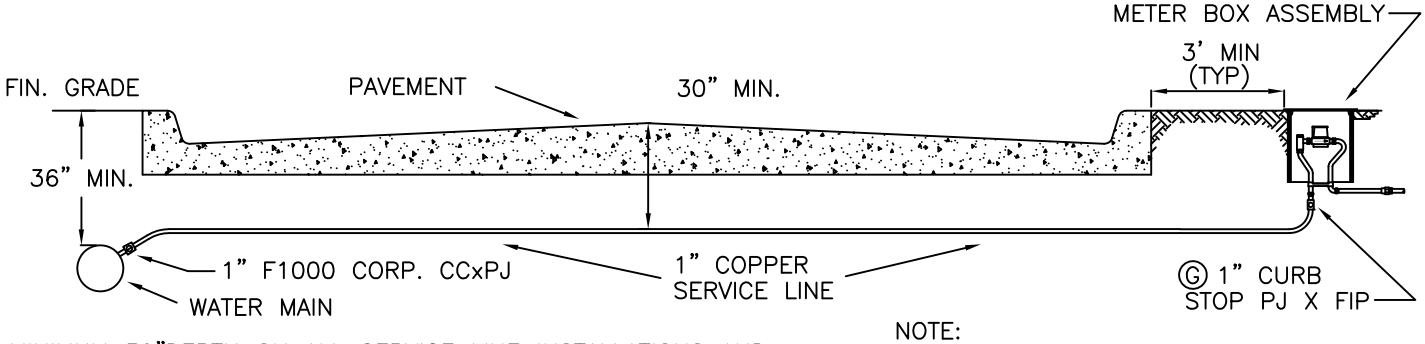
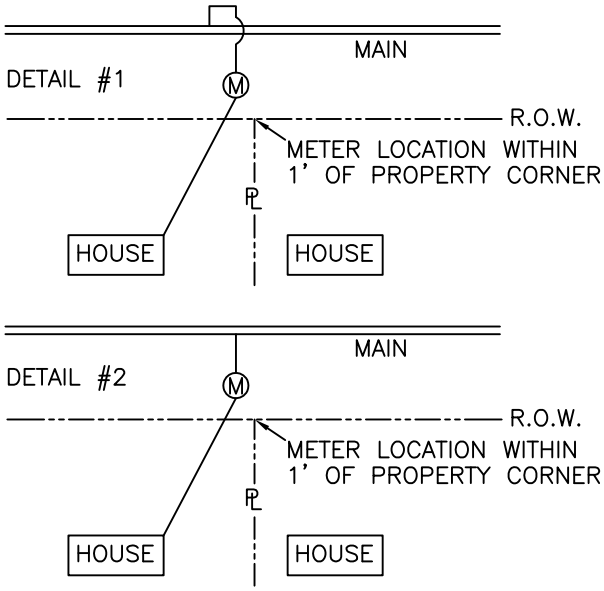
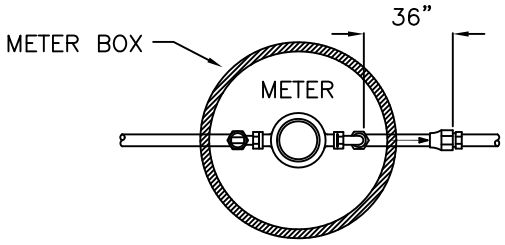
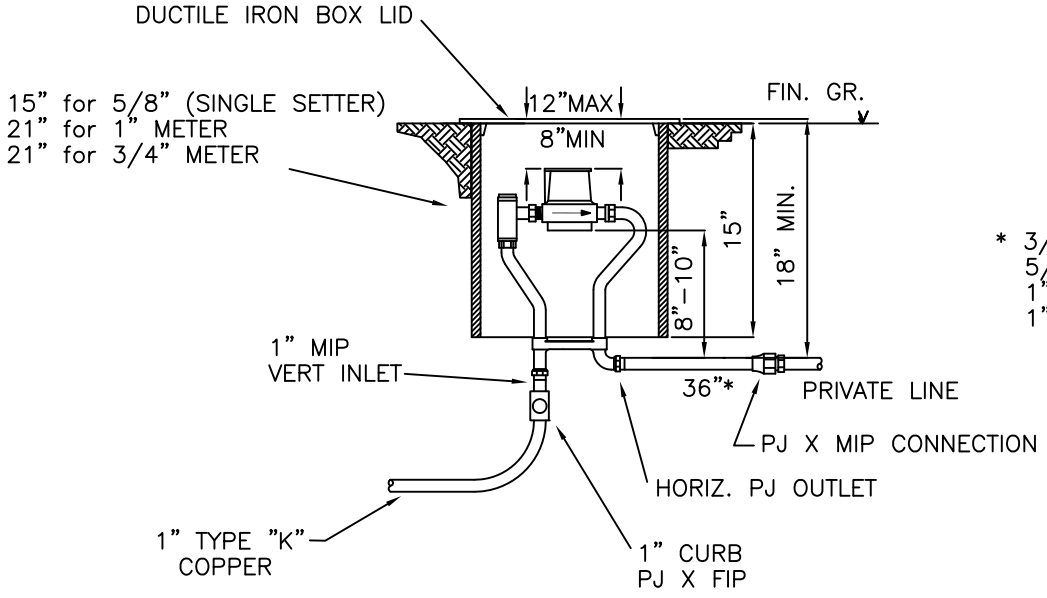


1. MINIMUM 30"DEPTH ON ALL SERVICE LINE INSTALLATIONS AND LINE SHALL BE EXTENDED A TYPICAL 3' BEHIND CURB.
2. CORPORATION STOP SHALL BE INSTALLED AT MAIN AND CURB STOP AT END OF SERVICE LINE. DIRECT TAP ON 6" AND LARGER D.I.P. TAP SADDLE FOR ALL PVC PIPE AND 4" D.I.P.
3. ALL SERVICE LINES SHALL BE 1" SEAMLESS, SOFT TEMPERED, TYPE "K" COPPER.
4. WHEN COPPER SERVICE LINE ARE TAPPED ONTO NON METALLIC MAINS, TRACER WIRE ON NON METALLIC MAIN SHALL BE WRAPPED AROUND TAPPING CORP. SEVERAL TURNS.
5. ANYTHING THAT HAS TO BE REMOVED TO FACILITATE NEW CONSTRUCTION SHALL BE DELIVERED TO CENTRAL ARKANSAS WATER CLEARWATER OPERATIONS CENTER
6. INSTALL METER BOX ASSEMBLY 3' BEHIND CURB UNLESS OTHERWISE DIRECTED BY C. A. W. (CITY AND COUNTY STREETS).
7. INSTALL METER BOX ASSEMBLY WITHIN 1' OF R. O. W. LINE, UNLESS OTHERWISE DIRECTED BY C. A. W. (FOR STATE HIGHWAYS).

NOTE:
METERS SHALL BE SET PERPENDICULAR TO STREET WITH OUTLETS GOING TOWARDS THE HOUSE OR BUSINESS



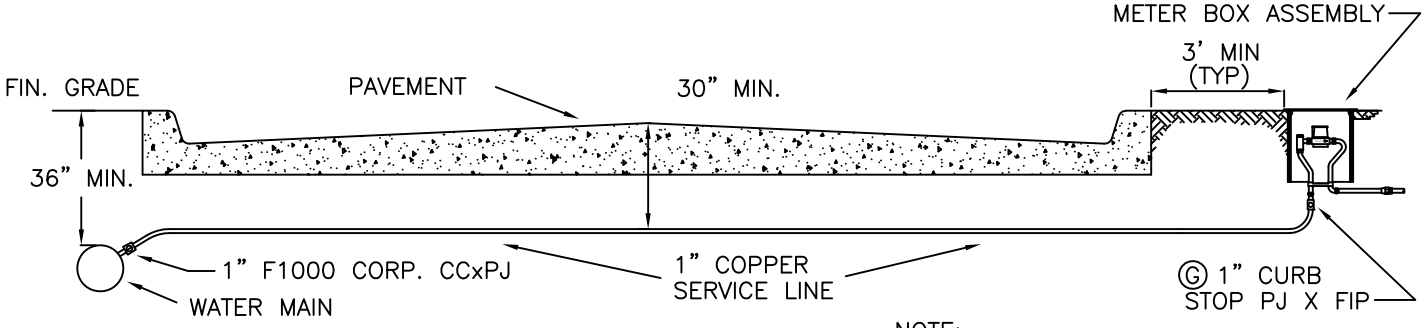




* 3/4" COPPER FOR 5/8" & 3/4" SETTERS; 1" COPPER FOR 1" SETTERS

5/8", 3/4", 1" STANDARD SINGLE METER BOX AND SETTING

01 Std mtr set.dwg
2016 Revision



1. MINIMUM 30"DEPTH ON ALL SERVICE LINE INSTALLATIONS AND LINE SHALL BE EXTENDED A TYPICAL 3' BEHIND CURB.
2. CORPORATION STOP SHALL BE INSTALLED AT MAIN AND CURB STOP AT END OF SERVICE LINE. DIRECT TAP ON 6" AND LARGER D.I.P. TAP SADDLE FOR ALL PVC PIPE AND 4" D.I.P.
3. ALL SERVICE LINES SHALL BE 1" SEAMLESS, SOFT TEMPERED, TYPE "K" COPPER.
4. WHEN COPPER SERVICE LINE ARE TAPPED ONTO NON METALLIC MAINS, TRACER WIRE ON NON METALLIC MAIN SHALL BE WRAPPED AROUND TAPPING CORP. SEVERAL TURNS.
5. ANYTHING THAT HAS TO BE REMOVED TO FACILITATE NEW CONSTRUCTION SHALL BE DELIVERED TO CENTRAL ARKANSAS WATER CLEARWATER OPERATIONS CENTER
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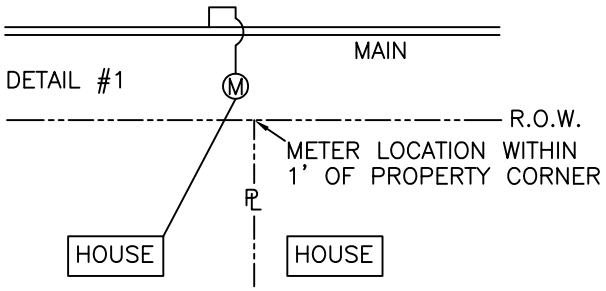
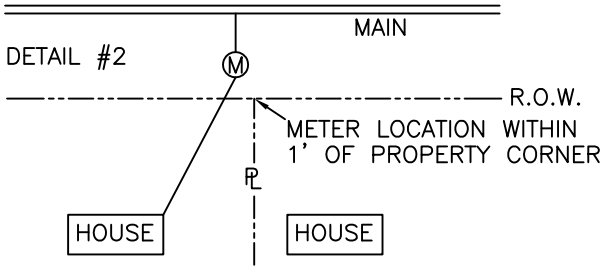
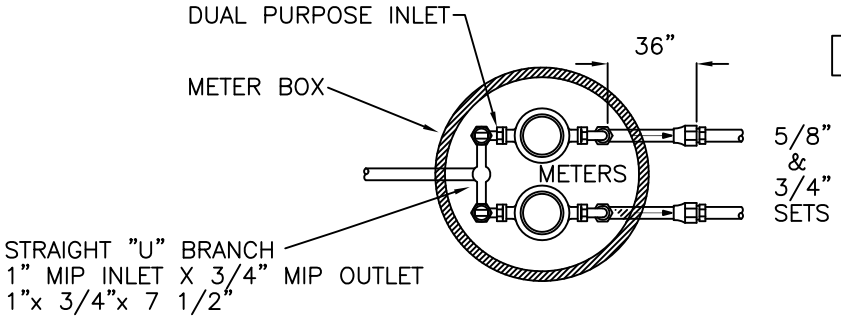
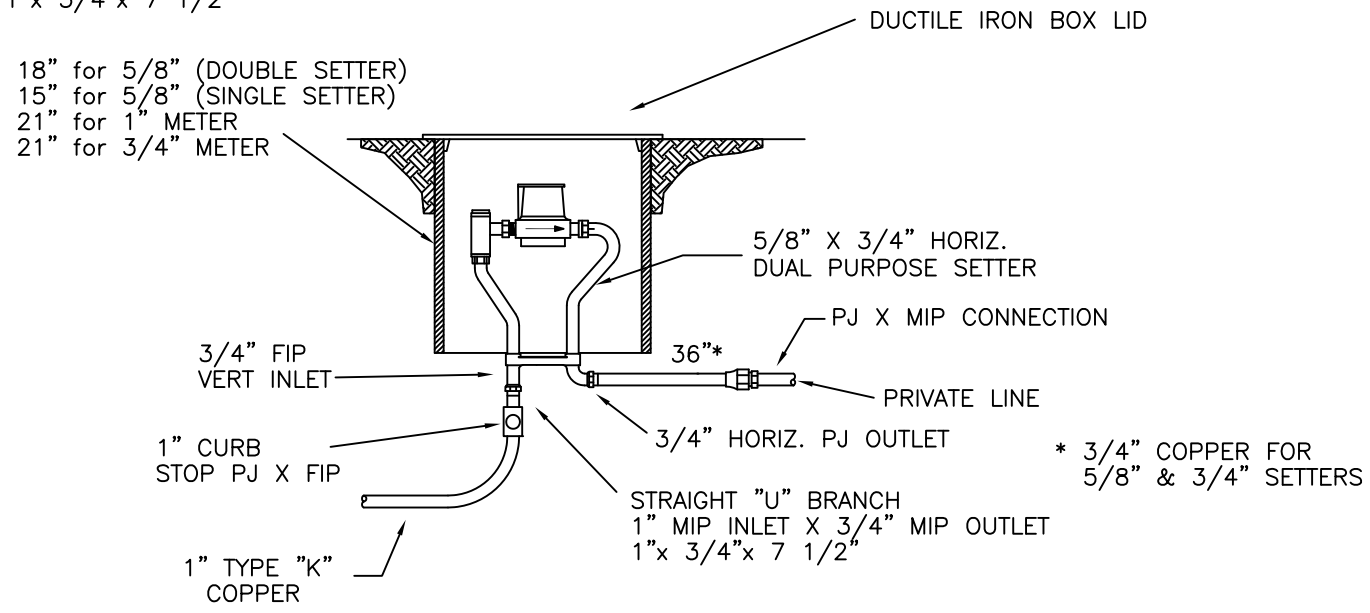
NOTE:
METERS SHALL BE SET PERPENDICULAR TO STREET WITH OUTLETS GOING TOWARDS THE HOUSE OR BUSINESS

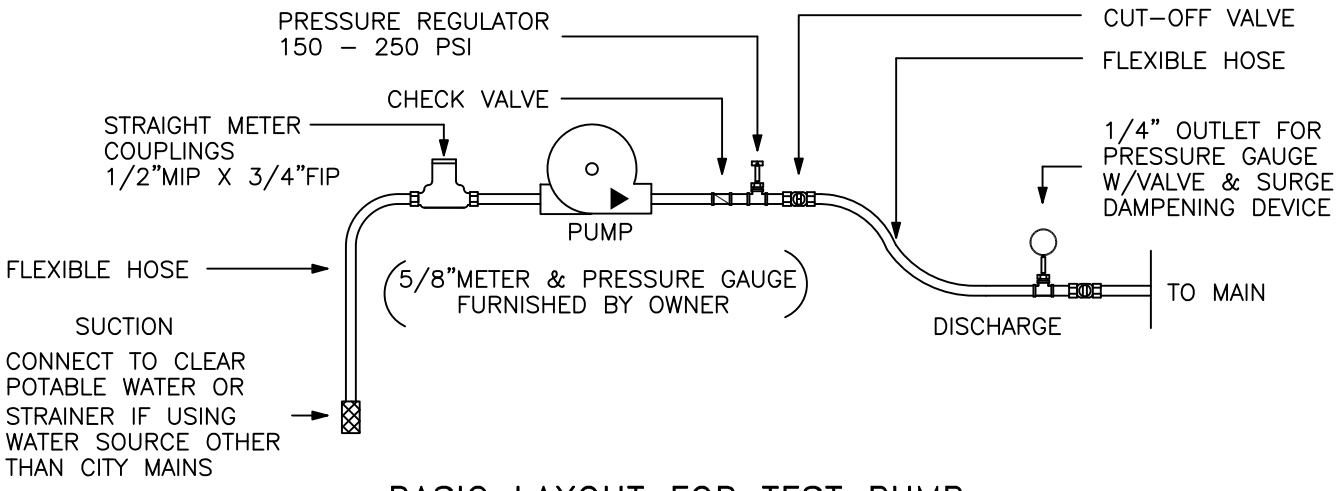






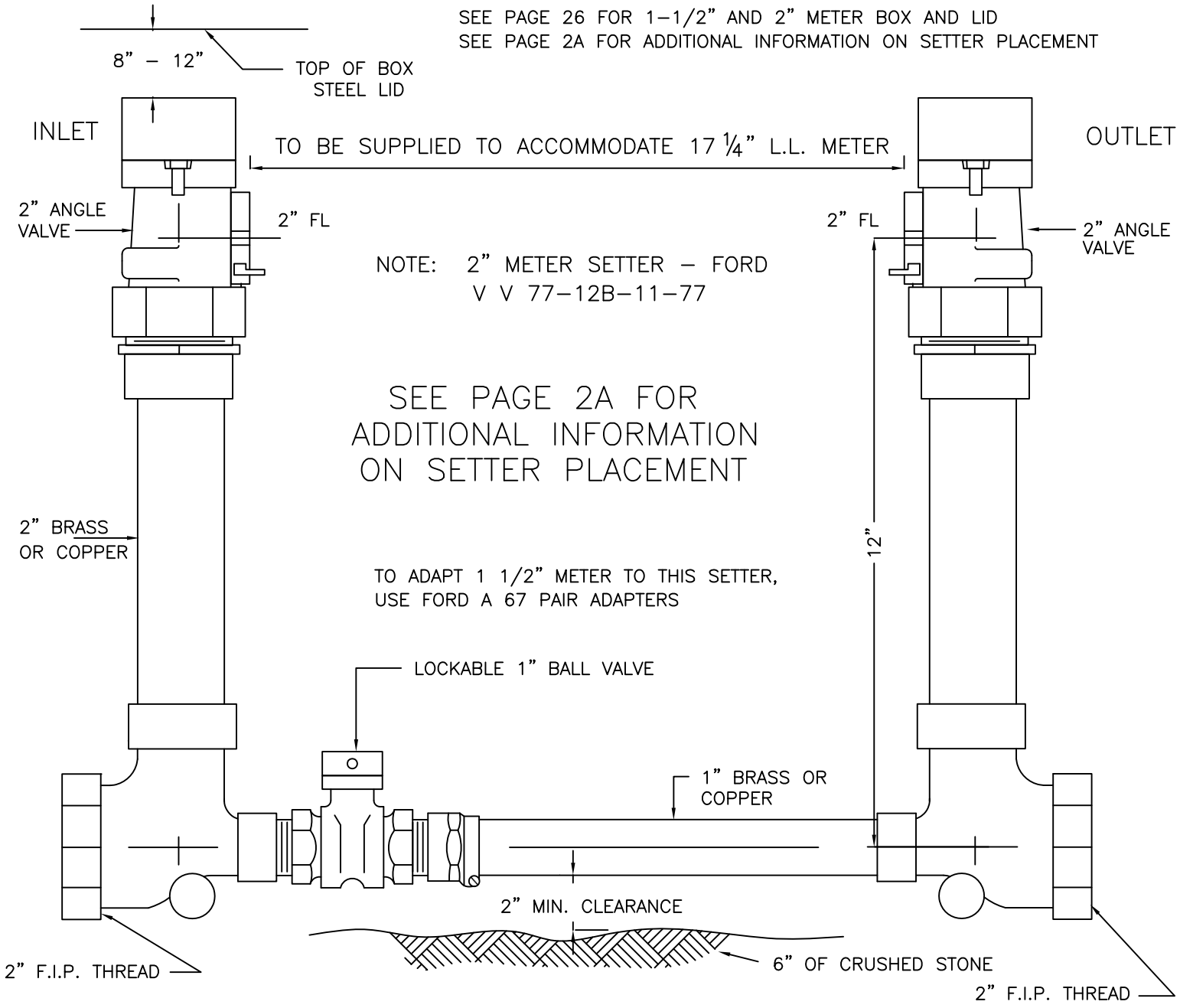


5/8", 3/4", 1" STANDARD DUAL METER BOX AND SETTING



BASIC LAYOUT FOR TEST PUMP

SEE PAGE 26 FOR 1–1/2" AND 2" METER BOX AND LID
SEE PAGE 2A FOR ADDITIONAL INFORMATION ON SETTER PLACEMENT

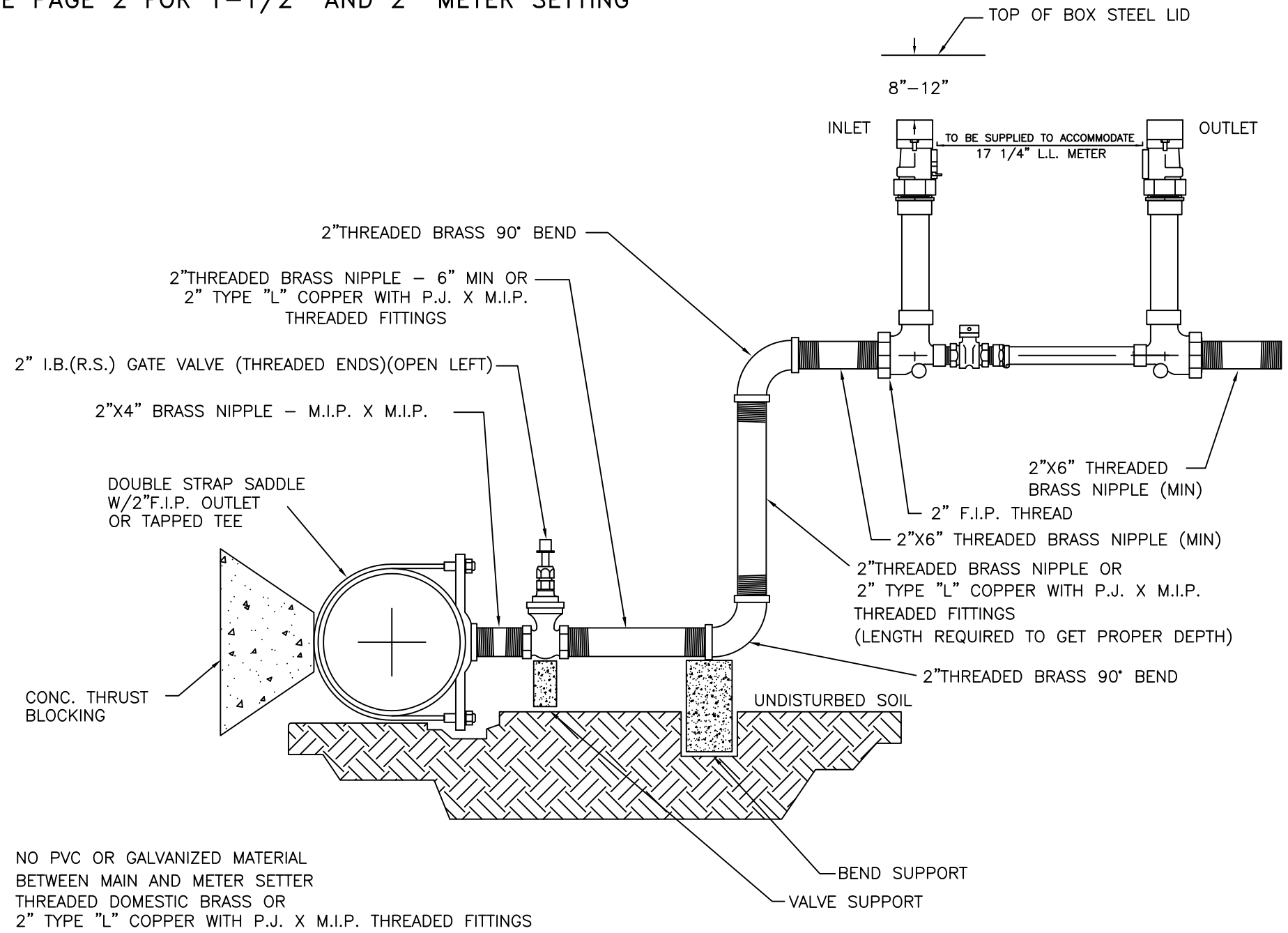


METER SETTING FOR 1 1/2" & 2" METERS

150 P.S.I. WORKING PRESSURE

02 2in mtr set&test pump.dwg
2016 Revision

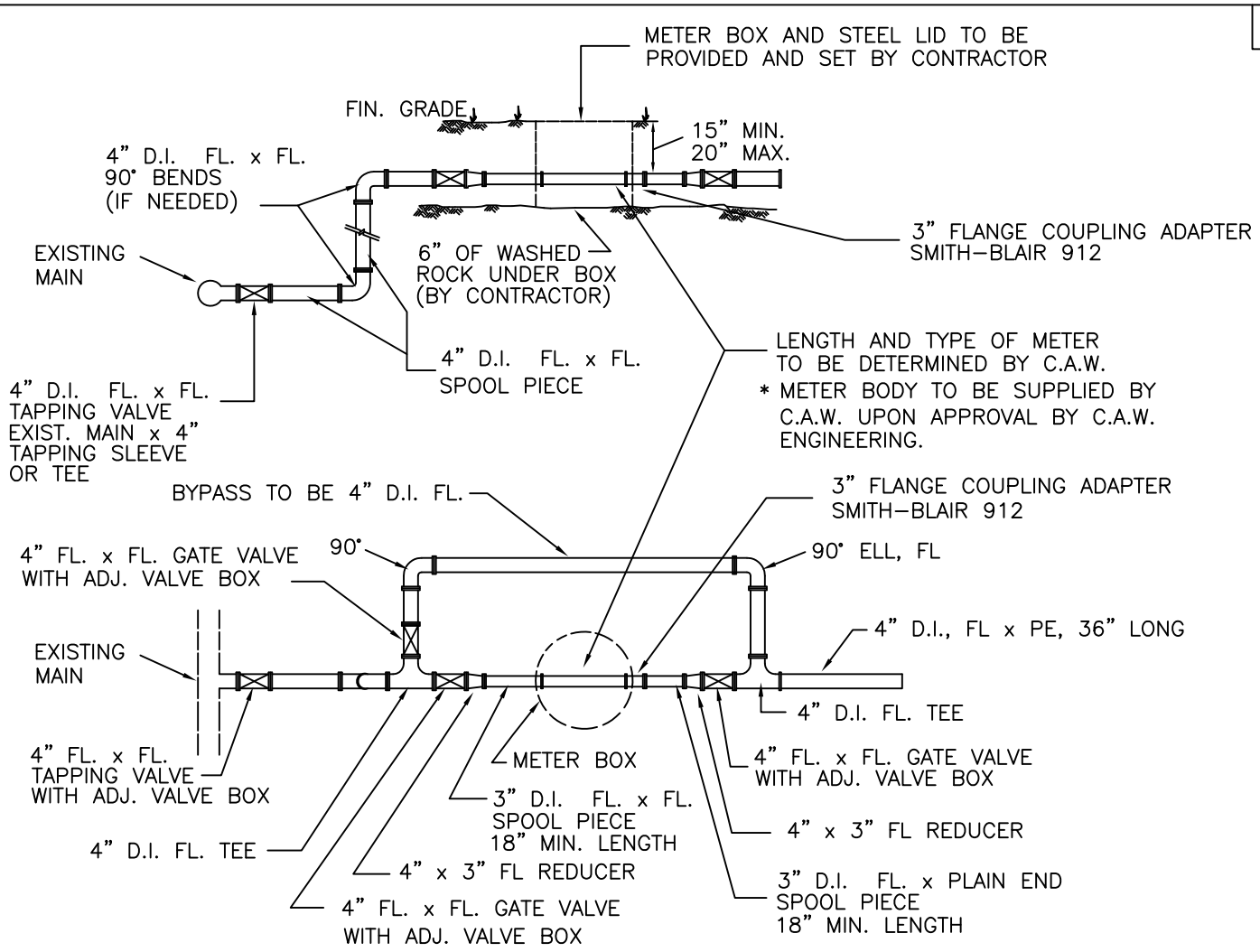
SEE PAGE 2 FOR 1–1/2" AND 2" METER SETTING



