Muscle Shoals

Utilities Board

Water and Wastewater Department

LOW PRESSURE SEWER STANDARD DETAILS

FOR YOUR WASTEWATER
COLLECTION AND DISPOSAL

MUSCLE SHOALS, ALABAMA

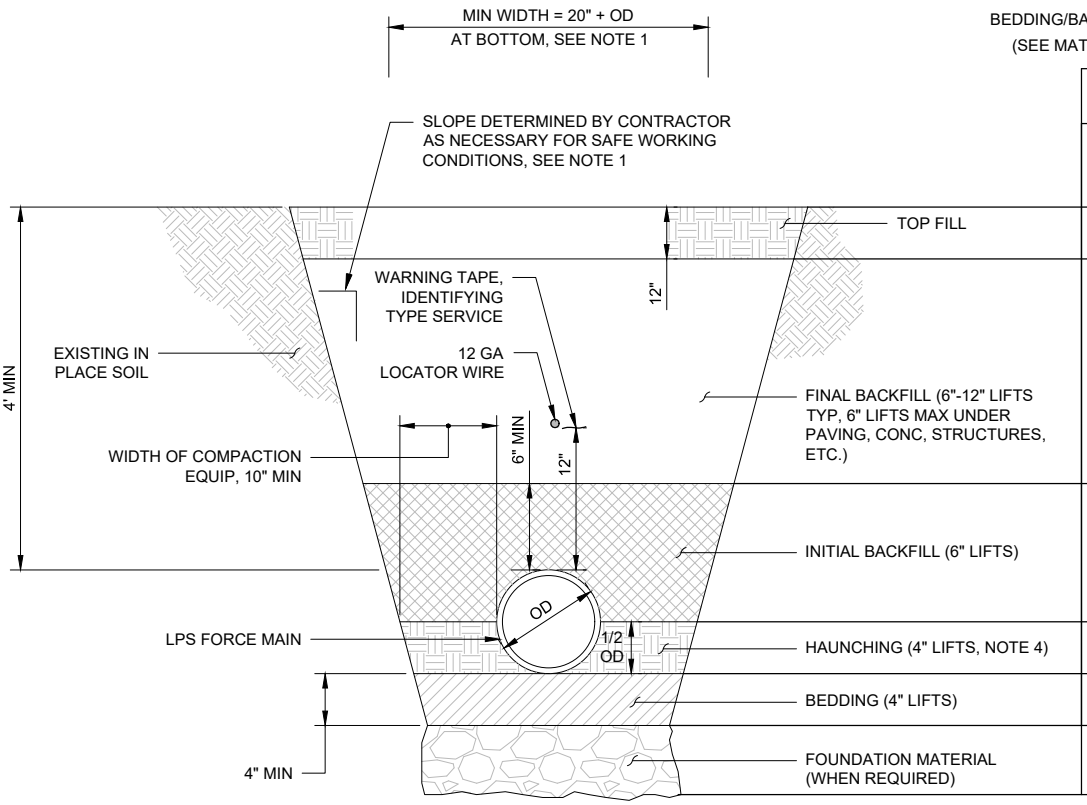
STANDARD DETAILS

LOW PRESSURE SEWER STANDARD DETAILS

SHEET INDEX

AUGUST 2026

DETAIL #	DESCRIPTION
SD-1	FORCE MAIN BEDDING & BACKFILL
SD-2	STEEL CASING PIPE DETAIL
SD-3	COMBINATION AIR RELEASE VALVE - AIR VACUUM
SD-4	LOW PRESSURE TYPICAL LATERAL INSTALLATION
SD-5	LOW PRESSURE SERVICE BOX
SD-6	LOW PRESSURE FORCE MAIN & SERVICE LAYOUT PLAN
SD-7	VALVE BOX DETAIL
SD-8	TYPICAL THRUST RESTRAINT
SD-9	LOW PRESSURE SEWER SYSTEM TERMINAL FLUSHING ASSEMBLY
SD-10	LOW PRESSURE SEWER SYSTEM IN-LINE FLUSHING ASSEMBLY
SD-11	LOW PRESSURE SEWER SYSTEM OFFSET FLUSHING ASSEMBLY
SD-12	LOW PRESSURE SEWER SYSTEM MAIN BRANCH DETAIL
SD-13	LOW PRESSURE SEWER SYSTEM TRANSITION MANHOLE
SD-14	UTILITY CROSSING & SEPARATION DETAIL



BEDDING/BACKFILL REQUIREMENTS & MATL DESIGNATIONS
(SEE MATERIAL DESIGNATION / DESCRIPTIONS TABLE)

	PRESSURE MAINS	PAVED AREAS
	HDPE	HDPE
TOP FILL	4	5*
FINAL BACKFILL (6"-12" LIFTS TYP, 6" LIFTS MAX UNDER PAVING, CONC, STRUCTURES, ETC.)	3	1
INITIAL BACKFILL (6" LIFTS)	2	1
HAUNCHING (4" LIFTS, NOTE 4)	2	1
BEDDING (4" LIFTS)	2	1
FOUNDATION MATERIAL (WHEN REQUIRED)	RIP-RAP OR CRUSHED STONE CLASS 1B (USCS IN ASTM D2487)	

* SEE NOTE 3

MATERIAL DESIGNATION / DESCRIPTIONS TABLE

DESIGNATION/ MATERIALS	DESCRIPTION
1	CRUSHED STONE, ASTM D448 NO. 67 GRADATION. SAND SHALL BE USED AS SUBSTITUTE IN RESIDENTIAL LAWNS, YARDS, AND LANDSCAPED AREAS.
2	SELECT EXCAVATED MATL REASONABLY DRY (WITHIN LIMITS REQ'D FOR COMPACTION) NO STONES > 1" DIA.
3	EXCAVATED MATL REASONABLY DRY (WITHIN LIMITS REQ'D FOR COMPACTION) NO STONES > 12" DIA.
4	SELECT TOPSOIL MATL TO SUPPORT VEGETATION, NO STONES OR ROCK ALLOWED.
5	CRUSHED STONE, MOIST "PUG-MIX" PER ALDOT SECTION 825.

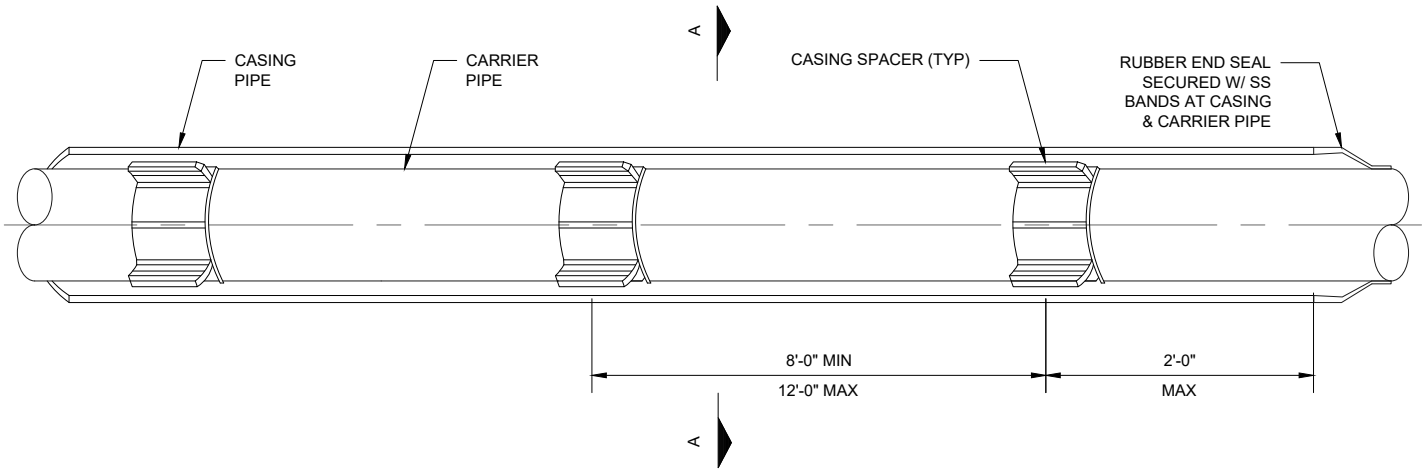
NOTES:

1. SLOPE, BENCHING, SHORING, ETC. AS DETERMINED AND DESIGNED BY THE CONTRACTOR. CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE OSHA REGULATIONS FOR "OPEN TRENCH EXCAVATIONS".
2. ALL MATERIALS SHALL BE COMPACTED TO MINIMUM 95% STANDARD PROCTOR DENSITY AT 2%± OPTIMUM MOISTURE CONTENT. MATERIALS UNDER PAVING, CONCRETE, STRUCTURES, ETC. SHALL BE COMPACTED TO MIN 98%-100% STANDARD PROCTOR. MECHANICAL COMPACTION SHALL BE BY VIBRATORY SHEEPSFOOT OR OTHER EQUIP. SPECIFICALLY DESIGNED FOR THE COMPACTION OF EARTH. COMPACTION EQUIP. SHALL BE ON-SITE PRIOR TO BEGINNING OF WORK. MECHANICAL COMPACTION SHALL BE COMPLETED IN LOOSE LIFTS AS SHOWN ON THE DETAIL.
3. TEMPORARY COMPACTED PUG-MIX BACKFILL REQ'D UNTIL PAVEMENT PLACEMENT IS COMPLETE. THE CONTRACTOR SHALL CONTINUOUSLY MAINTAIN THIS PUGMIX TO KEEP IT FLUSH WITH THE ADJACENT PAVING, ETC. UNTIL THE FINAL PAVING IS PLACED. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ASPHALT OR CONCRETE PATCHES WHEN NEEDED FOR PUBLIC SAFETY AND/OR CONVENIENCE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SELECTING AND UTILIZING APPROPRIATE MEANS AND METHODS OF CONSTRUCTION TO ENSURE THAT THE ENTIRE AREAS UNDER THE HAUNCHES OF THE PIPE ARE FILLED WITH THE REQUIRED MATERIALS AND COMPACTED APPROPRIATELY.

