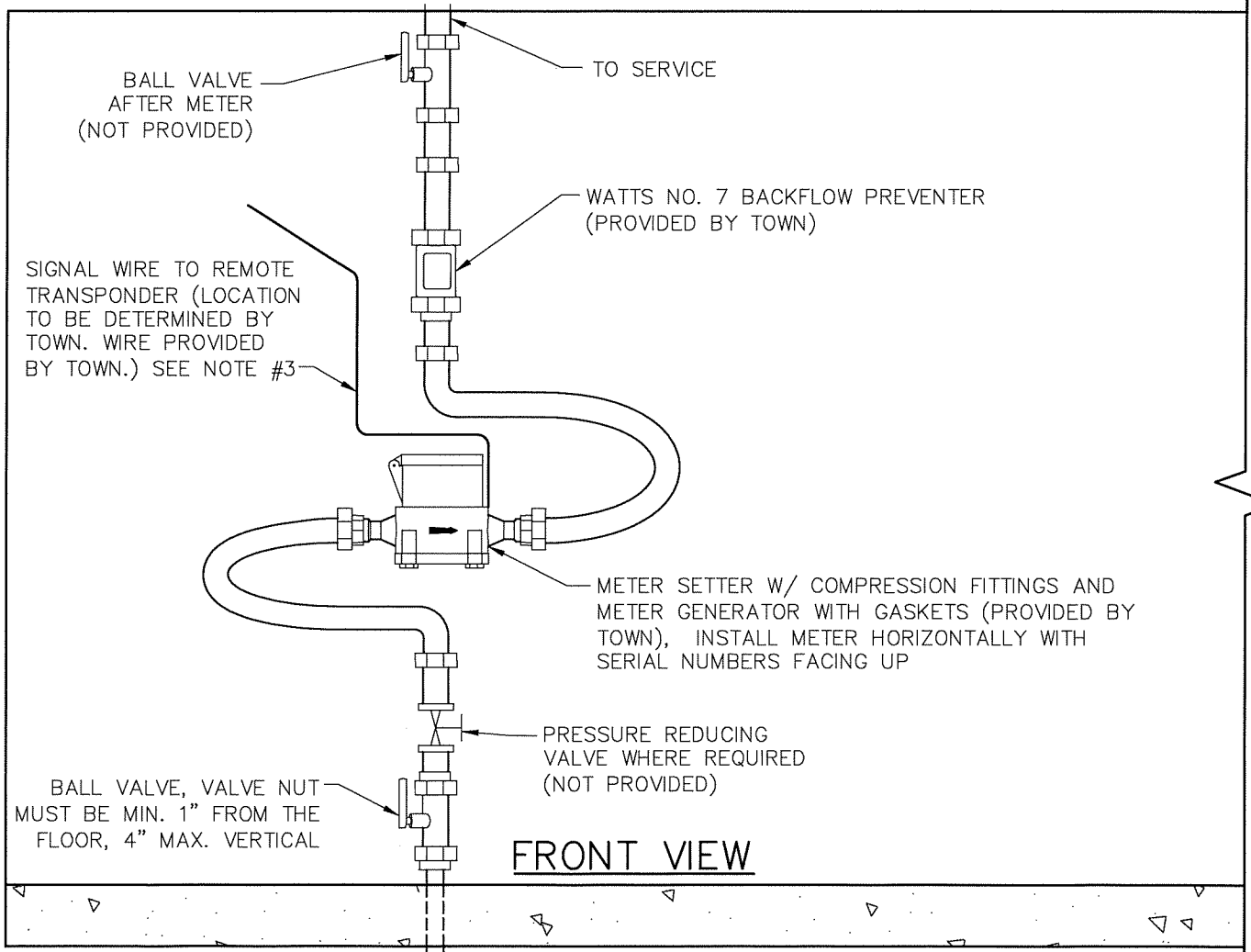
# WATER SERVICE LINE AND STOP BOX CONNECTION & INSTALLATION



NOTES:

1. METER SHALL BE PLACED IN ACCESSIBLE AND PROTECTED LOCATION AND MUST BE JUST AFTER ENTRANCE OF SERVICE TO BUILDING, PROTECTED FROM FREEZING AND DAMAGE.
2. NO CONNECTIONS ARE PERMITTED BEFORE THE METER OUTLET VALVE, EXCEPT AS SHOWN ON THIS DRAWING.
3. METER TRANSPONDER WILL BE INSTALLED BY WATER DEPARTMENT STAFF AT FINAL INSPECTION.
4. DO NOT GROUND BUILDING VIA WATER LINE.

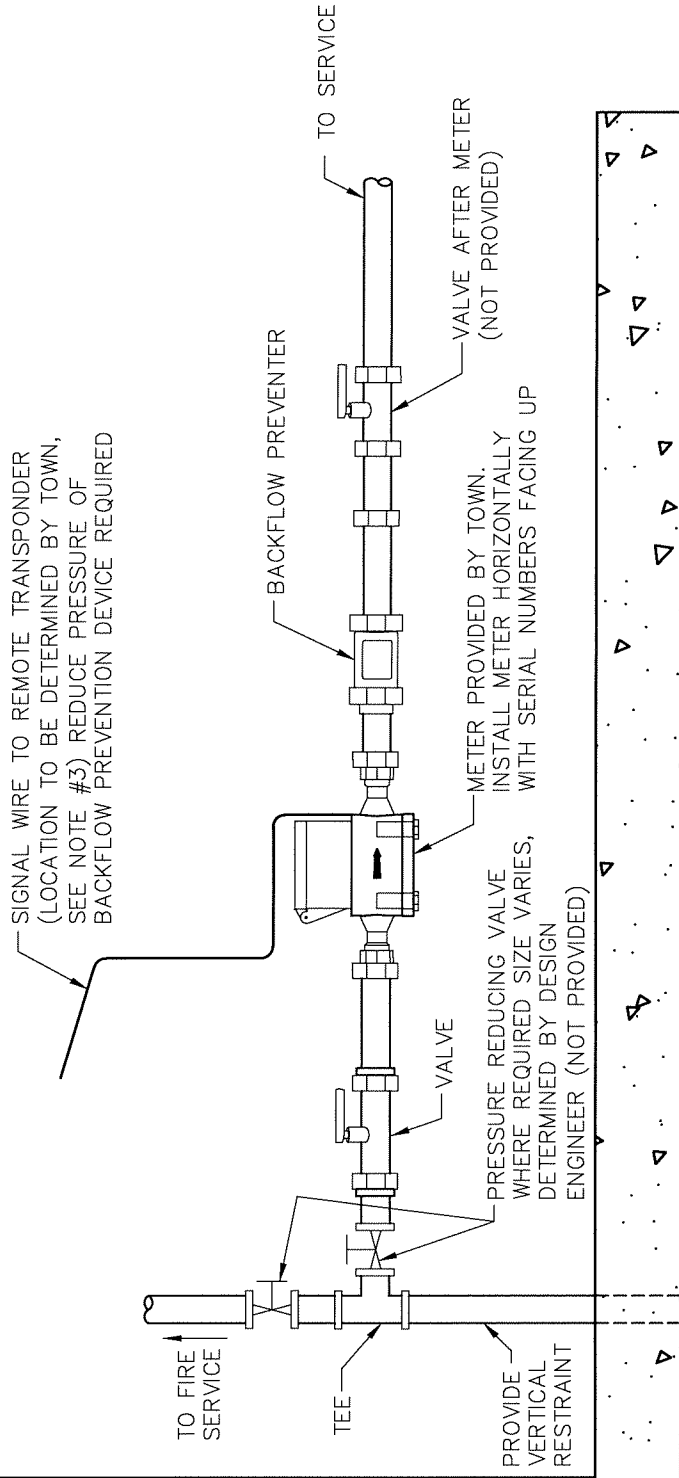
SIDE VIEW



RESIDENTIAL WATER METER INSTALLATION

NOTES:

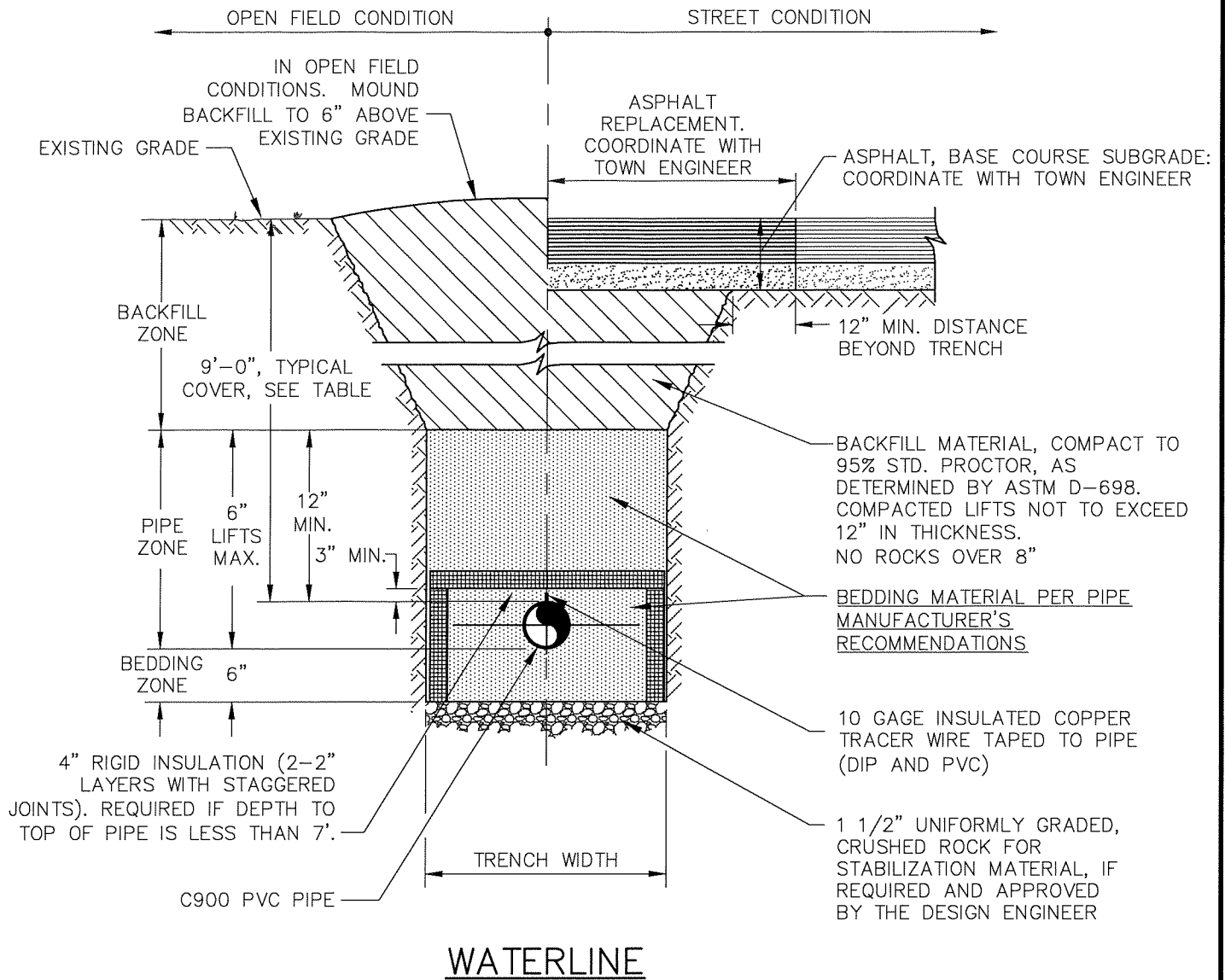
1. METER SHALL BE PLACED IN ACCESSIBLE AND PROTECTED LOCATION AND MUST BE JUST AFTER ENTRANCE OF SERVICE TO BUILDING, PROTECTED FROM FREEZING AND DAMAGE.
2. NO CONNECTIONS ARE PERMITTED BEFORE THE METER OUTLET VALVE, EXCEPT AS SHOWN ON THIS DRAWING.
3. METER TRANSDUCER WILL BE INSTALLED BY WATER DEPARTMENT STAFF AT FINAL INSPECTION.
4. DO NOT GROUND BUILDING VIA WATER LINE.
5. ALL FITTINGS BEFORE BACKFLOW PREVENTERS SHALL BE NSF APPROVED AND NON-CORROSIVE.



FRONT VIEW

COMMERCIAL WATER METER INSTALLATION





TRENCH WIDTH SHALL CONFIRM TO THE FOLLOWING:

PIPE I.D.	MIN. WD.	MAX. WD.
4" & SMALLER	1'-4"	2'-4"
6"	1'-6"	2'-6"
8"	1'-8"	2'-8"
12"	2'-0"	3'-0"
16"	2'-4"	3'-4"
20"	2'-8"	3'-8"
24"	3'-0"	4'-0"

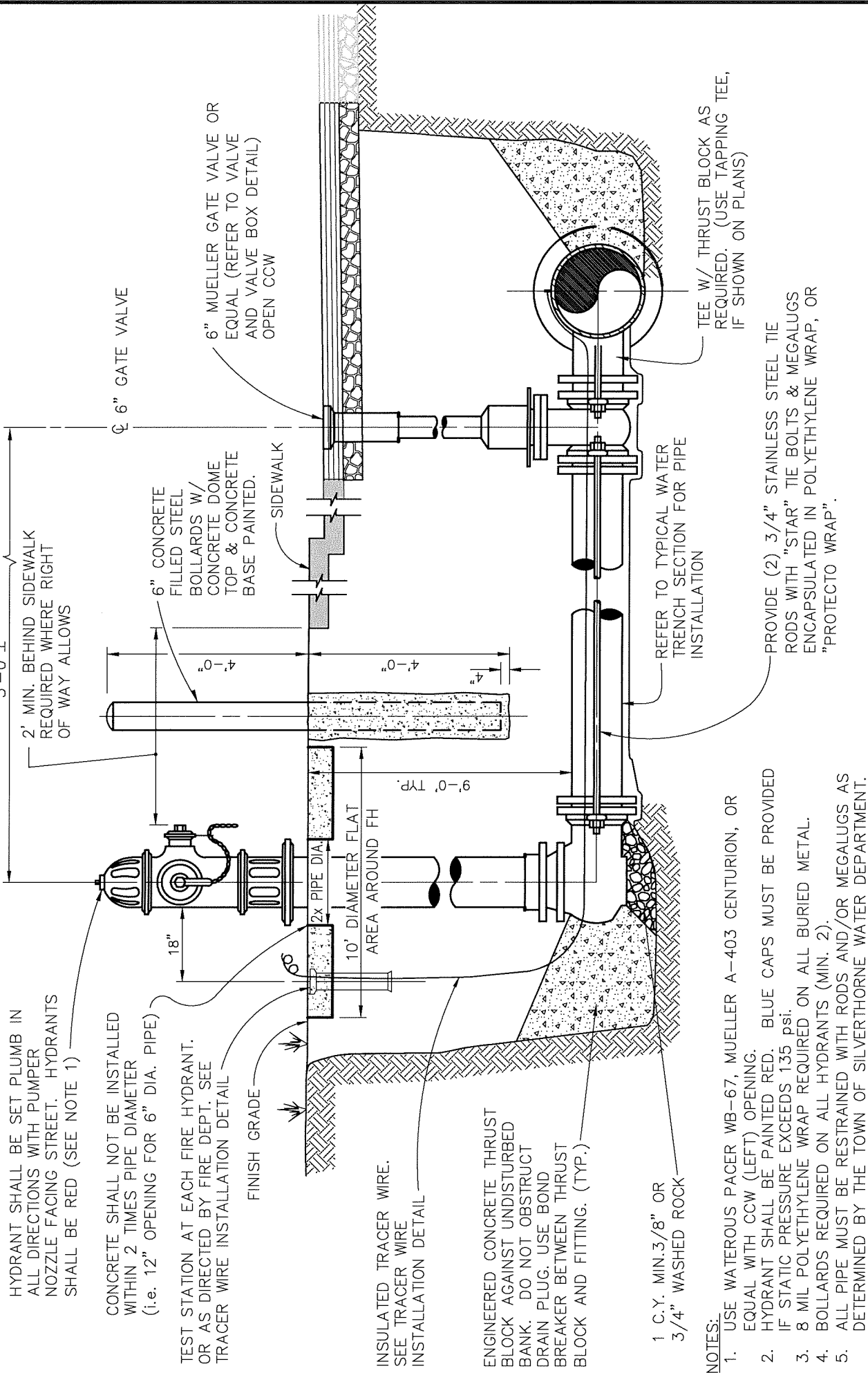
INSULATION REQUIREMENTS:

PIPE COVER	REQUIRED
>8'-0"	NO INSULATION
>7'-0" TO 8'-0"	TOP INSULATION
5'-0" TO 7'-0"	TOP AND SIDES
<5'-0" COVER	NOT PERMITTED

NOTES:

- INSULATION SHALL BE HIGHLOAD EXTRUDED POLYSTYRENE INSULATION BY DOW CHEMICAL OR EQUAL. TYPE HI-100, AT PIPE CROSSINGS, UNDER FOUNDATIONS AND UNDER EXISTING OR FUTURE ROADS. TYPE HI-60 IN UNPLOWED/UNDRIVEN FIELDS OR OPEN AREAS.
- BEDDING MATERIAL SHALL BE INSTALLED TO NOT PROVIDE HYDRAULIC PERMEABILITY IN EXCESS OF THE NATURAL SOILS. DESIGNING THE PREVENTION OF THE TRANSPORT OF WATER WITHIN THE TRENCH IS THE RESPONSIBILITY OF THE DESIGN ENGINEER.