NO PVC OR GALVANIZED MATERIAL
BETWEEN MAIN AND METER SETTER
THREADED DOMESTIC BRASS OR
2" TYPE "L" COPPER WITH P.J. X M.I.P. THREADED FITTINGS

BASIC LAYOUT FOR METER SETTING INSTALLATION FOR 1–1/2" & 2" METERS

02A 1–1/2 & 2in mtr set.dwg
2016 Revision



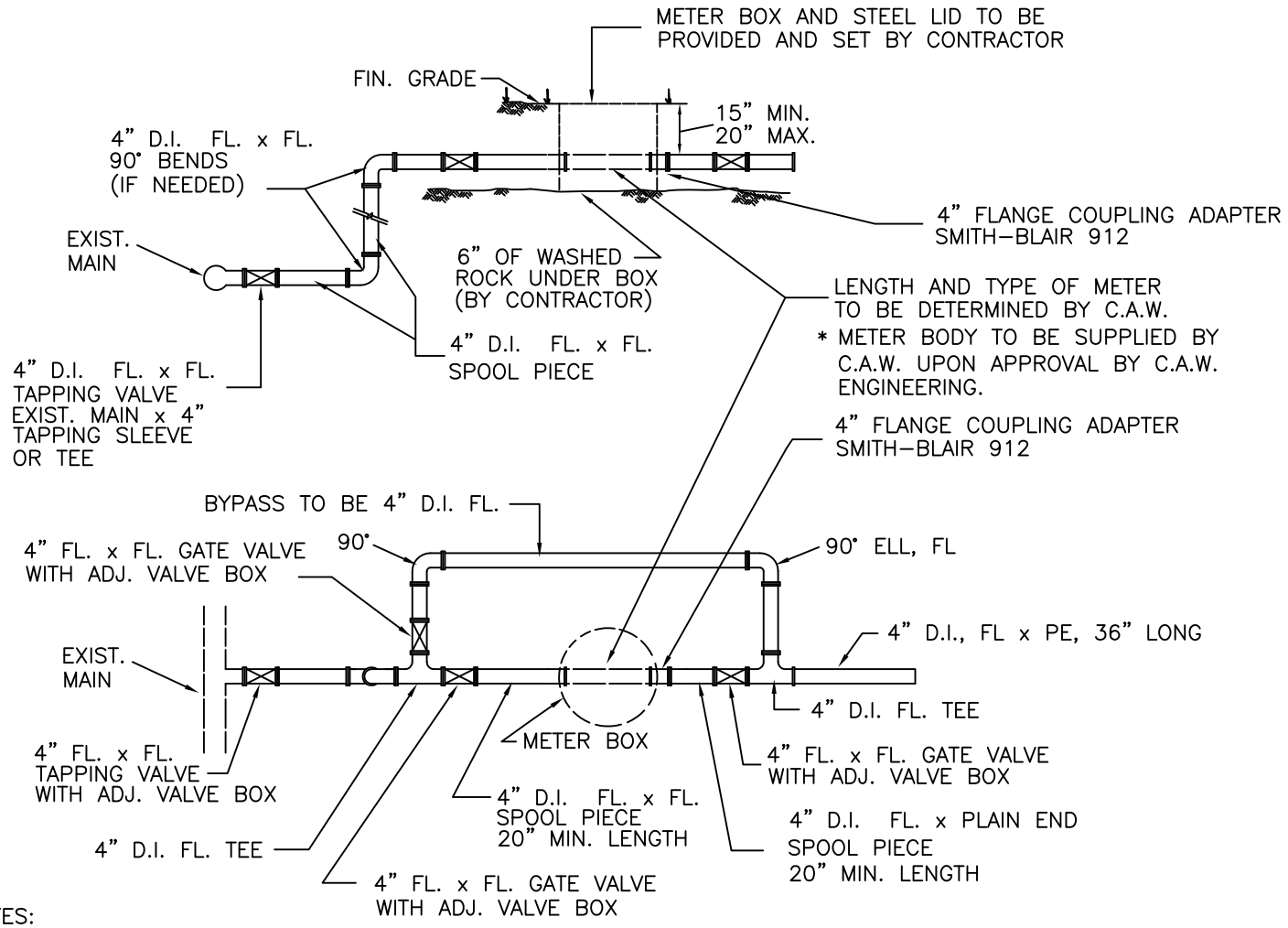
NOTES:

1. ALL PROCEDURES, MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE SPECIFICATIONS OF CENTRAL ARKANSAS WATER
2. ALL D.I. PIPE & FITTINGS SHALL BE POLY WRAPPED.
3. ALL FITTINGS AND VALVES SHALL BE FLANGED. ALL PIPE SHALL BE FLANGED OR P. E. WITH FLANGE ADAPTER.
4. ALL VALVES SHALL OPEN RIGHT, EXCEPT FOR CERTAIN AREAS NORTH OF ARKANSAS RIVER WHICH SHALL OPEN LEFT.
5. METER BOX AND STEEL LID PER DETAIL PAGE 26 WILL BE PROVIDED AND SET BY CONTRACTOR.
6. UNI–FLANGES SHALL NOT BE USED.
7. IF FLANGE ADAPTERS (BEYOND THE ONE SHOWN) ARE USED, PLACE CONC. THRUST BLOCKING BEHIND AFFECTED TEES AND BENDS.

QUANTITY	3" METER SETTER PARTS DESCRIPTION
4	4" FLANGE X FLANGE RESILIENT SEAT VALVES
2	4" FLANGED TEES
2	4" FLANGED 90 DEGREE BENDS
1	4" X 7' 4" DI FLANGED SPOOL PIECE
1	4" X 36" DI FLANGED X PLAIN END SPOOL PIECE
1	4" X 12" DI FLANGED SPOOL PIECE
1	4" X 21" DI FLANGED SPOOL PIECE
1	3" FLANGED COUPLING ADAPTOR **"SMITH BLAIR 912 ONLY"**
2	4" X 3" FLANGED REDUCERS
1	3" X 18" DI FLANGED SPOOL PIECE
1	3" X 18" DI FLANGED X PLAIN END SPOOL PIECE
18	4" FLANGE PACKS "BOLTS & GASKETS"
4	3" FLANGE PACKS "BOLTS & GASKETS"
2	4" FLANGED 90 DEGREE BENDS (AS REQUIRED FOR FIELD CONDITIONS.)
2	4" FL X FL SPOOL PIECES (LENGTHS AS REQUIRED FOR FIELD CONDITIONS.)

3" TURBINE METER SET

03 3in mtr set.dwg
2016 Revision



NOTES:

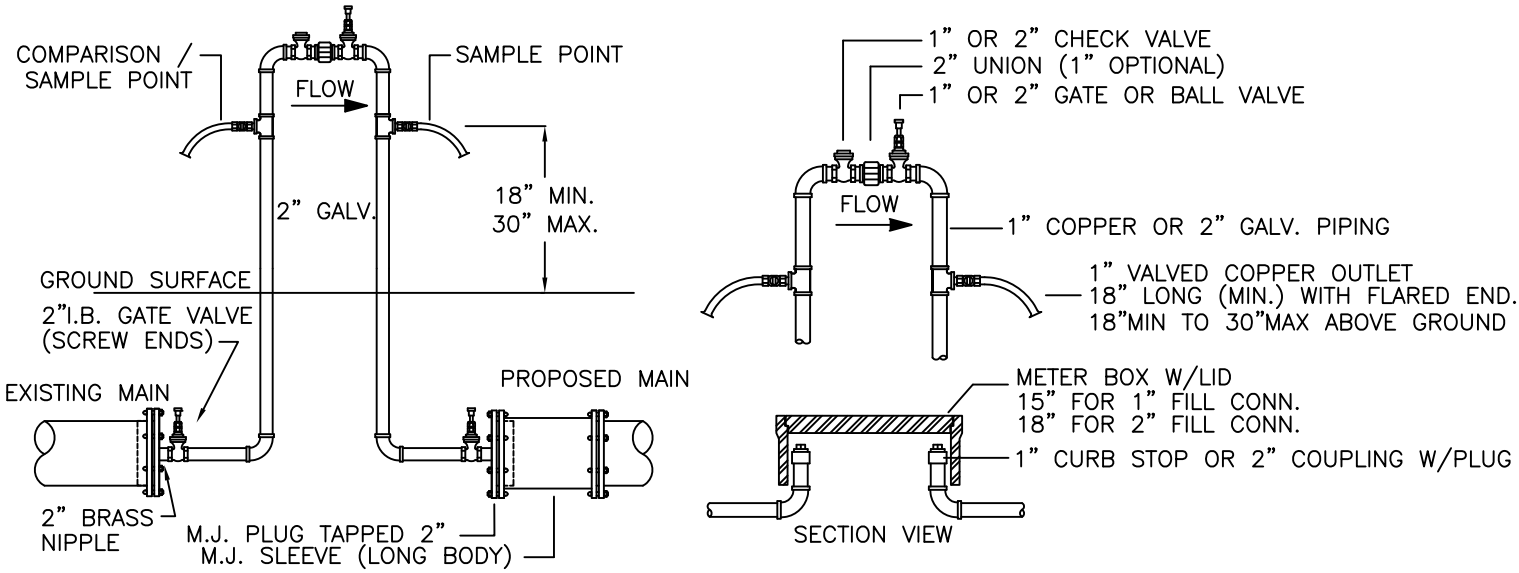
1. ALL PROCEDURES, MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE SPECIFICATIONS OF CENTRAL ARKANSAS WATER
2. ALL D.I. PIPE & FITTINGS SHALL BE POLY WRAPPED.
3. ALL FITTINGS AND VALVES SHALL BE FLANGED. ALL PIPE SHALL BE FLANGED OR P. E. WITH FLANGE ADAPTER.
4. ALL VALVES SHALL OPEN RIGHT, EXCEPT FOR CERTAIN AREAS NORTH OF ARKANSAS RIVER WHICH SHALL OPEN LEFT.
5. METER BOX AND STEEL LID PER DETAIL PAGE 26 WILL BE PROVIDED AND SET BY CONTRACTOR.
6. UNI-FLANGES SHALL NOT BE USED.
7. IF FLANGE ADAPTERS (BEYOND THE ONE SHOWN) ARE USED, PLACE CONC. THRUST BLOCKING BEHIND AFFECTED TEES AND BENDS.

QUANTITY	4" METER SETTER PARTS DESCRIPTION
4	4" FLANGE X FLANGE RESILIENT SEAT VALVES
2	4" FLANGED TEES
2	4" FLANGED 90 DEGREE BENDS
1	4" X 7' 4" DI FLANGED SPOOL PIECE
1	4" X 36" DI FLANGED X PLAIN END SPOOL PIECE
1	4" X 12" DI FLANGED SPOOL PIECE
1	4" X 21" DI FLANGED SPOOL PIECE
1	4" FLANGED COUPLING ADAPTOR **"SMITH BLAIR 912 ONLY"**
1	4" X 24" DI FLANGED SPOOL PIECE
1	4" X 24" DI FLANGED X PLAIN END SPOOL PIECE
20	4" FLANGE PACKS "BOLTS & GASKETS"
2	4" FLANGED 90 DEGREE BENDS (AS REQUIRED FOR FIELD CONDITIONS.)
2	4" FL X FL SPOOL PIECES (LENGTHS AS REQUIRED FOR FIELD CONDITIONS.)

4" TURBINE METER SET

NOTES:

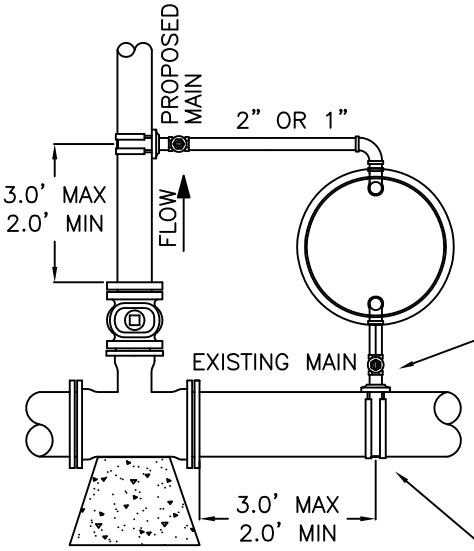
1. 2–INCH FILL CONNECTIONS ARE REQUIRED ON ALL MAINS, 12–INCH'S AND LARGER, OR AS DIRECTED BY C.A.W. ENG... 1–INCH FILL CONNECTIONS SHALL BE USED ON ALL MAINS SMALLER THAN 12–INCH'S EXCEPT FOR MAINS WITH TEMPORARY END TO END CONNECTIONS OR AS SPECIFIED.
2. FULL SIZE CONNECTIONS WILL BE ALLOWED ONLY WITH WRITTEN APPROVAL OF C.A.W. THESE CONNECTIONS SHALL HAVE A VALVE BOX TO ACCEPT "TYLER 7½", LOCKING LID. VALVES SHALL BE OPERATED BY C.A.W. PERSONNEL ONLY. ALL OTHER CONNECTIONS TO EXISTING FACILITIES SHALL CONTAIN A CHECK VALVE.
3. 2" BLOWOFFS ARE REQUIRED ON ALL MAINS 6" AND LARGER.
4. AFTER APPROVAL OF SAMPLES, CLOSE CORP STOPS AT MAIN AND REMOVE THE ENTIRE FILL ASSEMBLY UNLESS OTHERWISE DIRECTED BY THE ENGINEER. FOR 2" PERMANENT CONNECTIONS, CLOSE 2" VALVES, REMOVE FILL ASSEMBLY, AND PLUG COUPLINGS. TEMPORARY CONNECTIONS SHALL HAVE ALL PIPING REMOVED AT MAIN CONNECTION POINTS AND 2" VALVES PLUGGED.
5. 2" VALVES ON MAIN LINES SHALL BE I. B. (R.S.) WITH THREADED ENDS; OPEN LEFT. 2" NIPPLES SHALL BE BRASS. OR 2" CORP. STOPS
6. 1" VALVES ON MAIN LINES SHALL BE BRASS CORPORATION STOPS.
7. ALL 1" TAPS WILL BE BY DIRECT TAP METHOD, UNLESS PREVIOUSLY APPROVED BY CAW. EXCEPTIONS MAY BE: PRESSURE CLASS D.I., C–900, AND SDR17 PVC, WHERE THE USE OF SADDLES MAY BE PERMITTED.



TEMPORARY (END TO END)

(NO METER BOX REQUIRED)

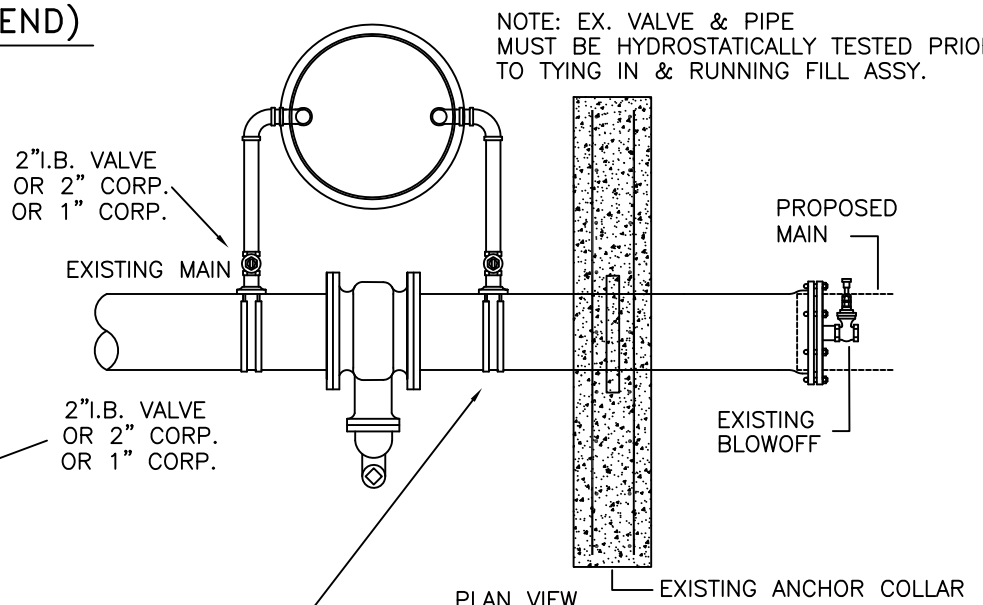
*** SEE NOTE NO. 1 ***



TEE/TAP

*** SEE NOTE NO. 2 ***

NOTE: EX. VALVE & PIPE MUST BE HYDROSTATICALLY TESTED PRIOR TO TYING IN & RUNNING FILL ASSY.



PLAN VIEW

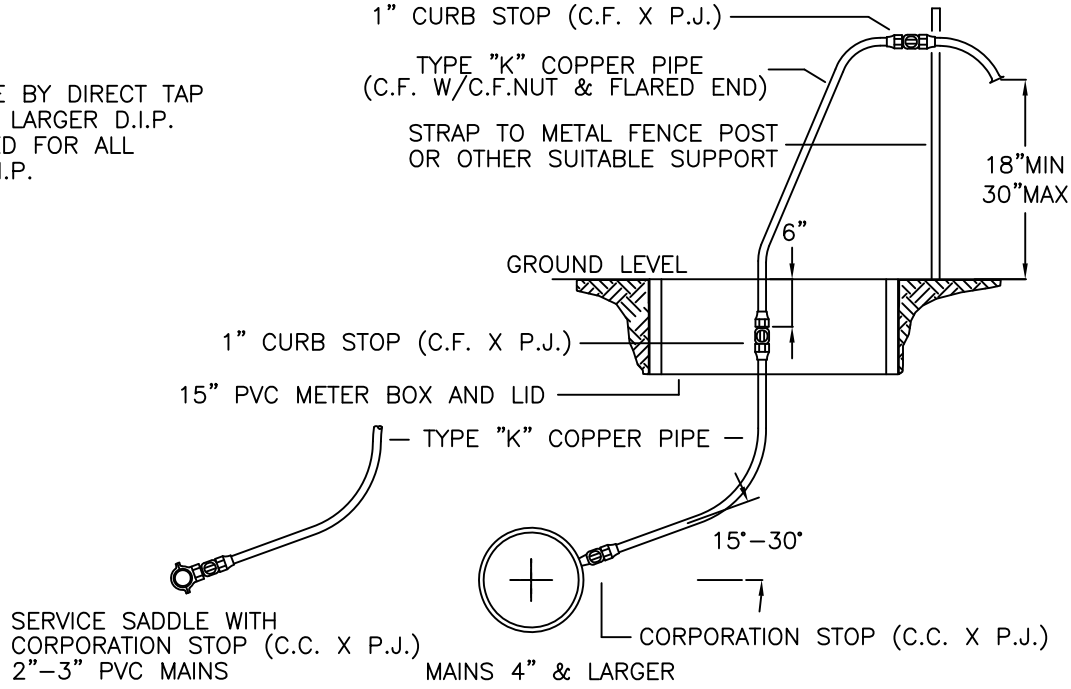
INLINE

*** SEE NOTE NO. 2 ***

1"/ 2" FILL CONNECTION DETAILS TYPICAL INSTALLATIONS

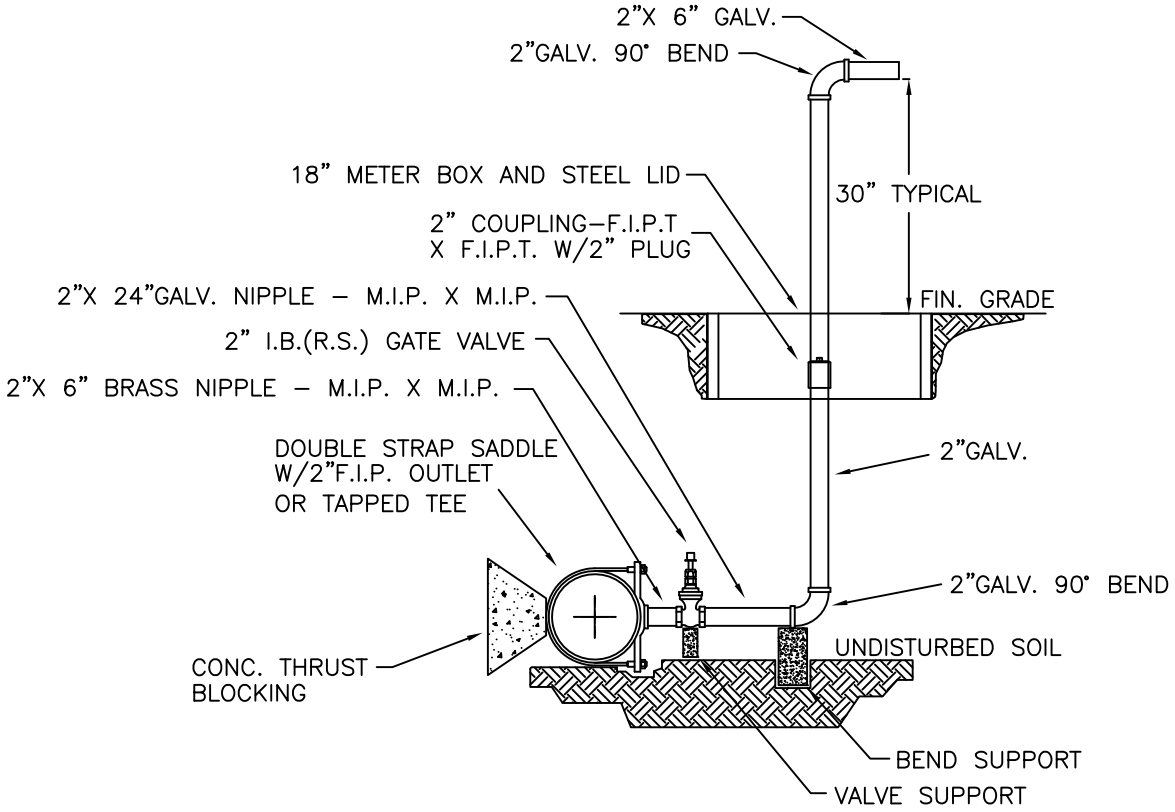
05 Fill con.dwg
2016 Revision

NOTE:
ALL 1" TAPS WILL BE BY DIRECT TAP METHOD, ON 6" AND LARGER D.I.P. TAP SADDLE REQUIRED FOR ALL PVC PIPE AND 4" D.I.P.



NOTE:
REMOVE RISER PIPE & INSTALL METER BOX W/LID WITHIN TEN (10) DAYS AFTER TAKING SAMPLE UNLESS OTHERWISE DIRECTED BY ENGINEER.