MUSCLE SHOALS
UTILITIES BOARD

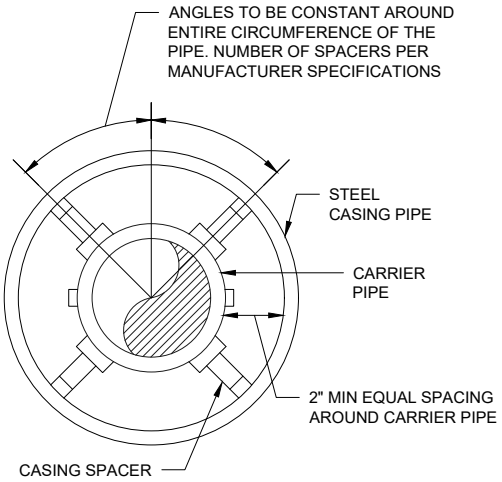
FORCE MAIN BEDDING & BACKFILL

SD-1

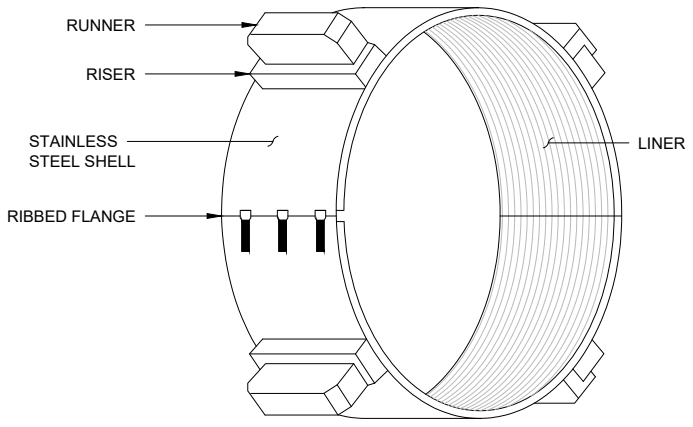


ELEVATION VIEW

STEEL CASING PIPE		
NOMINAL PIPE DIAMETER (IN.)	MIN. CASING DIAMETER (IN.)	MIN. WALL THICKNESS (IN.)
2	8	0.250
3	8	0.250
4	10	0.250
6	12	0.250

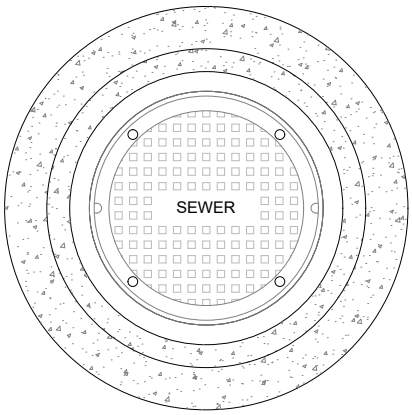


SECTION A-A

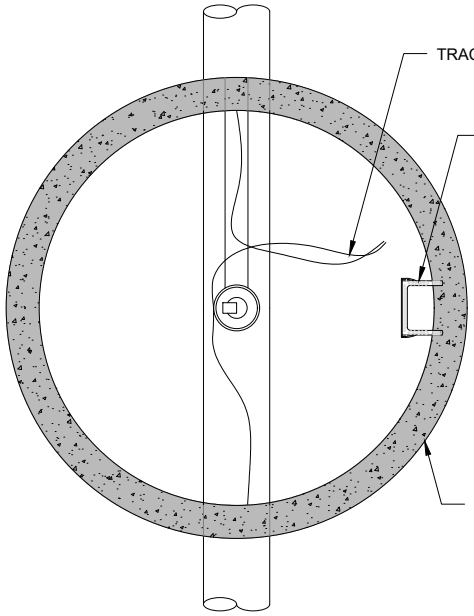


SPACER ISOMETRIC VIEW

MUSCLE SHOALS UTILITIES BOARD	STEEL CASING PIPE DETAIL	SD-2



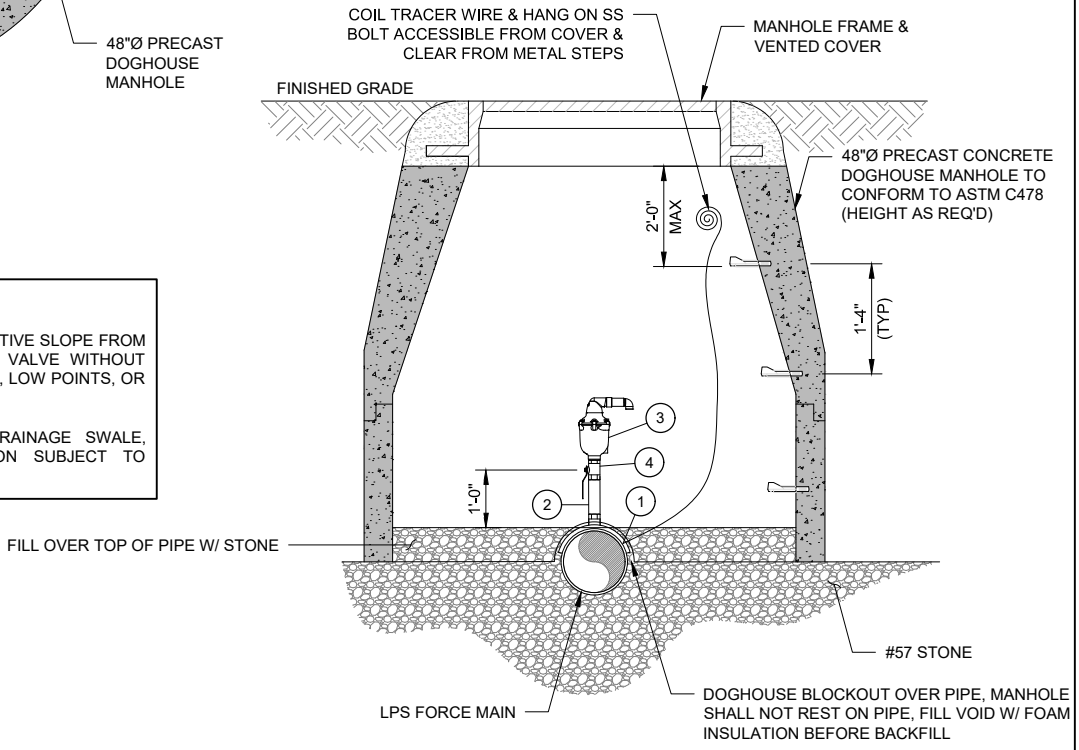
TYPICAL TOP VIEW



SECTION PLAN VIEW

FITTINGS LIST

1. 2" FNPT ELECTROFUSION TAPPING SADDLE, W/ 316 SS NPT OUTLET
2. 2" THREADED 316 SS NIPPLE, LENGTH AS REQ'D
3. BERMAD ARV MODEL C50-SP-P, MNPT END
4. 2" 316 SS BALL VALVE, FNPT ENDS W/ LEVER OPERATOR



SECTION VIEW

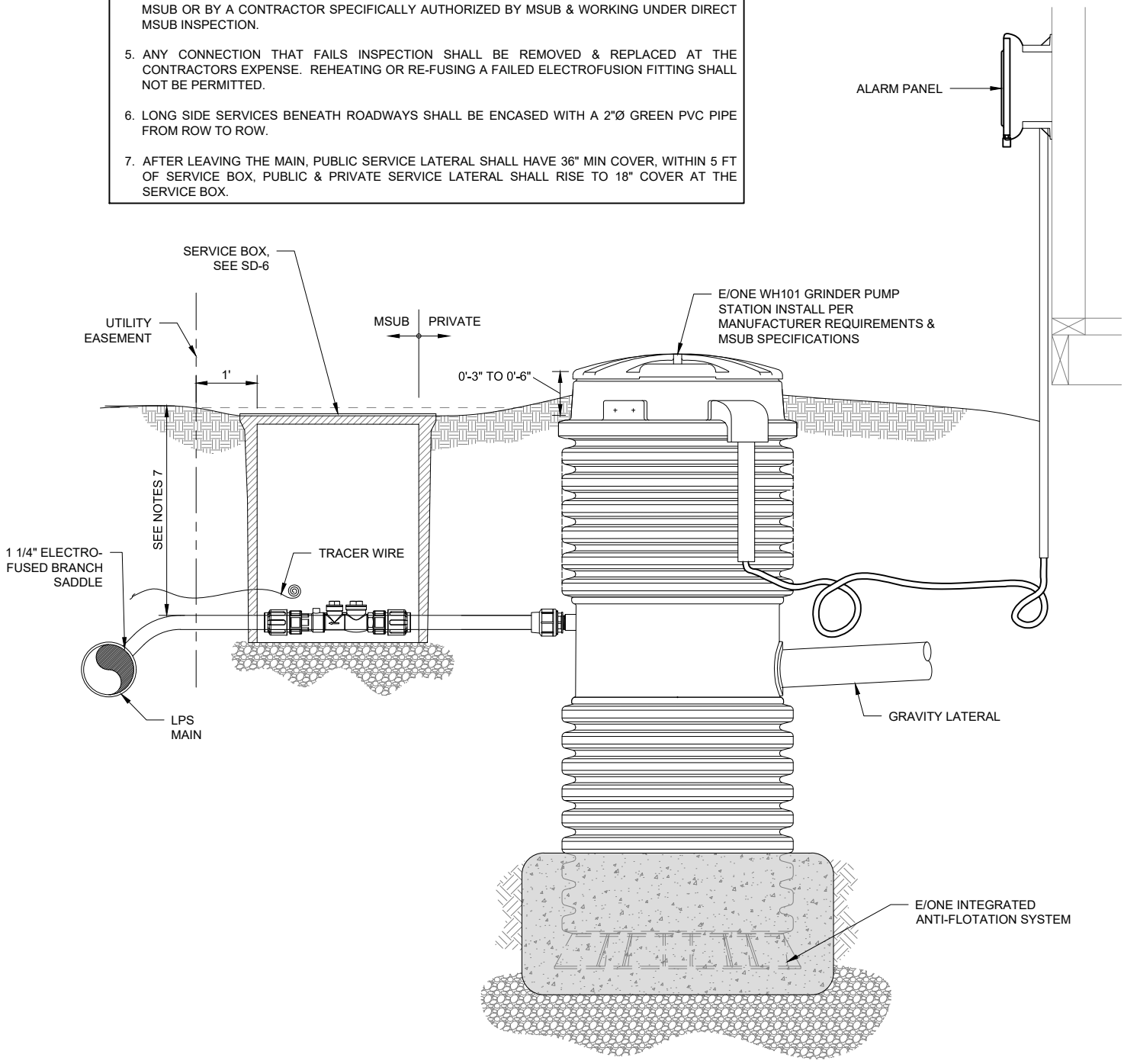
NOTE:

1. ALL PIPES SHALL HAVE POSITIVE SLOPE FROM MAIN LINE TO AIR/VACUUM VALVE WITHOUT INTERMEDIATE HIGH POINTS, LOW POINTS, OR TRAPS.
2. DO NOT INSTALL IN A DRAINAGE SWALE, DEPRESSION, OR LOCATION SUBJECT TO PONDING OR FLOODING.

