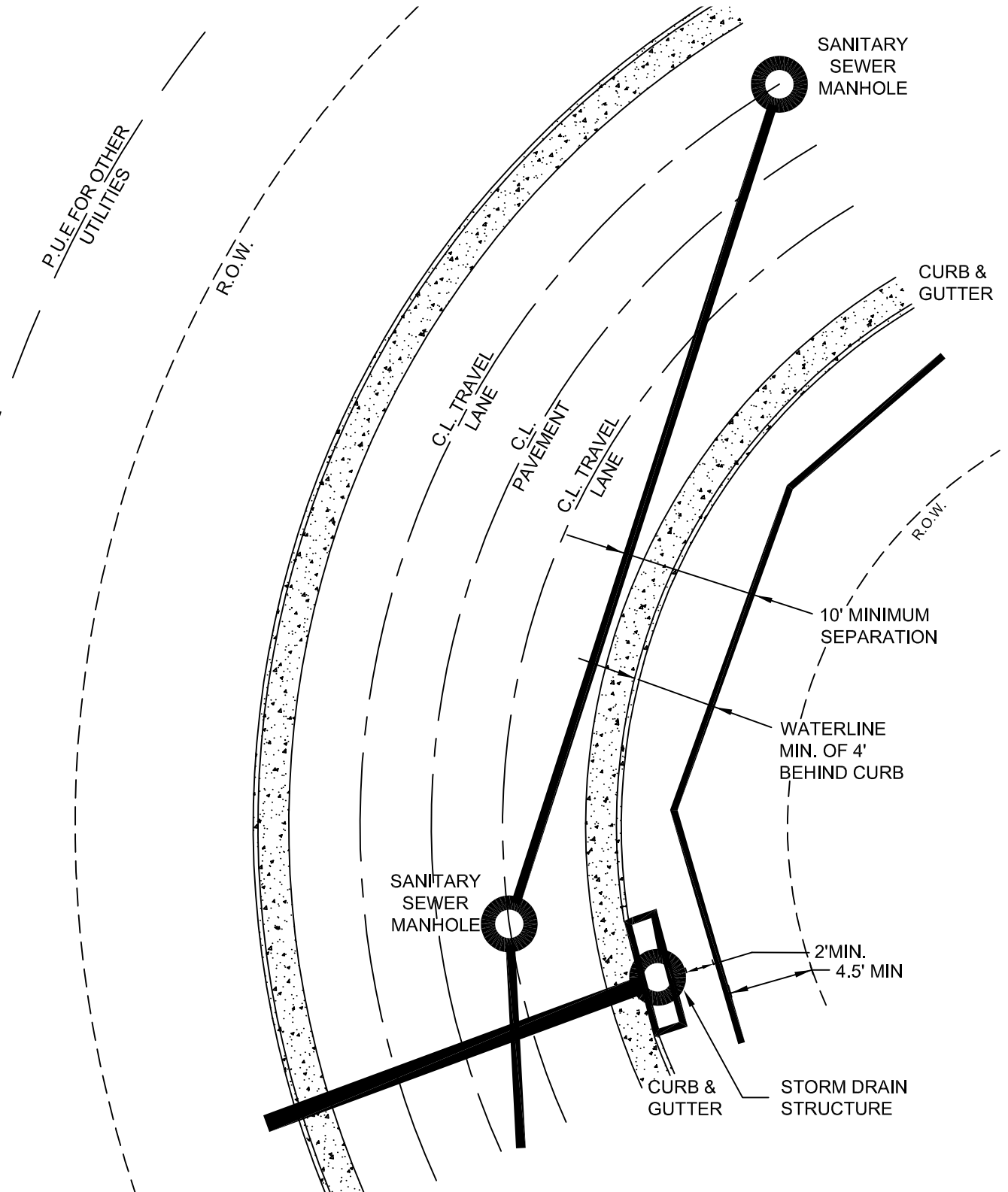


LIST OF GENERAL DETAIL DRAWINGS

<u>G#</u>	<u>TITLE</u>
G-1	PUBLIC WATER AND SANITARY SEWER STANDARD CONFIGURATION IN PUBLIC ROADS
G-2	PUBLIC WATER AND SANITARY SEWER STANDARD CUL-DE-SAC CONFIGURATION
G-3	SANITARY SEWER AND WATER LINE EASEMENTS
G-4	TRACER WIRE
G-5	CHAIN LINK FENCE
G-6	PIPE SUPPORT IN CASING PIPE
G-7	AERIAL CROSSING DETAIL
G-8	CONCRETE PIER
G-9	CONCRETE ENCASED PIPE
G-10	ANCHOR BLOCK
G-11	BEDDING AND BACKFILL OUTSIDE OF PAVED AREAS
G-12	BEDDING AND BACKFILL UNDER PAVEMENT AND IN RIGHT OF WAY
G-13	HDPE TO OTHER PIPE TRANSITION

1. A WORK AREA WITH A MINIMUM CLEAR SPACE OF TEN FEET BEHIND THE BACK OF CURB SHALL BE PROVIDED FOR ALL WATER AND SEWER MAINS. A DEDICATED WATER OR SEWER EASEMENT MUST BE PROVIDED IF THERE IS LESS THAN TEN FEET BEHIND THE BACK OF CURB AND THE LIMITS OF RIGHT-OF-WAY.