## TYPICAL WATER TRENCH SECTION



HYDRANT SHALL BE SET PLUMB IN ALL DIRECTIONS WITH PUMPER NOZZLE FACING STREET. HYDRANTS SHALL BE RED (SEE NOTE 1)

CONCRETE SHALL NOT BE INSTALLED WITHIN 2 TIMES PIPE DIAMETER (i.e. 12" OPENING FOR 6" DIA. PIPE)

TEST STATION AT EACH FIRE HYDRANT. OR AS DIRECTED BY FIRE DEPT. SEE TRACER WIRE INSTALLATION DETAIL

FINISH GRADE

INSULATED TRACER WIRE. SEE TRACER WIRE INSTALLATION DETAIL

ENGINEERED CONCRETE THRUST BLOCK AGAINST UNDISTURBED BANK. DO NOT OBSTRUCT DRAIN PLUG. USE BOND BREAKER BETWEEN THRUST BLOCK AND FITTING. (TYP.)

1 C.Y. MIN. 3/8" OR 3/4" WASHED ROCK

**NOTES:**

1. USE WATEROUS PACER WB-67, MUELLER A-403 CENTURION, OR EQUAL WITH CCW (LEFT) OPENING.
2. HYDRANT SHALL BE PAINTED RED. BLUE CAPS MUST BE PROVIDED IF STATIC PRESSURE EXCEEDS 135 psi.
3. 8 MIL POLYETHYLENE WRAP REQUIRED ON ALL BURIED METAL.
4. BOLLARDS REQUIRED ON ALL HYDRANTS (MIN. 2).
5. ALL PIPE MUST BE RESTRAINED WITH RODS AND/OR MEGALUGS AS DETERMINED BY THE TOWN OF SILVERTHORNE WATER DEPARTMENT.

5'-0" ±  
2' MIN. BEHIND SIDEWALK REQUIRED WHERE RIGHT OF WAY ALLOWS

6" CONCRETE FILLED STEEL BOLLARDS W/ CONCRETE DOME TOP & CONCRETE BASE PAINTED.

SIDEWALK

6" GATE VALVE

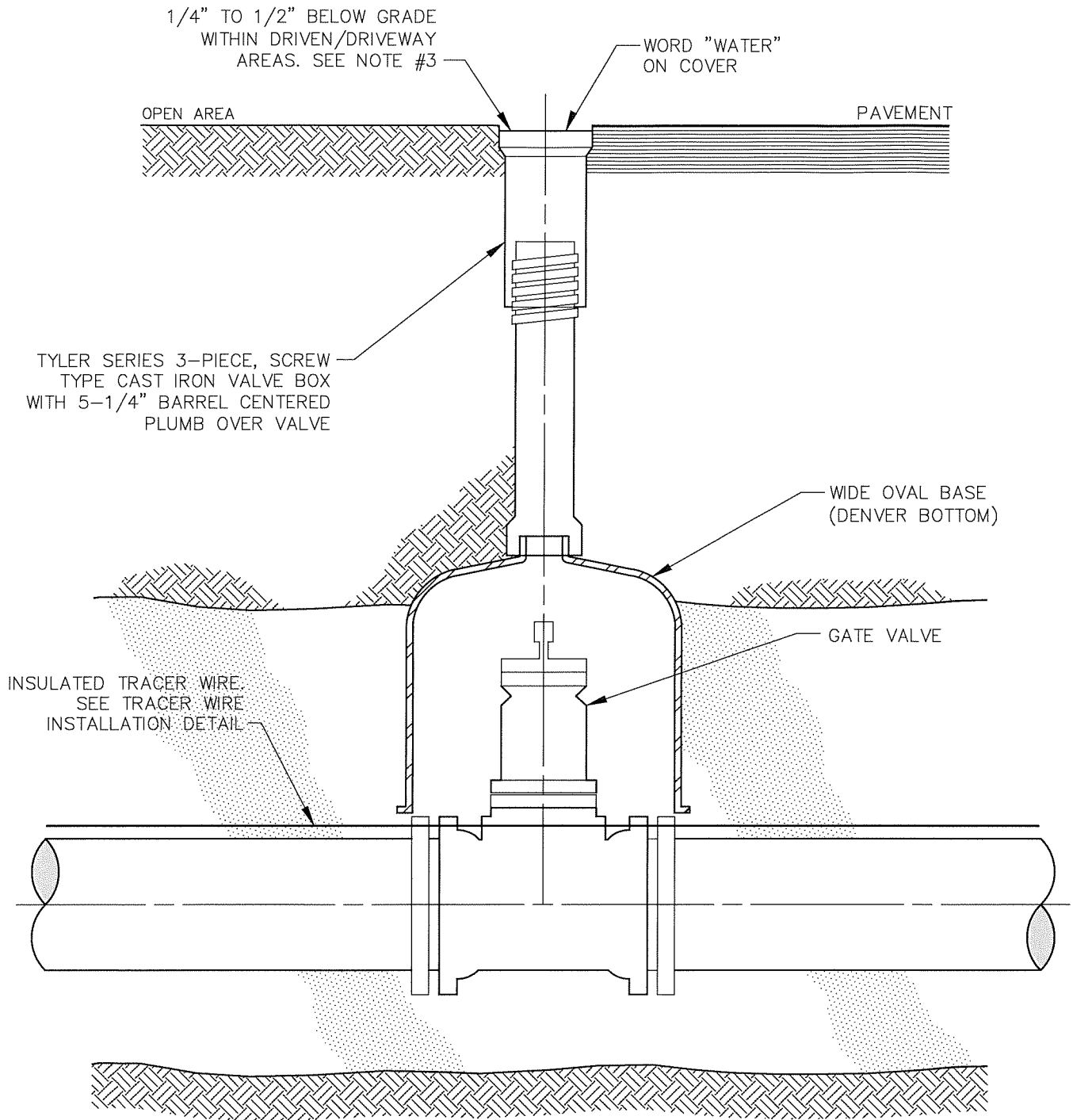
6" MUELLER GATE VALVE OR EQUAL (REFER TO VALVE AND VALVE BOX DETAIL) OPEN CCW

REFER TO TYPICAL WATER TRENCH SECTION FOR PIPE INSTALLATION

PROVIDE (2) 3/4" STAINLESS STEEL TIE RODS WITH "STAR" TIE BOLTS & MEGALUGS ENCAPSULATED IN POLYETHYLENE WRAP, OR "PROTECTO WRAP."

TEE W/ THRUST BLOCK AS REQUIRED. (USE TAPPING TEE, IF SHOWN ON PLANS)

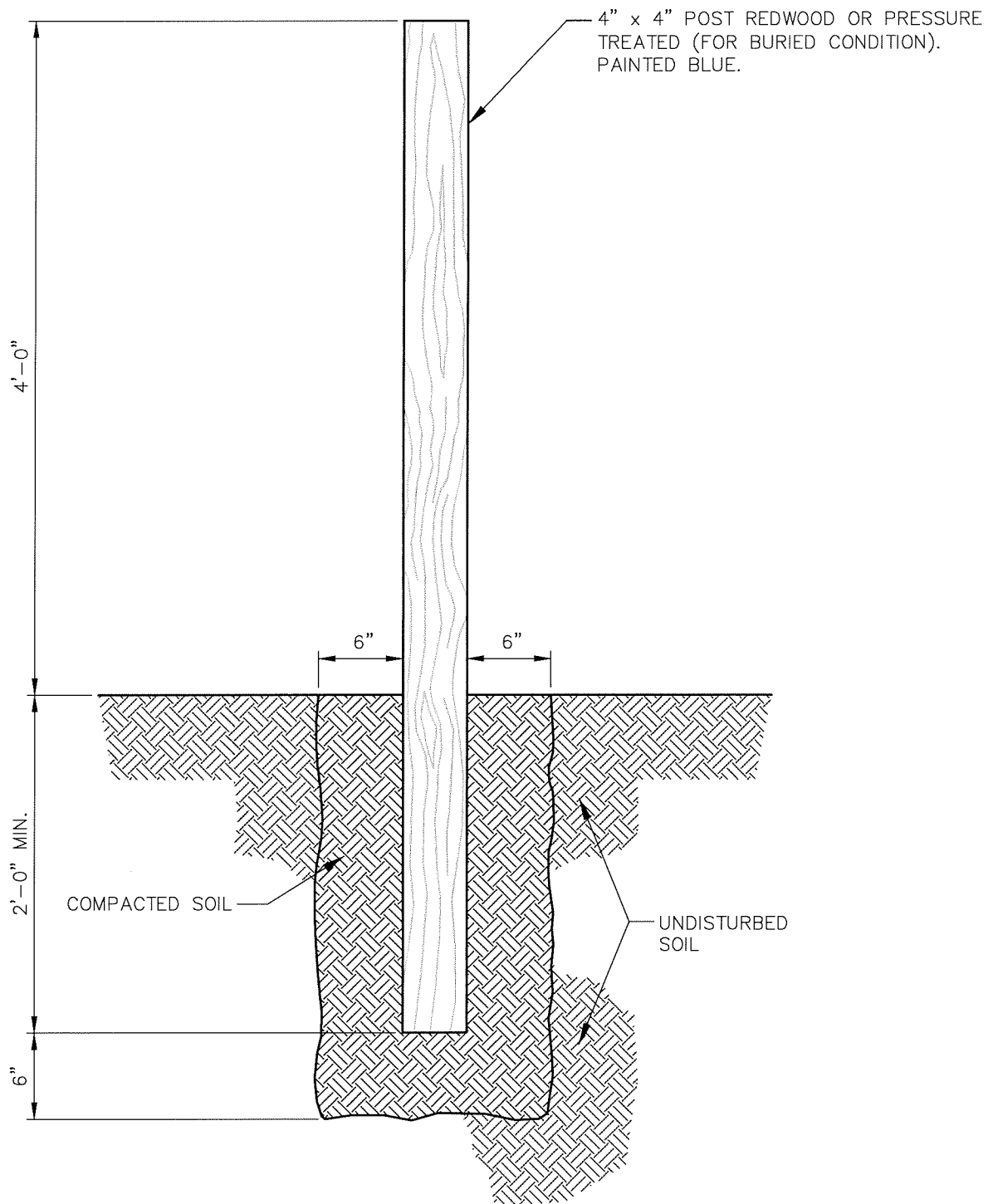
# TYPICAL FIRE HYDRANT ASSEMBLY



**NOTES:**

1. GATE VALVES SHALL OPEN CCW AND SHALL BE RESILIENT SEAT.
2. FITTINGS SHALL BE WRAPPED WITH 8 MIL MINIMUM THICKNESS POLYETHYLENE AND ALL VALVES AND FITTINGS SHALL BE EPOXY COATED.
3. VALVE BOX SHALL BE SET 1/4" TO 1/2" BELOW FINAL ASPHALT PAVEMENT GRADE IN DRIVEN AREAS. INSTALL AT GRADE IN NON-PAVED AREAS IF NOT IN R.O.W..
4. PROVIDE MARKER POSTS WHERE NECESSARY, AS DETERMINED BY SILVERTHORNE WATER DEPARTMENT OUTSIDE R.O.W. OR DRIVE.
5. SEE TYPICAL WATER TRENCH SECTION FOR PIPE INSTALLATION.
6. VALVE BOX AND ROD SHALL BE INSTALLED PLUMB AND STRAIGHT.
7. VALVE AND BOX SHALL BE MADE IN USA UNLESS OTHERWISE APPROVED BY THE TOWN OF SILVERTHORNE WATER DEPARTMENT.
8. ALL BURIED METAL TO BE WRAPPED.

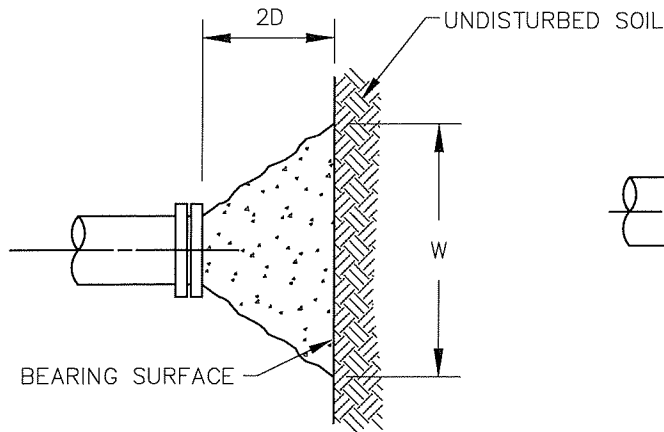
## VALVE AND VALVE BOX DETAIL



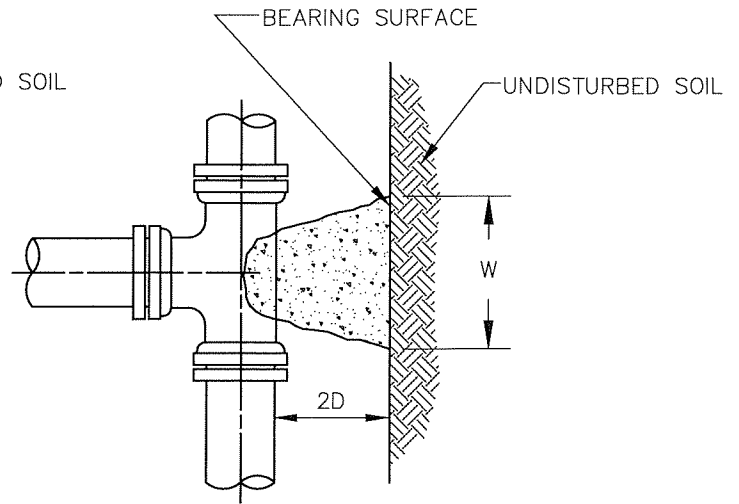
NOTE:

1. PROVIDE IF MAINLINE OR SERVICE VALVE NOT IN TRAVELED WAY.

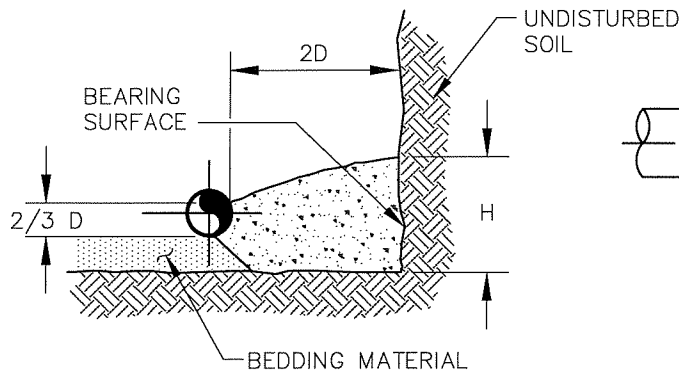
## VALVE MARKER POST



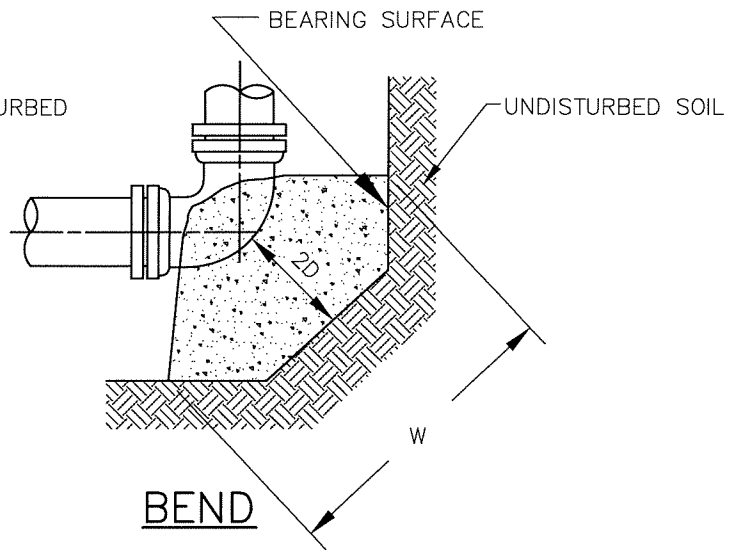
**CAP (OR PLUG)**



**TEE**



**SECTION**



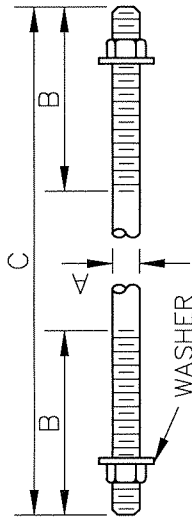
**BEND**

MINIMUM THRUST AREA AGAINST UNDISTURBED SOIL REQUIRED – SQUARE FEET					
SIZE	11-1/4" BEND	22-1/2" BEND	45° BEND	90° BEND	TEE (BRANCH SIZE OR CAP)
4"	0.5	1.0	1.5	2.5	2.0
6"	1.0	1.5	3.0	5.5	4.0
8"	1.5	2.5	5.0	9.0	6.5
12"	3.0	5.5	10.5	19.5	14.0
16"	5.0	9.5	18.5	34.0	24.0

**NOTES:**

1. D = PIPE DIAMETER
2. AREA AGAINST UNDISTURBED SOIL = H x W
3. DO NOT COVER FITTING BOLTS WITH CONCRETE.
4. PLACE MIXED CONCRETE AGAINST UNDISTURBED SOIL. USE FORMS.
5. ALL FITTINGS ARE TO BE WRAPPED IN 8 MIL POLYETHYLENE SHEETING.
6. USE BOND BREAKER BETWEEN THRUST BLOCK AND FITTING. (TYP.)
7. PROVIDE MINIMUM 3,000 PSI CONCRETE.
8. SIZES SHOWN FOR 1,500 PSF SOIL BEARING PRESSURE AND AN INTERNAL TEST PRESSURE OF 150 PSI. DESIGN ENGINEER MUST VERIFY DESIGN FOR ACTUAL SOIL CONDITIONS AND INTERNAL PRESSURE.
9. DO NOT COVER THRUST BLOCK FOR MINIMUM OF 24 HOURS
10. ALL BURIED METAL TO BE POLYETHYLENE WRAPPED.

# THRUST BLOCK

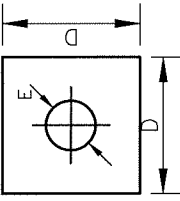
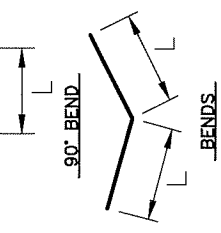
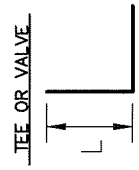
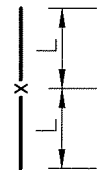


### TIE ROD DETAILS

NOT TO SCALE

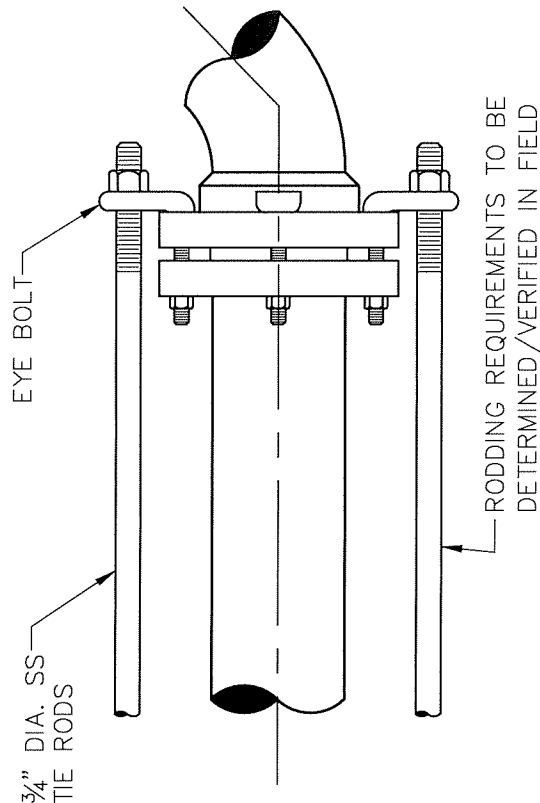
TIE RODS		WASHERS	
A	B	D	E
ROD DIAMETER	THREAD LENGTH	HOLE DIAMETER	THICKNESS
3/4" - 1"	6"	1/8" LARGER THAN ROD Ø	1/2"
3/4" - 1-1/2"	ALL THREAD	1/8" LARGER THAN ROD Ø	5/8"
	ROD LENGTH		
	1' - 11' & 20'		
	1' - 11' & 20'		

RESTRAINT JOINT		8"		12"	
PIPE SIZE		D	L	D	L
FITTING		3/4"	60"	S.S. 3/4"	86"
90° BEND, TEE, PLUG OR VALVE					S.S.
45° BEND		3/4"	18"	S.S. 3/4"	25"
22-1/2° BEND		3/4"	5"	S.S. 3/4"	7"
11-1/4° BEND		3/4"	1.0'	S.S. 3/4"	2'



### WASHER DETAIL

NOT TO SCALE



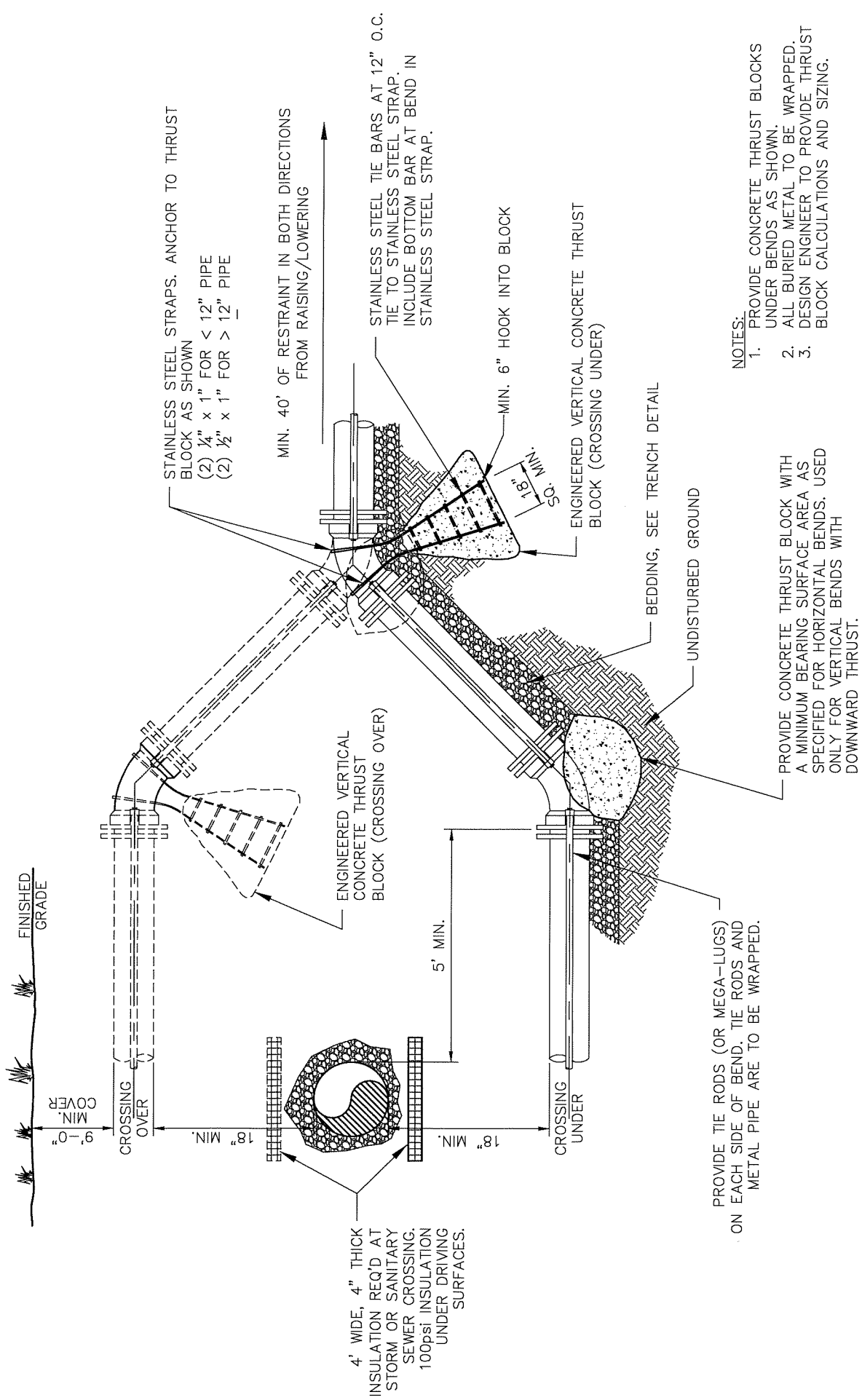
1. SEE TIED JOINTS ROD DIMENSIONS THIS SHEET.
2. SEE CLAMP DETAILS AND DIMENSION (SHEET 24, DENVER WATER DEPARTMENT STANDARDS) FOR PROPER PLACEMENT OF WASHERS.
3. RODS, NUTS, COUPLING NUTS & WASHERS ARE 304 OR 316 STAINLESS STEEL.

### TYPICAL RESTRAINED JOINT

NOT TO SCALE

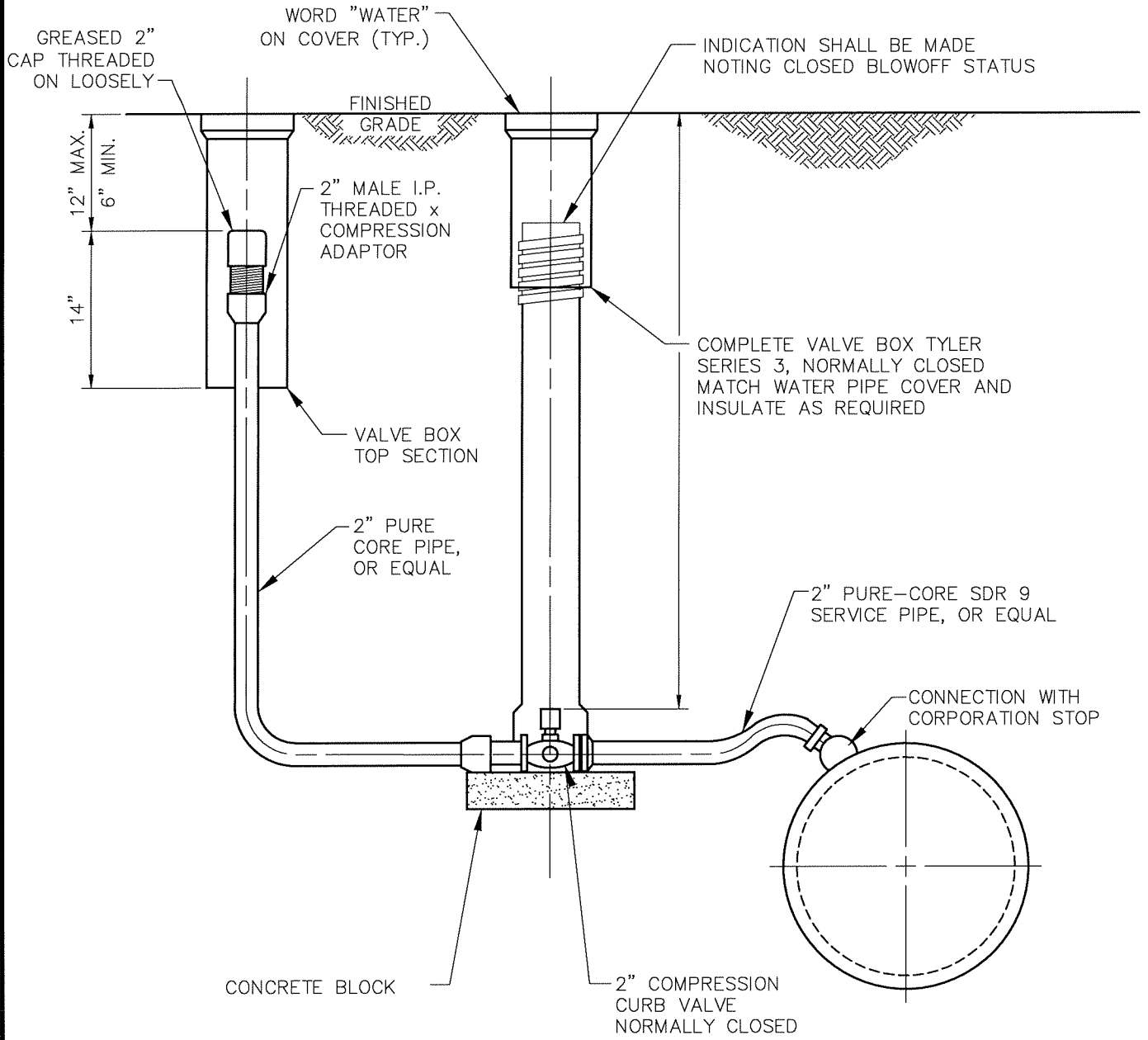
1. LENGTH OF TIED PIPE MEASURED EACH WAY FROM VALVES AND BENDS.
2. D=DIAMETER, L=LENGTH, G=GRADE, S.S.=STAINLESS STEEL
3. BASED ON 150 PSI INTERNAL PRESSURE, FOR L AND PRESSURES LISTED SEE TIE ROD & WASHER DETAIL.
4. S.S. MEANS STAINLESS STEEL ROD A.S.T.M. STANDARD DESIGNATION A304 MIN.
5. NUTS SHALL BE A.S.T.M. STANDARD DESIGNATION A-304 GRADE A OR B HEXAGON HEAVY SERIES.
6. SEE TIE ROD DETAIL DRAWING ALSO TIE ROD COUPLING DETAILS, CLAMP DETAILS AND SET CLAMP DETAILS.
7. LENGTH REFERS TO THE AMOUNT OF PIPE WHICH MUST BE TIED TOGETHER AND IS NOT NECESSARILY THE LENGTH OF THE RODS.
8. LENGTH OF TIED PIPE CHART IS ALSO FOR THE LENGTH OF JOINT RESTRAINT FOR MEGALUGS.
9. CROSSES MUST BE RESTRAINED IN ALL DIRECTIONS.
10. 12" AND SMALLER IN LINE VALVES AND TEES SHALL HAVE A MECHANICAL JOINT RESTRAINT DEVICE ON EACH SIDE OF THE FITTING OR VALVE WHERE SPECIFICALLY REQUESTED BY THE TOWN OF SILVERTHORNE OR DESIGN ENGINEER, MECHANICAL JOINT RESTRAINT DEVICE SHALL BE MEGALUG 1100 SERIES MANUFACTURED BY EBBA IRON, INC
11. ALL FITTINGS MUST BE RESTRAINED WITH TWO (2) OF THE FOLLOWING METHODS: MEGALUGS (OR EQUAL), TIE RODS, THRUST BLOCKS.
12. A SECOND VALVE WILL BE REQUIRED TO BE CLOSED WHEN EXCAVATING NEXT TO A EXISTING VALVE.
13. TR FLEX OR EQUAL ACCEPTABLE ALSO.
14. ALL BURIED METAL TO BE WRAPPED.