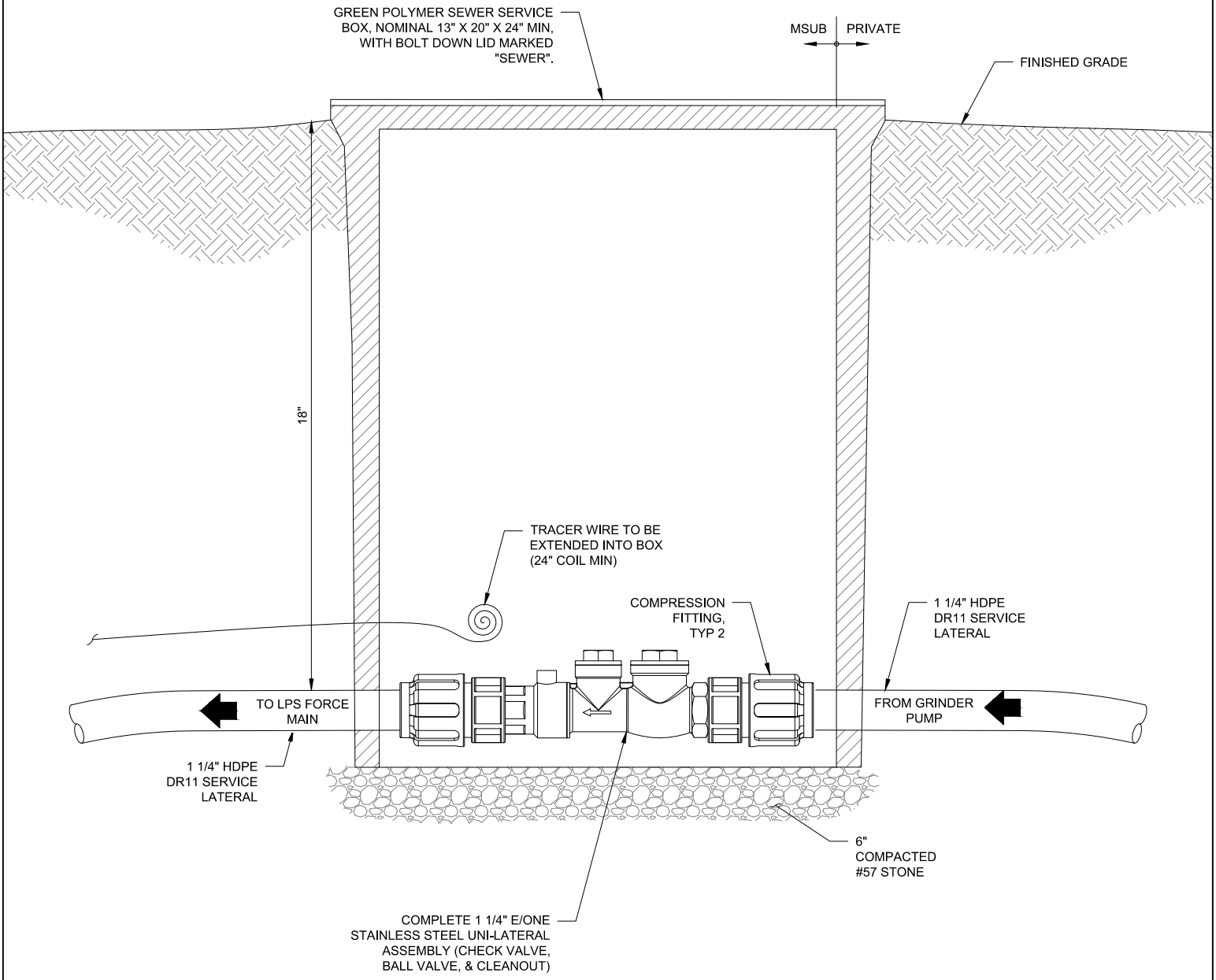
MUSCLE SHOALS UTILITIES BOARD	COMBINATION AIR RELEASE VALVE - AIR VACUUM	SD-3

NOTES:

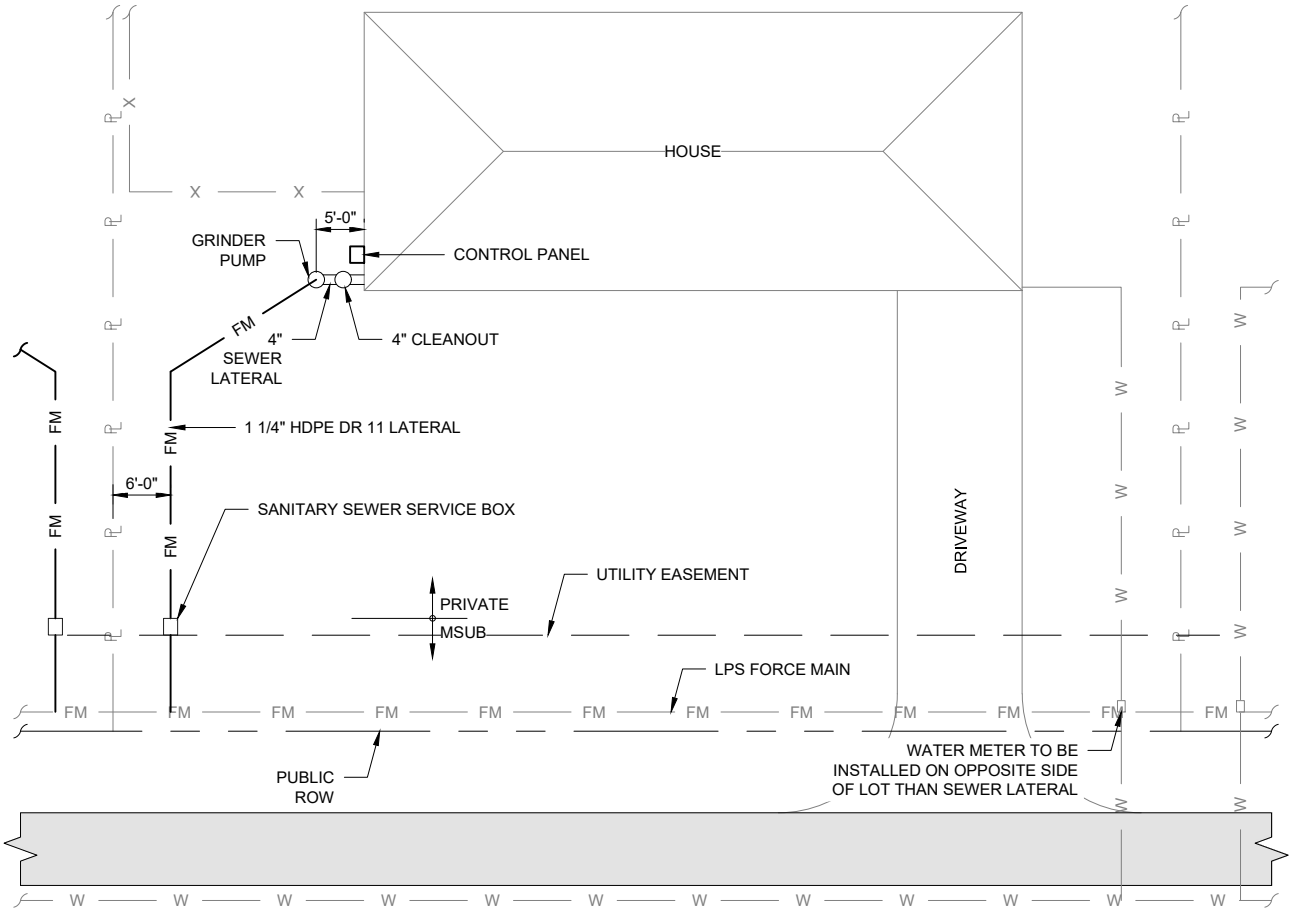
1. ALL FITTINGS SHALL BE INSTALLED BY BUTT-FUSION WELDING OR ELECTROFUSION COUPLINGS, EXCEPT THE MECHANICAL TRANSITIONS SHOWN IN THE SERVICE BOX AND AT THE WETWELL.
2. DO NOT TAP THE PRESSURE SEWER MAIN UNTIL THE ELECTRO FUSED BRANCH SADDLE HAS BEEN INSPECTED & ALL REQ'D PRESSURE TESTING HAS BEEN COMPLETED & APPROVED BY OWNER. MECHANICAL SERVICE SADDLES, THREADED CONNECTIONS, SOCKET-FUSION CONNECTIONS, & FIELD FABRICATED FITTINGS SHALL NOT BE PERMITTED.
3. THE INTEGRAL CUTTER SHALL COMPLETELY PENETRATE THE MAIN & RETAIN THE PIPE COUPON. LOOSE COUPONS OR CUTTINGS SHALL NOT BE PERMITTED TO ENTER THE LPS FORCE MAIN.
4. CONNECTIONS TO AN EXISTING OR ACCEPTED MSUB LPS FORCE MAIN SHALL BE PERFORMED BY MSUB OR BY A CONTRACTOR SPECIFICALLY AUTHORIZED BY MSUB & WORKING UNDER DIRECT MSUB INSPECTION.
5. ANY CONNECTION THAT FAILS INSPECTION SHALL BE REMOVED & REPLACED AT THE CONTRACTORS EXPENSE. REHEATING OR RE-FUSING A FAILED ELECTROFUSION FITTING SHALL NOT BE PERMITTED.
6. LONG SIDE SERVICES BENEATH ROADWAYS SHALL BE ENCASED WITH A 2"Ø GREEN PVC PIPE FROM ROW TO ROW.
7. AFTER LEAVING THE MAIN, PUBLIC SERVICE LATERAL SHALL HAVE 36" MIN COVER, WITHIN 5 FT OF SERVICE BOX, PUBLIC & PRIVATE SERVICE LATERAL SHALL RISE TO 18" COVER AT THE SERVICE BOX.