1" BLOW OFF / SAMPLE POINT ASSEMBLY

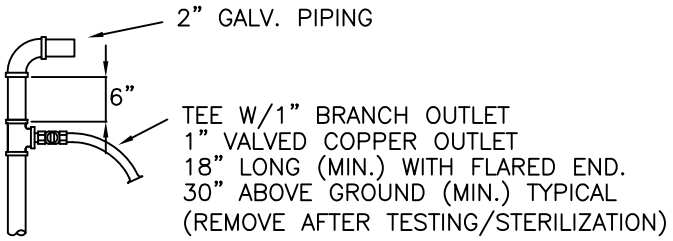


NOTES:

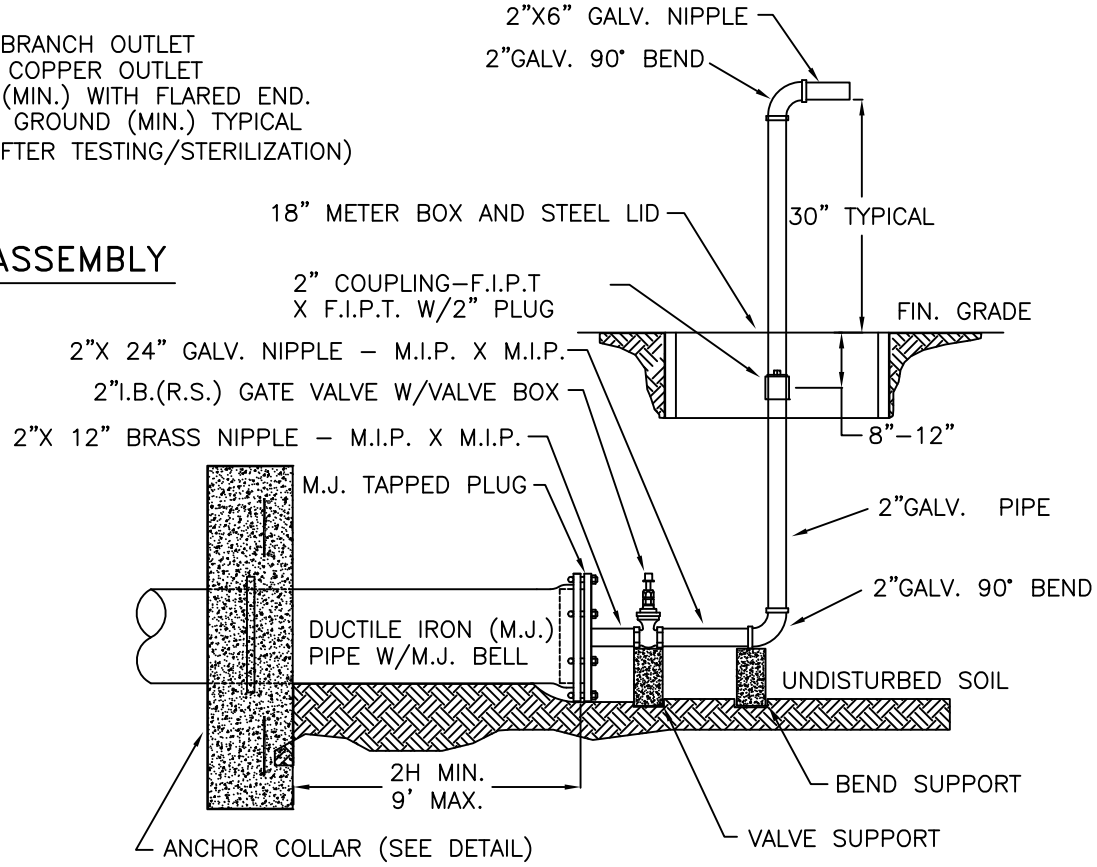
1. ALL SADDLES, STRAPS AND BOLTS SHALL BE POLYWRAPPED.
2. WHEN TAPPING MAIN USE 1 7/8 " BIT.
3. TAPPED TEES MAY BE USED ON CONNECTIONS TO NEW MAINS WHEN APPROVED BY OWNER.
4. ALL THREADED OUTLETS SHALL HAVE A DOUBLE WRAP OF TEFLON TAPE, TEFLON PASTE OR RECTORSEAL ON THREADS.
5. VALVE BOXES SHALL BE INSTALLED ON ALL BLOW OFF VALVES.
6. AFTER TESTING AND STERILIZATION IS COMPLETE, 2" GALV. PIPING TO BE REMOVED AND 2" VALVE PLUGGED.
7. RISER PIPE WILL BE PIPED INTO METER BOX AS SHOWN ONLY WHEN SPECIFIED.

2" SIDE BLOW OFF ASSEMBLY

06 Side Blowoff.dwg
2016 Revision



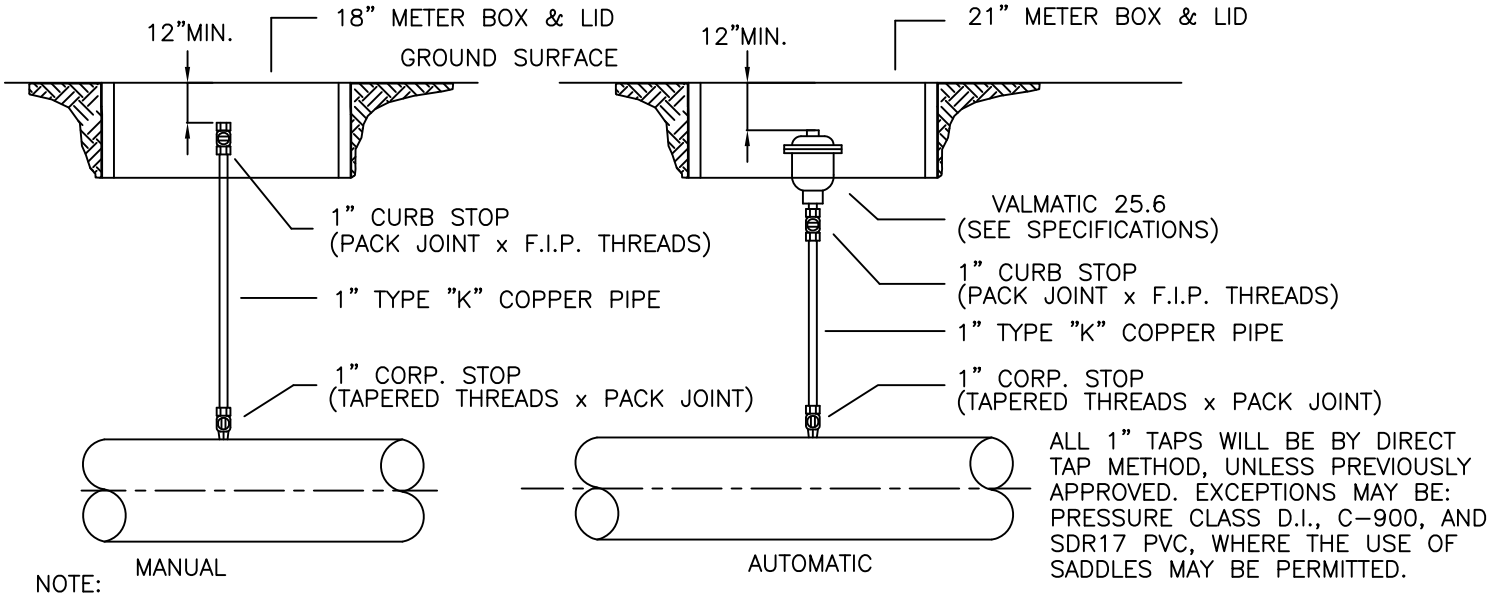
2" SAMPLE POINT ASSEMBLY



NOTES:

1. 2" END BLOW OFF'S TO BE INSTALLED AT THE END OF MAINS 6" AND LARGER
2. A 1" COPPER BLOW OFF SHALL BE INSTALLED AT ON NEAR THE END OF EVERY MAIN NOT REQUIRING A 2" BLOW OFF.
3. ALL THREADED OUTLETS SHALL HAVE A DOUBLE WRAP OF TEFLON TAPE, TEFLON PASTE OR RECTORSEAL ON THREADS.
4. VALVE BOXES SHALL BE INSTALLED ON ALL BLOW OFF VALVES.
5. AFTER TESTING AND STERILIZATION IS COMPLETE, 2" GALV. PIPING TO BE REMOVED AND 2" VALVE PLUGGED.
6. RISER PIPE WILL BE PIPED INTO METER BOX AS SHOWN ONLY WHEN SPECIFIED.

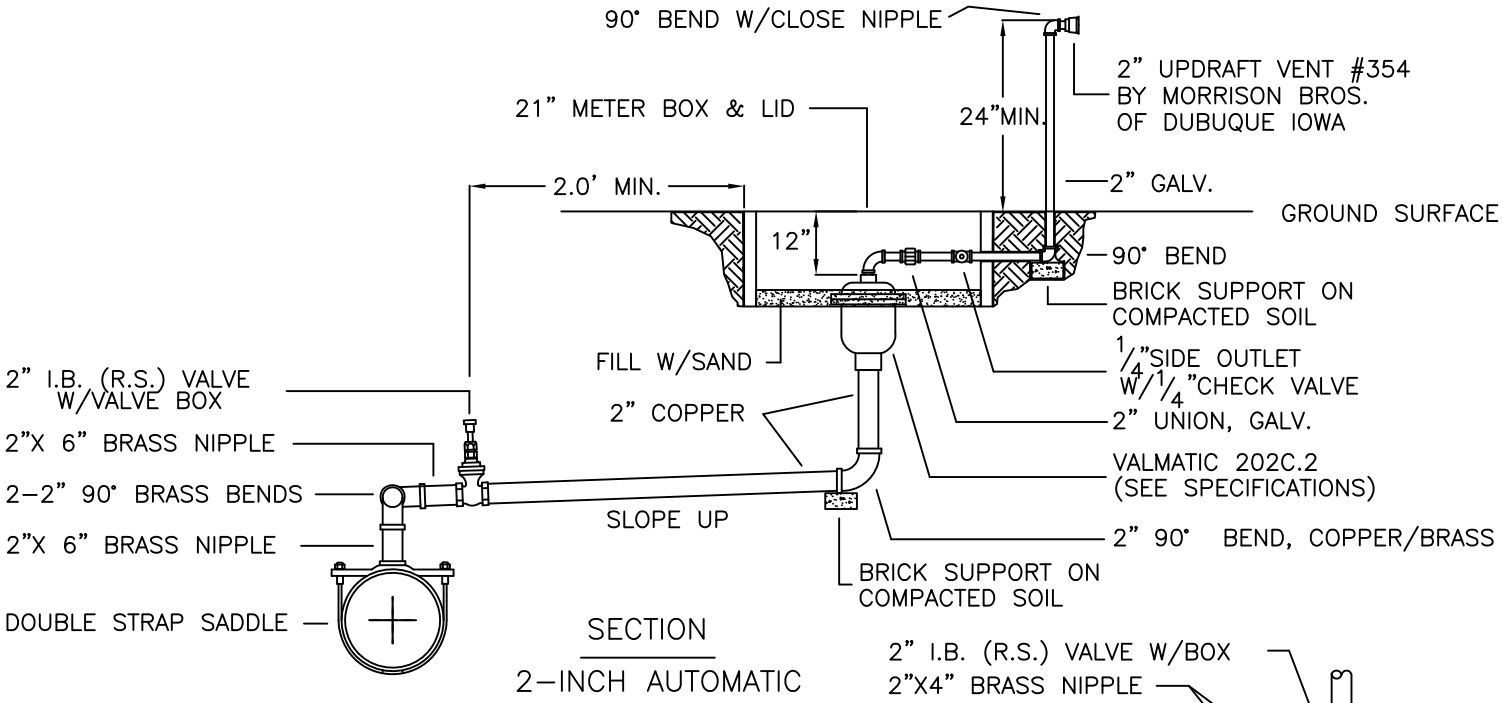
2" END BLOW OFF ASSEMBLY



NOTE:

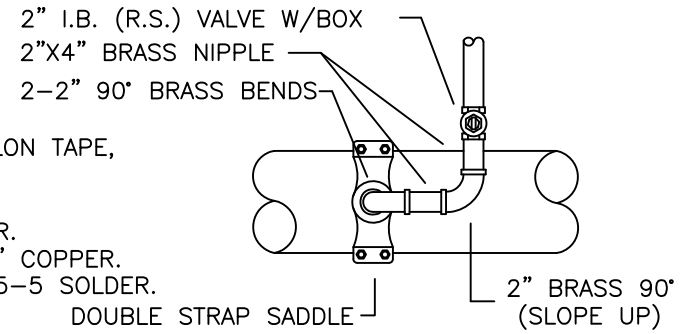
1. ALL THREADED CONNECTIONS SHALL HAVE A DOUBLE WRAP OF TEFLON TAPE, TEFLON PASTE OR RECTORSEAL ON THE THREAD.
2. VALVES WILL BE PIPED TO POINT BEYOND PAVEMENT AND SHOULDER.
3. COPPER PIPE SHALL SLOPE CONTINUOUSLY UPWARDS FROM MAIN TO AIR RELEASE.

AIR RELEASE DETAIL



SECTION

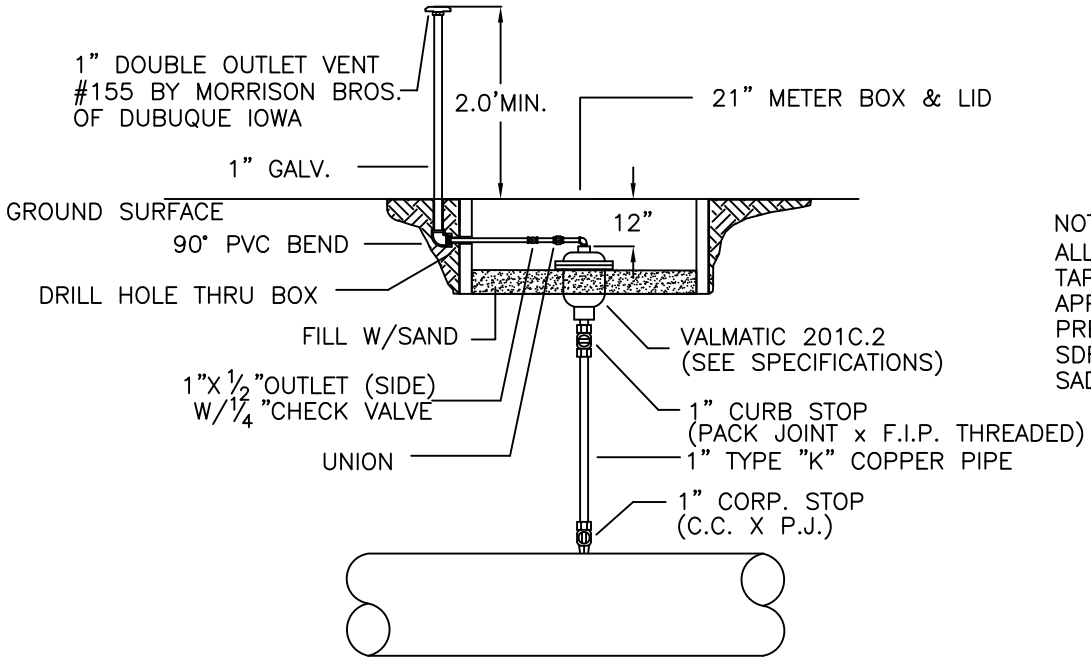
2-INCH AUTOMATIC



PLAN 2-INCH AUTOMATIC

(ROTATED 90°)

1. ALL THREADED CONNECTIONS SHALL HAVE A DOUBLE WRAP OF TEFLON TAPE, TEFLON PASTE, OR RECTORSEAL ON THREADS.
2. DRILL HOLE IN SIDE OF METER BOX FOR OUTLET PIPING.
3. VALVES WILL BE PIPED TO POINT BEYOND PAVEMENT AND SHOULDER.
4. PIPE BETWEEN 2" I.B. VALVE AND AIR VALVE SHALL BE 2" TYPE "K" COPPER. SWEAT ON ALL FITTINGS, ADAPTERS, ELLS, COUPLINGS, ETC. WITH 95-5 SOLDER.



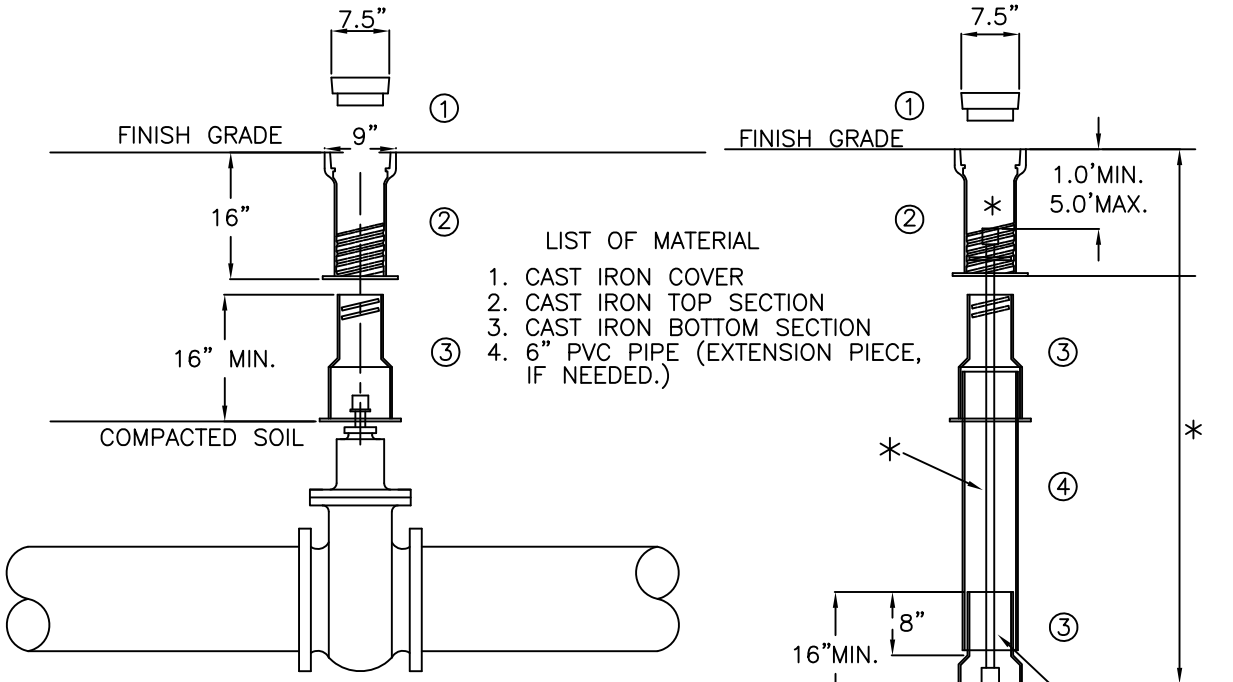
PLAN

1-INCH AUTOMATIC

NOTE:
ALL 1" TAPS WILL BE BY DIRECT TAP METHOD, UNLESS PREVIOUSLY APPROVED. EXCEPTIONS MAY BE: PRESSURE CLASS D.I., C-900, AND SDR17 PVC, WHERE THE USE OF SADDLES MAY BE PERMITTED.

COMBINATION AIR VALVE DETAIL

08 Com air vac.dwg
2016 Revision



LIST OF MATERIAL

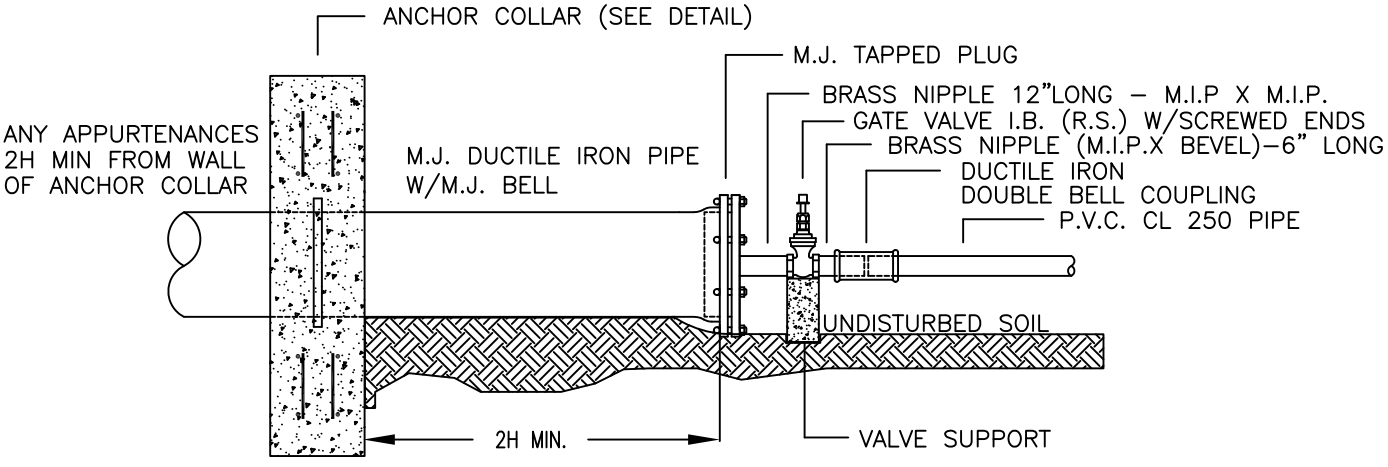
1. CAST IRON COVER
2. CAST IRON TOP SECTION
3. CAST IRON BOTTOM SECTION
4. 6" PVC PIPE (EXTENSION PIECE, IF NEEDED.)

NOTES:

1. IF EXTENSION PIECE IS USED, ANOTHER VALVE BOX BOTTOM SECTION SHALL BE USED.
2. EXTENSION PIECE CAN BE CUT TO LENGTH REQUIRED.
3. USE SLIP TYPE BOTTOM OR CUT THREADS OFF SCREW TYPE BOX
4. IN UNDEVELOPED AREAS, CONSTRUCT A 2'X2'X0.5' THICK CLASS "A" CONC. PAD AROUND THE TOP OF THE VALVE BOX. REINFORCED WITH #5 REBAR

*PROVIDE VALVE STEM EXTENSION WITH CENTERING DEVICE IF GREATER THAN 5.0' DEEP. (PER C.A.W. SPECIFICATIONS)

VALVE BOX INSTALLATION

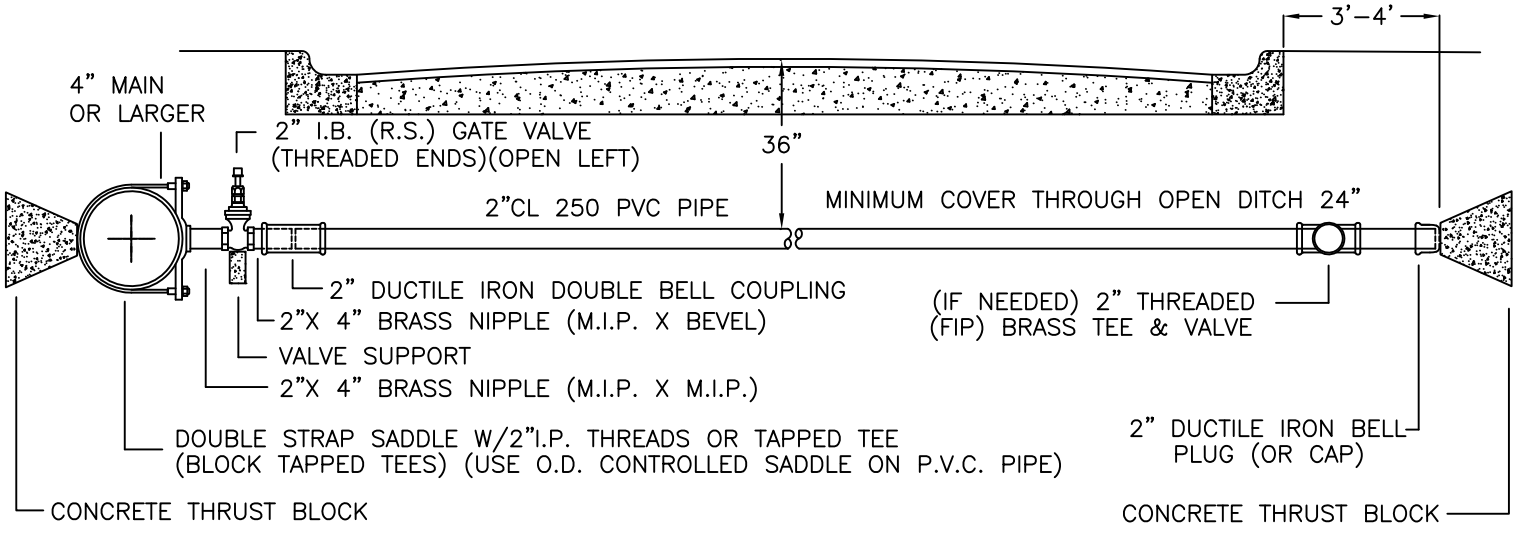


NOTES:

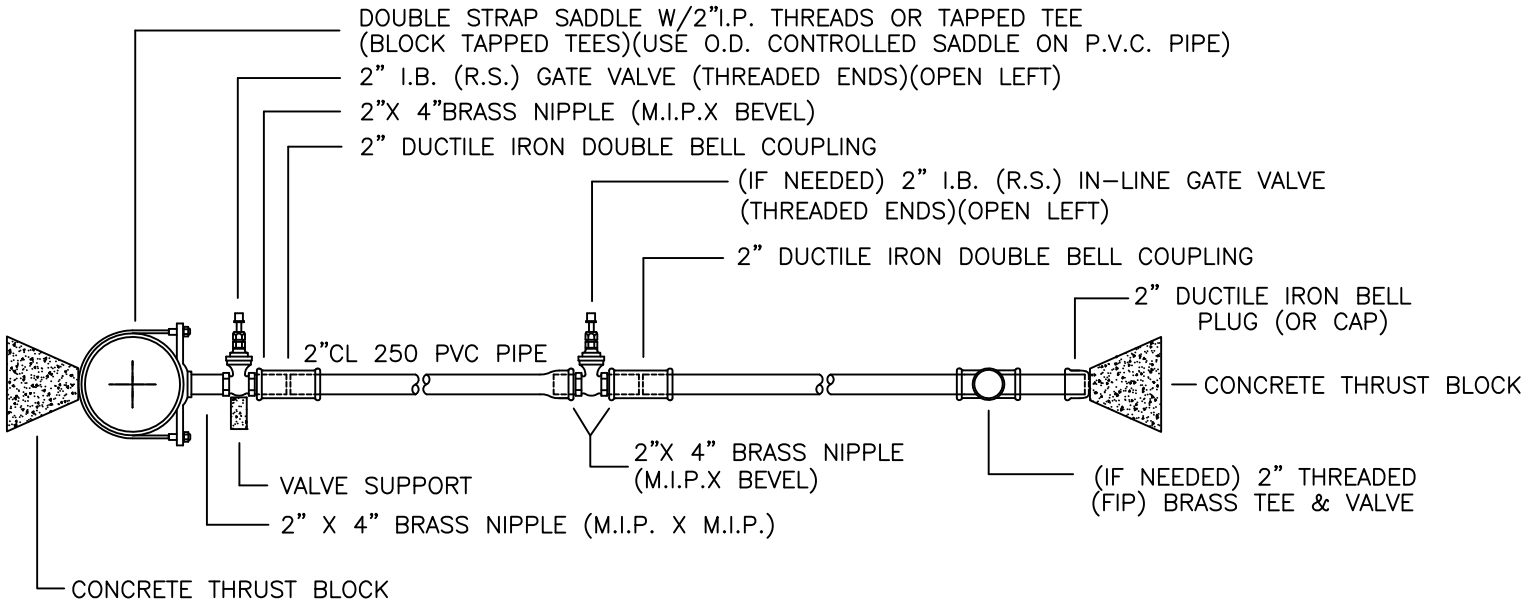
1. SIZE OF TAP, VALVE, AND PVC SHALL BE AS SHOWN IN THE CONSTRUCTION PLAN.
2. VALVE SHALL BE INSTALLED WITH VALVE BOX.