# TIE ROD AND WASHER DETAIL WITH LENGTH OF RESTRAINED PIPE



- NOTES:
1. PROVIDE CONCRETE THRUST BLOCKS UNDER BENDS AS SHOWN.
  2. ALL BURIED METAL TO BE WRAPPED. DESIGN ENGINEER TO PROVIDE THRUST BLOCK CALCULATIONS AND SIZING.
  - 3.

# RESTRAINED JOINTS AND THRUST BLOCKS AT VERTICAL BENDS



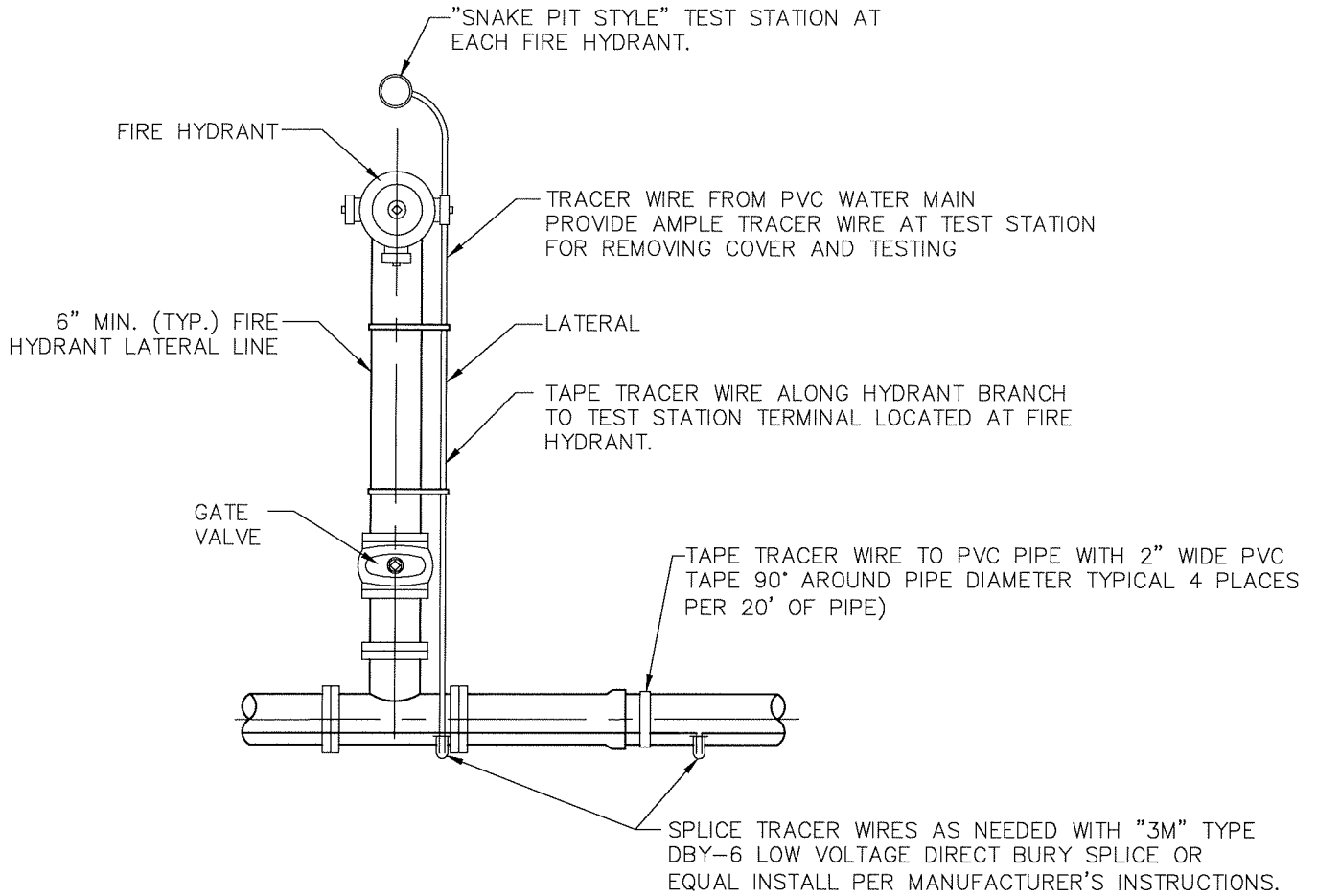
SECTION

NOTES:

1. ALL BURIED METAL TO BE WRAPPED PER SPEC.

BLOW-OFF INSTALLATION 12" AND SMALLER PIPE



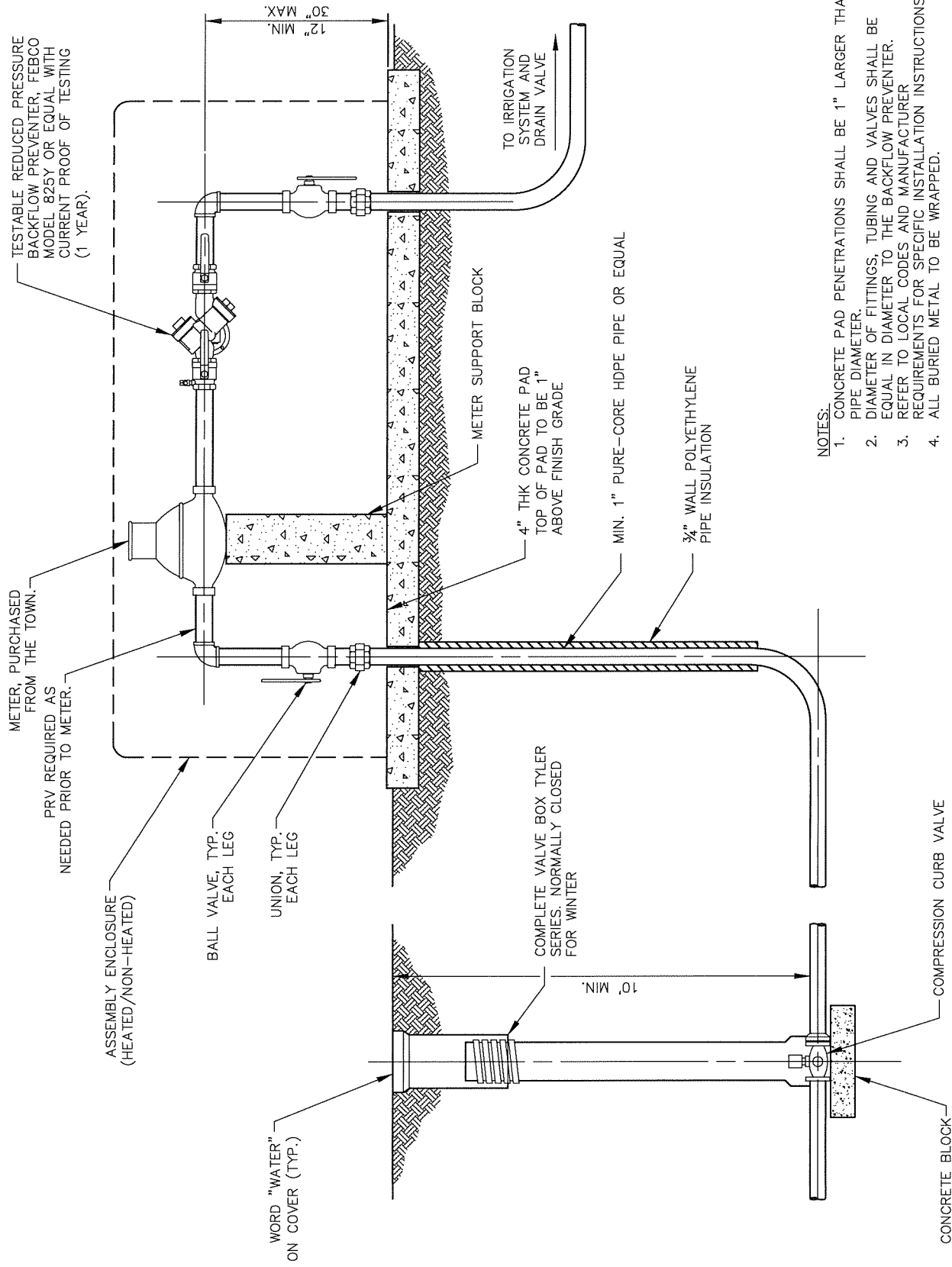


## PLAN

NOTE:

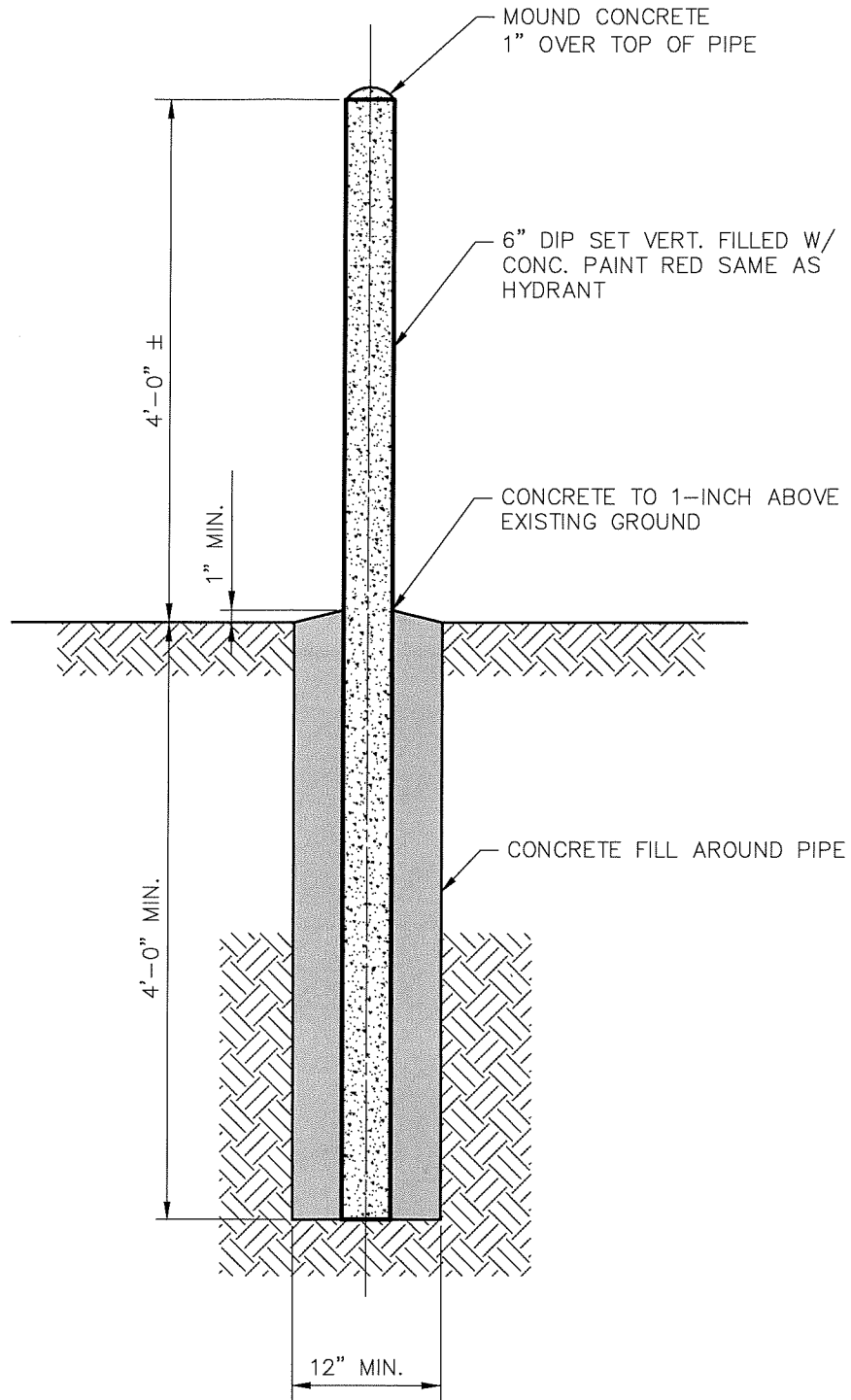
1. ALL BURIED METAL TO BE POLYETHYLENE WRAPPED.

# TRACER WIRE INSTALLATION

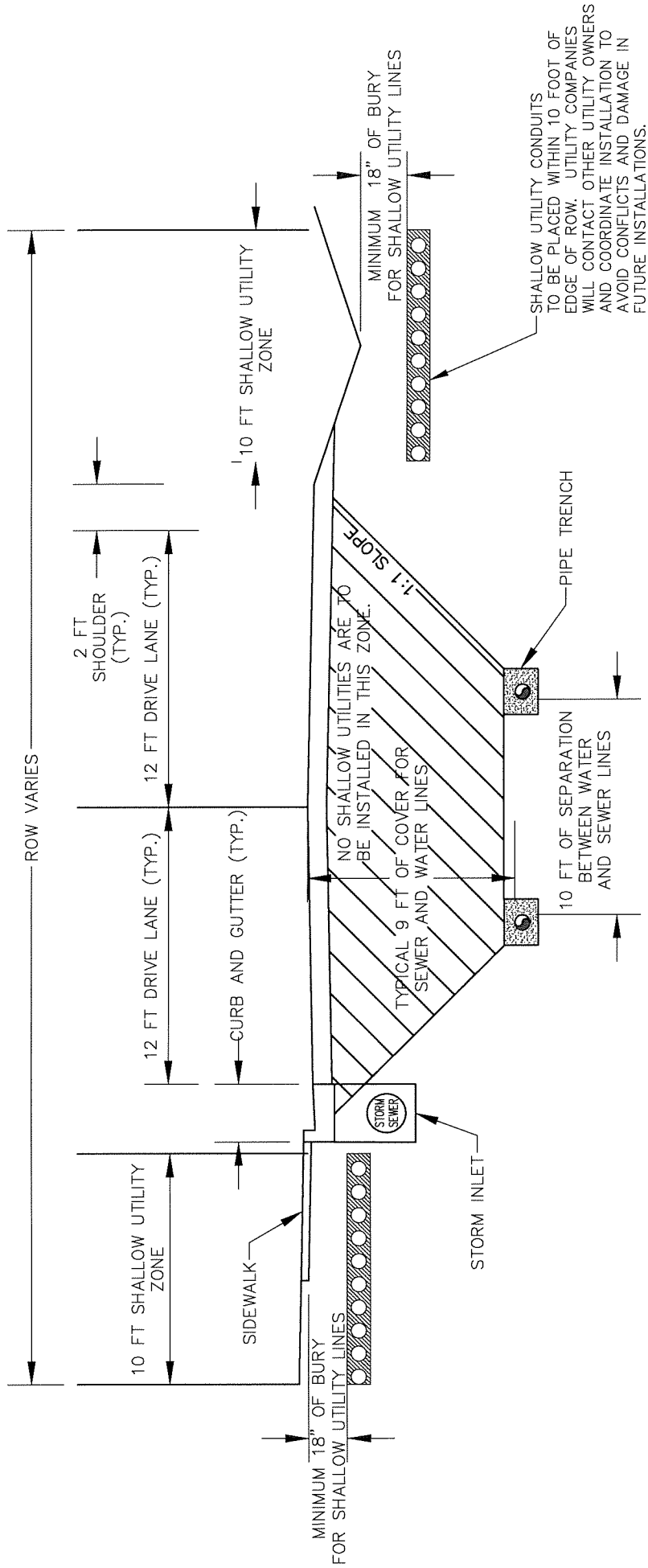


- NOTES:
1. CONCRETE PAD PENETRATIONS SHALL BE 1" LARGER THAN PIPE DIAMETER.
  2. DIAMETER OF FITTINGS, TUBING AND VALVES SHALL BE EQUAL IN DIAMETER TO THE BACKFLOW PREVENTER.
  3. REFER TO LOCAL CODES AND MANUFACTURER REQUIREMENTS FOR SPECIFIC INSTALLATION INSTRUCTIONS.
  4. ALL BURIED METAL TO BE WRAPPED.