MUSCLE SHOALS UTILITIES BOARD	LOW PRESSURE TYPICAL LATERAL INSTALLATION	SD-4



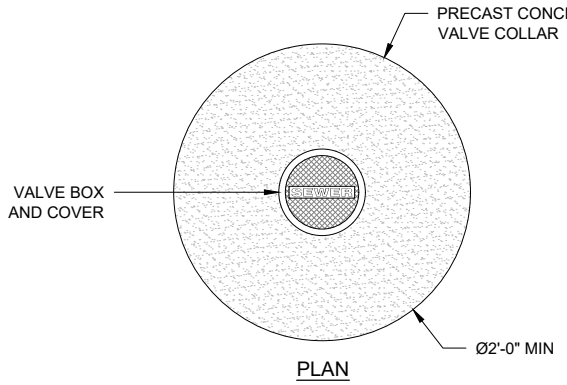
MUSCLE SHOALS UTILITIES BOARD	LOW PRESSURE SERVICE BOX	SD-5



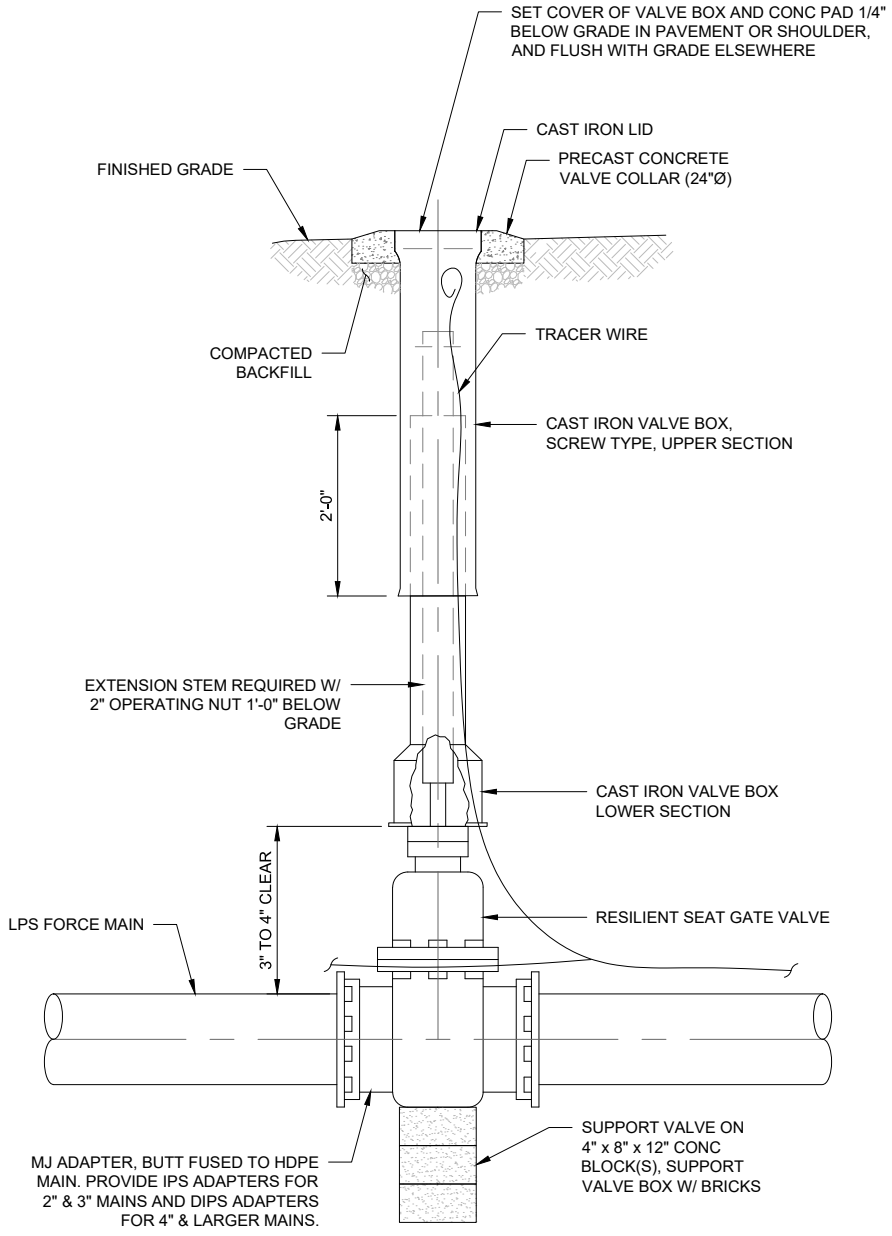
NOTES:

1. INSTALLER SHALL OBTAIN SITE PLAN APPROVAL PRIOR TO INSTALLATION.
2. UNDER NO CIRCUMSTANCES SHALL MSUB SEWER LATERALS BE INSTALLED BENEATH DRIVEWAYS OR TRANSFORMER PADS. ANY MSUB SEWER LATERAL BENEATH DRIVEWAYS OR TRANSFORMER PADS SHALL BE RELOCATED BY THE DEVELOPER PRIOR TO FINAL APPROVAL AT NO ADDITIONAL COST TO MSUB.
3. GRINDER PUMP TO BE LOCATED IN FRONT OF FENCE TO MAINTAIN ACCESS.
4. SEWER SERVICE BOX SHALL BE LOCATED 6' FROM THE SIDE LOT LINE AND WITHIN 1' OF THE BACK OF THE UTILITY EASEMENT.
5. SEWER SERVICE BOX SHALL BE INSTALLED ON THE OPPOSITE PROPERTY LINE AS THE WATER SERVICE.
6. LPS FORCE MAIN TO BE INSTALLED WITHIN THE FIRST 3' OF THE ROAD SIDE OF THE UTILITY EASEMENT.

MUSCLE SHOALS UTILITIES BOARD	LOW PRESSURE FORCE MAIN & SERVICE LAYOUT PLAN	SD-6

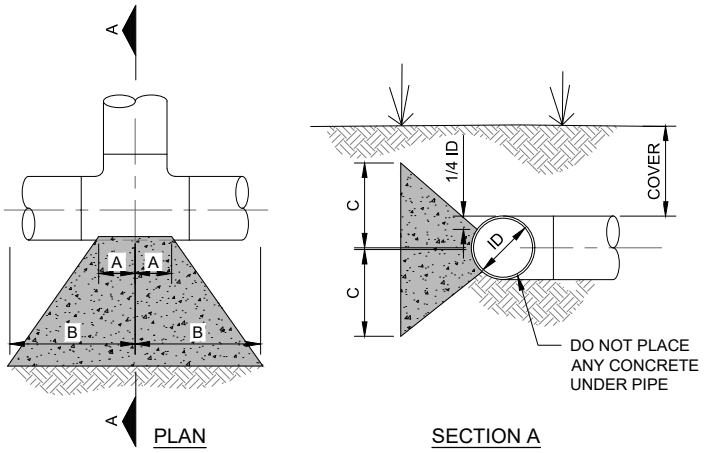


PLAN



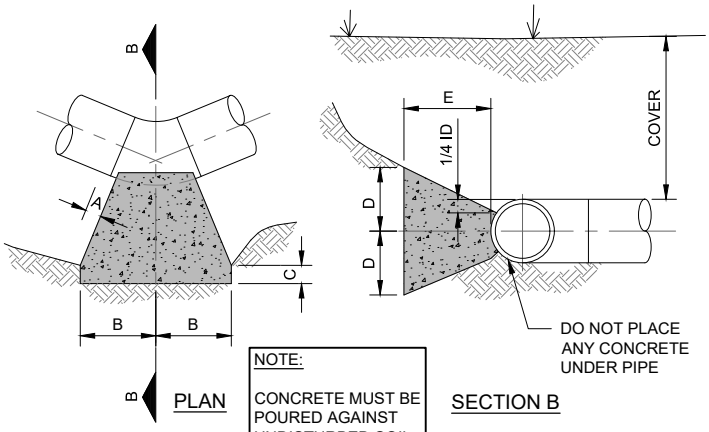
SECTION

MUSCLE SHOALS UTILITIES BOARD	VALVE BOX DETAIL	SD-7



TYPICAL CONCRETE BRACING FOR TEES

PIPE DIA	A	B	C	MIN COVER
4"	5"	5"	6"	4'-0"
6"	6"	8"	9"	4'-0"

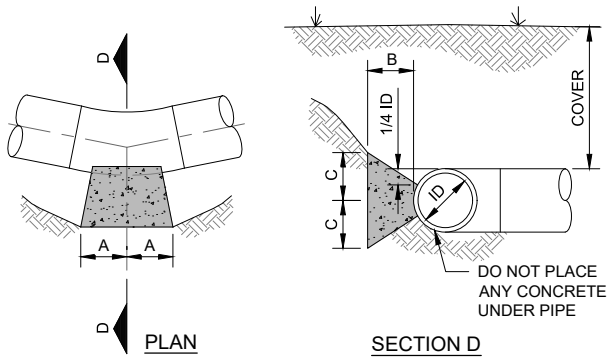


NOTE:

CONCRETE MUST BE POURED AGAINST UNDISTURBED SOIL

TYPICAL CONCRETE BRACING FOR 45° BENDS

PIPE DIA	A	B	C	D	E	MIN COVER
4"	4 1/2"	3 1/2"	1'-0"	6"	1'-1"	4'-0"
6"	4 1/2"	6 1/2"	9"	9"	1'-2"	4'-0"