2"/3" PVC MAIN CONNECTION TO 6"AND LARGER MAINS

09 Val box&PVC conn.dwg
2016 Revision



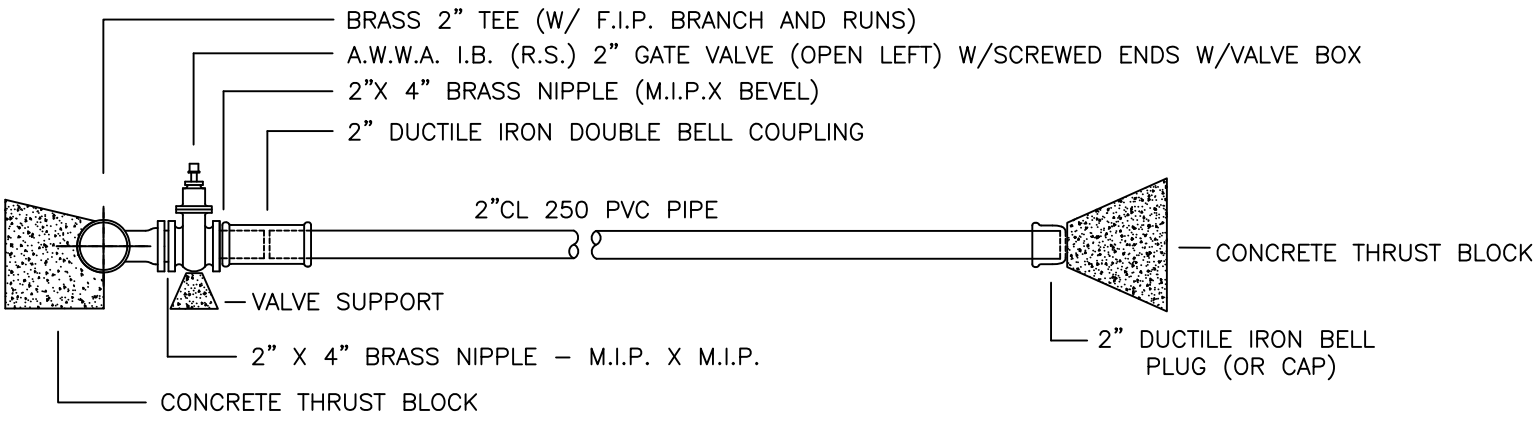
2" SERVICE CONNECTIONS – MAINS 4" AND LARGER



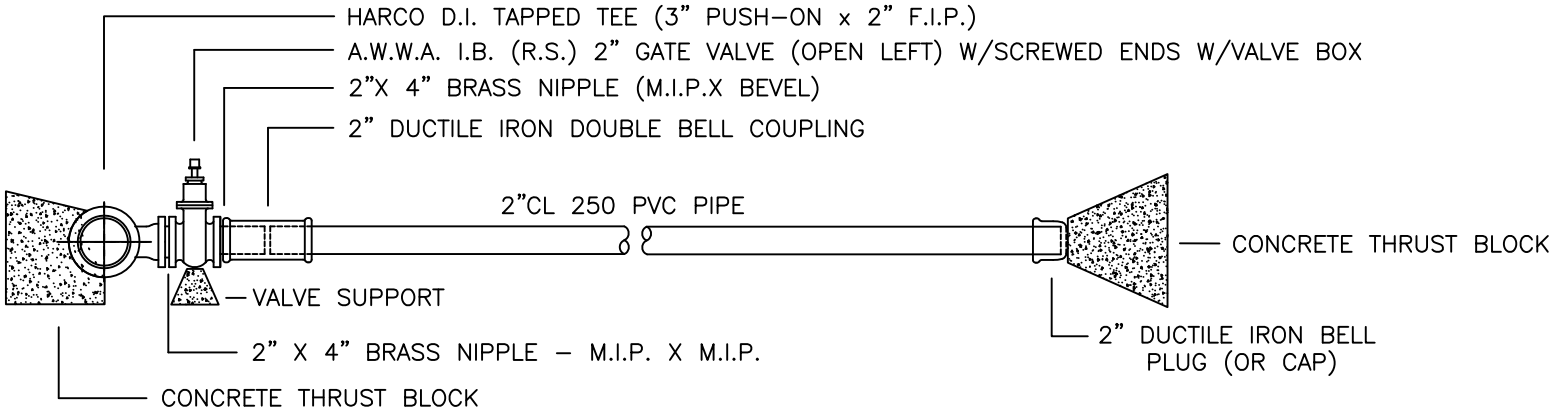
2" SERVICE AND MAIN CONNECTION – MAINS 4" AND LARGER

NOTES:

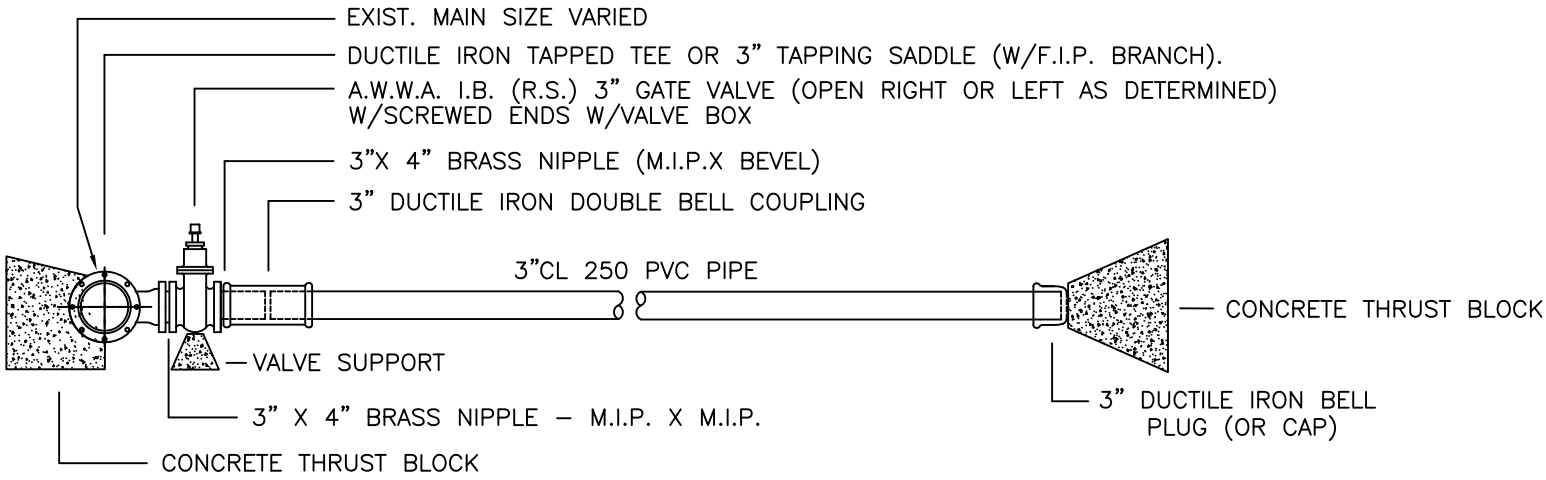
1. SADDLES, STRAPS AND BOLTS SHALL BE POLYWRAPPED.
2. WHEN MAIN TAPPED USE 1 7/8" BIT.
   (TAPPED TEES MAY BE USED ON CONNECTIONS TO NEW MAINS WHEN SPECIFIED).
3. VALVE BOXES SHALL BE INSTALLED ON ALL VALVES.
4. INSTALL CONTINUOUS INSULATED COPPER WIRE WRAPPED AROUND ALL PVC PIPES.
5. PROVIDE CONCRETE SUPPORT UNDER VALVES ATTACHED TO SADDLES.



2" x 2" SERVICE AND MAIN CONNECTION



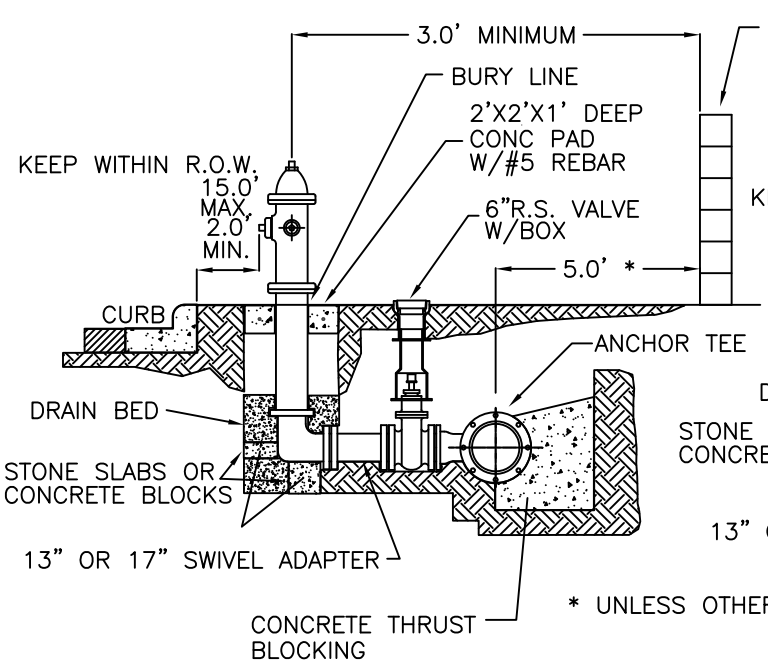
3" x 2" SERVICE AND MAIN CONNECTION



3" SERVICE AND MAIN CONNECTIONS

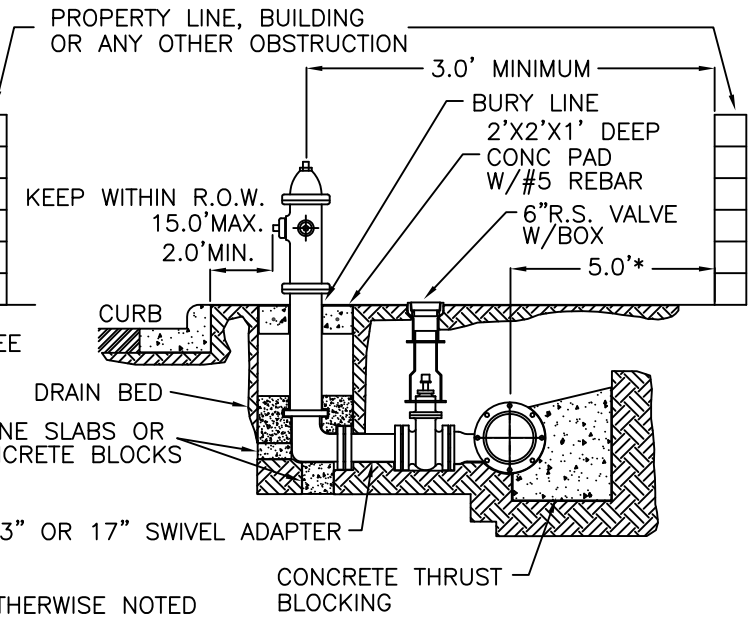
NOTES:

1. ALL THREADED CONNECTIONS SHALL HAVE A DOUBLE WRAP OF TEFLON TAPE, TEFLON PASTE, OR RECTOR SEAL.
2. LAY COPPER TRACING WIRE WITH PVC PIPE.
3. POLY WRAP ALL IRON FITTINGS, BOLTS, AND NUTS.



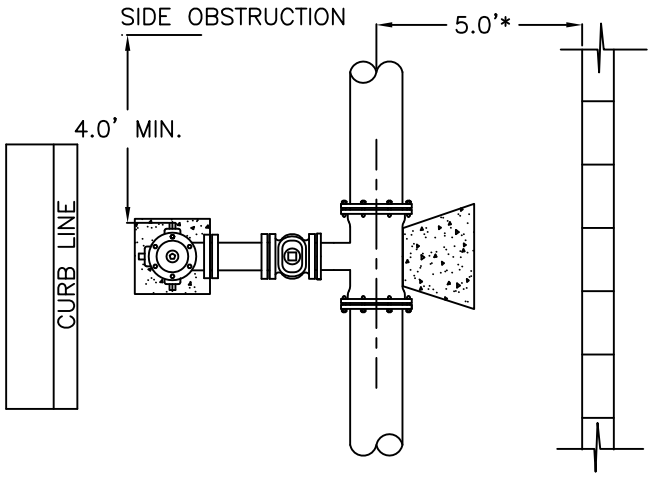
* UNLESS OTHERWISE NOTED

ELEVATION VIEW / STANDARD ANCHOR TEE



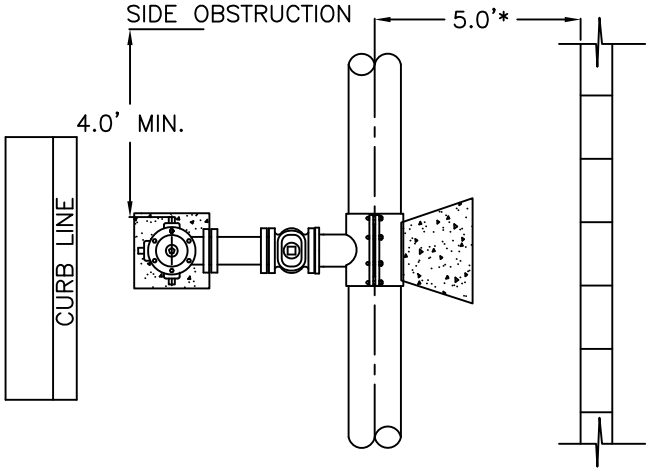
ELEVATION VIEW / FLANGED OUTLET

CONCRETE PIPE – USE TANGENT FLANGE OUTLET.



PLAN VIEW

STANDARD FIRE HYDRANT INSTALLATION
USE ANCHOR TEE (UNLESS OTHER WISE NOTED)



PLAN VIEW

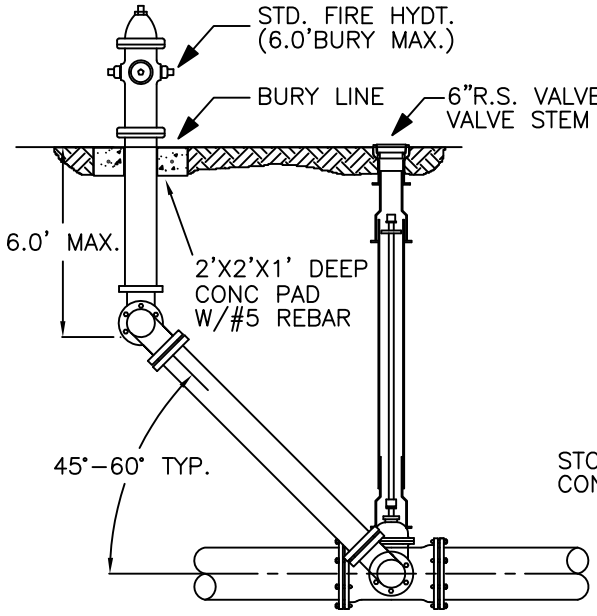
TANGENT OUTLET
MAINS 16" AND LARGER

NOTES:

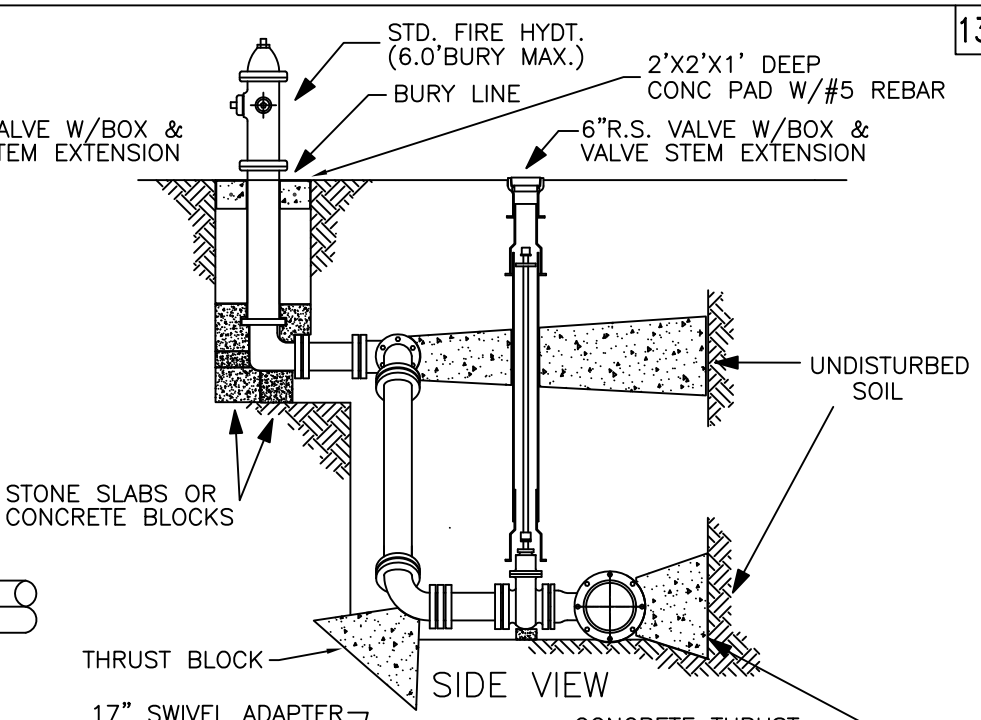
1. DRAINAGE BED SHALL CONSIST OF CRUSH STONE OR COURSE GRAVEL WITH COURSE SAND. MINIMUM VOLUME OF 6 CU. FT. DRAIN BED SHALL EXTEND A MINIMUM OF 6" ABOVE DRAIN OUTLET.
2. USE 6" D.I. NIPPLE WITH M.J. RETAINER GLANDS IF DISTANCE BETWEEN VALVE AND HYDRANT MUST BE GREATER THAN 17" SWIVEL ADAPTER.
3. FIRE HYDRANT TO BE BLOCKED AGAINST FIRM SOIL AS SHOWN.
4. ALL HYDRANTS SHALL BE INSTALLED PLUMB.
5. LARGE NOZZLE SHALL FACE CURB UNLESS OTHERWISE NOTED. ROTATE BARREL AS REQUIRED.
6. HYDRANT SHOULD NOT BE SET CLOSER THAN 4.0' TO OBSTRUCTIONS THAT ARE IN LINE WITH NOZZLE.
7. M.J. ANCHOR TEE OR TAPPING SLEEVE MAY BE USED (SEE MATERIAL SPECIFICATIONS) WHEN USING REGULAR M.J. TEE USE 13" SWIVEL ADAPTER NIPPLE BETWEEN TEE AND VALVE.
8. HYDRANTS TO BE SET AT DEPTHS GREATER THAN 6.0' SHALL BE SET WITH A MODIFIED FIRE HYDRANT SETTING. SEE DEEP BURY FIRE HYDRANT ASSEMBLY
9. POLY WRAP ALL PIPE, FITTINGS, BOLTS AND NUTS
10. FOR HYDRANTS NOT SET IN CONCRETE, PAVEMENT OR SIDEWALKS, A CONCRETE PAD SHALL BE CONSTRUCTED AROUND THE HYDRANT BARREL. CONCRETE PAD SHALL BE 2'X2'X1' DEEP, REINFORCED WITH ONE #5 REBAR ALL AROUND HYDRANT.

STANDARD FIRE HYDRANT ASSEMBLY

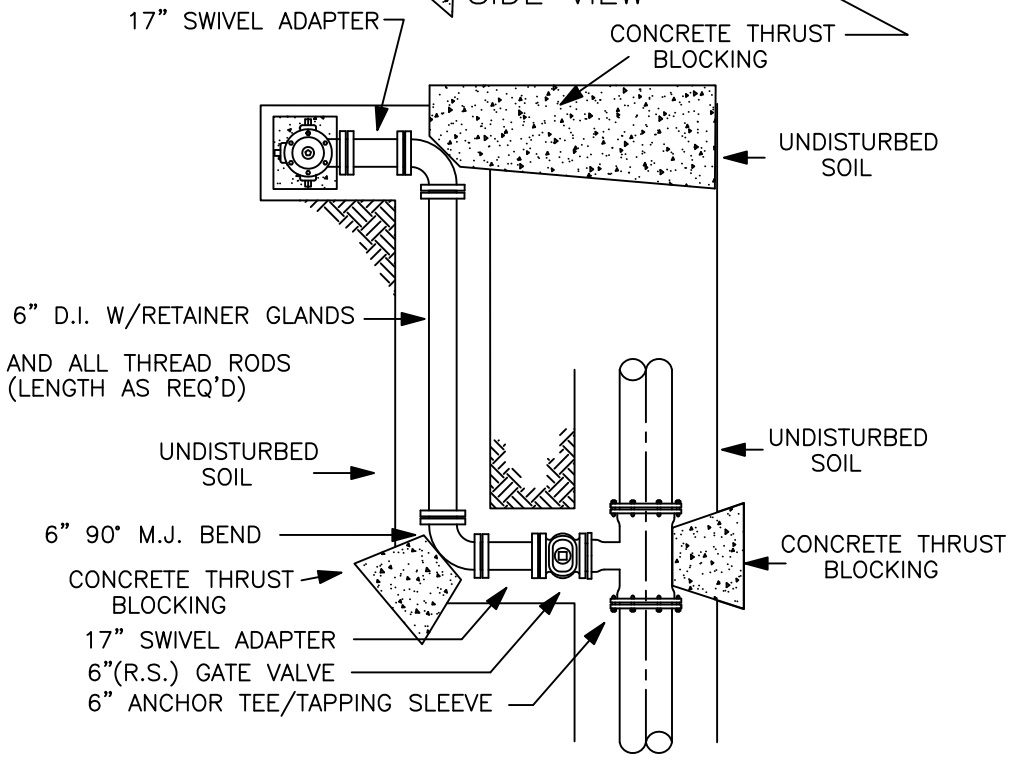
12 FH Standard w_conc.dwg
2016 Revision



FRONT VIEW



SIDE VIEW



PLAN VIEW

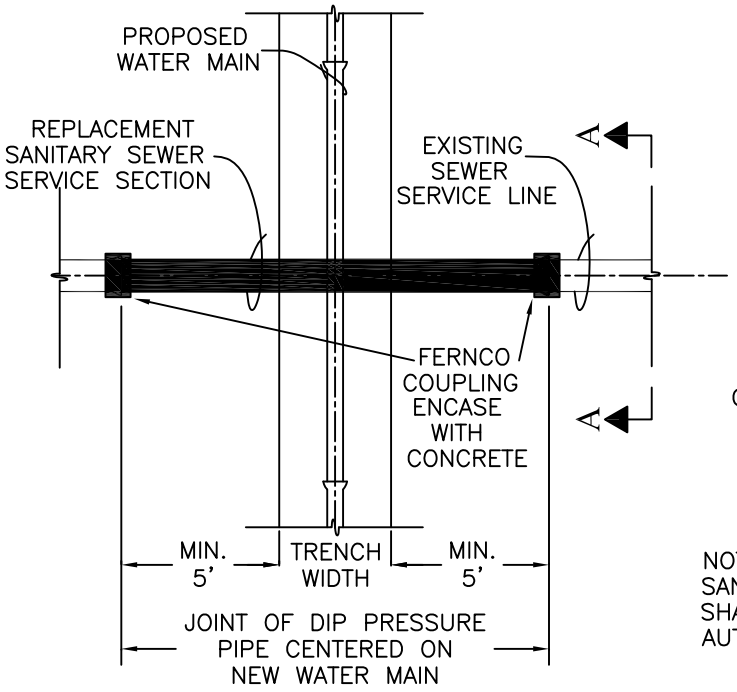
NOTES:

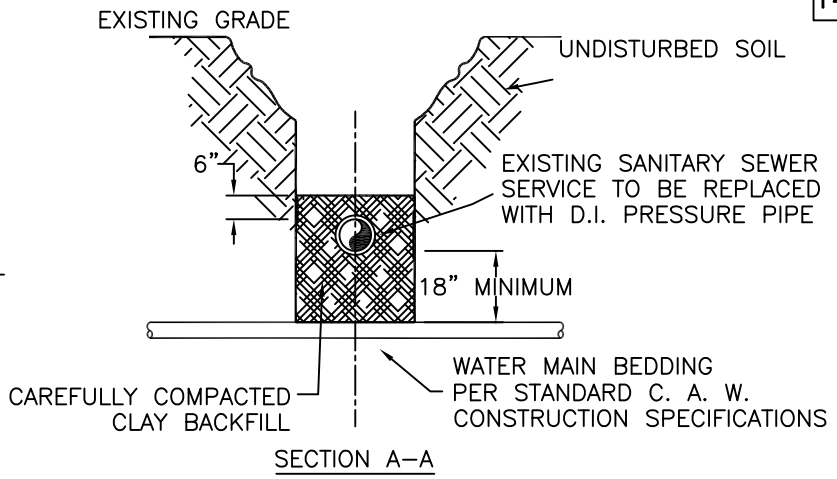
1. DRAINAGE BED SHALL CONSIST OF CRUSH STONE OR COURSE GRAVEL WITH COURSE SAND. MINIMUM VOLUME OF 6 CU. FT. DRAIN BED SHALL EXTEND A MINIMUM OF 6" ABOVE DRAIN OUTLET.
2. USE 6" D.I. NIPPLE WITH M.J. RETAINER GLANDS IF DISTANCE BETWEEN VALVE AND HYDRANT MUST BE GREATER THAN 17" SWIVEL ADAPTER.
3. FIRE HYDRANT TO BE BLOCKED AGAINST FIRM SOIL AS SHOWN.
4. ALL HYDRANTS SHALL BE INSTALLED PLUMB.
5. LARGE NOZZLE SHALL FACE CURB UNLESS OTHERWISE NOTED. ROTATE BARREL AS REQUIRED.
6. HYDRANT SHOULD NOT BE SET CLOSER THAN 4.0' TO OBSTRUCTIONS THAT ARE IN LINE WITH NOZZLE.
7. M.J. ANCHOR TEE OR TAPPING SLEEVE MAY BE USED (SEE MATERIAL SPECIFICATIONS) WHEN USING REGULAR M.J. TEE USE 13" SWIVEL ADAPTER NIPPLE BETWEEN TEE AND VALVE.
8. POLY WRAP ALL PIPE, FITTINGS, BOLTS AND NUTS
9. FOR HYDRANTS NOT SET IN CONCRETE, PAVEMENT OR SIDEWALKS, A CONCRETE PAD SHALL BE CONSTRUCTED AROUND THE HYDRANT BARREL. CONCRETE PAD SHALL BE 2'X2'X1' DEEP, REINFORCED WITH ONE #5 REBAR ALL AROUND HYDRANT.