# OUTSIDE SETTING FOR IRRIGATION SERVICE

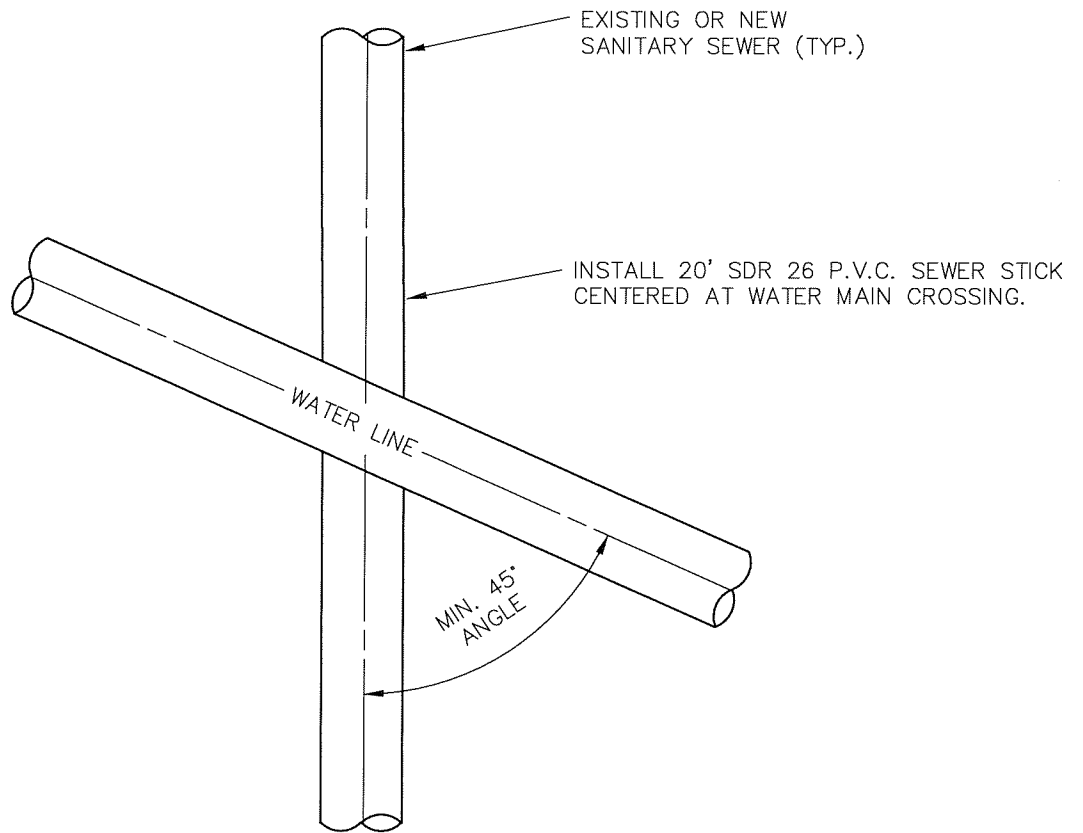


# BOLLARD

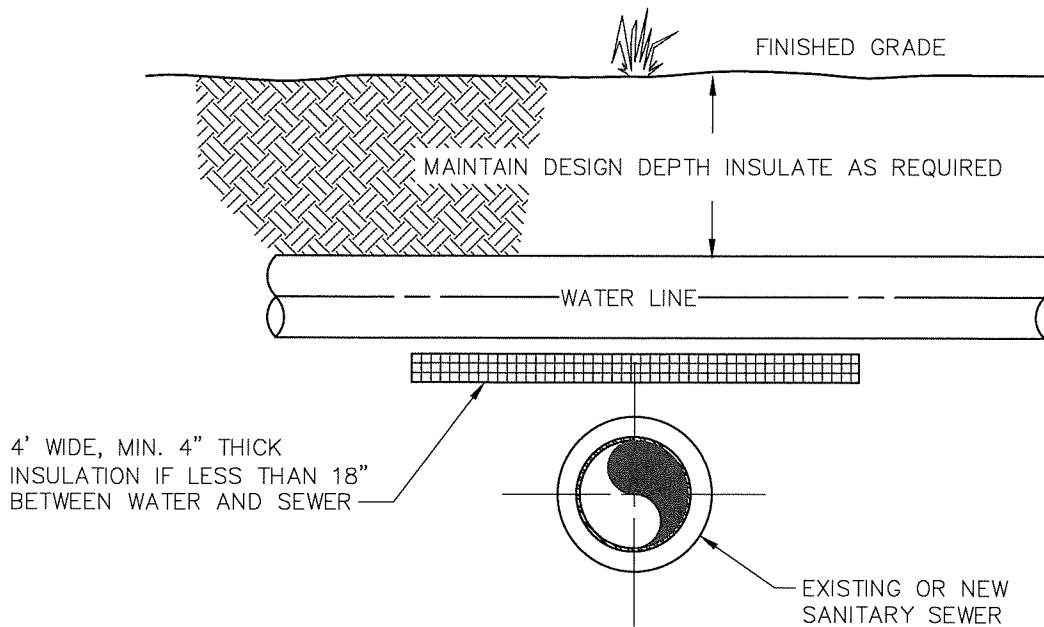


TOWN OF SILVERTHORNE  
 TYPICAL RIGHT OF WAY UTILITY PLACEMENT  
 (NOT TO SCALE)

TYPICAL RIGHT OF WAY UTILITY PLACEMENT

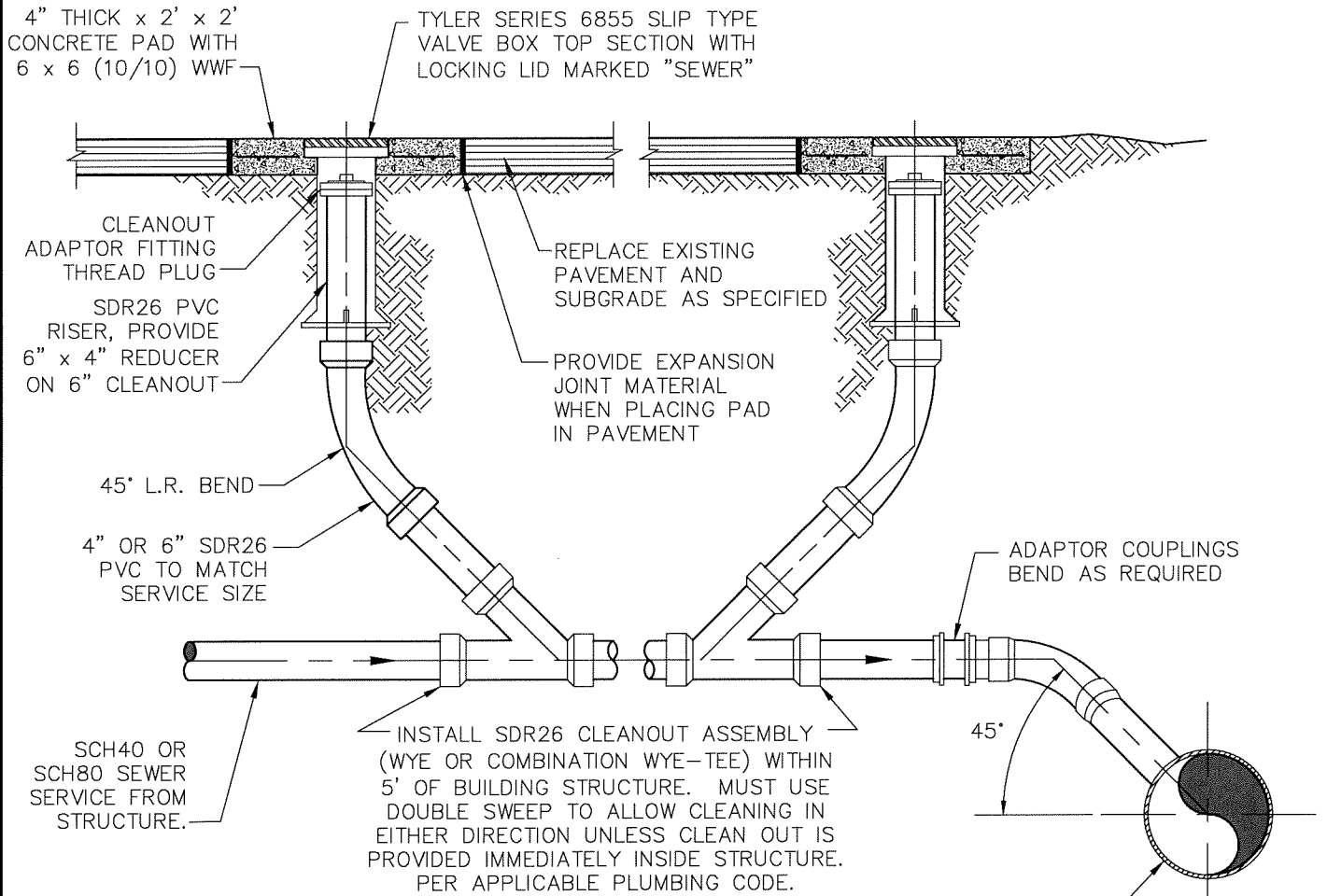


PLAN

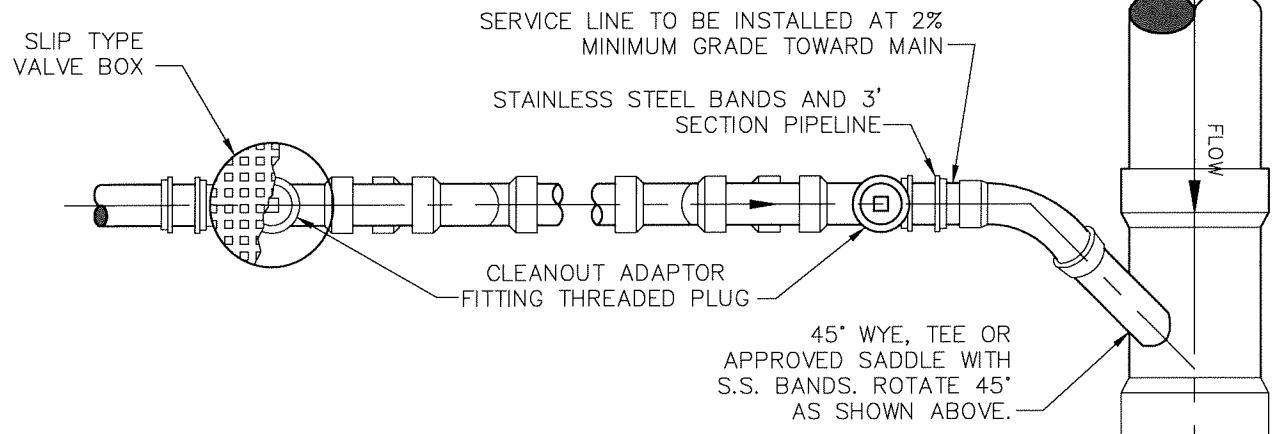


SECTION

# SEWER/WATER CROSSING



**SECTION**

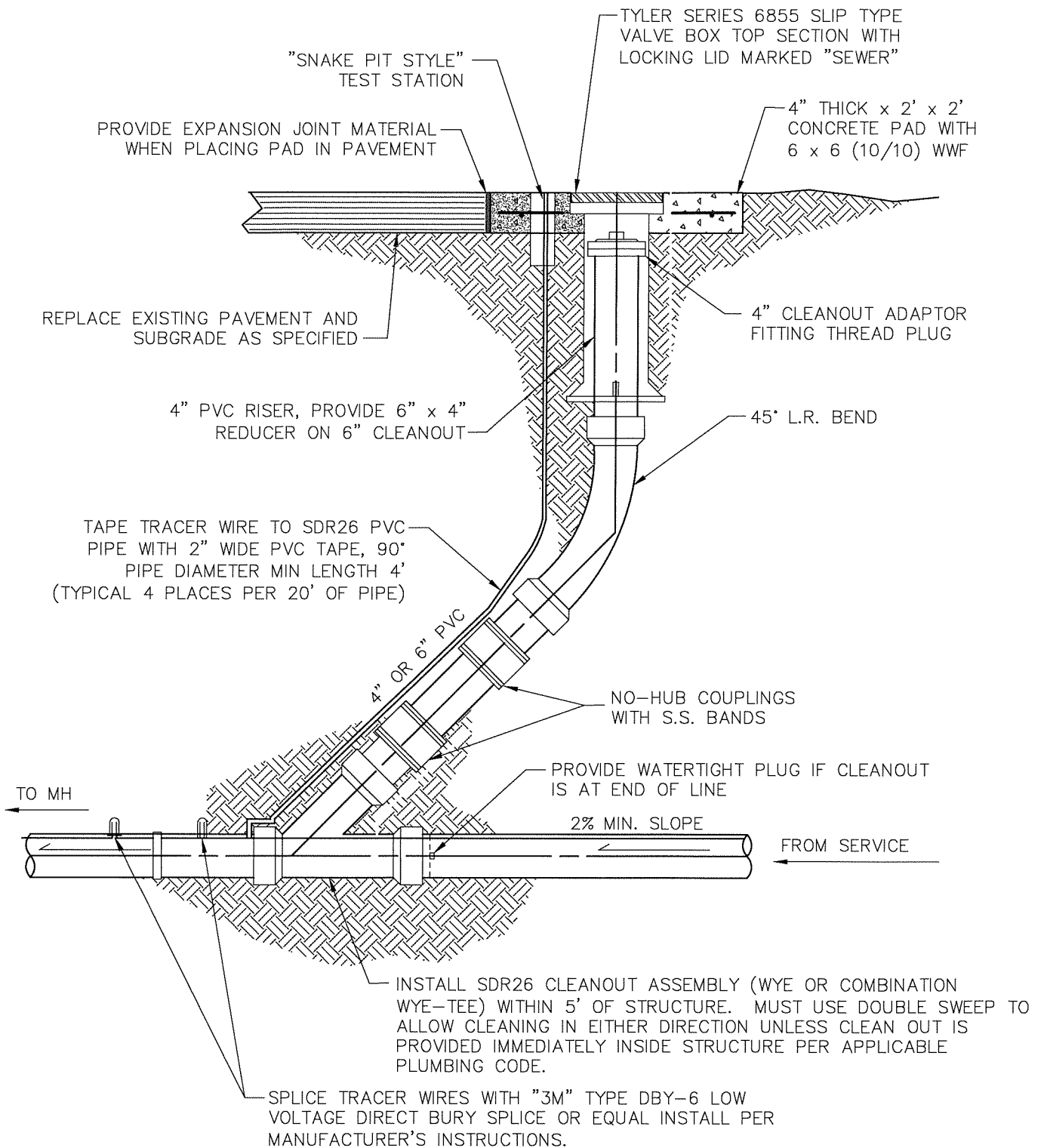


**PLAN**

**NOTES:**

1. SEWER SERVICE TO BE ASTM 3034, SDR 26 PVC PIPE & FITTINGS
2. COMPACT GROUND ALONG SERVICE TO 95% MIN. STANDARD PROCTOR
3. ONLY WYE FITTINGS WILL BE ALLOWED ON NEW MAINS
4. ALL SERVICE LINES SHALL BE INSPECTED BY THE TOWN OF SILVERTHORNE DURING INSTALLATION AND MUST BE APPROVED BY THE TOWN OF SILVERTHORNE BEFORE BACKFILLED.