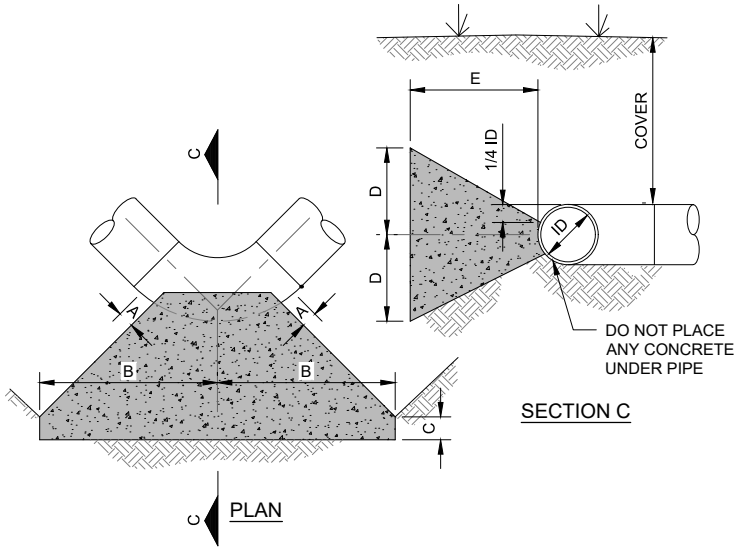


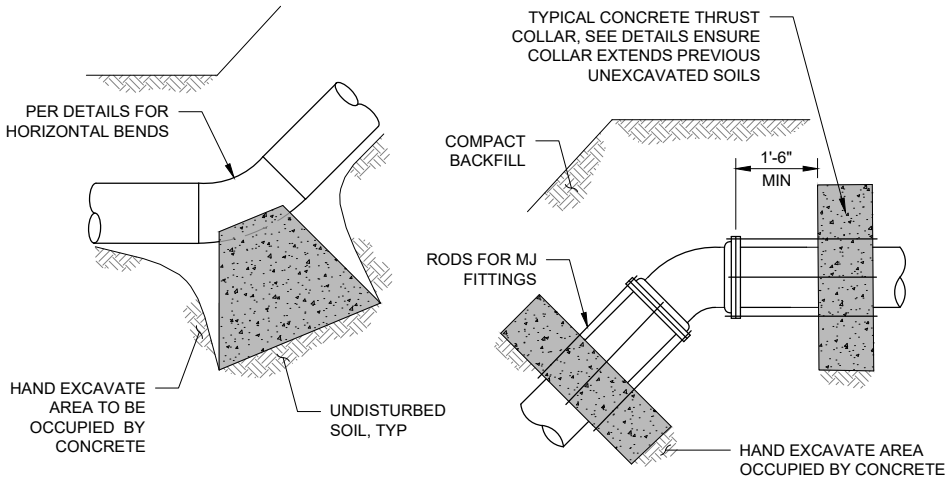
TYPICAL CONCRETE BRACING FOR 11 1/4° & 22 1/2° BENDS

	22 1/2° BENDS				11 1/4° BENDS			
PIPE DIA	A	B	C	MIN COVER	A	B	C	MIN COVER
4"	2"	1'-1"	4"	2'-6"	2"	1'-0"	3"	4'-0"
6"	4"	1'-0"	6"	2'-6"	2"	1'-0"	4"	4'-0"

TYPICAL CONCRETE BRACING FOR 90° BENDS

PIPE DIA.	A	B	C	D	E	MIN COVER
4"	4 1/2 "	6"	1'-8"	6"	1'-10"	4'-0"
6"	4 1/2 "	1'-0"	1'-7"	9"	1'-9"	4'-0"





CONCRETE BRACING FOR VERTICAL BENDS

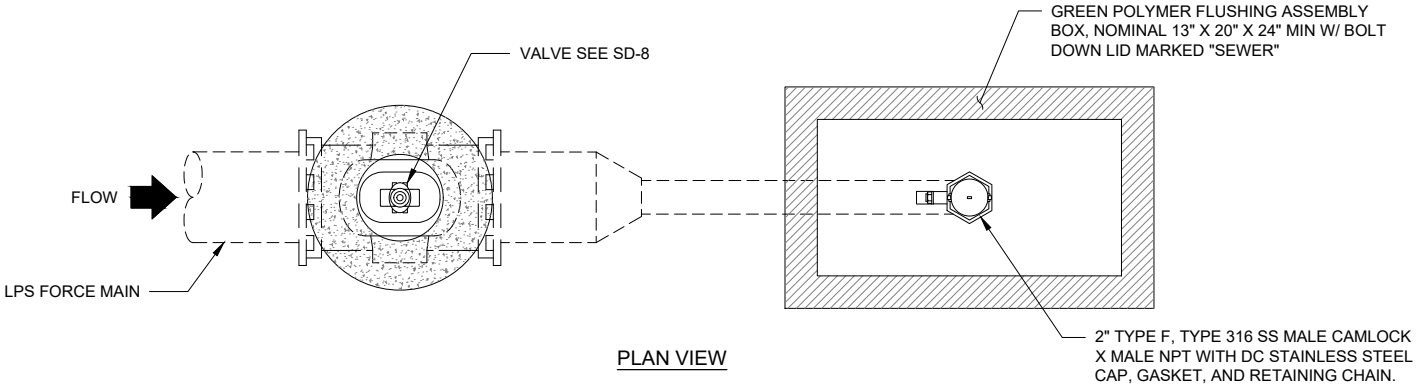
NOTES:

1. CONCRETE SHALL HAVE 3,000 PSI STRENGTH AT 28 DAYS.
2. THE VALUES IN THE TABLE ARE BASED ON 2,000 PSF SOIL BEARING CAPACITY AND 150 PSI TEST/DESIGN PRESSURE.
3. HEIGHT OF CONCRETE THRUST BLOCK ABOVE THE PIPE CENTERLINE IS 1/3 THE D DIMENSION.
4. PROVIDE A 10 MIL PLASTIC BARRIER BETWEEN CONCRETE AND PIPE. OBTAIN INSPECTOR'S APPROVAL PRIOR TO PLACEMENT OF CONCRETE.
5. CONCRETE FOR THRUST BLOCK TO BE POURED AGAINST UNDISTURBED EARTH.
6. GENERAL DIMENSIONS SHALL BE CONSIDERED AS MINIMUMS, CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADDITIONAL AS REQUIRED FOR ACTUAL FIELD CONDITIONS ENCOUNTERED.