DEEP BURY FIRE HYDRANT ASSEMBLY

(BURY DEEPER THAN 6.0')

13 FH Deep bury.dwg
2016 Revision



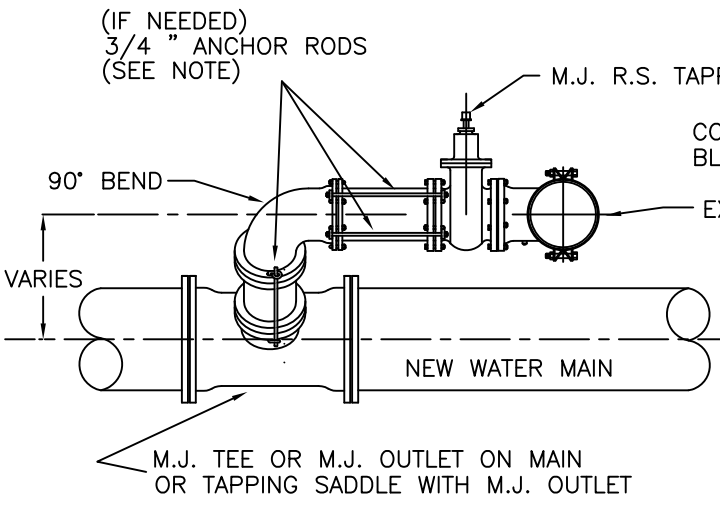


SECTION A–A

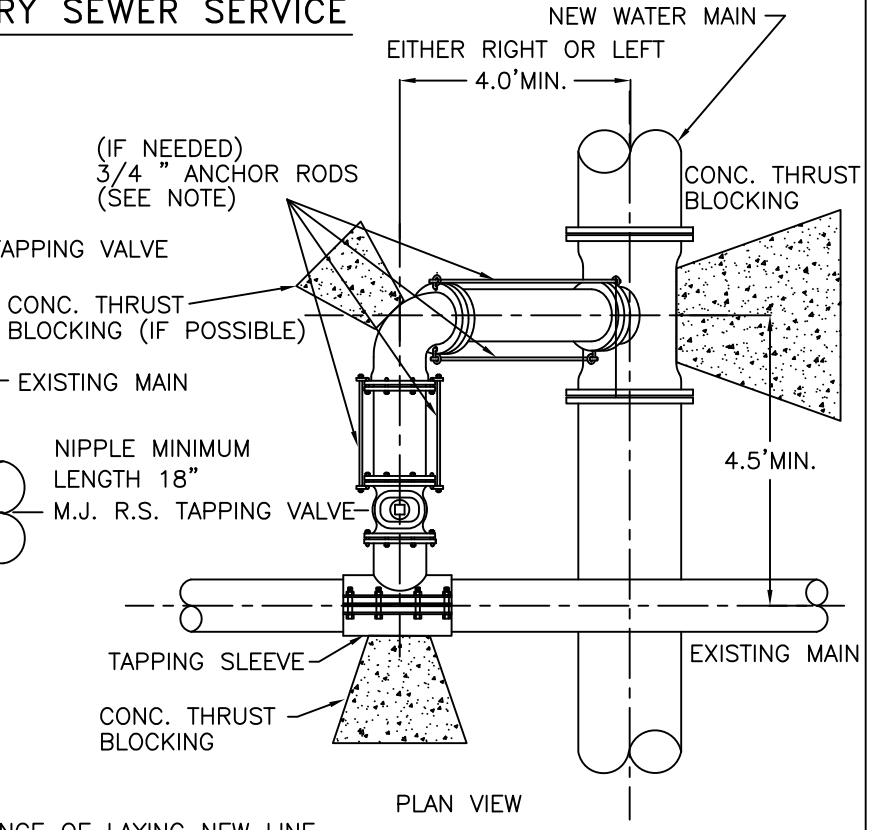
NOTE:
SANITARY SEWER SERVICE REPLACEMENT SHALL BE SUBJECT TO LOCAL WASTEWATER AUTHORITY SPECIFICATIONS AND INSPECTION.

PLAN

NEW WATER MAIN CROSSING UNDER EXISTING SANITARY SEWER SERVICE



SECTION VIEW



PLAN VIEW

NOTES:

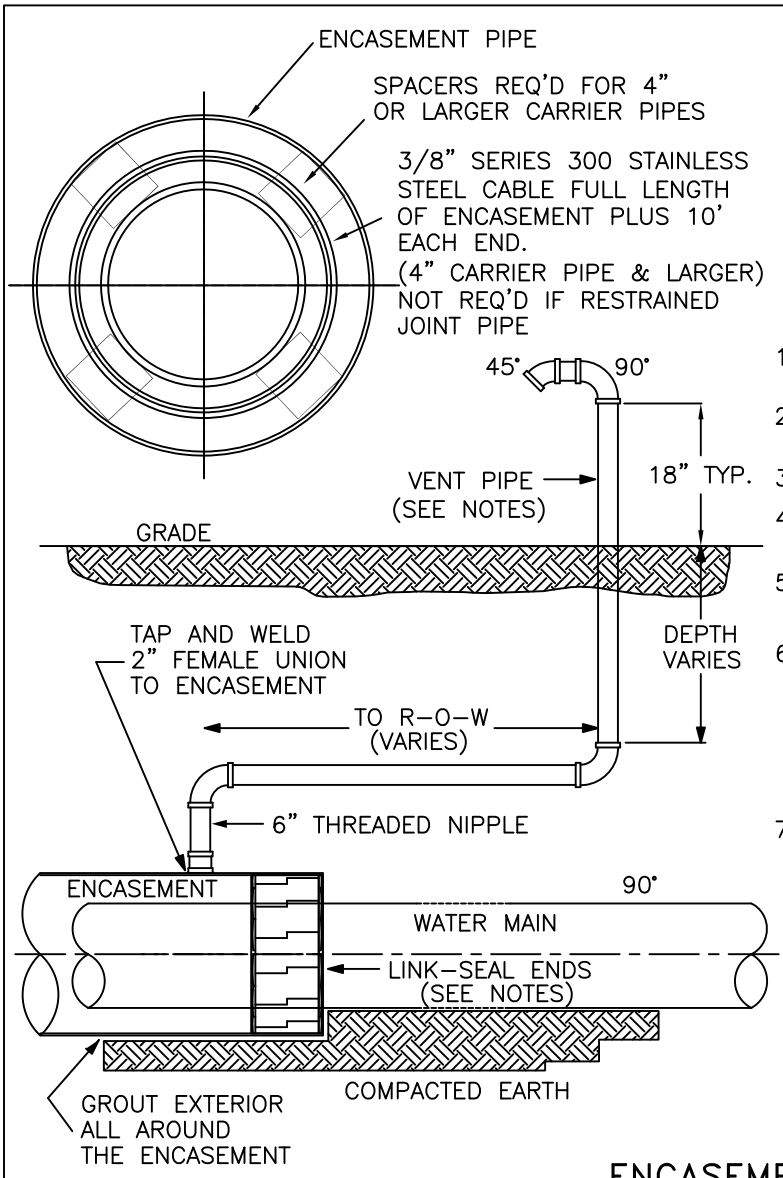
1. CONTRACTOR SHALL LOCATE EXISTING MAIN IN ADVANCE OF LAYING NEW LINE IN ORDER TO ASSURE ADEQUATE LENGTH TO ADJUST DEPTH OF NEW MAIN.
2. DIMENSIONS SHOWN ARE RECOMMENDED MINIMUMS TO PROVIDE ADEQUATE ROOM FOR TIGHTENING BOLTS ON JOINTS. (OTHER DIMENSIONS MAY BE USED)
3. USE TIE RODS IF ADEQUATE THRUST BLOCKING AGAINST UNDISTURBED SOIL IS NOT POSSIBLE.
4. ALL TIE RODS AND NUTS FOR PERMANENT PLACEMENT SHALL BE SERIES 300 STAINLESS STEEL USE 3/4" RODS FOR 6" THRU 24". USE 1" RODS FOR 30" THRU 36". USE 1 1/4" RODS FOR 42" THRU 48".
5. RODS SHALL BE FIELD CUT TO FIT & SHALL BE PROTECTED WITH POLYWRAP.
6. ROTATE TEE UP & ELBOW DOWN AS REQUIRED TO MATCH.

225 PSI SERIES 300 STAINLESS STEEL

PIPE SIZE	6"	8"	10"	12"	16"	20"	24"	30"	36"	42"	48"
RODS / NIPPLE	2	2	4	4	8	12	16	14	18	16	20

SWING CONNECTION – NEW MAIN TO EXISTING MAIN

14 Swing Con&Sew Cross.dwg
2016 Revision



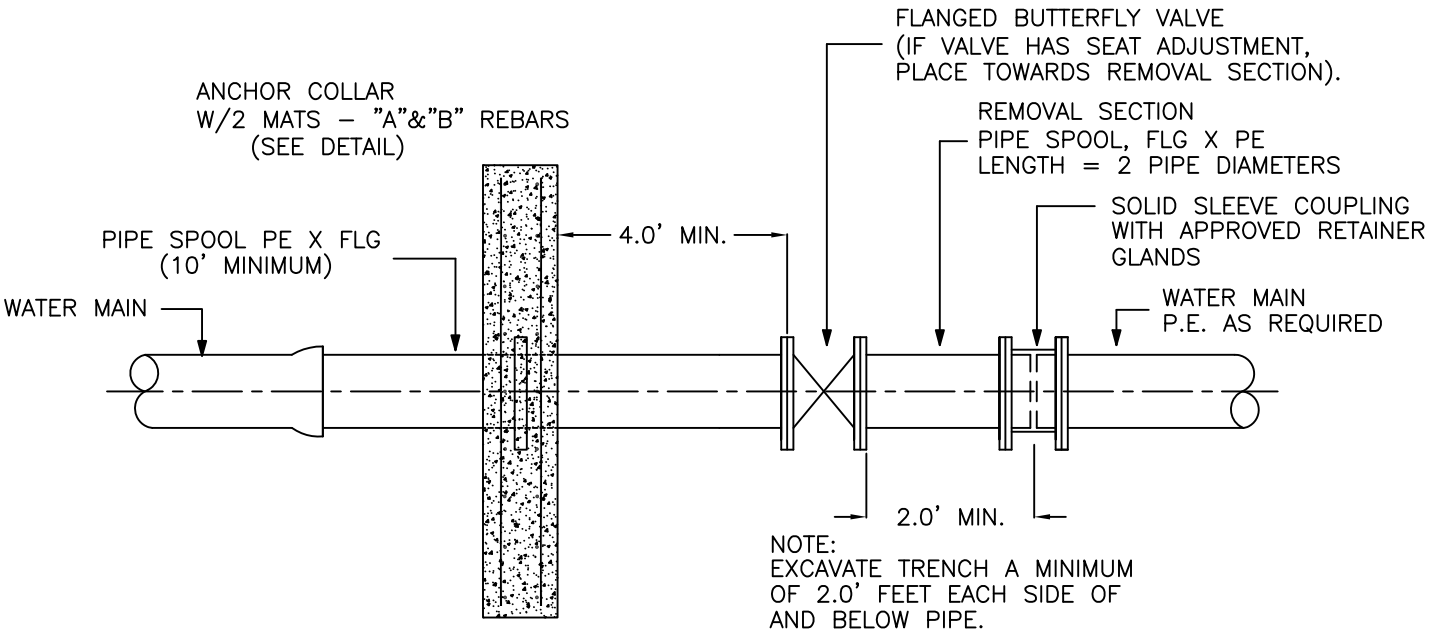
NOTES:

1. SPACER SHALL BE AS SPECIFIED IN THE MATERIAL SPECIFICATIONS IN THE FOLLOWING AMOUNTS:
   4 EACH FOR 12" AND LARGER PIPE
   3 EACH FOR 4" THRU 10" PIPE
   > PER JOINT OF PIPE
2. PLACE SPACERS 2.0' FROM ENDS.
3. WHEN CONCRETE PIPE IS USED, JOINT PROTECTION WILL BE AS SPECIFIED IN PARAGRAPH 16.8.2.4 OF THE CONSTRUCTION SPECIFICATIONS.

NOTES:

1. ENCASEMENT VENTS PIPES SHALL BE MADE OF 2-INCH GALV. AND SHALL BE CONSTRUCTED AS SHOWN.
2. VENT PIPES SHALL BE INSTALLED PLUMB & WITHIN 6-INCHES OF THE RIGHT-OF-WAY.
3. VENTS ARE REQUIRED UNLESS DELETED BY THE ENGINEER.
4. ENCASEMENT ENDS SHALL BE SEALED WITH LINK-SEAL OR APPROVED EQUAL.
5. GROUT EXTERIOR ANNULAR SPACE AROUND ENCASEMENT (PARAGRAPH 22.12 OF THE CONSTRUCTION SPECIFICATIONS.
6. ENCASEMENTS FOR MAINS 2-INCH AND LARGER THAT CROSS R.O.W.'S CONTROLLED BY THE AHTD OR RAILROAD SHALL HAVE VENT PIPE PLACED AT EACH RIGHT-OF-WAY LINE. VENT PIPES SHALL BE 2-INCH GALV. AND SHALL HAVE A C.A.W. LABEL ATTACHED.
   (LABELS WILL BE PROVIDED BY C.A.W.)
7. FOR CARRIER PIPES 4" AND LARGER 3/8" SERIES 300 STAINLESS STEEL CABLE SHALL BE SECURELY FASTENED TO THE LEAD END OF THE WATER MAIN DURING INSTALLATION WITH A 3/8" CABLE CLAMP AND SPIRAL WRAPPED AROUND WATER MAIN AS PLACED THROUGH THE ENCASEMENT. ONCE THE WATER MAIN IS IN PLACE, THE 3/8" CABLE CLAMP SHALL BE REMOVED AND THE REQUIRED 10' OF ADDITIONAL CABLE ON EACH END SHALL BE WRAPPED AROUND WATER MAIN AND SECURED INSIDE THE SEALED END. IF RESTRAINED JOINT WATER PIPE, DO NOT INSTALL CABLE.

ENCASEMENT AND VENT



TYPICAL BUTTERFLY VALVE INSTALLATION IN STRAIGHT RUN OF PIPE

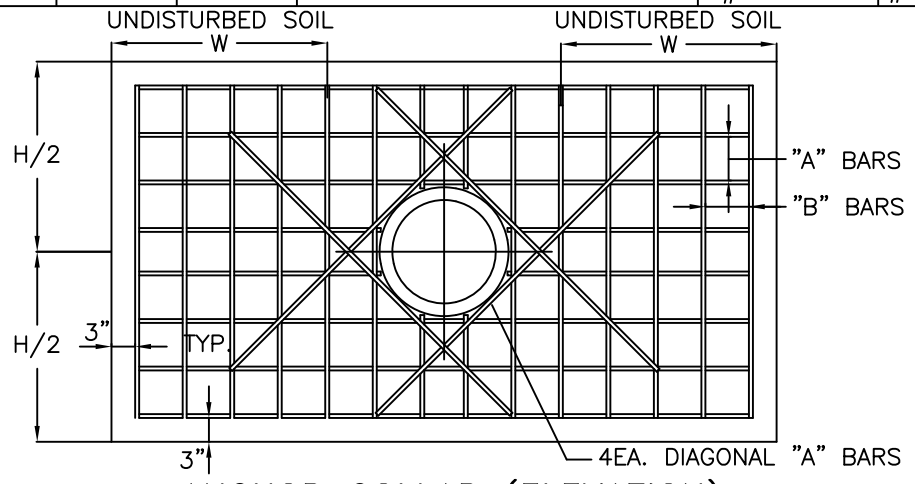
(16" AND LARGER PIPE)

ANCHOR COLLAR SCHEDULE						
PIPE SIZE	* MINIMUM DIMENSIONS *				REINFORCING BARS	
	W	H	T	THRUST COLLAR	"A" BARS	"B" BARS
6"	1.5'	2.0'	2.0'	M.L. RETAINER GLAND	#6 @ 6"	#6 @ 6"
8"	1.5'	2.5'	2.0'	M.L. RETAINER GLAND	#6 @ 6"	#6 @ 6"
12"	2.0'	4.0'	2.0'	M.L. RETAINER GLAND	#6 @ 6"	#6 @ 6"
16"	3.0'	4.5'	2.0'	M.L. RETAINER GLAND	#6 @ 6"	#6 @ 6"
20"	3.5'	5.0'	2.0'	M.L. RETAINER GLAND	#6 @ 6"	#6 @ 6"
24"	4.5'	5.5'	2.0'	M.L. RETAINER GLAND	#7 @ 6"	#7 @ 10"
30"	6.5'	6.0'	2.5'	4.5" X 1.0" WELD-ON	#8 @ 6"	#8 @ 10"
36"	7.5'	7.0'	2.5'	4.7" X 1.0" WELD-ON	#8 @ 6"	#8 @ 10"
42"	8.5'	8.0'	3.0'	5.0" X 1.25" WELD-ON	#8 @ 6"	#8 @ 10"

ALL RETAINER GLANDS SHALL BE MEGA-LUG

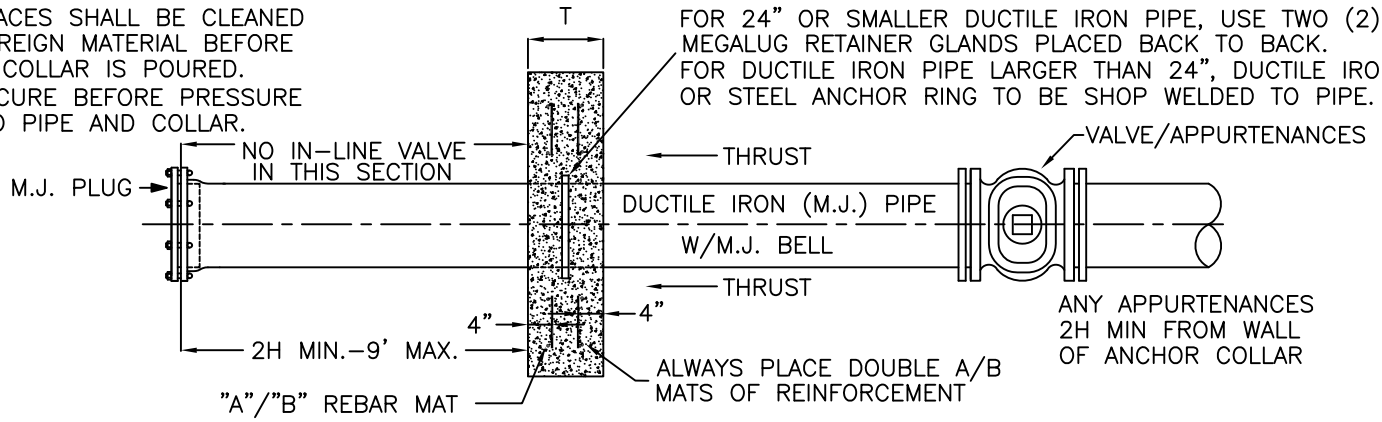
WELD-ON THRUST RING SHALL BE DUCTILE IRON OR STEEL

WELD ON THRUST RING SHALL BE DESIGNED FOR 250 PSI WORKING PRESSURE AND 375 PSI TEST PRESSURE.

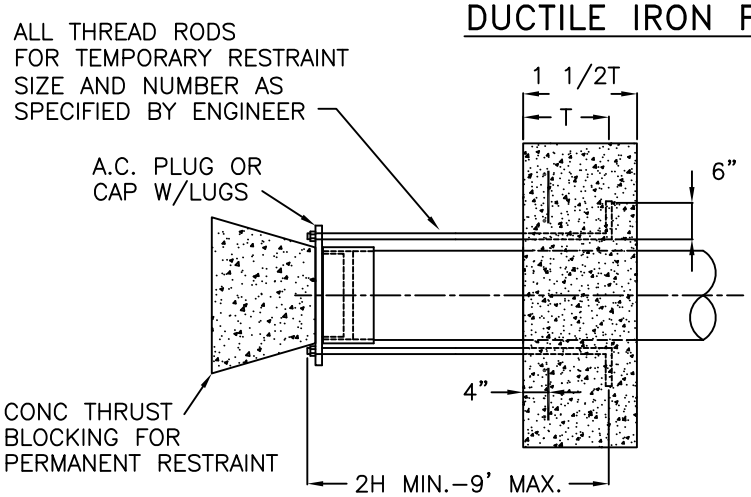


ANCHOR COLLAR (ELEVATION)

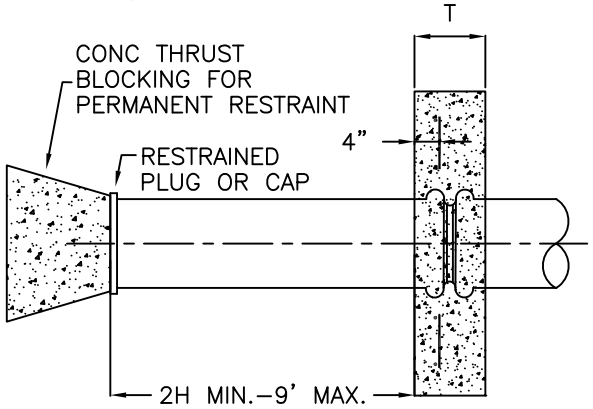
NOTE:
PIPE SURFACES SHALL BE CLEANED OF ALL FOREIGN MATERIAL BEFORE CONCRETE COLLAR IS POURED.
72 HOUR CURE BEFORE PRESSURE APPLIED TO PIPE AND COLLAR.



DUCTILE IRON PIPE (TOP VIEW)



ASBESTOS CEMENT PIPE ANCHOR COLLAR DETAIL

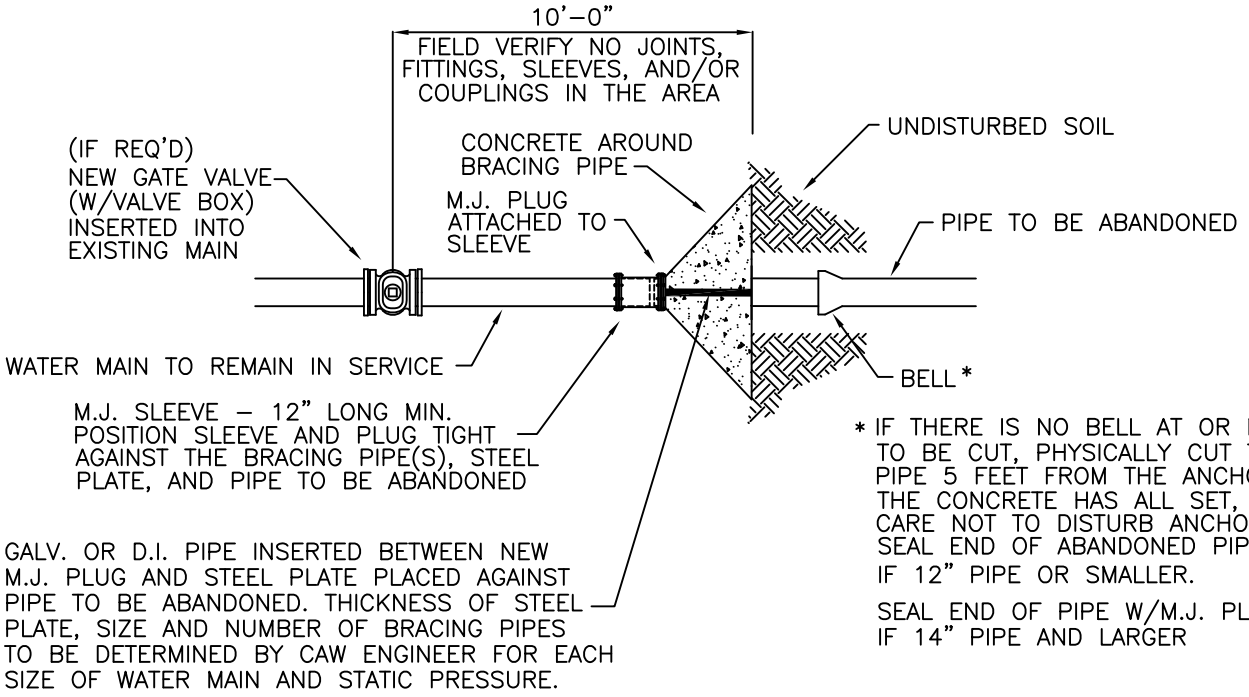


CONCRETE PIPE-PRECAST KEY

16 Anc Col det.dwg
2016 Revision

NOTES:

1. NEW VALVE SHALL BE INSTALLED ONLY IF SHOWN IN THE CONSTRUCTION PLAN.
2. IF WATER MAIN CAN BE TEMPORARILY SHUT DOWN, NEW INSERTED VALVE SHALL BE CUT IN BY CONTRACTOR.
3. IF WATER MAIN CAN NOT BE TEMPORARILY SHUT DOWN PRIOR TO CUT AND PLUG, NEW INSERTED VALVE SHALL BE INSTALLED BY C.A.W. USING HYDRO–TAP METHOD.
4. SEE C.A.W. STANDARD DETAILS FOR MINIMUM DIMENSIONS OF ANCHOR COLLAR.