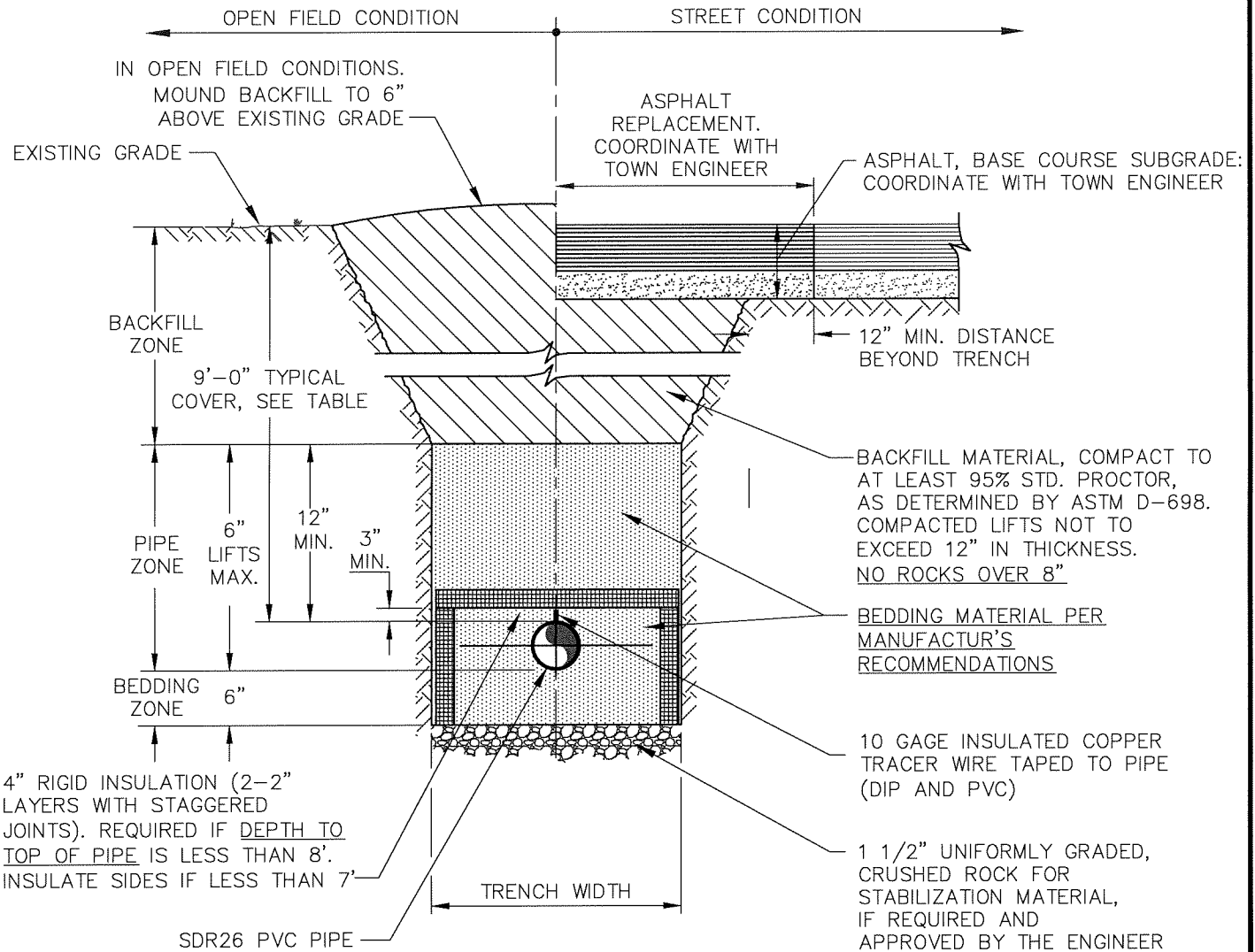
**SEWER SERVICE LINE CONNECTION**



**NOTES:**

1. CLEANOUT FITTINGS AND PIPING TO BE SDR26 AND SAME SIZE AS SEWER SERVICE.
2. CLEANOUT REQUIRED WITHIN 5' OF BUILDING/STRUCTURE.
3. CLEANOUT REQUIRED AT EVERY 100' SPACING IN SERVICE LINE BEFORE MAIN.

# SANITARY SEWER SERVICE IN-LINE CLEANOUT



## SEWER MAIN

TRENCH WIDTH SHALL CONFIRM TO THE FOLLOWING:

PIPE I.D.	MIN. WD.	MAX. WD.
4" & SMALLER	1'-4"	2'-4"
6"	1'-6"	2'-6"
8"	1'-8"	2'-8"
12"	2'-0"	3'-0"
16"	2'-4"	3'-4"
20"	2'-8"	3'-8"
24"	3'-0"	4'-0"

INSULATION REQUIREMENTS:

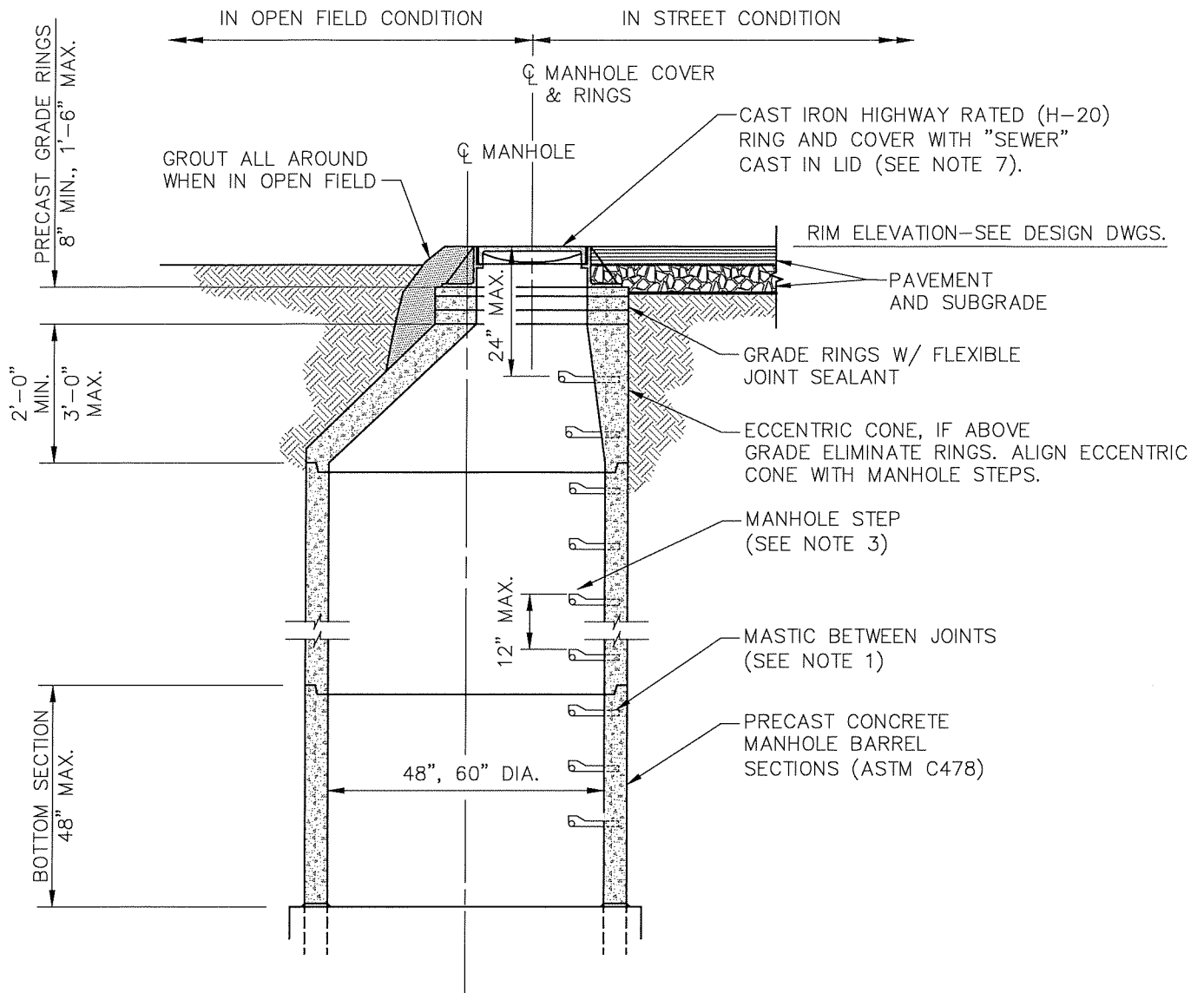
PIPE COVER	REQUIRED
>8'-0"	NO INSULATION
>7'-0" TO 8'-0"	TOP INSULATION
5'-0" TO 7'-0"	TOP AND SIDES
<5'-0" COVER	NOT PERMITTED

NOTE:

- INSULATION SHALL BE HIGHLOAD EXTRUDED POLYSTYRENE INSULATION BY DOW CHEMICAL OR EQUAL. TYPE HI-100, AT PIPE CROSSINGS, UNDER FOUNDATIONS AND UNDER EXISTING OR FUTURE ROADS PLOWED AND/OR DRIVEN SURFACES. TYPE HI-60 IN UNPLOWED/UNDRIVEN FIELDS OR OPEN AREAS.
- BEDDING MATERIAL SHALL BE INSTALLED TO NOT PROVIDE HYDRAULIC PERMEABILITY IN EXCESS OF THE NATURAL SOILS. DESIGNING THE PREVENTION OF THE TRANSPORT OF WATER WITHIN THE TRENCH IS THE RESPONSIBILITY OF THE DESIGN ENGINEER.

# TYPICAL SANITARY SEWER MAIN TRENCH SECTION



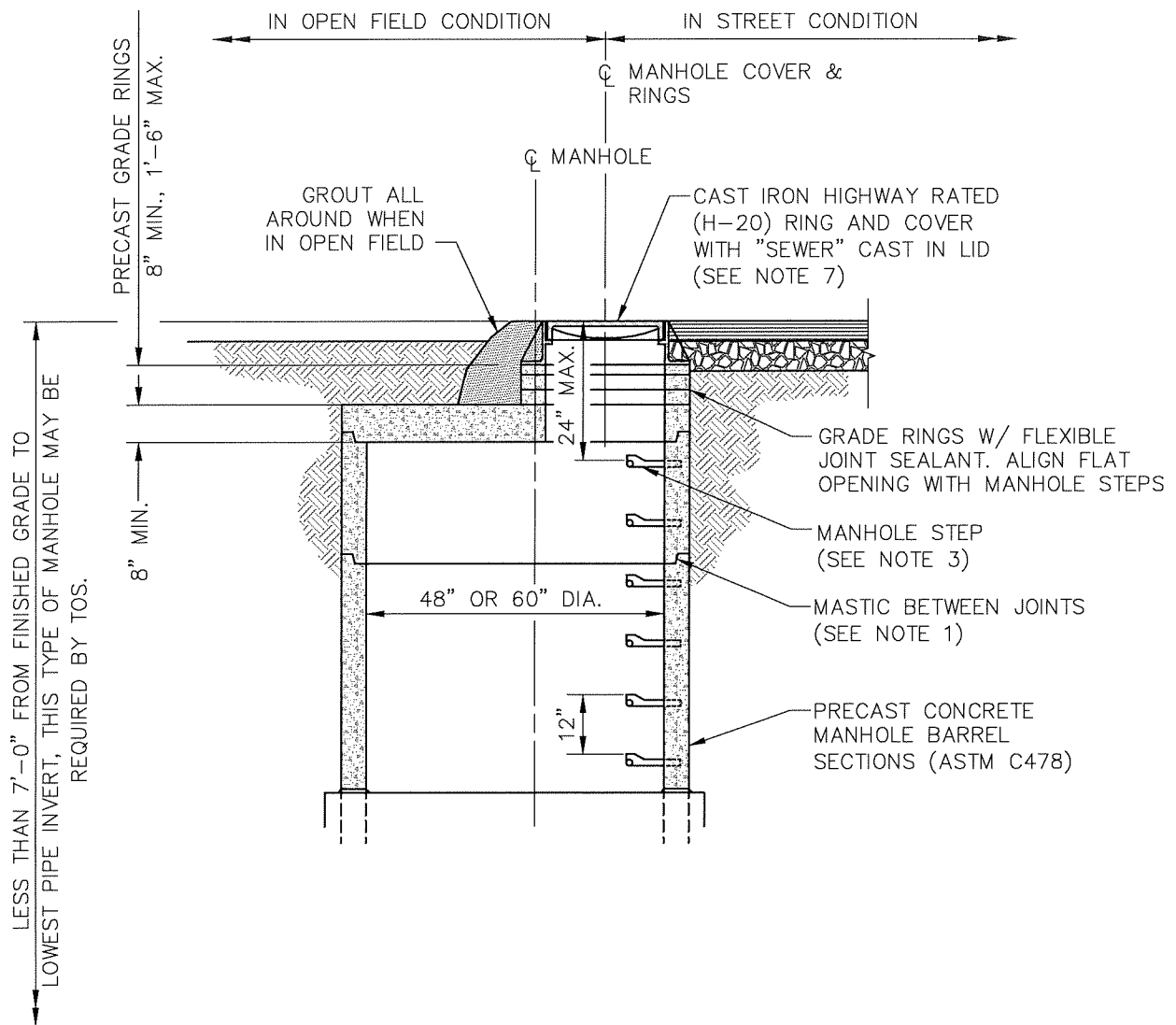


## MANHOLE SECTION WITH ECCENTRIC CONE

### NOTES:

1. ALL JOINTS TO BE DOUBLE BAND RUB-R-NEK OR APPROVED EQUAL. ANY MATERIAL EXTRUDED INTO MANHOLE MUST BE TRIMMED OFF AT FACE OF CONCRETE BELOW WATER TABLE DEFINE DISTANCE (AT END OF WARRANTY).
2. ALL MANHOLES PLACED IN "OPEN SPACE" OR FIELDS SHALL BE INSTALLED WITH A RING AND COVER THAT IS 6" ABOVE FINAL GRADE WITH A COLLAR OF CONCRETE. A MARKER POST SHALL BE INSTALLED NEAR BY. SEE MARKER POST DETAIL.
3. STEPS INSTALLED OVER DOWNSTREAM INVERT OF MANHOLE AND SHALL BE COPOLYMER COATED PLASTIC 1/2" GRADE 60 STEEL REINFORCED, SIMILAR TO PS2-PF MANUFACTURED BY MA INDUSTRIES.
4. SEE EITHER CAST IN PLACE OR PRECAST MANHOLE BASE DETAIL.
5. WRAP ALL BARREL SECTIONS AND CONE WITH BITUTHANE WRAP - 6" OVERLAP IS REQUIRED.
6. AVOID 12" HIGH BARREL SECTIONS IF POSSIBLE.
7. 60" OR LARGER DIAMETER MANHOLES REQUIRE A 30" OPENING.