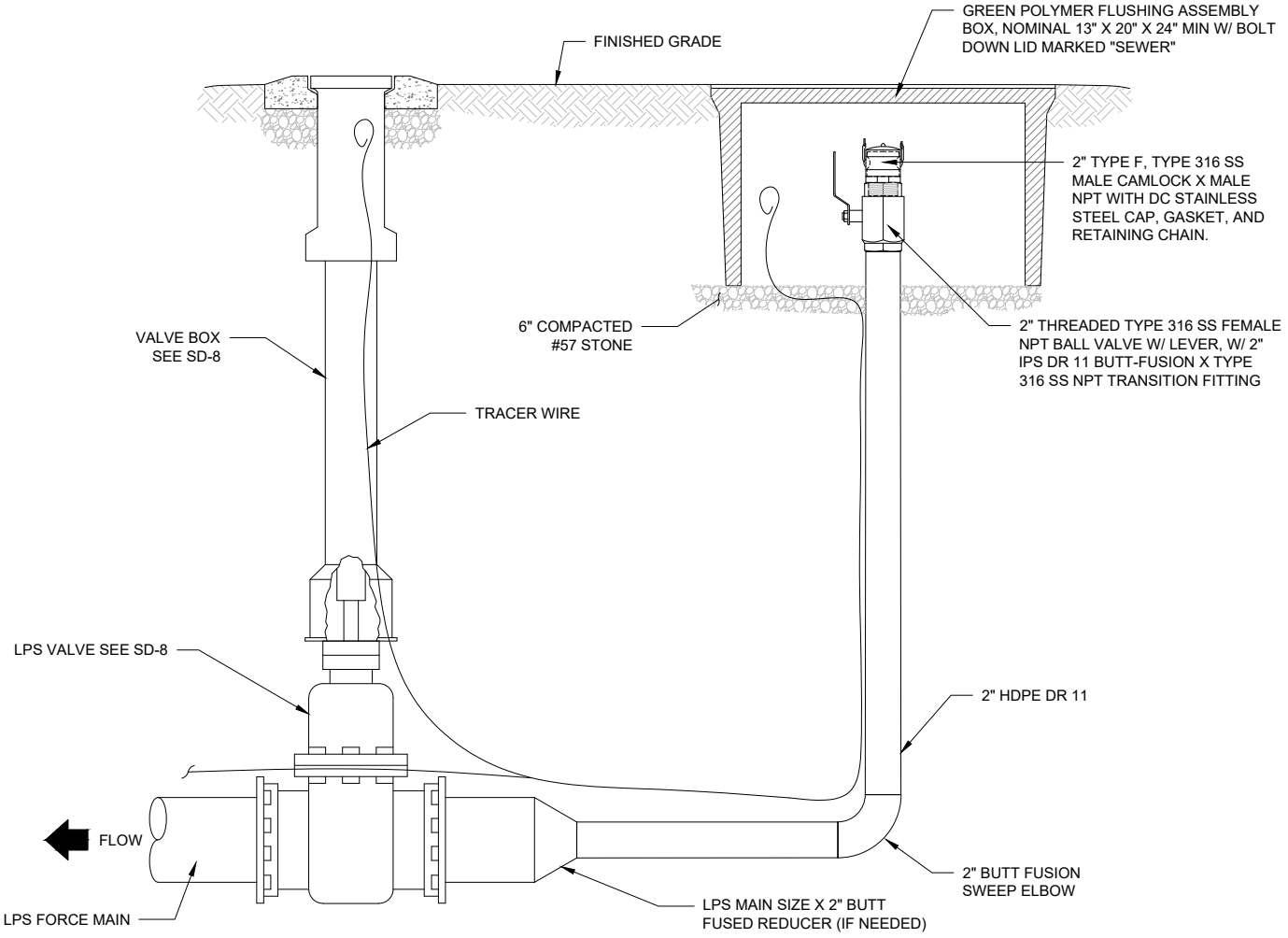
MUSCLE SHOALS
UTILITIES BOARD

TYPICAL THRUST RESTRAINT

SD-8



PLAN VIEW

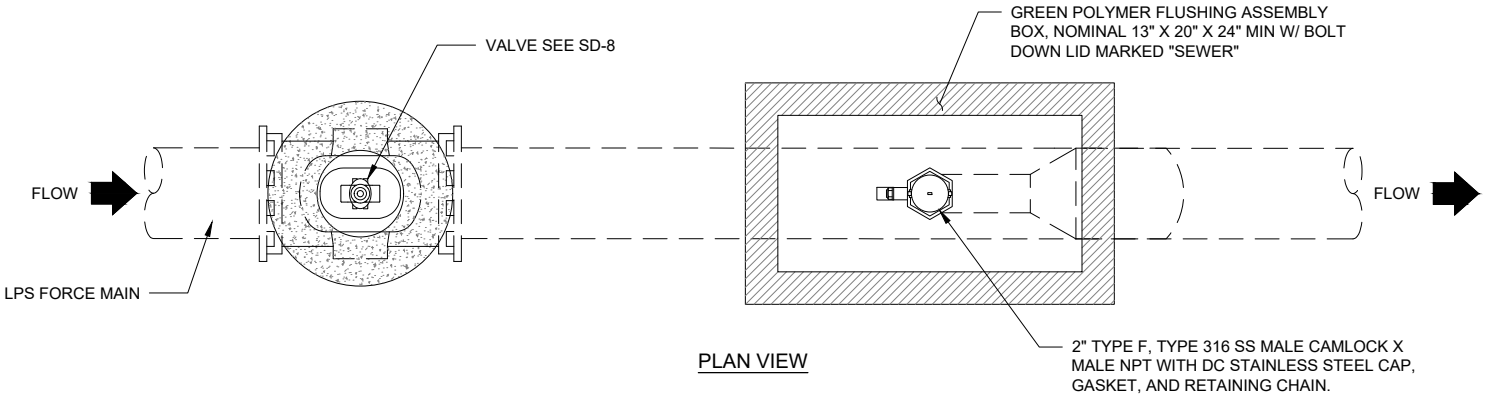


ELEVATION VIEW

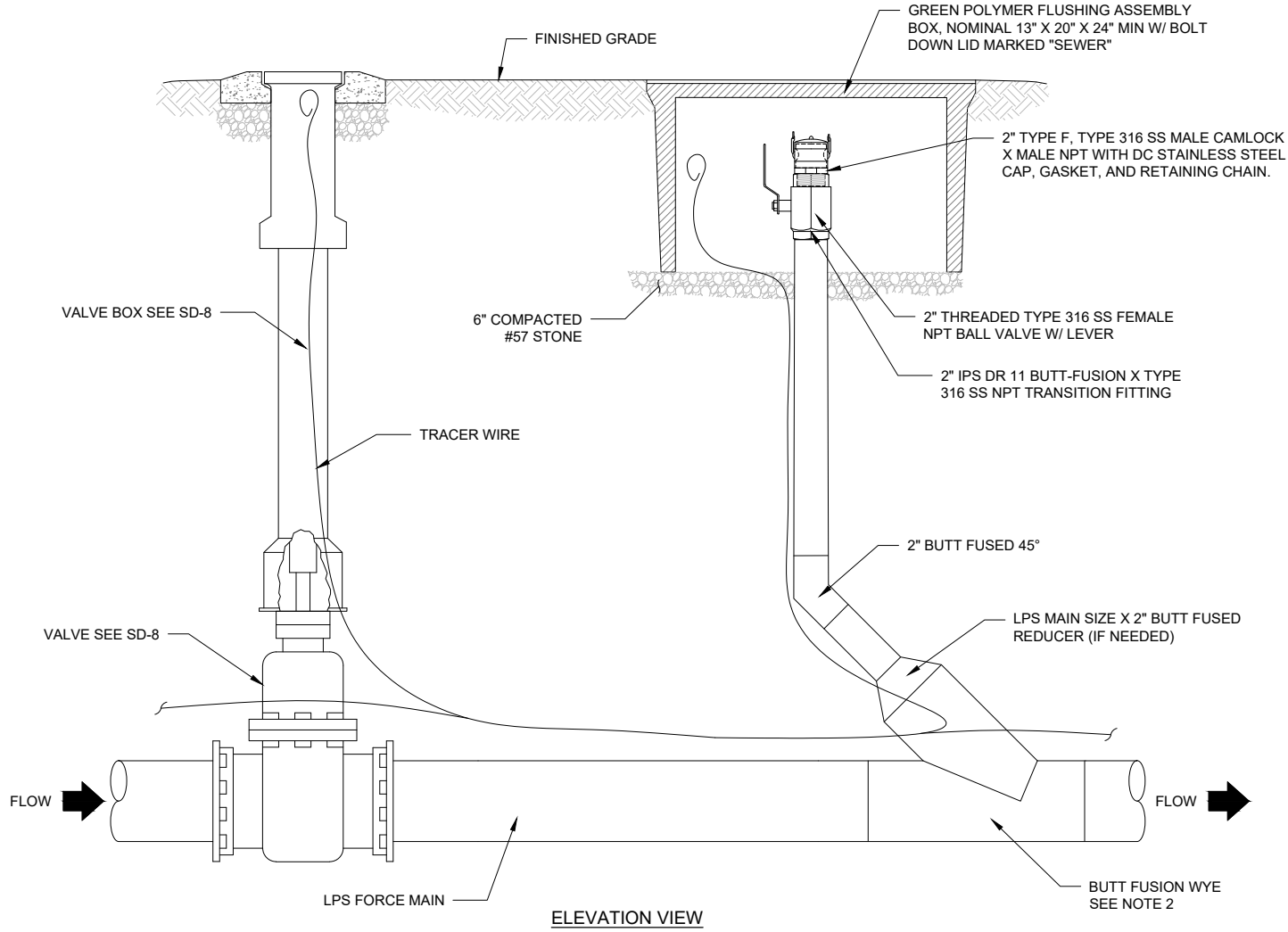
NOTES:

1. ALL HDPE PIPE AND FITTINGS SHALL BE PE4710, DR 11. PIPE AND FITTINGS 3" AND SMALLER SHALL BE IPS. PIPE AND FITTINGS 4" AND LARGER SHALL BE DIPS. ALL 2-INCH FLUSHING BRANCH PIPE SHALL BE IPS. FITTINGS SHALL MATCH THE ACTUAL OUTSIDE DIAMETER SYSTEM OF EACH CONNECTED PIPE. CONNECTION TRANSITIONING BETWEEN IPS AND DIPS SHALL USE A FACTORY FABRICATED OR PIPE-MANUFACTURER-APPROVED TRANSITION FITTING.

MUSCLE SHOALS UTILITIES BOARD	LOW PRESSURE SEWER SYSTEM TERMINAL FLUSHING ASSEMBLY	SD-9



PLAN VIEW

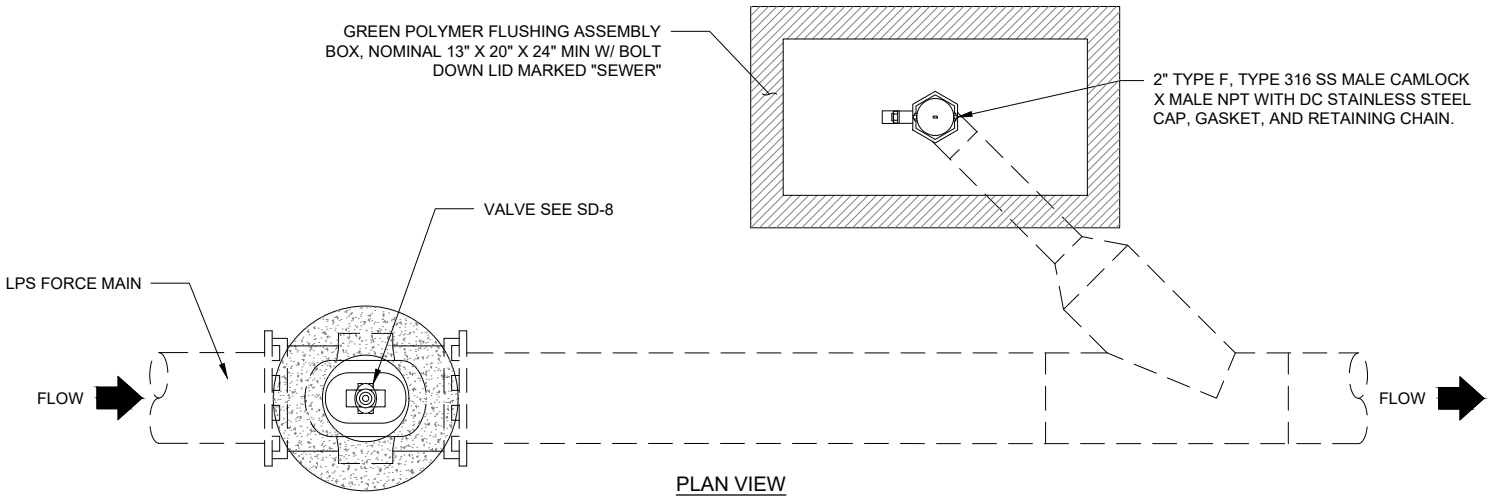


ELEVATION VIEW

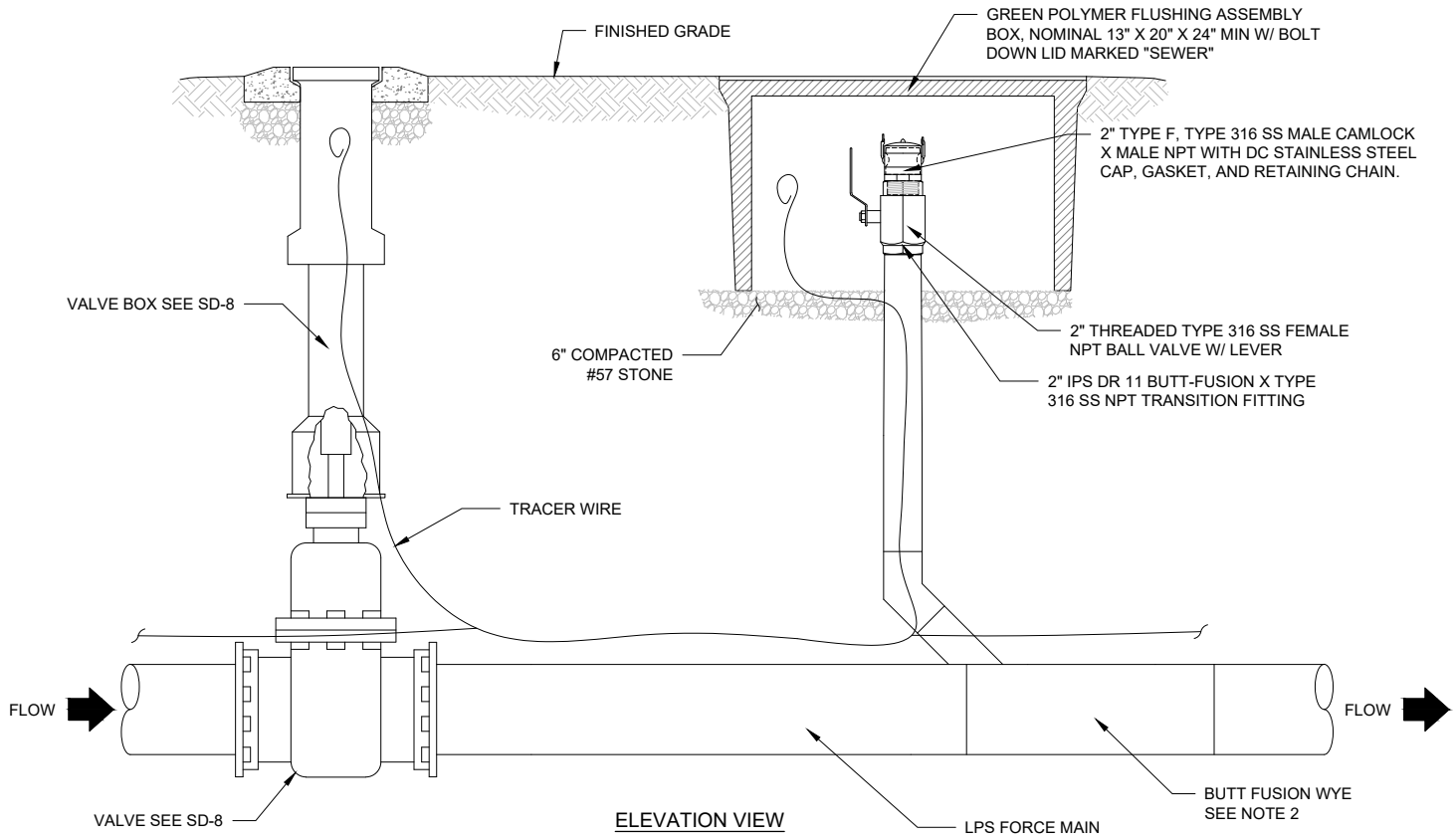
NOTES:

1. ALL HDPE PIPE AND FITTINGS SHALL BE PE4710, DR 11. PIPE AND FITTINGS 3" AND SMALLER SHALL BE IPS. PIPE AND FITTINGS 4" AND LARGER SHALL BE DIPS. ALL 2-INCH FLUSHING BRANCH PIPE SHALL BE IPS. FITTINGS SHALL MATCH THE ACTUAL OUTSIDE DIAMETER SYSTEM OF EACH CONNECTED PIPE. CONNECTION TRANSITIONING BETWEEN IPS AND DIPS SHALL USE A FACTORY FABRICATED OR PIPE-MANUFACTURER-APPROVED TRANSITION FITTING.
2. PROVIDE A FACTORY FABRICATED PE4710 DR 11 BUTT FUSION WYE MATCHING THE NOMINAL SIZE AND OUTSIDE DIAMETER OF THE LPS FORCE MAIN. MAINS 3" AND SMALLER SHALL BE IPS; MAINS 4" AND LARGER SHALL BE DIPS. REDUCE THE WYE BRANCH TO A 2" IPS PE 4710 DR 11 USING A MANUFACTURED REDUCER. OMIT THE REDUCER ON 2" IPS MAINS. LOCATE THE FLUSHING WYE IMMEDIATELY DOWNSTREAM OF THE MAINLINE ISOLATION VALVE.

MUSCLE SHOALS UTILITIES BOARD	LOW PRESSURE SEWER SYSTEM IN-LINE FLUSHING ASSEMBLY	SD-10



PLAN VIEW

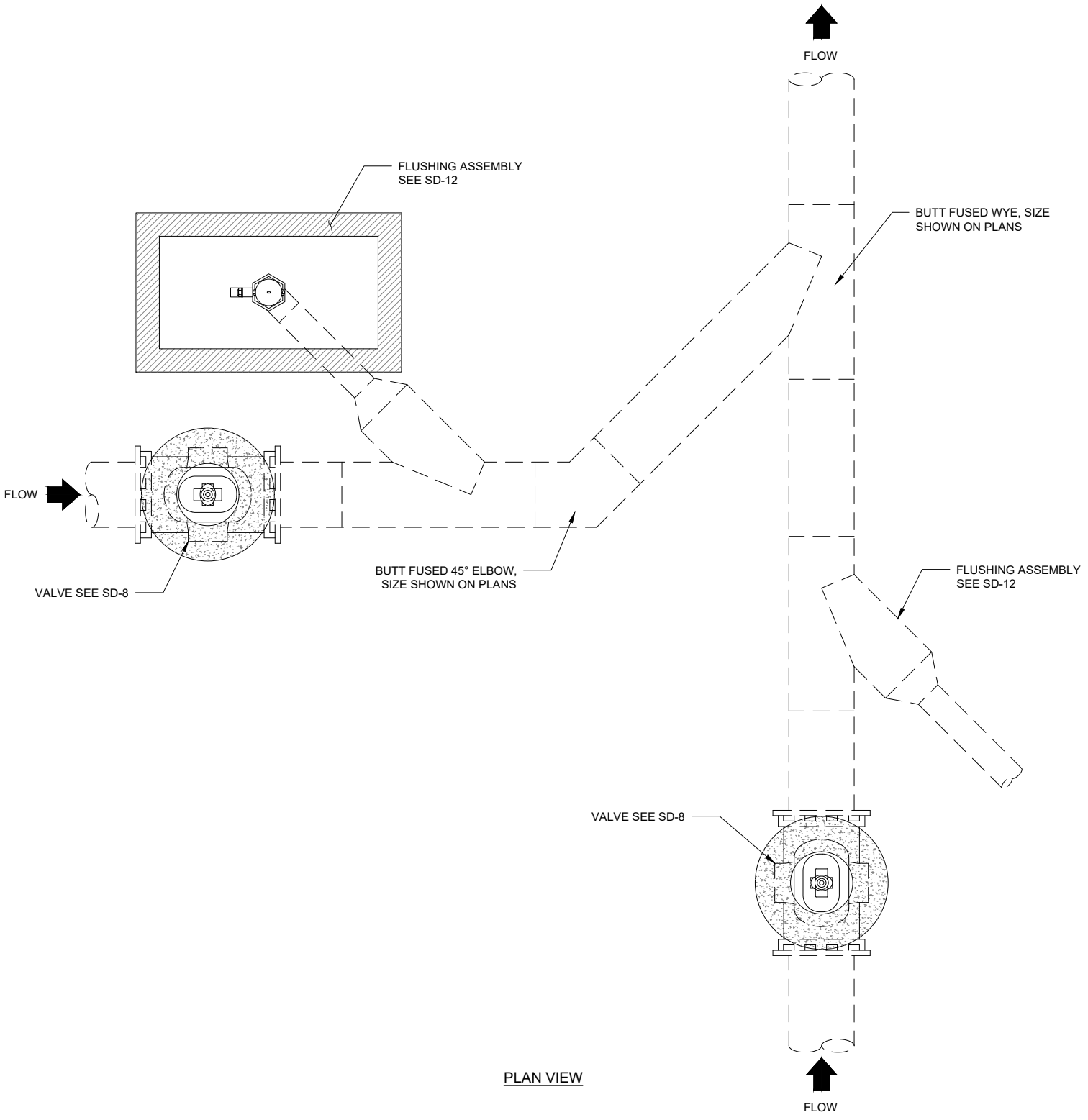


ELEVATION VIEW

NOTES:

1. ALL HDPE PIPE AND FITTINGS SHALL BE PE4710, DR 11. PIPE AND FITTINGS 3" AND SMALLER SHALL BE IPS. PIPE AND FITTINGS 4" AND LARGER SHALL BE DIPS. ALL 2-INCH FLUSHING BRANCH PIPE SHALL BE IPS. FITTINGS SHALL MATCH THE ACTUAL OUTSIDE DIAMETER SYSTEM OF EACH CONNECTED PIPE. CONNECTION TRANSITIONING BETWEEN IPS AND DIPS SHALL USE A FACTORY FABRICATED OR PIPE-MANUFACTURER-APPROVED TRANSITION FITTING.
2. PROVIDE A FACTORY FABRICATED PE4710 DR 11 BUTT FUSION WYE MATCHING THE NOMINAL SIZE AND OUTSIDE DIAMETER OF THE LPS FORCE MAIN. MAINS 3" AND SMALLER SHALL BE IPS; MAINS 4" AND LARGER SHALL BE DIPS. REDUCE THE WYE BRANCH TO A 2" IPS PE 4710 DR 11 USING A MANUFACTURED REDUCER. OMIT THE REDUCER ON 2" IPS MAINS. LOCATE THE FLUSHING WYE IMMEDIATELY DOWNSTREAM OF THE MAINLINE ISOLATION VALVE.
3. LOCATE FLUSHING BOX AS CLOSE TO THE MAIN AS PRACTICABLE. OFFSET DISTANCE SHALL BE SHOWN ON THE APPROVED PLANS AND SHALL NOT EXCEED 5 FEET UNLESS APPROVED BY MSUB.

MUSCLE SHOALS UTILITIES BOARD	LOW PRESSURE SEWER SYSTEM OFFSET FLUSHING ASSEMBLY	SD-11

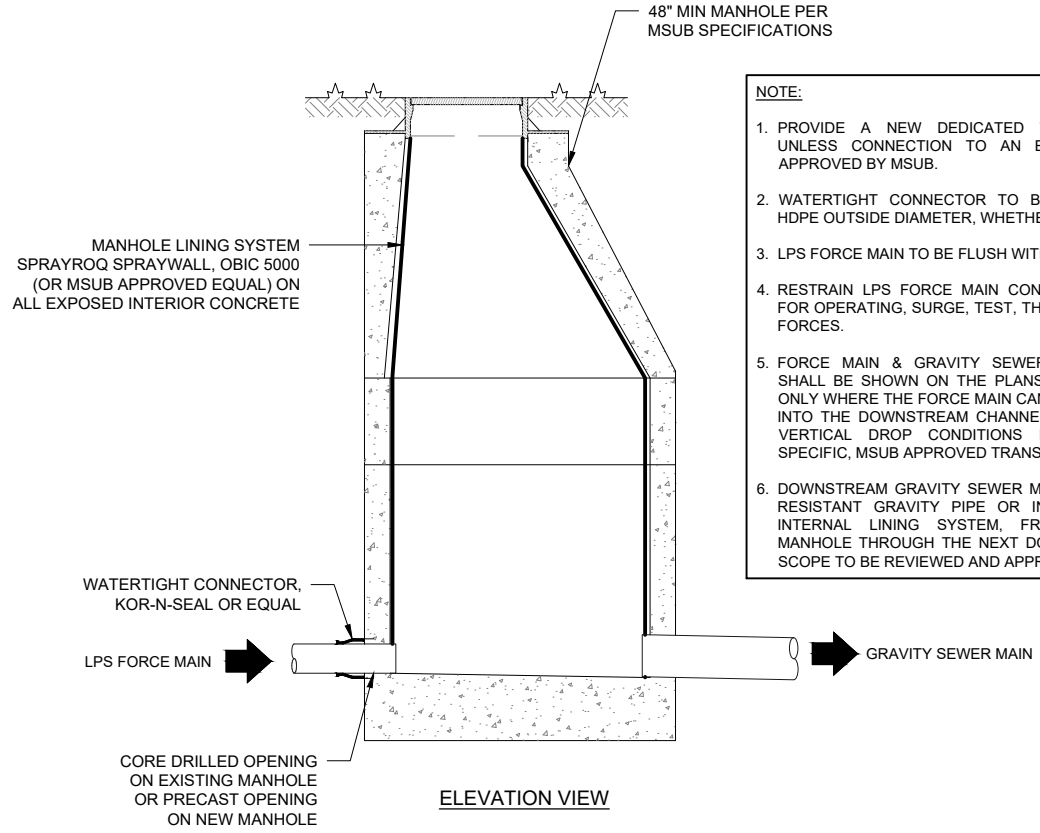


PLAN VIEW

NOTES:

1. ALL HDPE PIPE AND FITTINGS SHALL BE PE4710, DR 11. PIPE AND FITTINGS 3" AND SMALLER SHALL BE IPS. PIPE AND FITTINGS 4" AND LARGER SHALL BE DIPS. ALL 2-INCH FLUSHING BRANCH PIPE SHALL BE IPS. FITTINGS SHALL MATCH THE ACTUAL OUTSIDE DIAMETER SYSTEM OF EACH CONNECTED PIPE. CONNECTION TRANSITIONING BETWEEN IPS AND DIPS SHALL USE A FACTORY FABRICATED OR PIPE-MANUFACTURER-APPROVED TRANSITION FITTING.