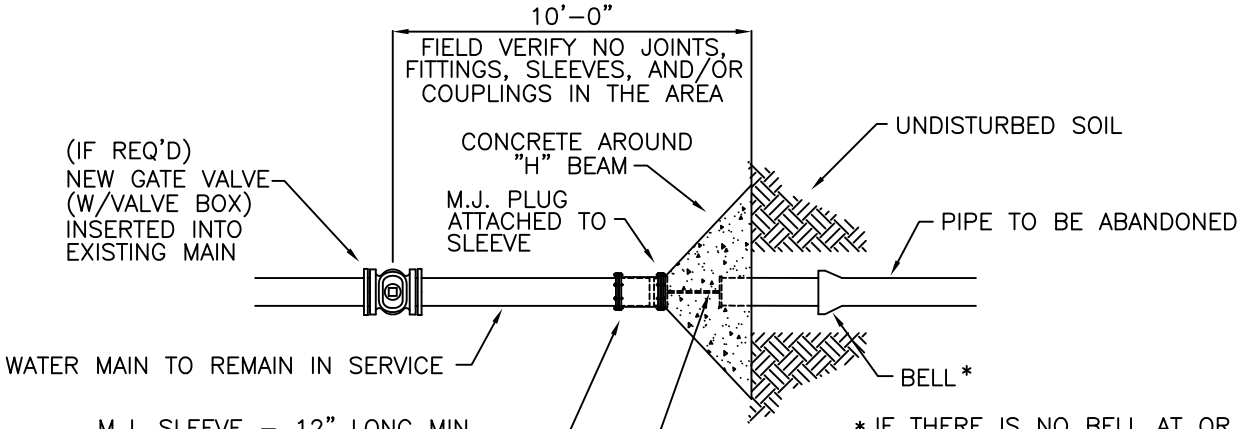


* IF THERE IS NO BELL AT OR NEAR THE POINT TO BE CUT, PHYSICALLY CUT THE ABANDONED PIPE 5 FEET FROM THE ANCHOR COLLAR AFTER THE CONCRETE HAS ALL SET, TAKING SPECIAL CARE NOT TO DISTURB ANCHOR COLLAR. SEAL END OF ABANDONED PIPE WITH CONCRETE IF 12" PIPE OR SMALLER.

SEAL END OF PIPE W/M.J. PLUG/CAP IF 14" PIPE AND LARGER

STANDARD CUT AND PLUG DETAIL NO. 1

N. T. S.



* IF THERE IS NO BELL AT OR NEAR THE POINT TO BE CUT, PHYSICALLY CUT THE ABANDONED PIPE 5 FEET FROM THE ANCHOR COLLAR AFTER THE CONCRETE HAS ALL SET, TAKING SPECIAL CARE NOT TO DISTURB ANCHOR COLLAR. SEAL END OF ABANDONED PIPE WITH CONCRETE IF 12" PIPE OR SMALLER.

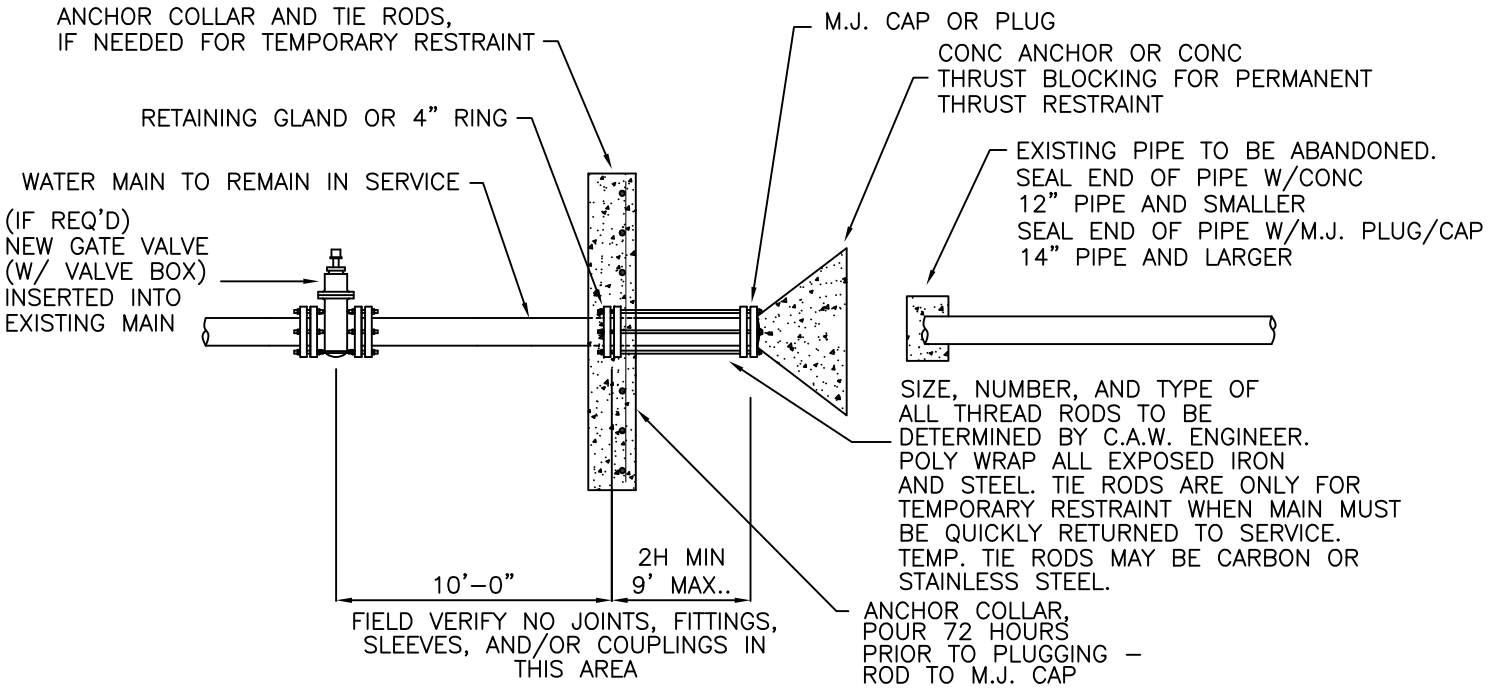
SEAL END OF PIPE W/M.J. PLUG/CAP IF 14" PIPE AND LARGER

STANDARD CUT AND PLUG DETAIL NO. 2

N. T. S.

NOTES:

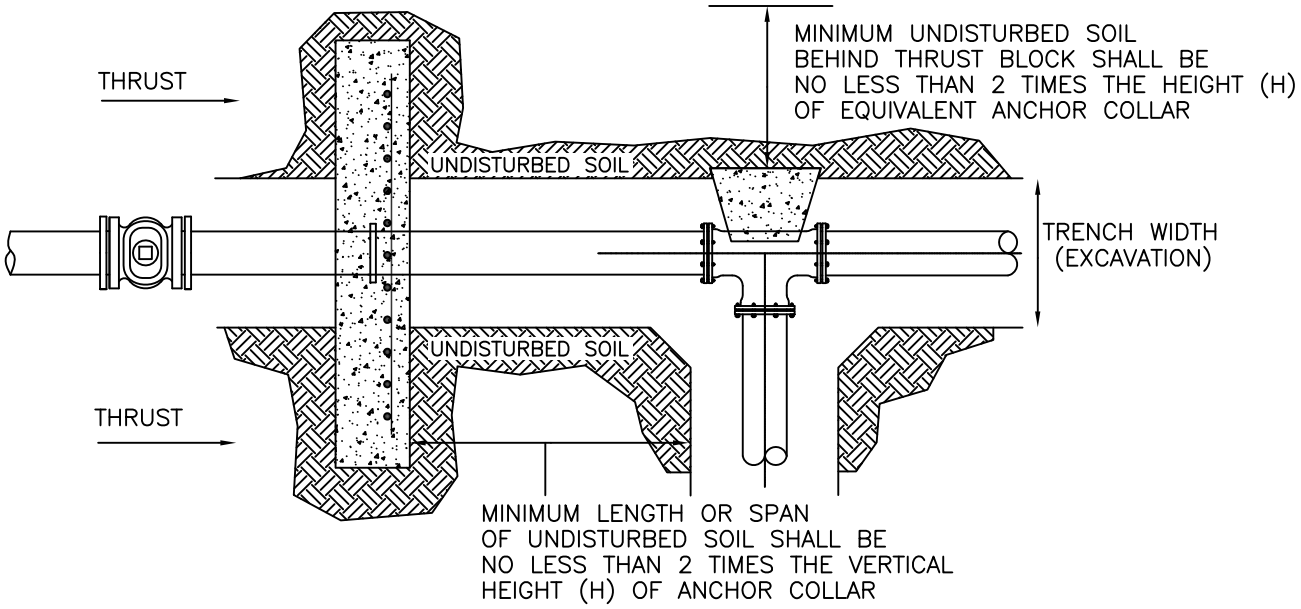
1. NEW VALVE SHALL BE INSTALLED ONLY IF SHOWN IN THE CONSTRUCTION PLAN.
2. IF WATER MAIN CAN BE TEMPORARILY SHUT DOWN, NEW INSERTED VALVE SHALL BE CUT IN BY CONTRACTOR.
3. IF WATER MAIN CAN NOT BE TEMPORARILY SHUT DOWN PRIOR TO CUT AND PLUG, NEW INSERTED VALVE SHALL BE INSTALLED BY C.A.W. USING HYDRO–TAP METHOD.
4. SEE C.A.W. STANDARD DETAILS FOR MINIMUM DIMENSIONS OF ANCHOR COLLAR.



ALTERNATE CUT AND PLUG DETAIL

TO BE USED ONLY UPON WRITTEN APPROVAL FROM C.A.W.

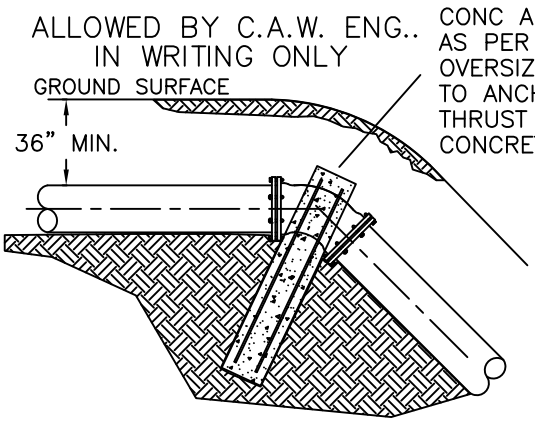
N. T. S.

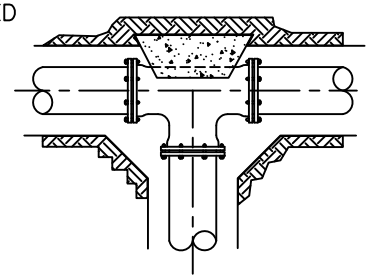


MINIMUM UNDISTURBED SOIL BEHIND ANCHOR COLLAR / THRUST BLOCK

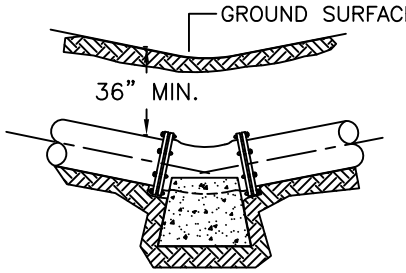
PLAN VIEW

18 Alternate Cut & Plug & Min Undisturbed Soil .dwg
2016 Revision

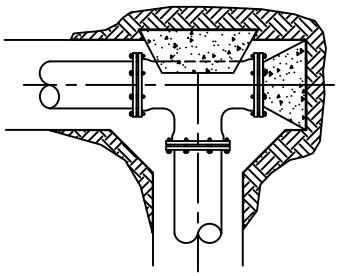




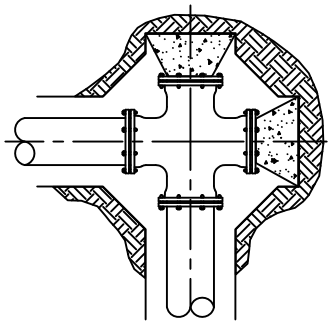
BLOCKING FOR TEE



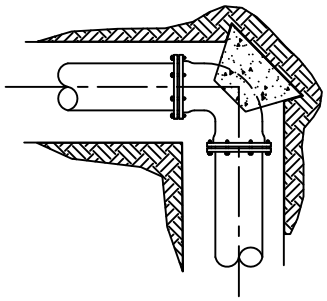
TYPICAL BLOCKING
FOR VERTICAL BENDS



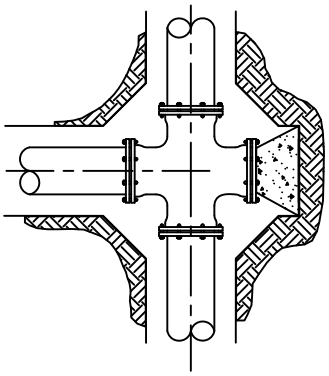
* SPECIAL BLOCKING OF TEE & PLUG
(WHEN DIRECTED BY ENGINEER)



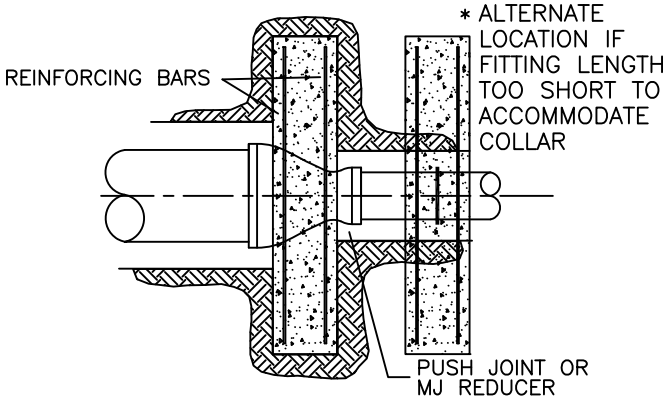
TYPICAL SECTION OF CROSS & 2 PLUG BLOCKING
(WHEN DIRECTED BY ENGINEER)



TYPICAL BLOCKING
FOR HORIZONTAL BENDS



TYPICAL SECTION OF CROSS & PLUG BLOCKING
(WHEN DIRECTED BY ENGINEER)

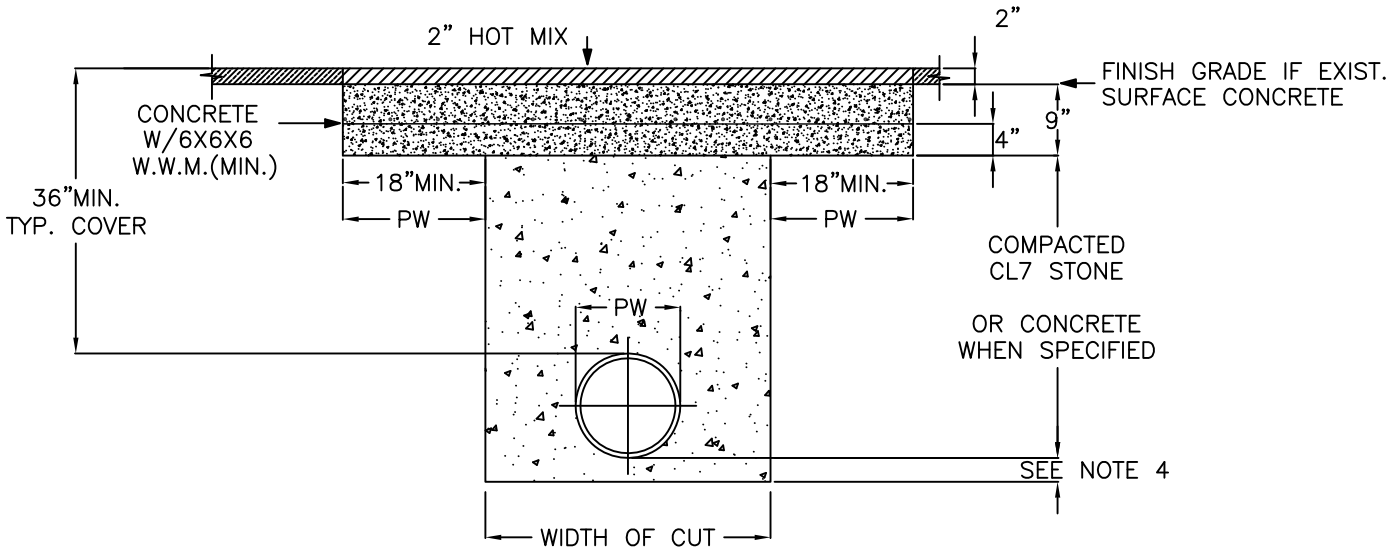


THRUST SUPPORT FOR REDUCER
(SIZE TO BE DETERMINED BY ENGINEER)

NOTES ON THRUST BLOCKING

1. ALL BLOCKING SHALL BE AGAINST UNDISTURBED SOIL.
2. * WHERE SOIL CONDITIONS MAKE IT NECESSARY TO POUR CONCRETE OVER JOINTS, THE ENDS OF THE ADJACENT PIPES MUST HAVE A THRUST BLOCK TO RESIST MOVEMENT OF THESE JOINTS.
3. WEIGHT CALCULATIONS TO BE BASED ON THRUST DUE TO STATIC PRESSURE + 50% OR TEST PRESSURE, WHICH EVER IS GREATER. (THRUST = $2AP\ 1/2\ \sin\phi$ WHERE A = AREA OF PIPE P = WATER PRESSURE)
4. WHEN BLOCKING AGAINST PLUG, PLUG SHALL BE COVERED TO PREVENT BONDING OF CONCRETE.
5. WHERE SHEAR BECOMES A PROBLEM PROPER REINFORCING MUST BE INSTALLED INTO THE BLOCKING.
6. CLEARANCE SHALL BE A MINIMUM OF 6" BETWEEN PIPE AND OBSTRUCTIONS.
7. CLEARANCE ON PIPES BELONGING TO OIL/GAS COMPANIES SHALL BE 18" UNLESS SPECIAL PERMISSION IS GIVEN BY THESE COMPANIES.

STANDARD THRUST BLOCKING

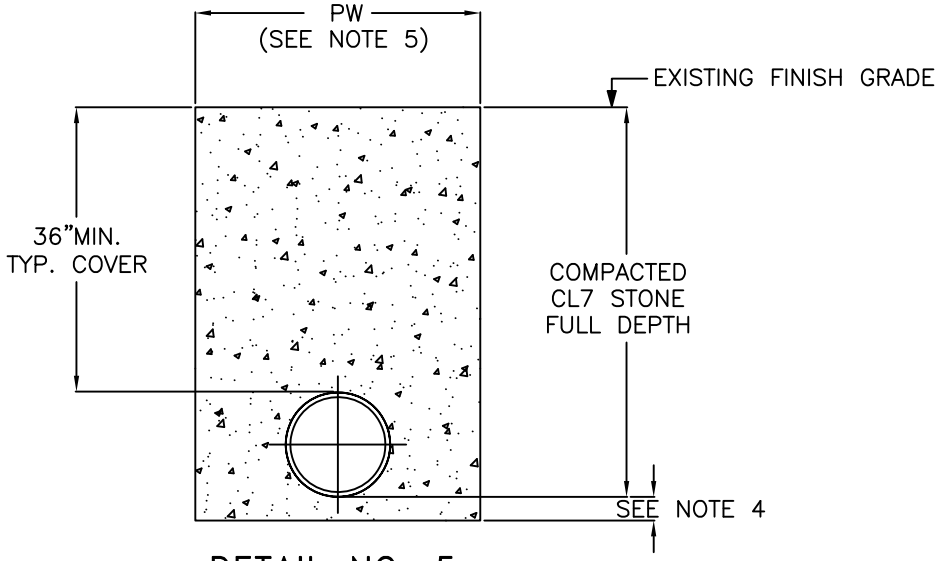


NOTES:

1. MATERIAL TO MEET OR EXCEED ARKANSAS HIGHWAY COMMISSION SPECIFICATIONS.
2. REFER TO BEDDING & BACKFILL DETAILS FOR PVC PIPE BEDDING REQUIREMENTS WITH SAND OR #67 STONE.
3. DO NOT PLACE CLASS 7 STONE AGAINST PVC PIPE; IF PVC PIPE ENCAPSULATE PVC WITH #67 STONE.
4. PLACE 6"–9" OF SELECT GRANULAR RIVER SAND OR #67 STONE FOR ALL PIPE LAID IN HARD ROCK.
5. PW: PAYABLE WIDTH FOR PAVEMENT REPAIR. ANY TRENCH WIDTH EXCEEDING PW DIMENSION IS A NON PAY ITEM, BUT MUST BE BACKFILLED AS PER DETAIL.

TYPICAL SECTION OF REPAIR FOR UTILITY CUT ON STATE HIGHWAY

DETAIL NO. 1

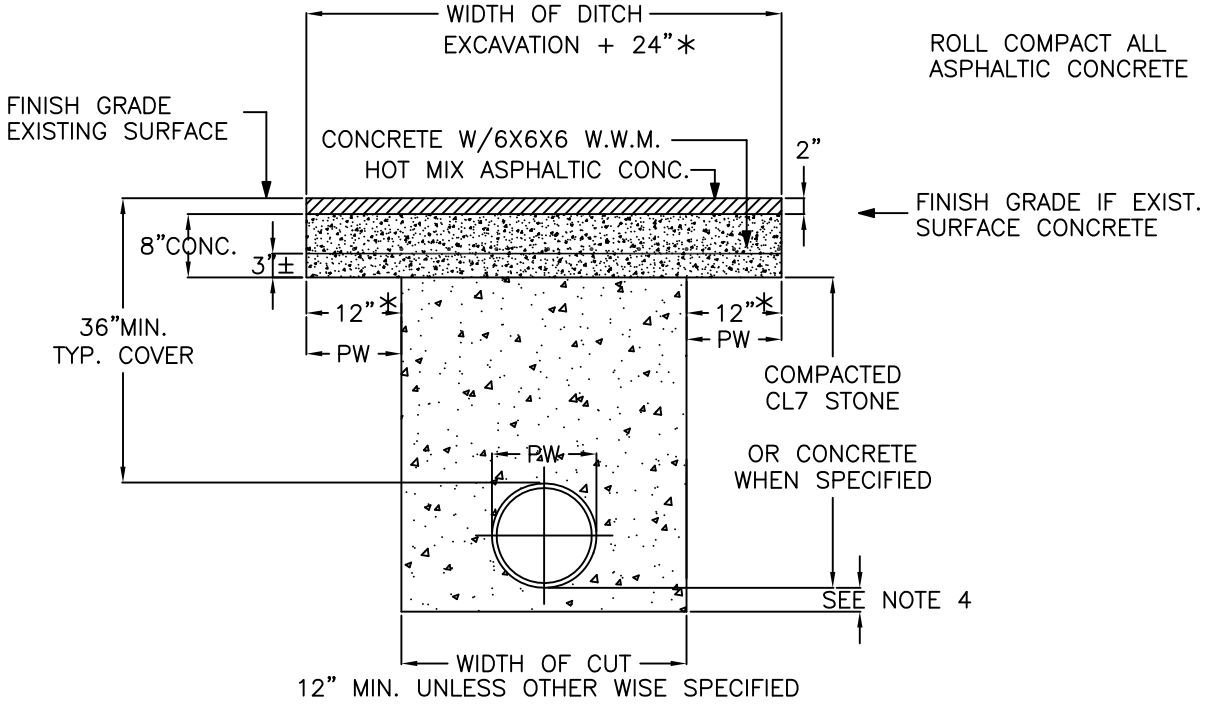


DETAIL NO. 5

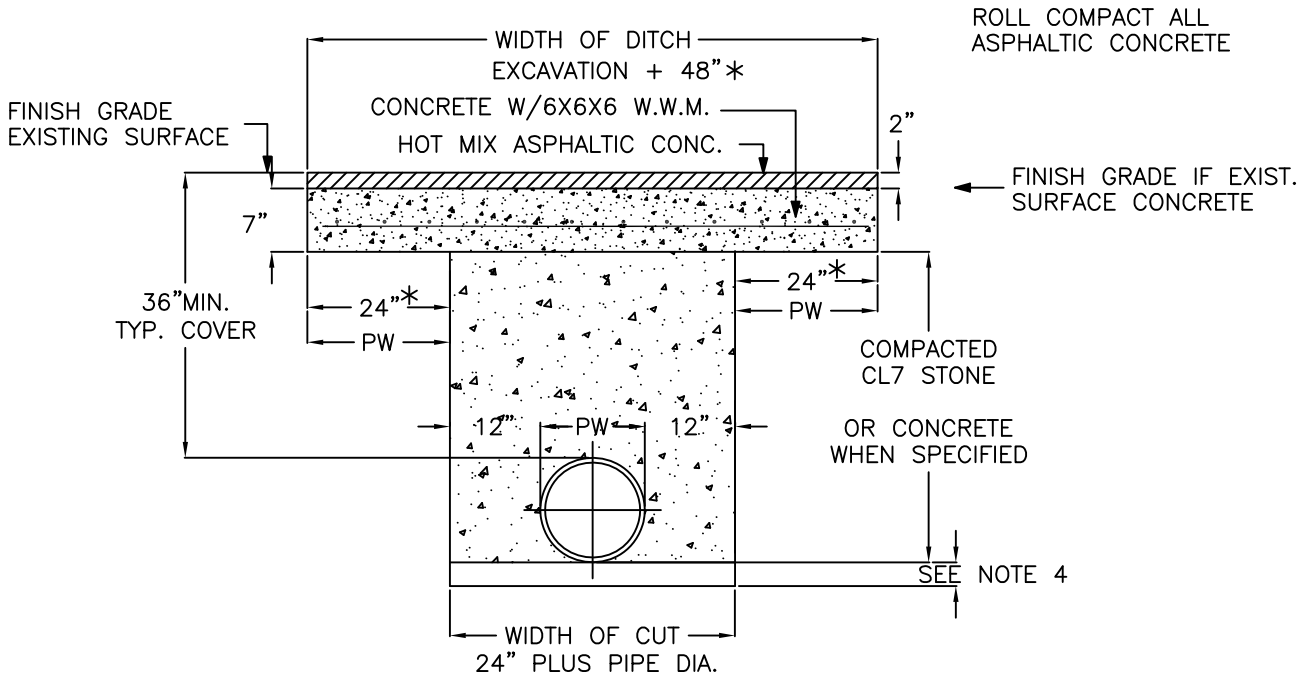
NOTES:

1. MATERIAL TO MEET OR EXCEED ARKANSAS HIGHWAY COMMISSION SPECIFICATIONS.
2. REFER TO BEDDING & BACKFILL DETAILS FOR PVC PIPE BEDDING REQUIREMENTS WITH SAND OR #67 STONE.
3. DO NOT PLACE CLASS 7 STONE AGAINST PVC PIPE; IF PVC PIPE ENCAPSULATE PVC WITH #67 STONE.
4. PLACE 6"–9" OF SELECT GRANULAR RIVER SAND OR #67 STONE FOR ALL PIPE LAID IN HARD ROCK.
5. PW: PAYABLE WIDTH FOR PAVEMENT REPAIR AS DEFINED IN SECTION 39.3.20. ANY TRENCH WIDTH EXCEEDING PW DIMENSION IS A NON PAY ITEM, BUT MUST BE BACKFILLED AS PER DETAIL.