# STANDARD MANHOLE RISER AND COVER

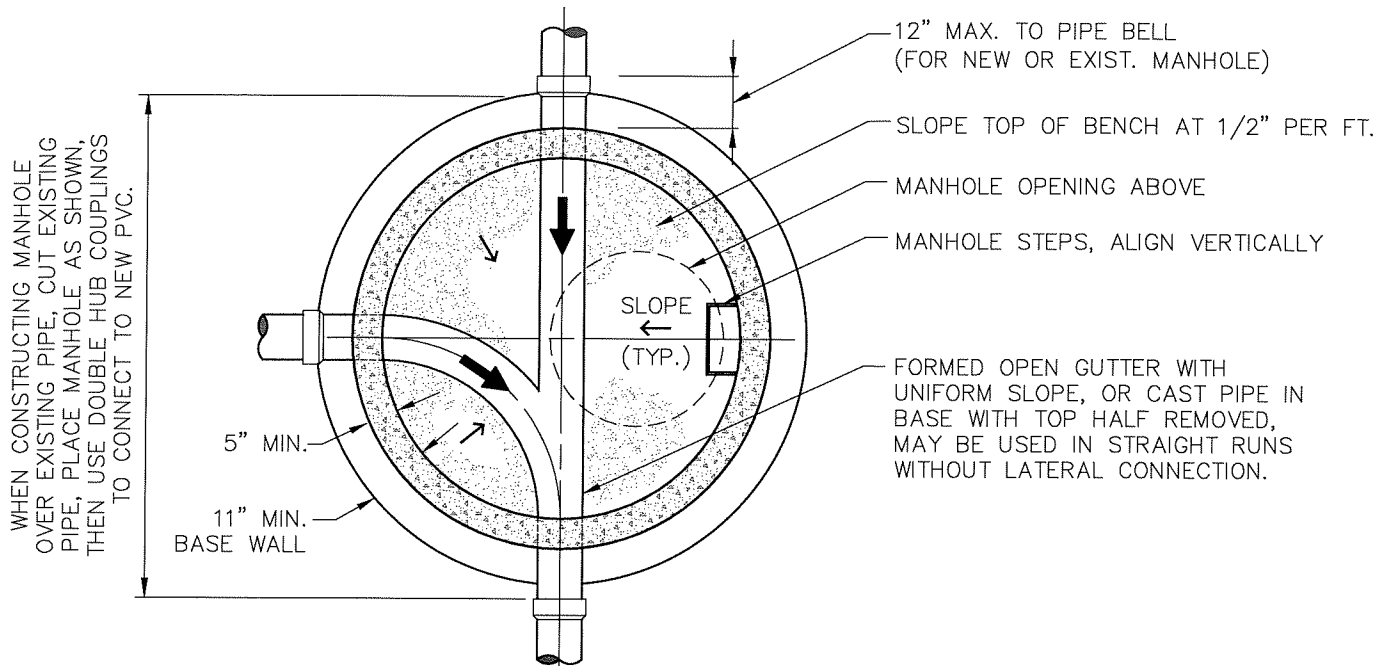


## MANHOLE SECTION WITH FLAT TOP

### NOTES:

1. ALL JOINTS TO BE DOUBLE BAND RUB-R-NEK OR APPROVED EQUAL. ANY MATERIAL EXTRUDED INTO MANHOLE MUST BE TRIMMED OFF AT FACE OF CONCRETE BELOW WATER TABLE.
2. ALL MANHOLES PLACED IN "OPEN SPACE" OR FIELDS SHALL BE INSTALLED WITH A RING AND COVER THAT IS 6" ABOVE FINAL GRADE WITH A COLLAR OF CONCRETE. A MARKER POST SHALL BE INSTALLED NEAR BY. SEE MARKER POST DETAIL.
3. STEPS INSTALLED OVER DOWNSTREAM INVERT OF MANHOLE AND SHALL BE COPOLYMER COATED PLASTIC 1/2" GRADE 60 STEEL REINFORCED, SIMILAR TO PS2-PF MANUFACTURED BY MA INDUSTRIES.
4. SEE EITHER CAST IN PLACE OR PRECAST MANHOLE BASE DETAIL.
5. WRAP ALL BARREL SECTIONS AND CONE WITH BITUTHANE WRAP - 6" OVERLAP IS REQUIRED.
6. AVOID 12" HIGH BARREL SECTIONS IF POSSIBLE.
7. 60" OR LARGER DIAMETER MANHOLES REQUIRE A 30" OPENING.

# SHALLOW MANHOLE RISER AND COVER



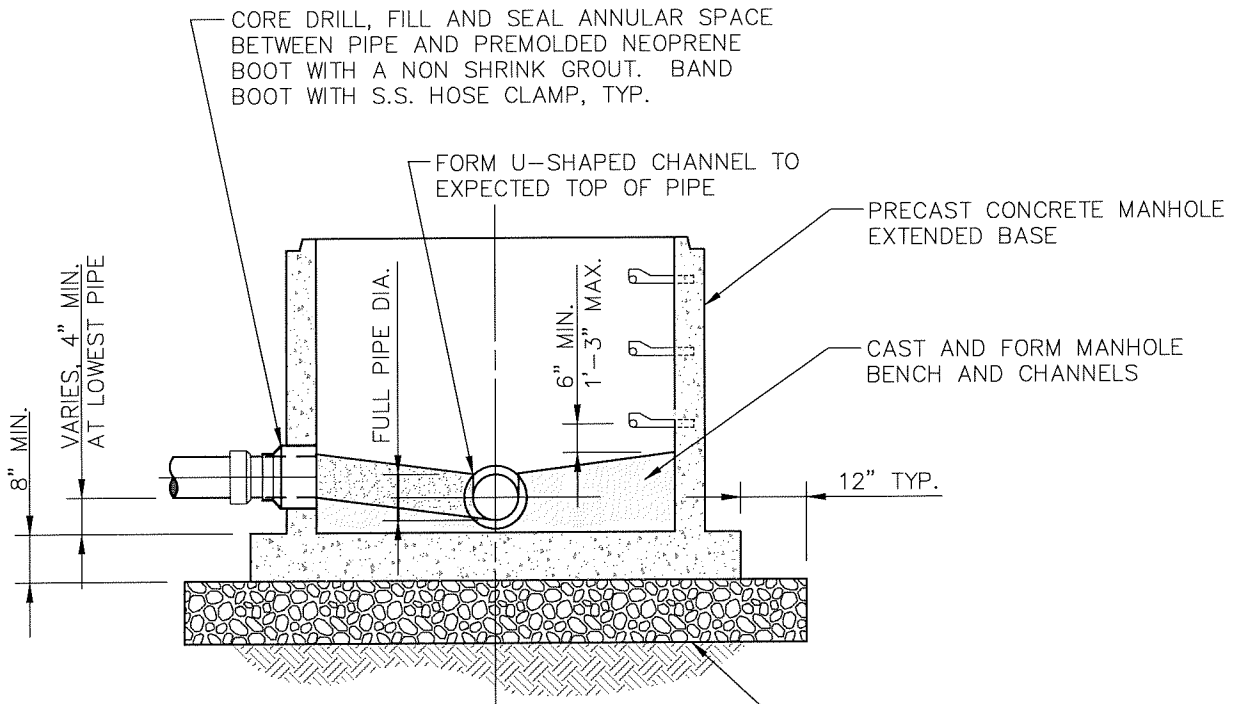
WHEN CONSTRUCTING MANHOLE OVER EXISTING PIPE, CUT EXISTING PIPE, PLACE MANHOLE AS SHOWN, THEN USE DOUBLE HUB COUPLINGS TO CONNECT TO NEW PVC.

MANHOLE BASE  
PLAN VIEW

NOTES:

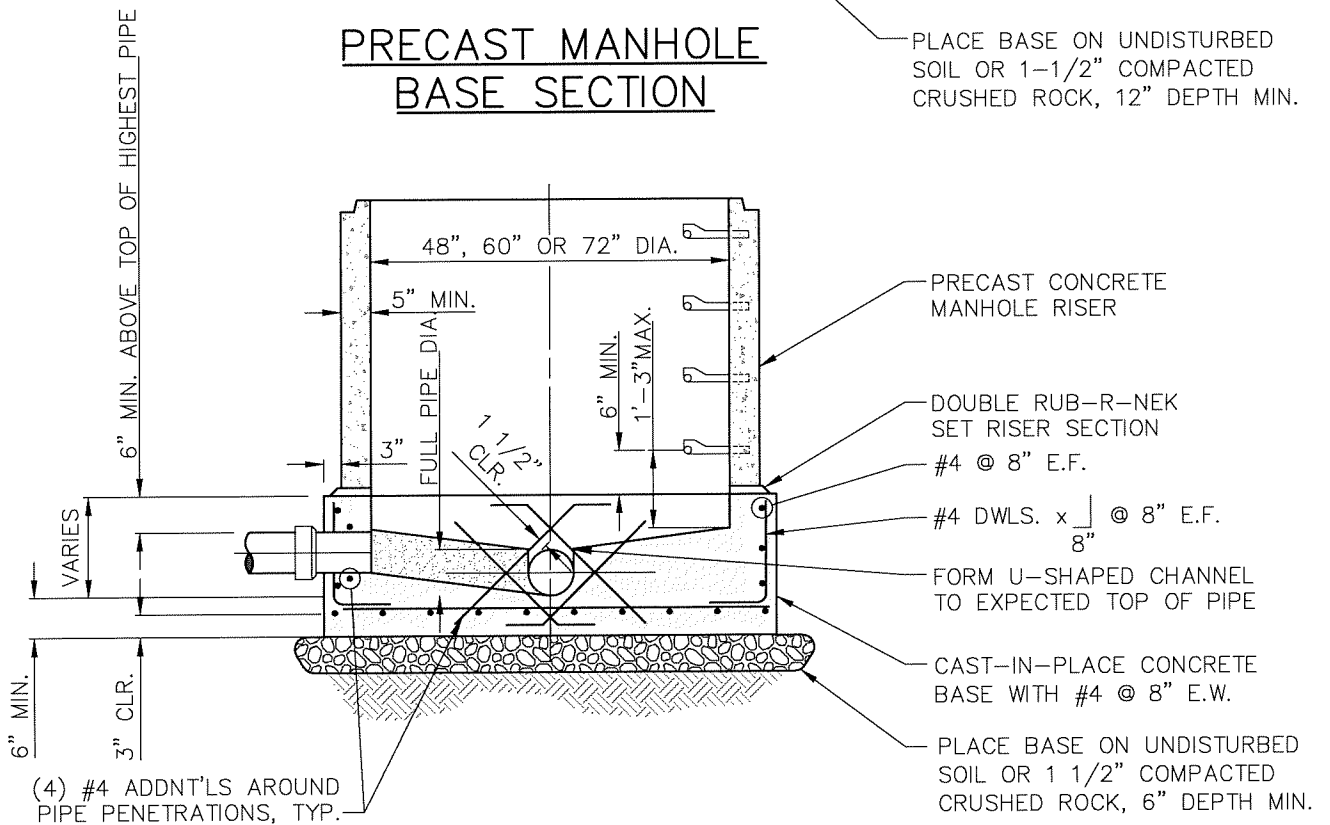
1. CONCRETE BASE AND/OR INTERIOR CONCRETE FILL SHALL BE MINIMUM 3,000 PSI CONCRETE.
2. SEE CAST-IN-PLACE OR PRECAST MANHOLE BASE FOR SECTION.

MANHOLE BASE INTERIOR



**PRECAST MANHOLE  
BASE SECTION**

PLACE BASE ON UNDISTURBED SOIL OR 1-1/2" COMPACTED CRUSHED ROCK, 12" DEPTH MIN.



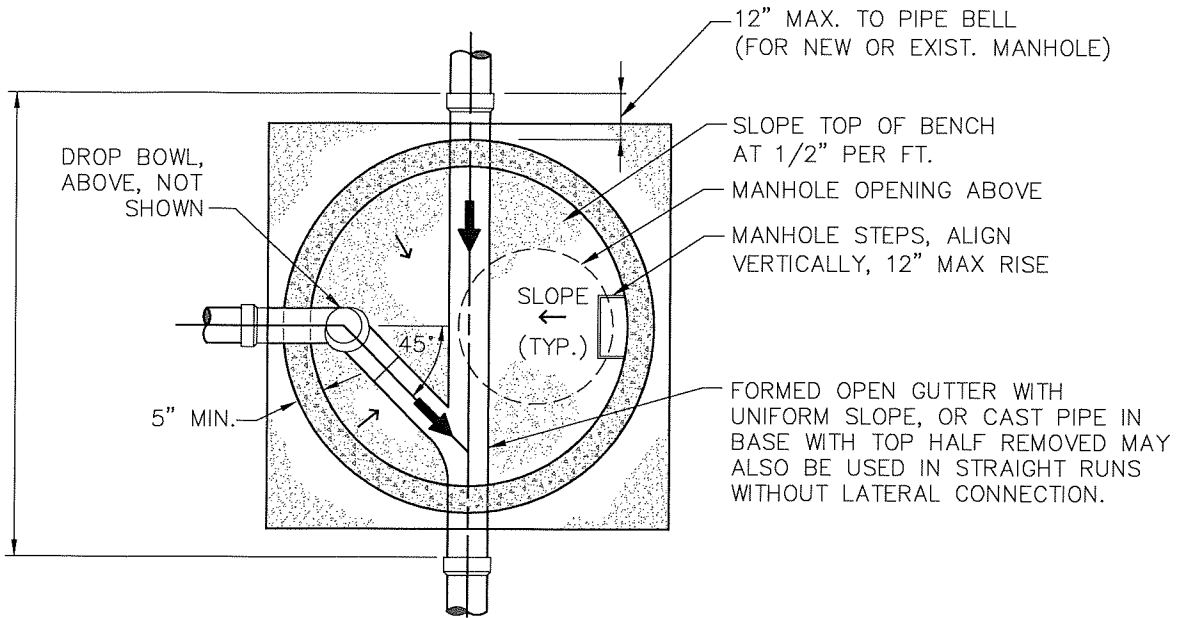
**CAST-IN-PLACE MANHOLE  
BASE SECTION**

**NOTES:**

1. PRECAST CONCRETE SHALL MEET OR EXCEED STRENGTH OF 3,000 PSI.
2. APPLY BONDING AGENT TO PRECAST BASE SECTION BEFORE PLACING CONCRETE FILL AND INVERTS.