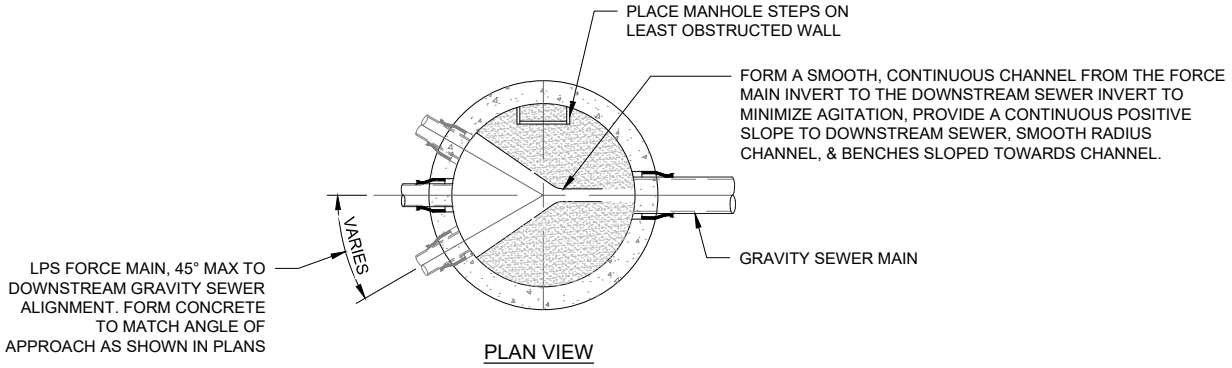
MUSCLE SHOALS UTILITIES BOARD	LOW PRESSURE SEWER SYSTEM MAIN BRANCH DETAIL	SD-12



ELEVATION VIEW

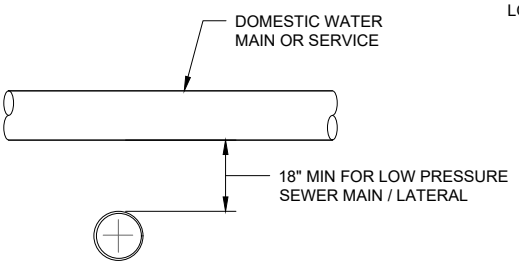
NOTE:

1. PROVIDE A NEW DEDICATED TRANSITION MANHOLE UNLESS CONNECTION TO AN EXISTING MANHOLE IS APPROVED BY MSUB.
2. WATERTIGHT CONNECTOR TO BE SIZED FOR ACTUAL HDPE OUTSIDE DIAMETER, WHETHER IPS OR DIPS.
3. LPS FORCE MAIN TO BE FLUSH WITH MANHOLE WALL.
4. RESTRAIN LPS FORCE MAIN CONNECTION AT MANHOLE FOR OPERATING, SURGE, TEST, THERMAL, & TERMINATION FORCES.
5. FORCE MAIN & GRAVITY SEWER INVERT ELEVATIONS SHALL BE SHOWN ON THE PLANS. THIS DETAIL APPLIES ONLY WHERE THE FORCE MAIN CAN DISCHARGE DIRECTLY INTO THE DOWNSTREAM CHANNEL WITHOUT FREE FALL. VERTICAL DROP CONDITIONS REQUIRE A PROJECT SPECIFIC, MSUB APPROVED TRANSITION DETAIL.
6. DOWNSTREAM GRAVITY SEWER MAIN TO BE CORROSION RESISTANT GRAVITY PIPE OR INSTALL AN APPROVED INTERNAL LINING SYSTEM, FROM THE TRANSITION MANHOLE THROUGH THE NEXT DOWNSTREAM MANHOLE. SCOPE TO BE REVIEWED AND APPROVED BY MSUB.

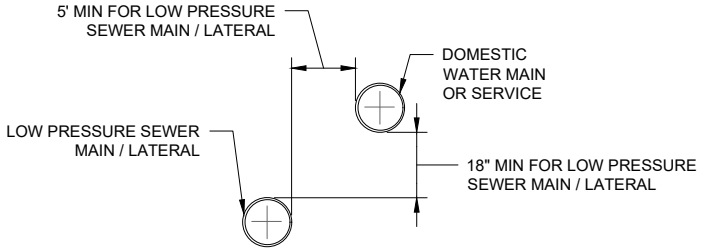


PLAN VIEW

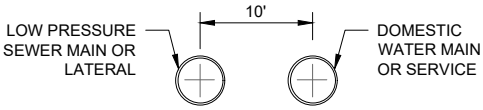
MUSCLE SHOALS UTILITIES BOARD	LOW PRESSURE SEWER SYSTEM TRANSITION MANHOLE	SD-13



LPS FORCE MAIN & WATER CROSSING

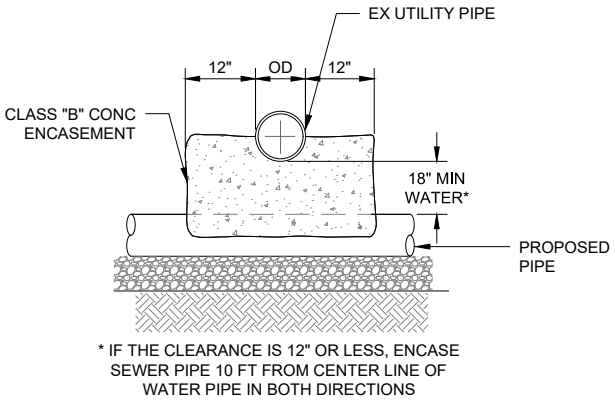


PREFERRED

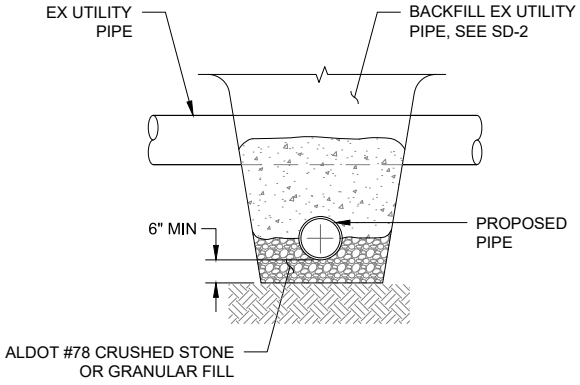


MITIGATED DESIGN

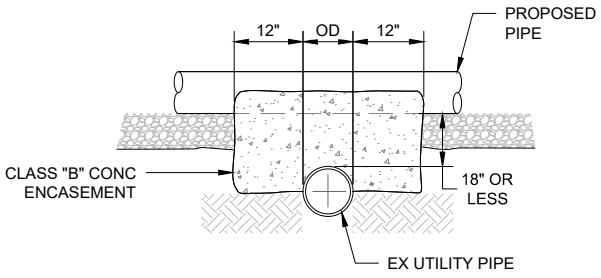
LPS FORCE MAIN & WATER PARALLEL SEPARATION



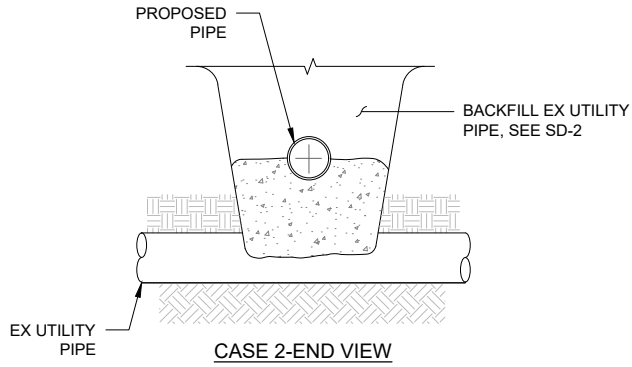
CASE 1-SIDE VIEW



CASE 1-END VIEW



CASE 2-SIDE VIEW



CASE 2-END VIEW

NOTES:

1. SHALL BE USED WHEN CLEARANCE BETWEEN PROPOSED LINE AND UTILITY PIPE IS 18" OR LESS.
2. "UTILITY PIPE" INCLUDES UNDERGROUND WATER, GAS, TELEPHONE AND ELECTRICAL CONDUITS, STORM AND SANITARY SEWERS, ETC.
3. CONTRACTOR SHALL COORDINATE WITH OTHER UTILITIES.
4. WHEN CROSSING OVER FLEXIBLE PIPE (PVC, FRP, PE, ETC.) EXTEND LENGTH AND DEPTH OF CONCRETE AS REQ'D TO ENSURE NO NEW LOADS ARE PLACED ON THE EXISTING PIPE.
5. SANITARY SEWER SHALL ALWAYS BE LOCATED BENEATH WATER LINES. WRITTEN APPROVAL SHALL BE REQ'D FROM MSUB FOR A SANITARY SEWER LINE TO CROSS ABOVE WATER LINES.

MUSCLE SHOALS UTILITIES BOARD	UTILITY CROSSING & SEPARATION DETAIL	SD-14