UNIMPROVED GRAVEL ROADS, STREETS, ALLEYS, DRIVEWAYS AND PARKING LOTS



DETAIL NO. 2A
CITY STREET



DETAIL NO. 2B
COUNTY ROAD

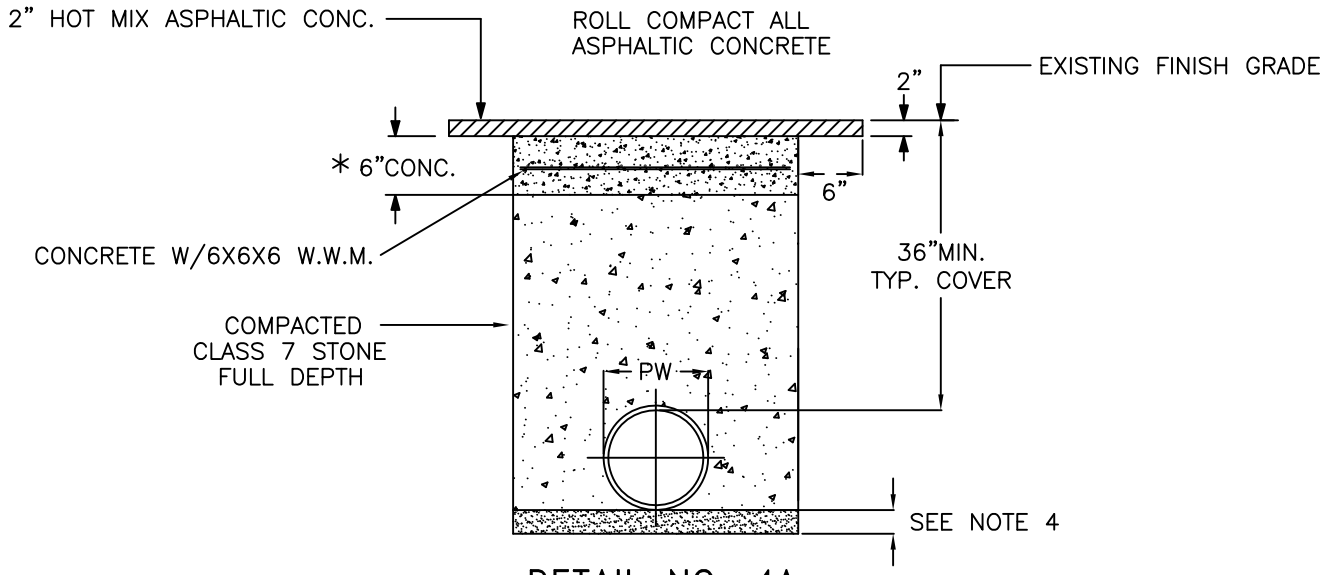
NOTES:

1. MATERIAL TO MEET OR EXCEED ARKANSAS HIGHWAY COMMISSION SPECIFICATIONS.
2. REFER TO BEDDING & BACKFILL DETAILS FOR PVC PIPE BEDDING REQUIREMENTS WITH SAND OR #67 STONE.
3. DO NOT PLACE CLASS 7 STONE AGAINST PVC PIPE; IF PVC PIPE ENCAPSULATE PVC WITH #67 STONE.
4. PLACE 6"–9" OF SELECT GRANULAR RIVER SAND OR #67 STONE FOR ALL PIPE LAID IN HARD ROCK.
5. PW: PAYABLE WIDTH FOR PAVEMENT REPAIR. ANY TRENCH WIDTH EXCEEDING PW DIMENSION IS A NON PAY ITEM, BUT MUST BE BACKFILLED AS PER DETAIL.

* INCREASE EACH SIDE IN UNSTABLE SOIL CONDITIONS AS DIRECTED BY THE ENGINEER.

TRENCH WIDTH 12" AND GREATER IMPROVED COUNTY & CITY ROAD SURFACES

21 2A&2B Rd det.dwg
2016 Revision



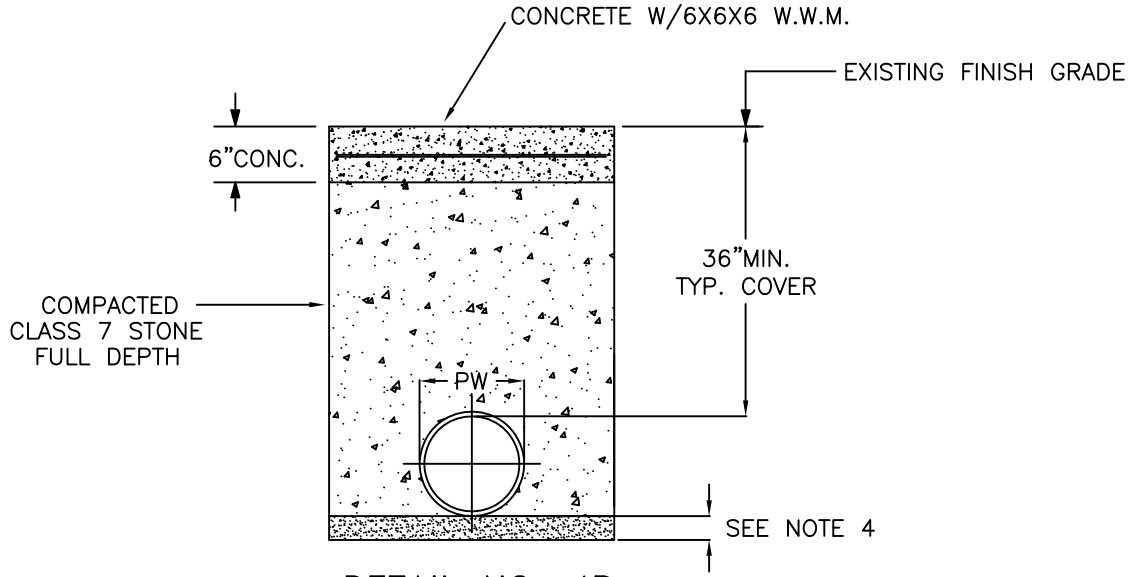
DETAIL NO. 4A

NOTES:

1. MATERIAL TO MEET OR EXCEED ARKANSAS HIGHWAY COMMISSION SPECIFICATIONS.
2. REFER TO BEDDING & BACKFILL DETAILS FOR PVC PIPE BEDDING REQUIREMENTS WITH SAND OR #67 STONE.
3. DO NOT PLACE CLASS 7 STONE AGAINST PVC PIPE; IF PVC PIPE ENCAPSULATE PVC WITH #67 STONE.
4. PLACE 6"–9" OF SELECT GRANULAR RIVER SAND OR #67 STONE FOR ALL PIPE LAID IN HARD ROCK.
5. PW: PAYABLE WIDTH FOR PAVEMENT REPAIR. ANY TRENCH WIDTH EXCEEDING PW DIMENSION IS A NON PAY ITEM, BUT MUST BE BACKFILLED AS PER DETAIL.

* OPTIONAL: WHEN SURFACE IS ASPHALT OR SURFACE TREATMENT, DELETE CONCRETE AND PLACE 6" OF HOT ASPHALTIC CONCRETE BASE COURSE LAID IN 2" LIFTS, COMPACTED.

IMPROVED ALLEYS, DRIVEWAYS AND PARKING LOTS (ASPHALT SURFACE)

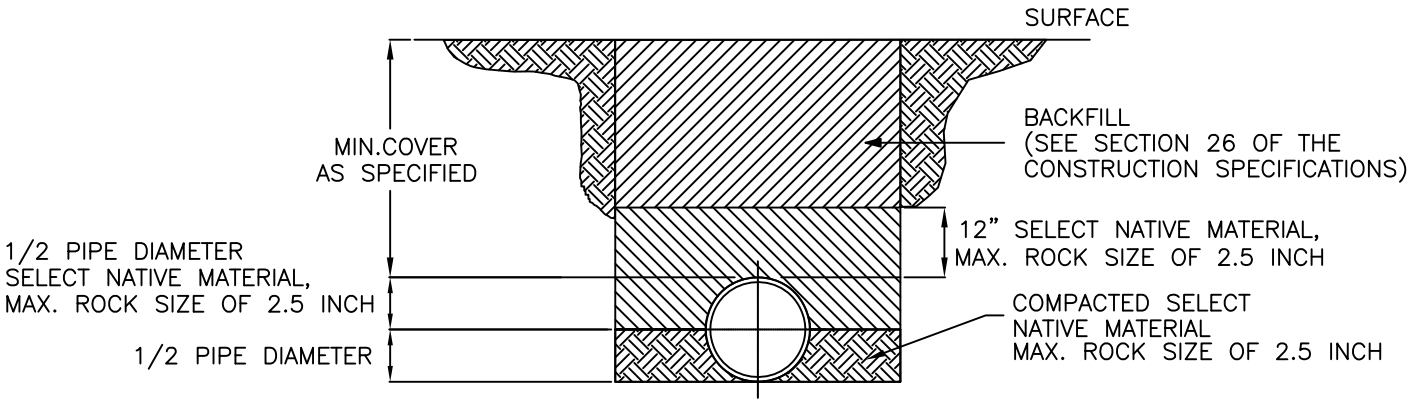


DETAIL NO. 4B

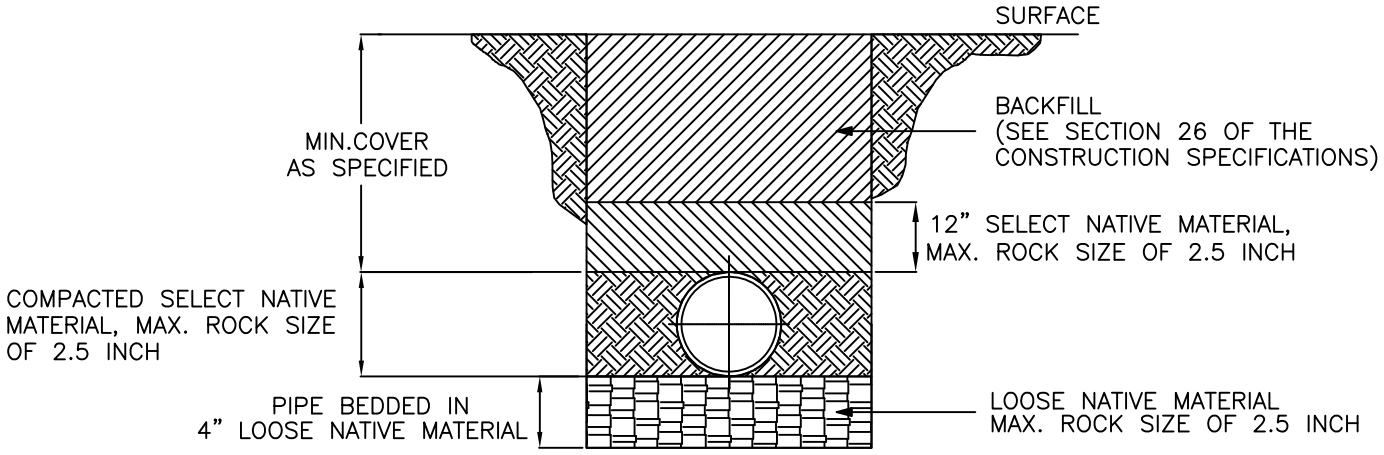
NOTES:

1. MATERIAL TO MEET OR EXCEED ARKANSAS HIGHWAY COMMISSION SPECIFICATIONS.
2. REFER TO BEDDING & BACKFILL DETAILS FOR PVC PIPE BEDDING REQUIREMENTS WITH SAND OR #67 STONE.
3. DO NOT PLACE CLASS 7 STONE AGAINST PVC PIPE; IF PVC PIPE ENCAPSULATE PVC WITH #67 STONE.
4. PLACE 6"–9" OF SELECT GRANULAR RIVER SAND OR #67 STONE FOR ALL PIPE LAID IN HARD ROCK.
5. PW: PAYABLE WIDTH FOR PAVEMENT REPAIR. ANY TRENCH WIDTH EXCEEDING PW DIMENSION IS A NON PAY ITEM, BUT MUST BE BACKFILLED AS PER DETAIL.

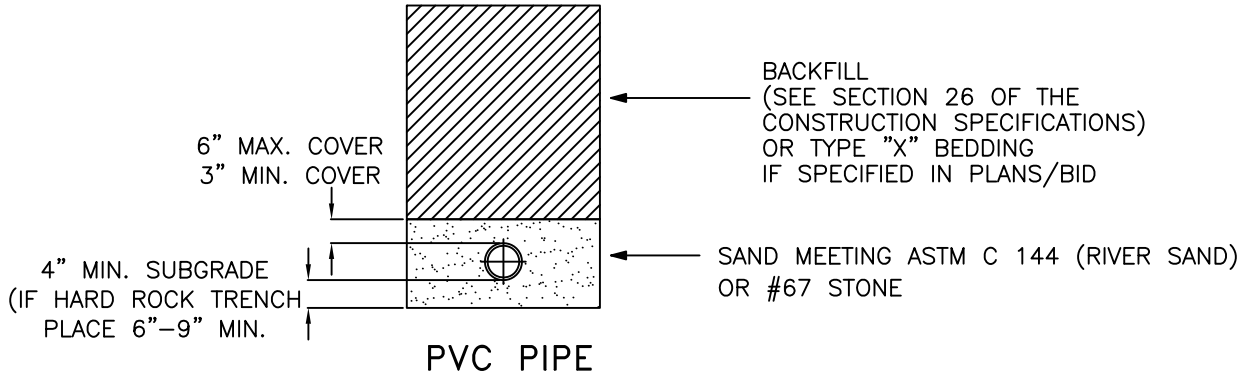
IMPROVED ALLEYS, DRIVEWAYS AND PARKING LOTS (CONCRETE SURFACE)



TYPE 2 BEDDING



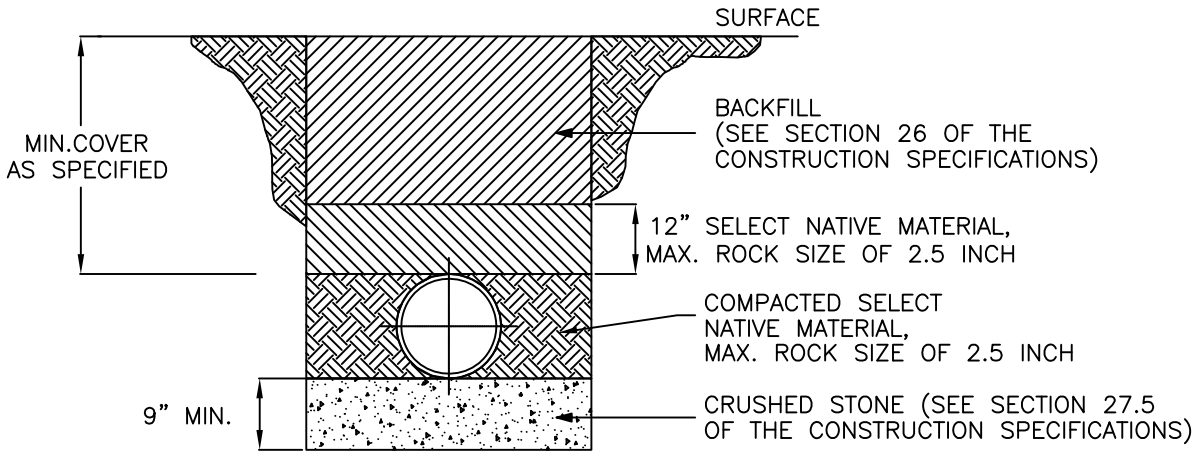
TYPE 3 BEDDING



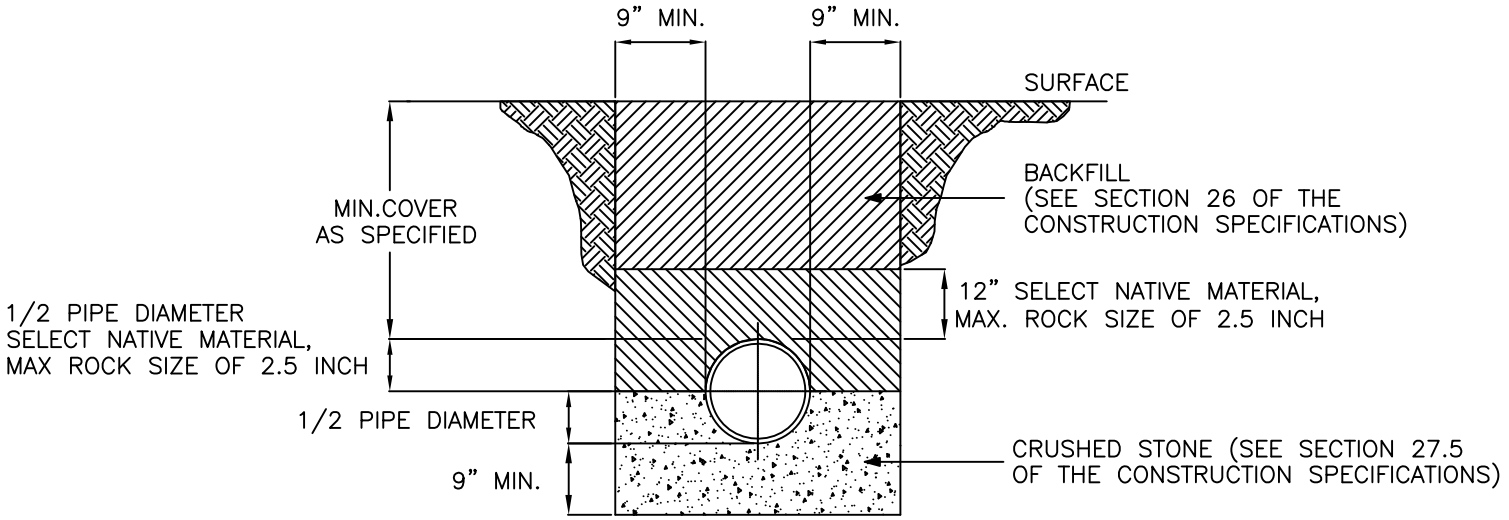
PVC PIPE

BEDDING & BACKFILL DETAILS

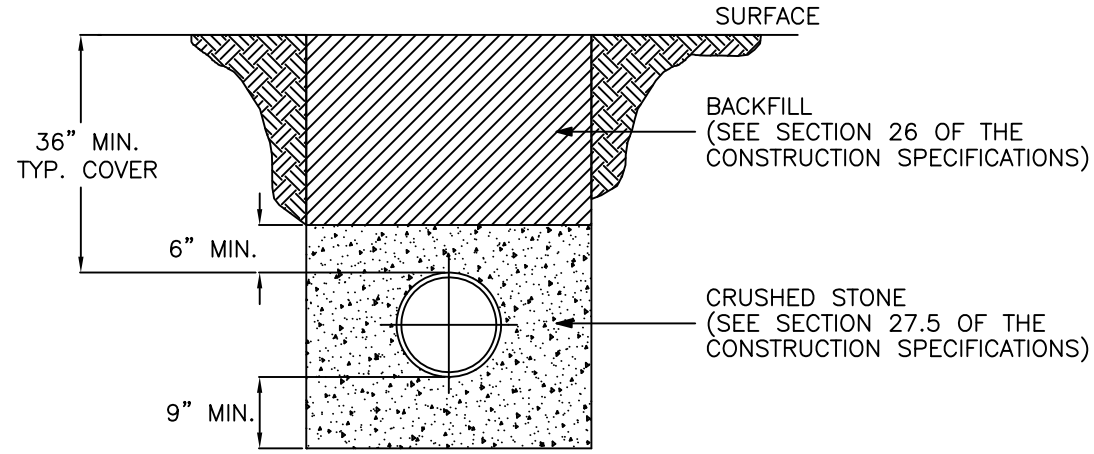
23 Type 2&3&PVC Bed det.dwg
2016 Revision



TYPE 4 BEDDING

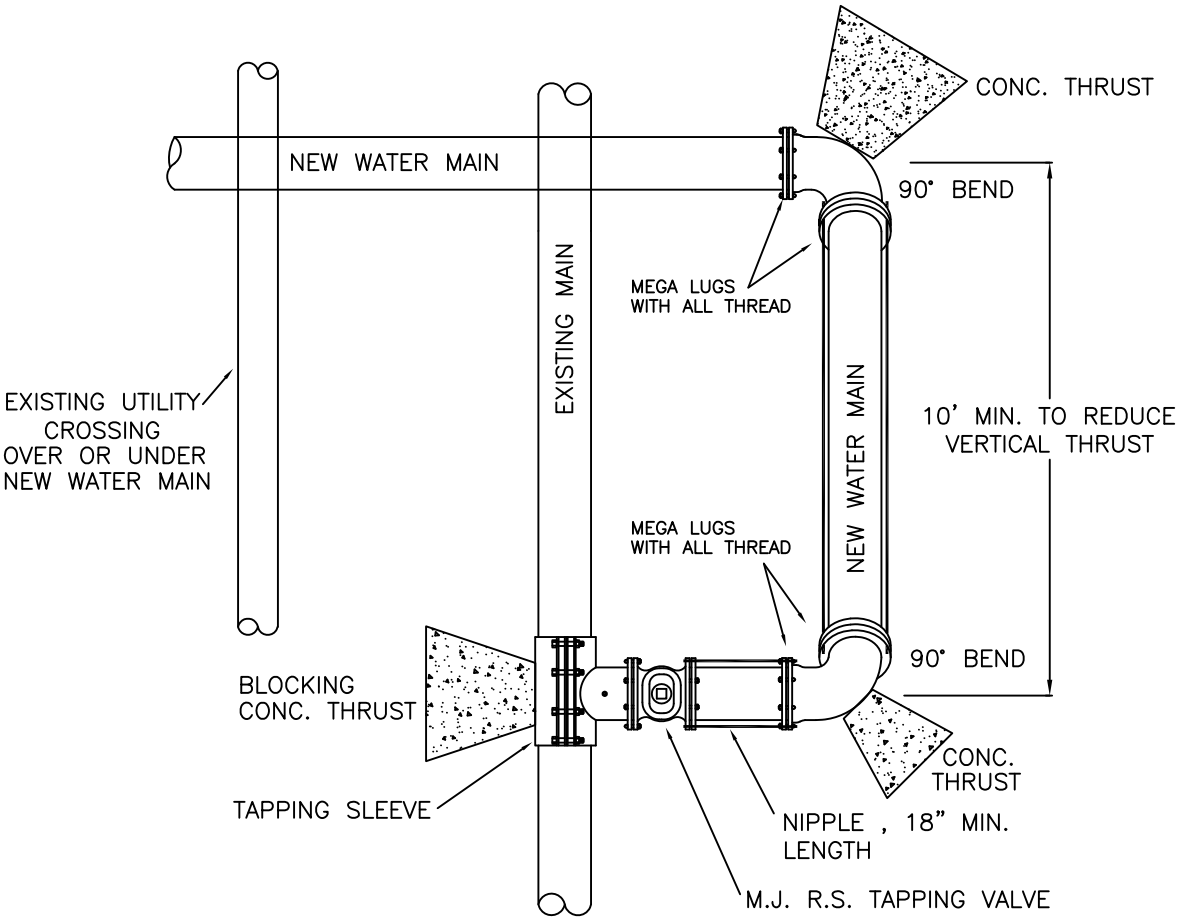


TYPE 4 (MODIFIED) BEDDING

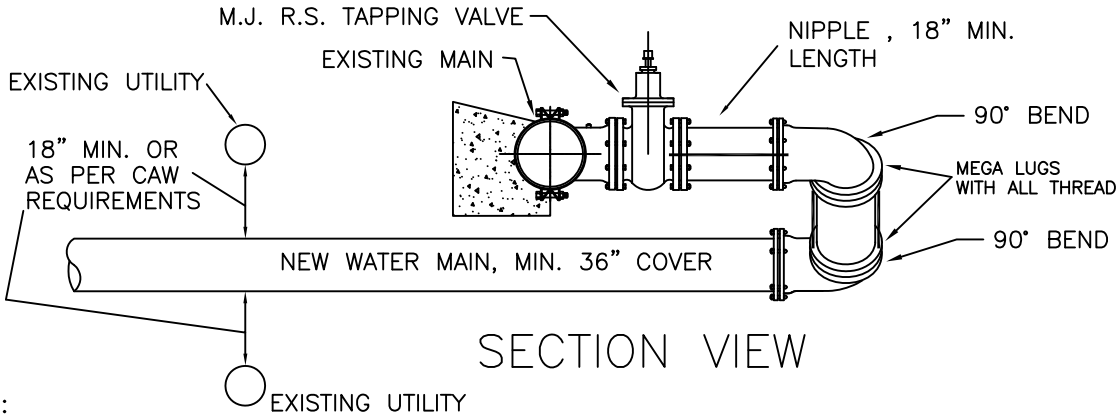


TYPE 5 BEDDING

BEDDING & BACKFILL DETAILS



PLAN VIEW



SECTION VIEW

NOTES:

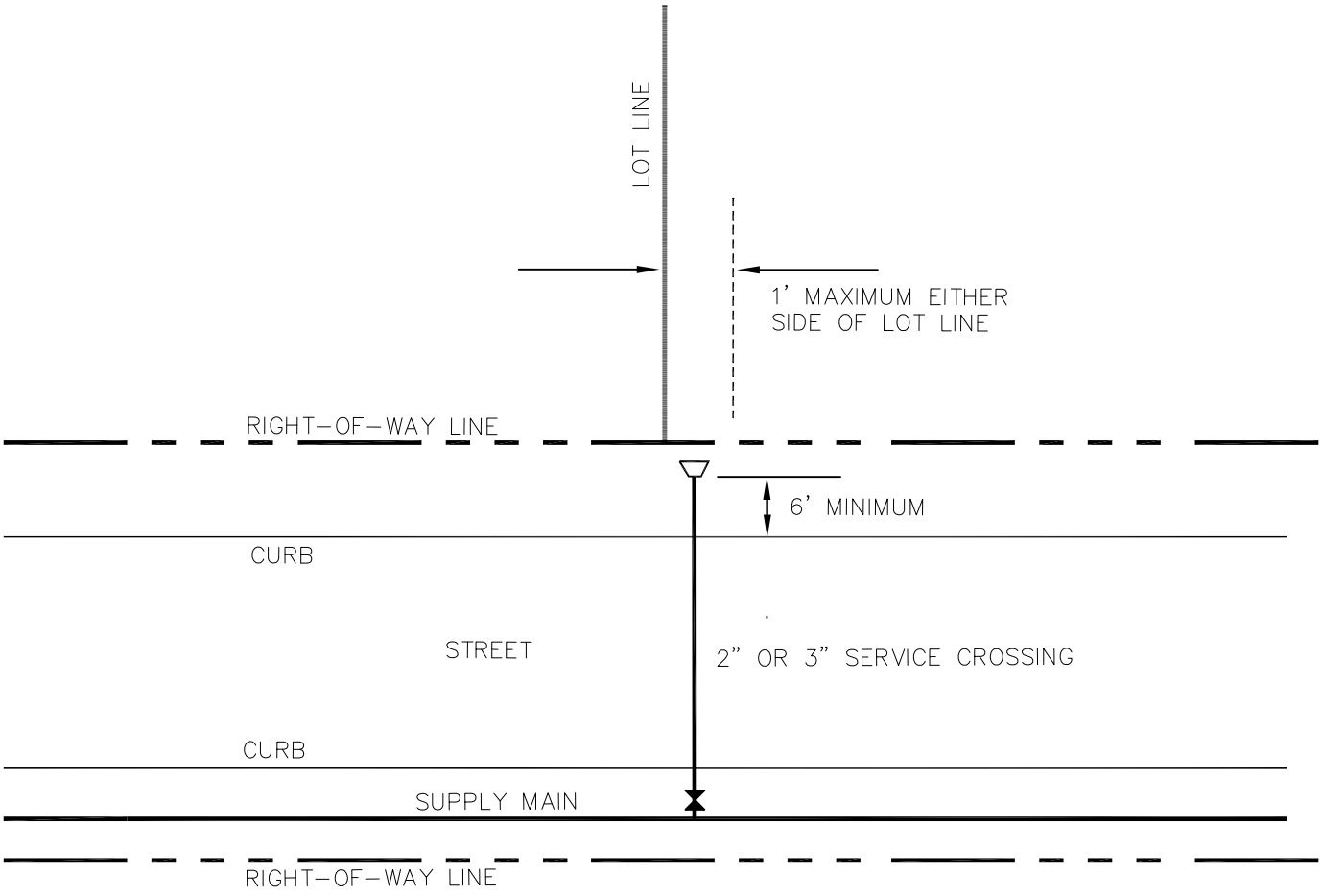
1. CONTRACTOR SHALL LOCATE EXISTING MAIN IN ADVANCE OF LAYING NEW LINE IN ORDER TO ASSURE ADEQUATE LENGTH TO ADJUST DEPTH OF NEW MAIN.
2. DIMENSIONS SHOWN ARE RECOMMENDED MINIMUMS TO PROVIDE ADEQUATE ROOM FOR TIGHTENING BOLTS ON JOINTS. (OTHER DIMENSIONS MAY BE USED)
3. USE TIE RODS IF ADEQUATE THRUST BLOCKING AGAINST UNDISTURBED SOIL IS NOT POSSIBLE.
4. ALL TIE RODS AND NUTS FOR PERMANENT PLACEMENT SHALL BE SERIES 300 STAINLESS STEEL. USE 3/4" RODS FOR 6" THRU 24". USE 1" RODS FOR 30" THRU 36". USE 1 1/4" RODS FOR 42" THRU 48".
5. RODS SHALL BE FIELD CUT TO FIT & SHALL BE PROTECTED WITH POLYWRAP.
6. ROTATE TEE UP & ELBOW DOWN AS REQUIRED TO MATCH.

225 PSI SERIES 300 STAINLESS STEEL

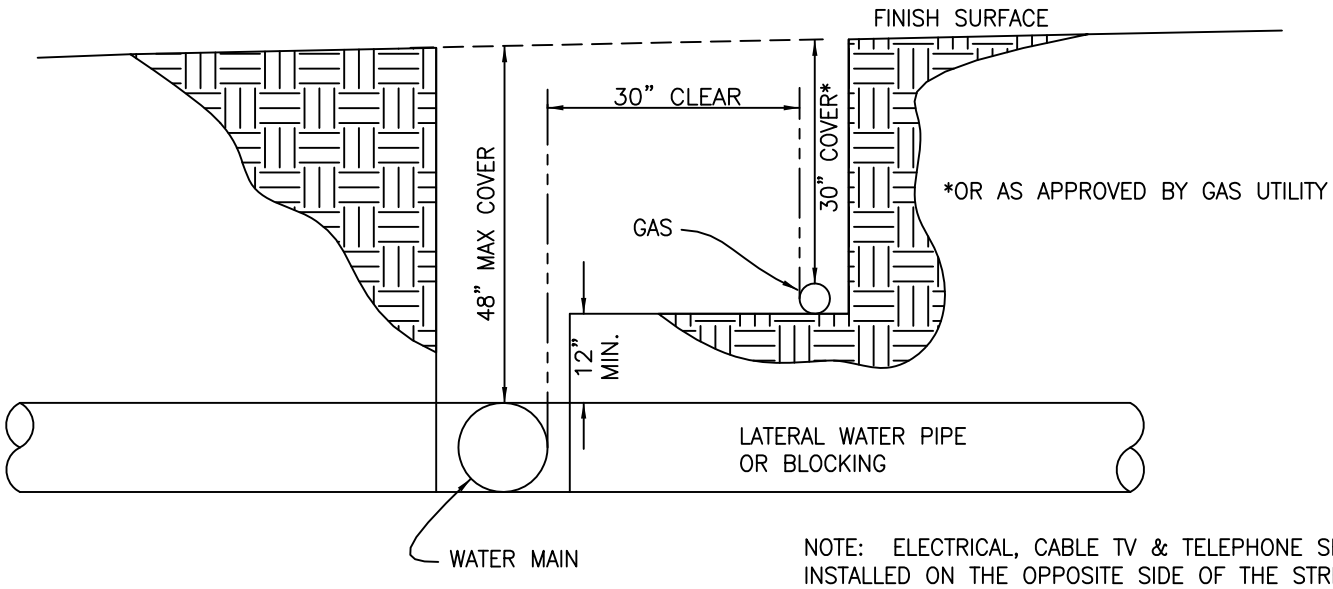
PIPE SIZE	6"	8"	10"	12"	16"	20"	24"	30"	36"	42"	48"
RODS / NIPPLE	2	2	4	4	8	12	16	14	18	16	20

BACKSIDE TAP SWING CONNECTION

24 Backside Tap Swing Connection
2016 Revision



2" & 3" SERVICE STREET CROSSING LOCATION



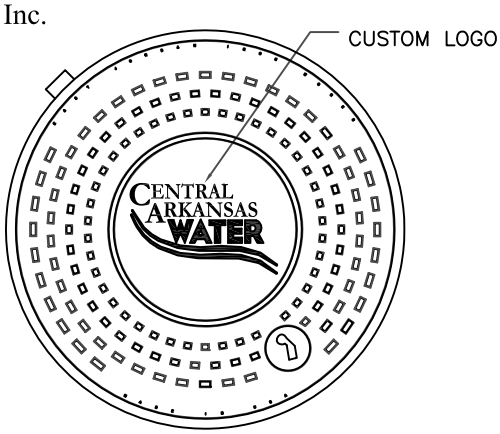
NOTE: ELECTRICAL, CABLE TV & TELEPHONE SHALL BE INSTALLED ON THE OPPOSITE SIDE OF THE STREET.

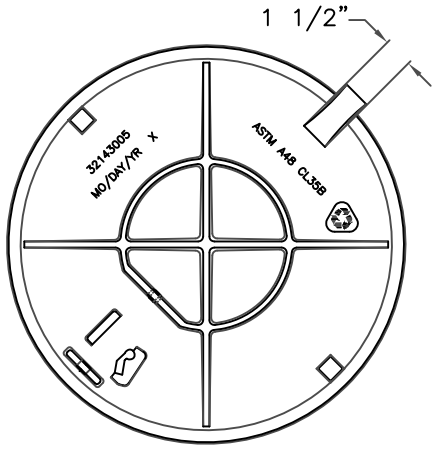
SHARED TRENCH OPTION FOR WATER AND GAS MAINS

TYPICAL SECTION

25 2" & 3" Street Crossing.dwg
25 Utility Shared Trench Sec.dwg
2016 Revision

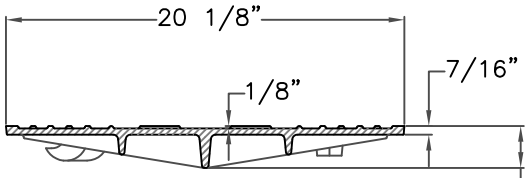
Manufacturer
East Jordan Iron Works, Inc.
P.O.Box 439
East Jordan, MI 49727
1-800-874-4100
Fax 231-536-4458





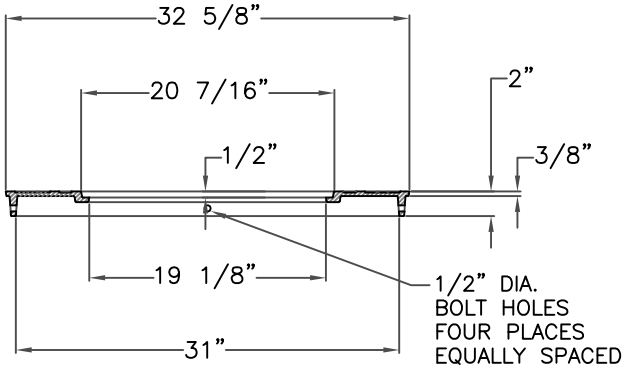
BOTTOM VIEW

PRODUCT NO. 32143005RING
COVER - GRAY IRON
ASTM A48 CL35B
ESTIMATED WEIGHT
COVER - 42LBS 19kg
LOAD RATING - NON TRAFFIC

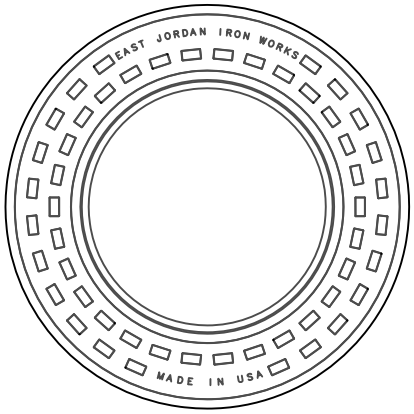


COVER SECTION

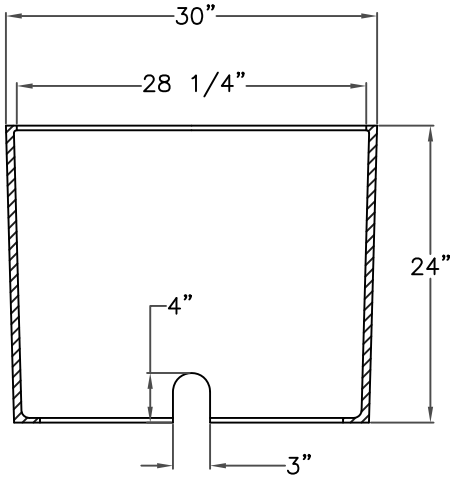
1-1/2", 2", 3", 4" - METER BOX LID



RING SECTION

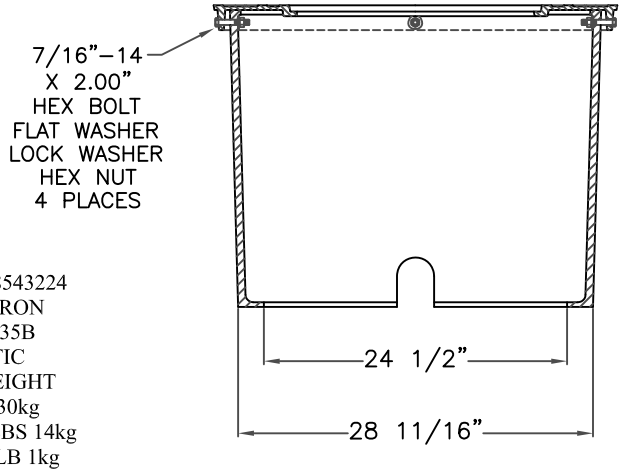


RING TOP VIEW



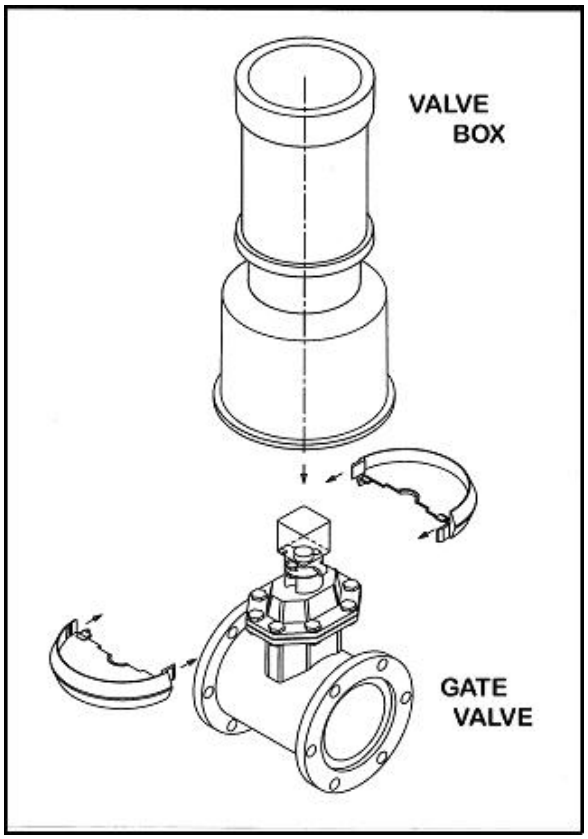
BOX SECTION

PRODUCT NO. 38543224
RING - GRAY IRON
ASTM A48 CL35B
BOX - PLASTIC
ESTIMATED WEIGHT
RING - 65LBS 30kg
PLASTIC BOX 30LBS 14kg
MISC PARTS - 1LB 1kg



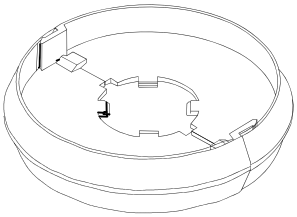
1-1/2", 2", 3", 4" - METER BOX & LID RING

BOXLOK

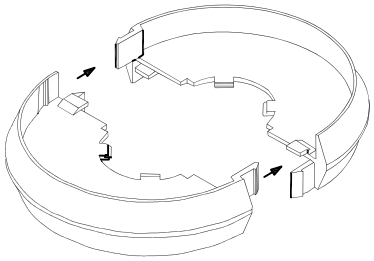


VALVE BOX ALIGNMENT DEVICE
TYPE NUMBERS

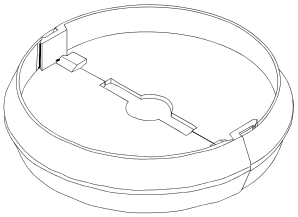
Valve Size (inches)	2"	3"	4"	6"	8"	10"	12"
AFC	2	2	2	2	2	1	1
AVK	1	1	1	1	1	1	1
Clow	2	2	2	2	2	2	1-CLOW
Kennedy	2	2	2	2	2	2	--
M&H	2	2	2	2	2	2	--
Mueller	2	2	2	2	2	2	1
Waterous	1	1	1	1	1	1	--
US Pipe (pre 2006)	1	1	1	1	1	1	1
US Pipe (after 2006)	2	2	2	2	2	2	2



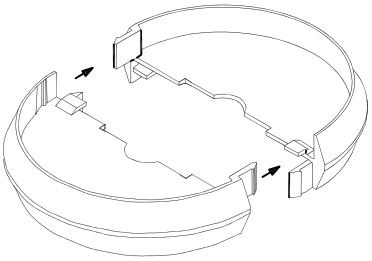
VALVE BOX ALIGNMENT DEVICE
ASSEMBLY TYPE 1
7.5 INCH OUTSIDE DIAMETER
BY 1.718 INCHES TALL



VALVE BOX ALIGNMENT DEVICE
ASSEMBLY TYPE 1
2 HALVES–SNAP LOCK,1–ROTATED 180°



VALVE BOX ALIGNMENT DEVICE
ASSEMBLY TYPE 2
7.5 INCH OUTSIDE DIAMETER
BY 1.718 INCHES TALL



VALVE BOX ALIGNMENT DEVICE
ASSEMBLY TYPE 2
2 HALVES–SNAP LOCK,1–ROTATED 180°

Valve Box Alignment Device.dwg
2016 Revision

THRUST BLOCK/ANCHOR COLLAR AS-BUILT RECORD FORM

CAW PROJECT NO. : _____ DATE AND TIME : _____

JOB DESC : _____ SUPV : _____ COORD : _____

PIPE DIA. & TYPE : _____ TYPE OF FITTING : _____

LOCATION (STA. NO., INTERSECTION, FEATURE LOCATE) : _____

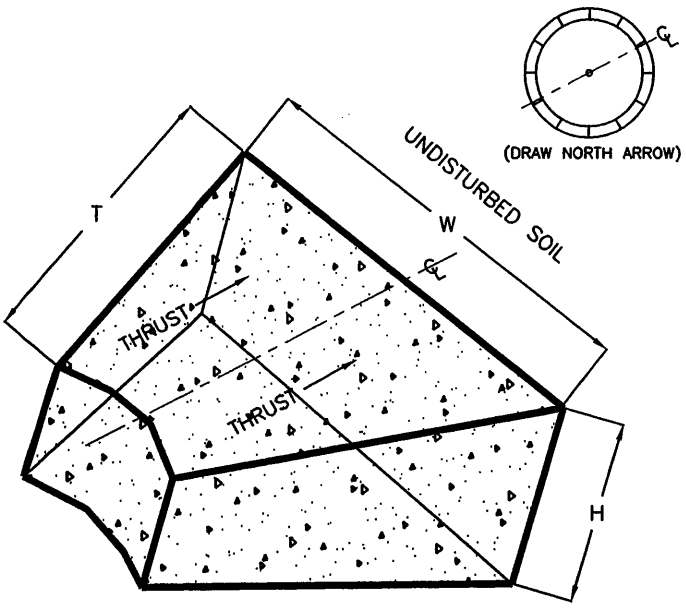
_____

TONS OF THRUST : _____ SOIL TYPE : _____

*REQUIRED LOAD BEARING AREA (S.F.) : [ ]

*(SEE OTHER SIDE FOR SAFE BEARING AREA TABLES)

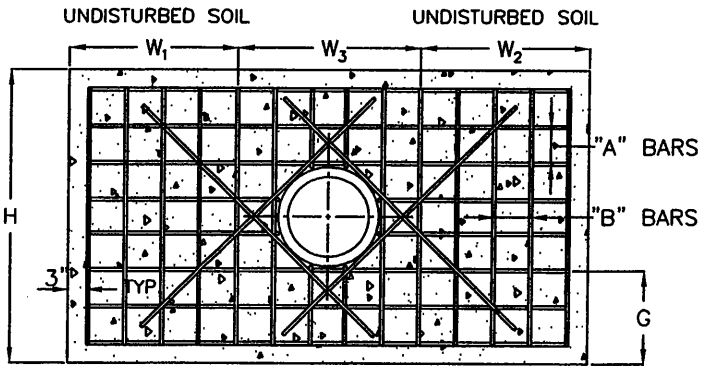
THRUST BLOCK AS-BUILT



ISOMETRIC

W =	FT
H =	FT
T =	FT

ANCHOR COLLAR AS-BUILT

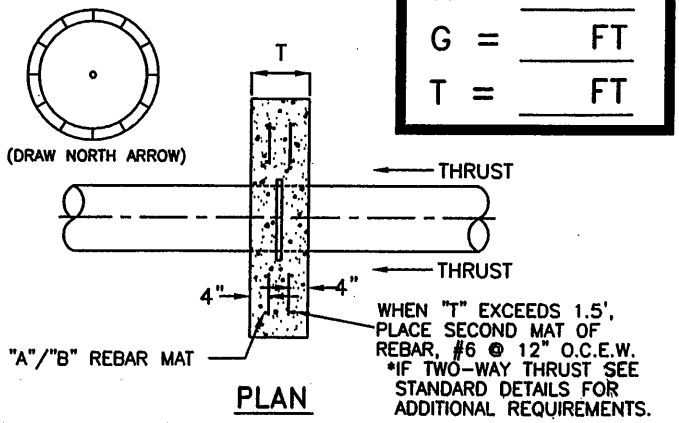


ELEVATION

"A" BARS = #___ @___"

"B" BARS = #___ @___"

W_1 =	FT
W_2 =	FT
W_3 =	FT
H =	FT
G =	FT
T =	FT



PLAN

NOTES ON THRUST BLOCKING

1. ALL BLOCKING SHALL BE AGAINST UNDISTURBED HAND DUG SOIL.
2. WHERE SOIL CONDITIONS MAKE IT NECESSARY TO POUR CONCRETE OVER JOINTS, THE ENDS OF THE ADJACENT PIPES MUST HAVE A THRUST BLOCK TO RESIST MOVEMENT OF THESE JOINTS.
3. WHERE SHEAR BECOMES A PROBLEM PROPER REINFORCING MUST BE INSTALLED INTO THE BLOCKING.
4. CLEARANCE SHALL BE A MINIMUM OF 6" BETWEEN PIPE AND OBSTRUCTIONS.
5. CLEARANCE ON PIPES BELONGING TO OIL/GAS COMPANIES SHALL BE 18" UNLESS SPECIAL PERMISSION IS GIVEN BY THESE COMPANIES.

(S.F.) SOLID ROCK Suggested Safe Bearing Area at 225 psi TEST Pressure

(25 tons / sq. ft.)

Fitting / Pipe Dia.	6"	8"	12"	16"	20"	24"	30"	36"	42"	48"
11 1/4°	1	1	2	3	4	5	7	9	11	14
15°	1	1	2	3	4	5	7	9	11	14
22 1/2°	1	1	2	3	4	5	7	9	11	14
30°	1	1	2	3	4	5	7	9	11	14
45°	1	1	2	3	4	5	7	9	11	14
90°	1	1	2	3	4	5	7	9	11	14
Plug (dead-end)	1	1	2	3	4	5	7	9	11	14

(S.F.) HARD SHALE Suggested Safe Bearing Area at 225 psi TEST Pressure

(6 tons / sq. ft.)

Fitting / Pipe Dia.	6"	8"	12"	16"	20"	24"	30"	36"	42"	48"
11 1/4°	1	1	2	3	4	5	7	9	11	14
15°	1	1	2	3	4	5	7	9	11	14
22 1/2°	1	1	2	3	4	5	7	9	11	14
30°	1	1	2	3	4	5	7	10	14	18
45°	1	1	2	3	5	7	11	15	20	26
90°	1	2	3	6	9	12	19	27	37	48
Plug (dead-end)	1	1	3	4	6	9	14	19	26	34

(S.F.) MEDIUM SHALE or DRY CLAY GRAVEL Suggested Safe Bearing Area at 225 psi TEST Pressure

(4 tons / sq. ft.)

Fitting / Pipe Dia.	6"	8"	12"	16"	20"	24"	30"	36"	42"	48"
11 1/4°	1	1	2	3	4	5	7	9	11	14
15°	1	1	2	3	4	5	7	9	11	14
22 1/2°	1	1	2	3	4	5	8	12	16	20
30°	1	1	2	3	5	7	11	15	21	27
45°	1	2	3	5	7	10	16	22	30	39
90°	2	3	5	8	13	18	29	41	56	72
Plug (dead-end)	1	2	4	6	9	13	20	29	39	51

(S.F.) SOFT SHALE, DRY SAND or LOAM Suggested Safe Bearing Area at 225 psi TEST Pressure

(2 tons / sq. ft.)

Fitting / Pipe Dia.	6"	8"	12"	16"	20"	24"	30"	36"	42"	48"
11 1/4°	1	1	2	3	4	5	8	12	14	16
15°	1	1	2	3	5	7	11	15	21	27
22 1/2°	1	2	3	5	7	10	16	23	31	40
30°	1	2	4	6	10	14	21	30	41	53
45°	2	3	5	9	14	20	31	44	60	78
90°	3	5	9	16	25	36	57	81	111	144
Plug (dead-end)	2	3	7	12	18	26	40	57	78	102

(S.F.) SOFT CLAY Suggested Safe Bearing Area at 225 psi TEST Pressure

(1.125 tons / sq. ft.)

Fitting / Pipe Dia.	6"	8"	12"	16"	20"	24"	30"	36"	42"	48"
11 1/4°	1	1	3	4	7	9	14	20	24	28
15°	1	2	3	6	9	12	19	27	37	48
22 1/2°	2	2	5	8	13	18	28	40	54	71
30°	2	3	6	11	17	24	37	53	72	94
45°	3	4	9	16	24	35	55	78	106	139
90°	4	8	16	29	45	64	100	144	196	256
Plug (dead-end)	3	5	12	21	32	46	71	101	139	181

(S.F.) WET CLAY Suggested Safe Bearing Area at 225 psi TEST Pressure

(0.55 tons / sq. ft.)

Fitting / Pipe Dia.	6"	8"	12"	16"	20"	24"	30"	36"	42"	48"
11 1/4°	2	2	5	9	13	18	29	41	48	56
15°	2	3	7	11	17	25	38	55	74	97
22 1/2°	3	4	9	16	25	36	57	82	111	145
30°	3	6	12	22	34	48	75	108	147	192
45°	5	8	18	32	50	71	111	160	217	284
90°	9	15	33	59	91	131	205	295	401	524
Plug (dead-end)	6	11	24	42	65	93	145	206	284	371