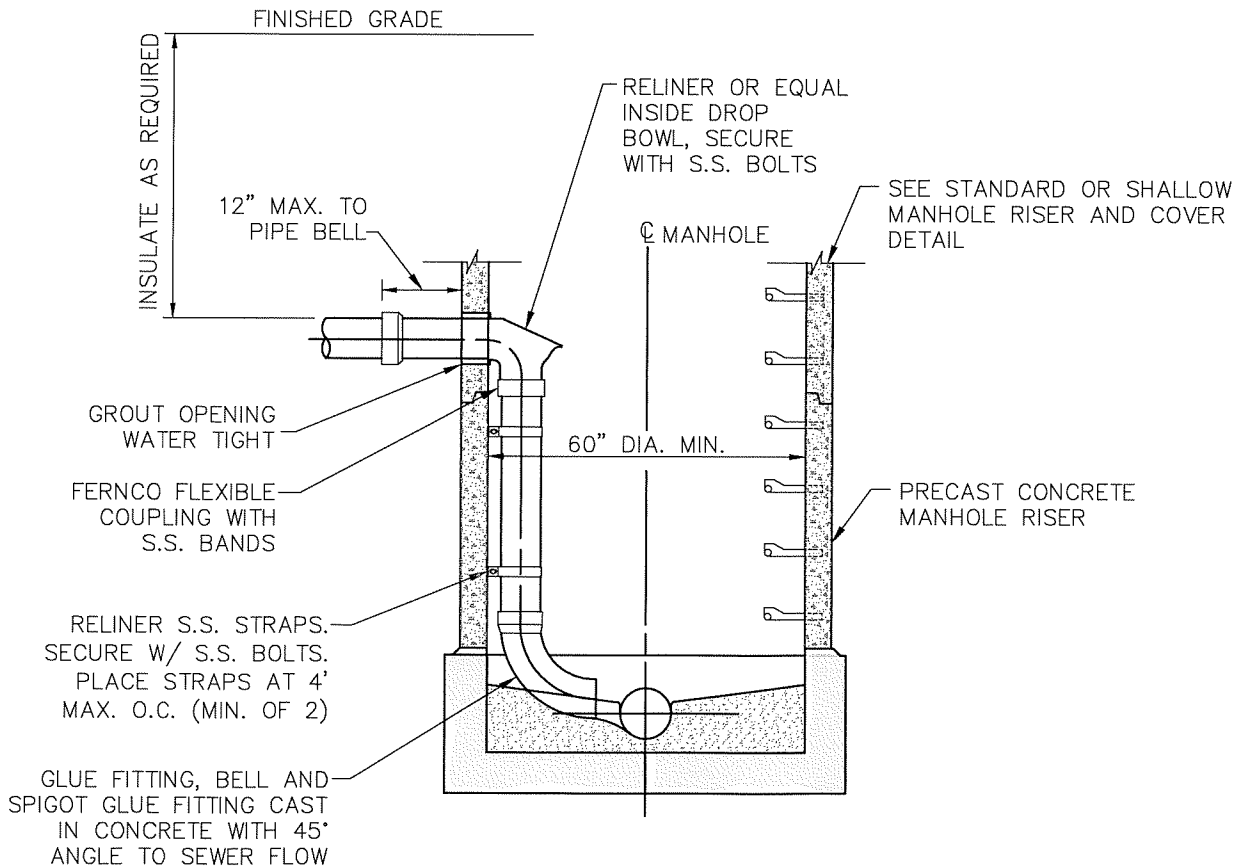
**MANHOLE BASE SECTIONS**

WHEN CONSTRUCTING MANHOLE OVER EXISTING PIPE, CUT EXISTING PIPE AND USE DOUBLE HUB COUPLINGS TO CONNECT TO NEW PVC, THEN PLACE MANHOLE AS SHOWN.



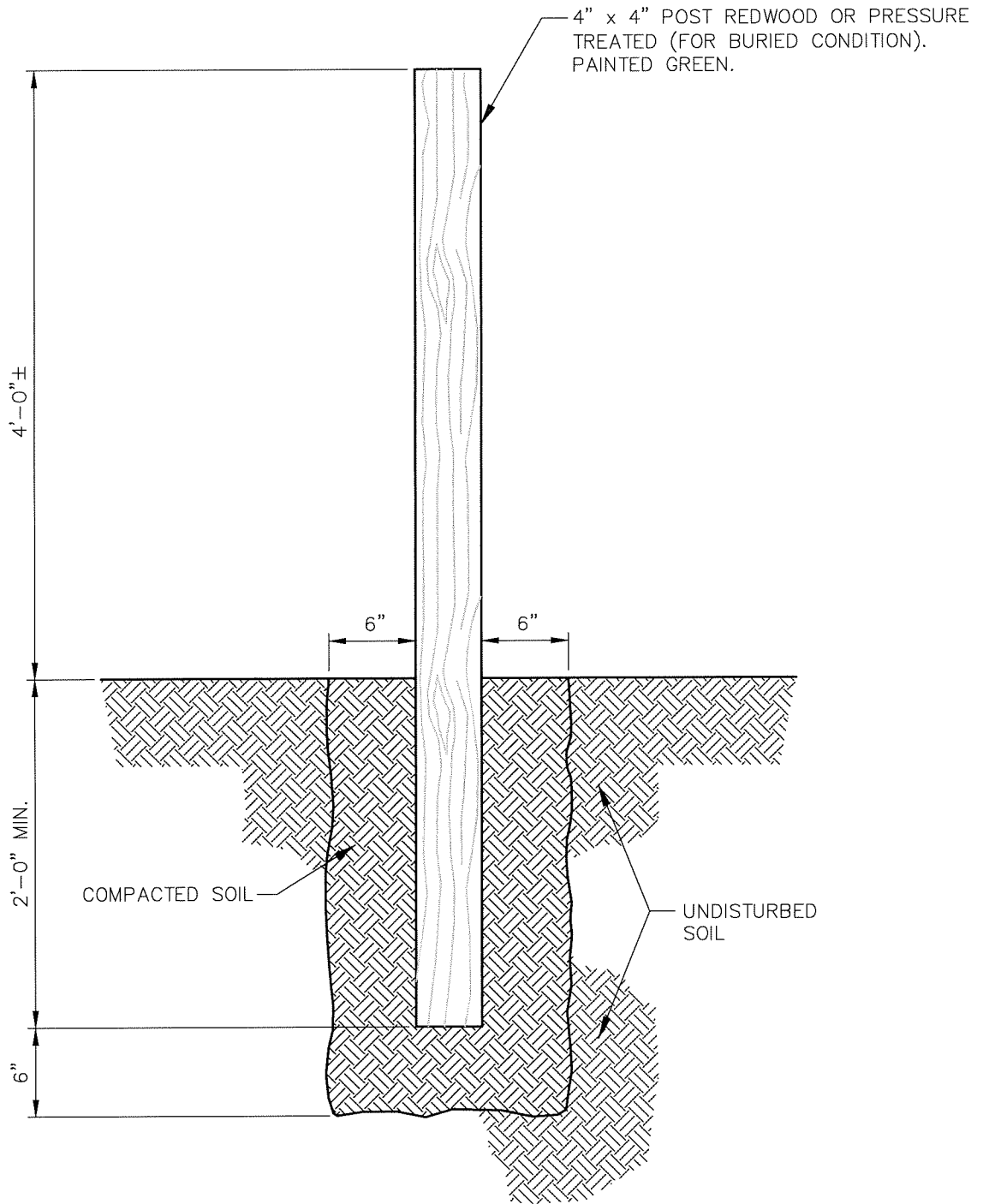
PLAN VIEW

NOTE:  
ANY DROP OF GREATER THAN 18" REQUIRES DROP MANHOLE.



SECTION VIEW

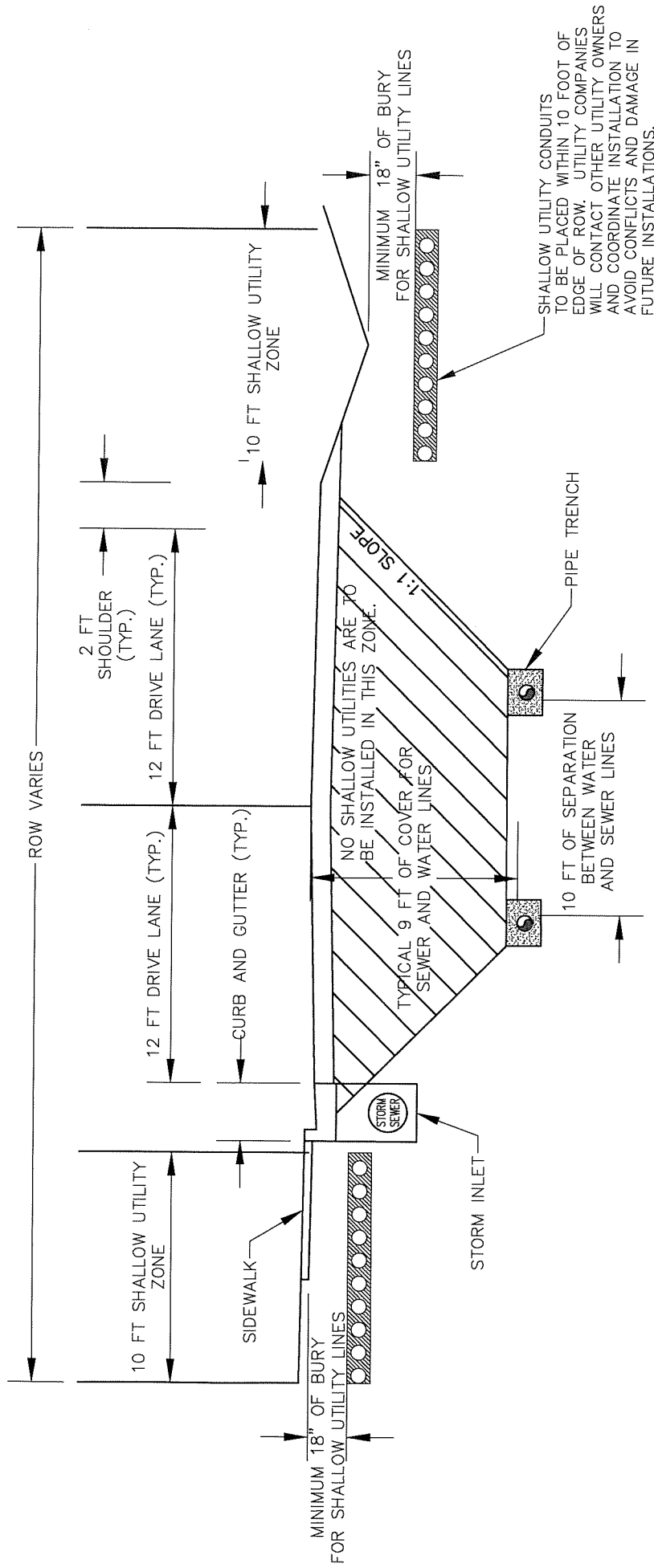
# INSIDE DROP MANHOLE



NOTES:

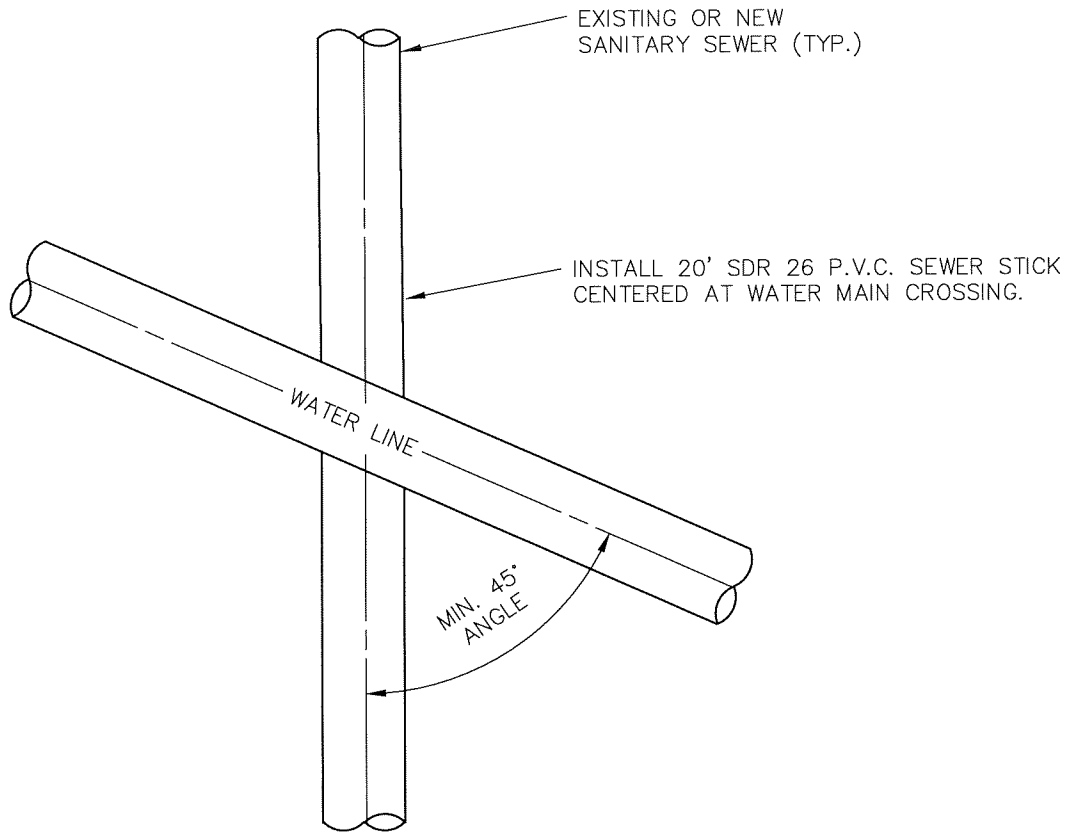
1. PROVIDE ONLY IF MANHOLE NOT IN TRAVELED WAY.

# SANITARY SEWER MANHOLE MARKER POST

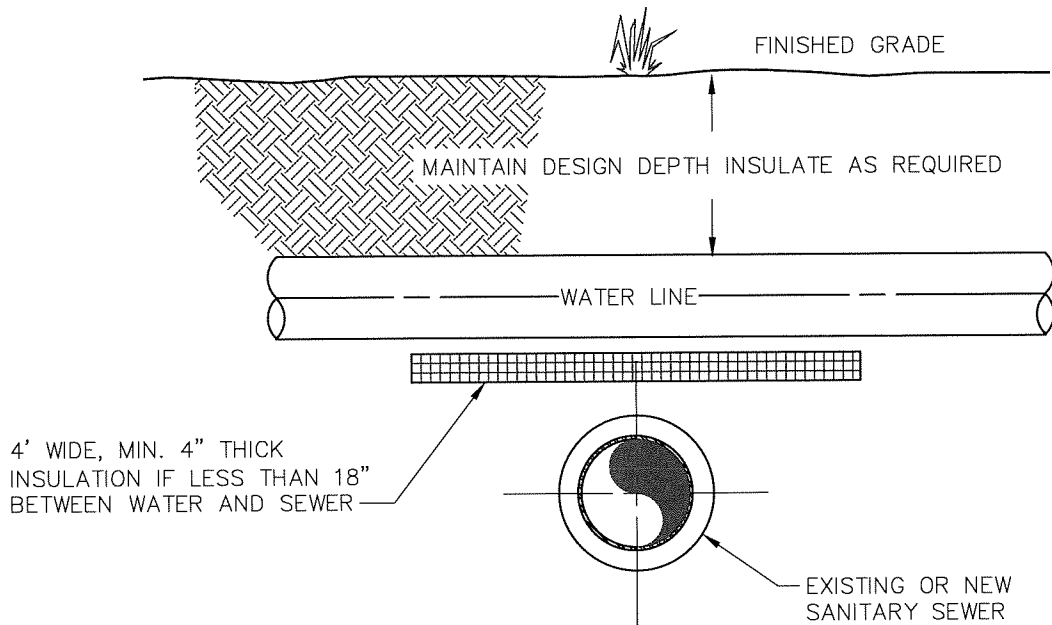


TOWN OF SILVERTHORNE  
 TYPICAL RIGHT OF WAY UTILITY PLACEMENT  
 (NOT TO SCALE)

TOWN OF SILVERTHORNE  
 TYPICAL RIGHT OF WAY UTILITY PLACEMENT



PLAN



SECTION

# SEWER/WATER CROSSING