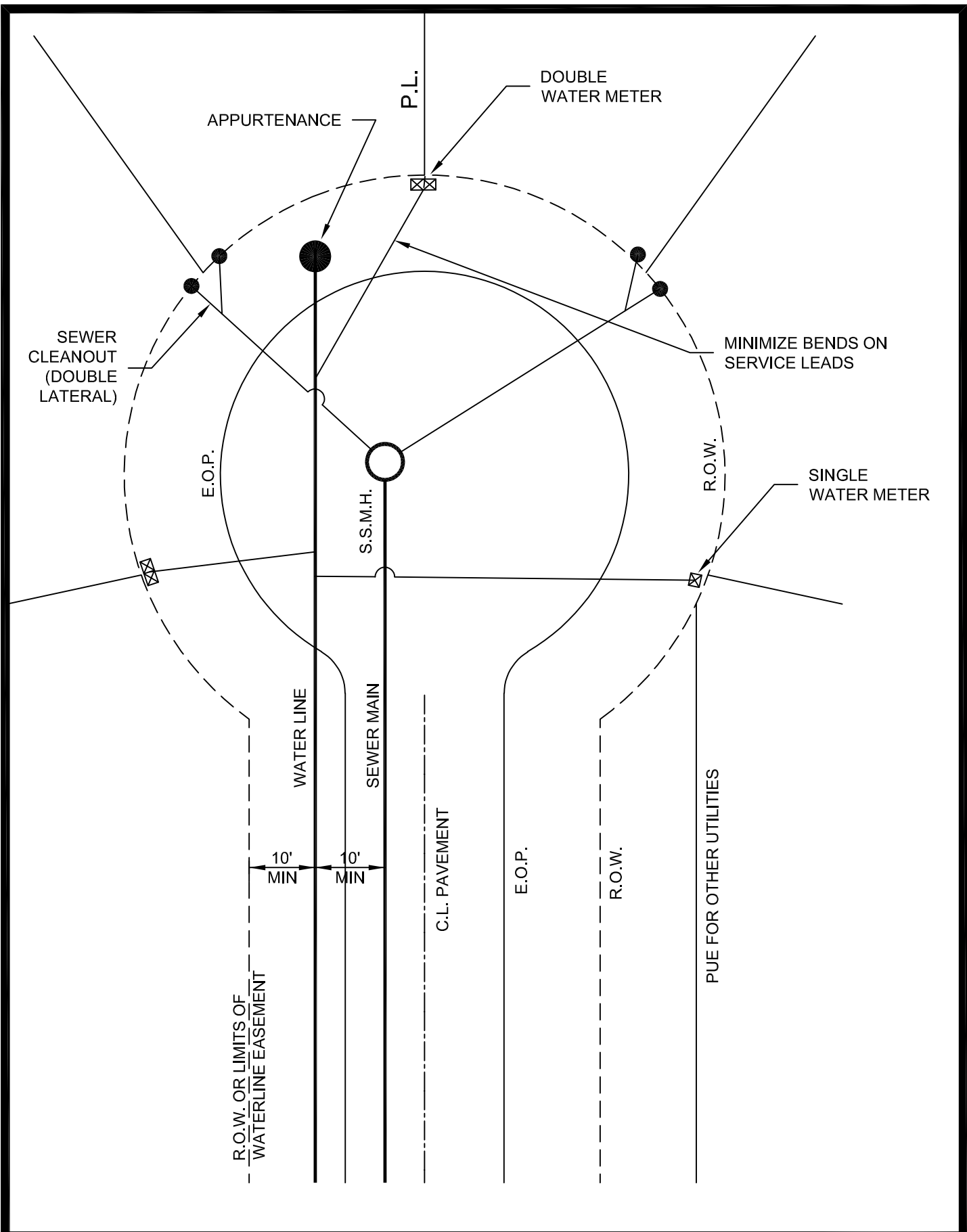


WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

**PUBLIC WATER AND SANITARY SEWER
STANDARD CONFIGURATION IN PUBLIC ROADS**

G-1

09/2024



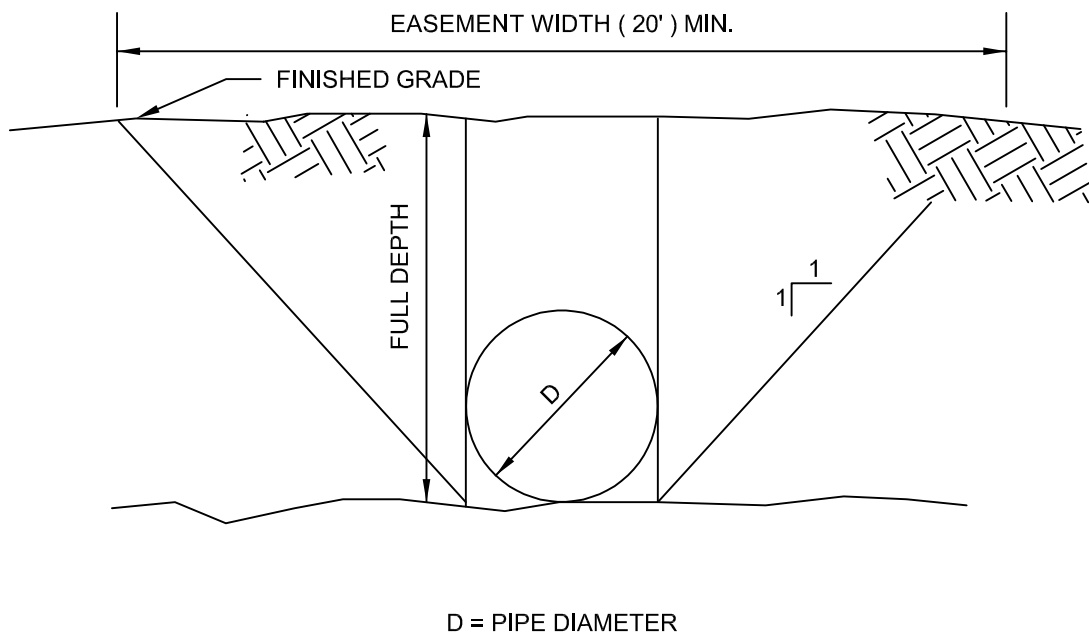
WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

**PUBLIC WATER AND SANITARY SEWER
STANDARD CUL-DE-SAC CONFIGURATION**

G-2

09/2024

1. PUBLIC EASEMENT WIDTH SHALL BE DETERMINED BASED ON 1:1 SIDE SLOPE EXTENDING FROM THE FINISHED GRADE TO OUTSIDE EDGE OF PIPE (NOMINAL PIPE DIAMETER) ROUNDED UP TO THE NEAREST 1' INCREMENT, OR 20' MINIMUM, WHICHEVER IS GREATER.
2. THIS EASEMENT SHALL EXTEND ALONG THE ENTIRE LENGTH OF THE SUBJECT PIPE AT LEAST ONE HALF THE DISTANCE OF EASEMENT PAST CENTER OF LAST MANHOLE OR WATER APPURTENANCE.



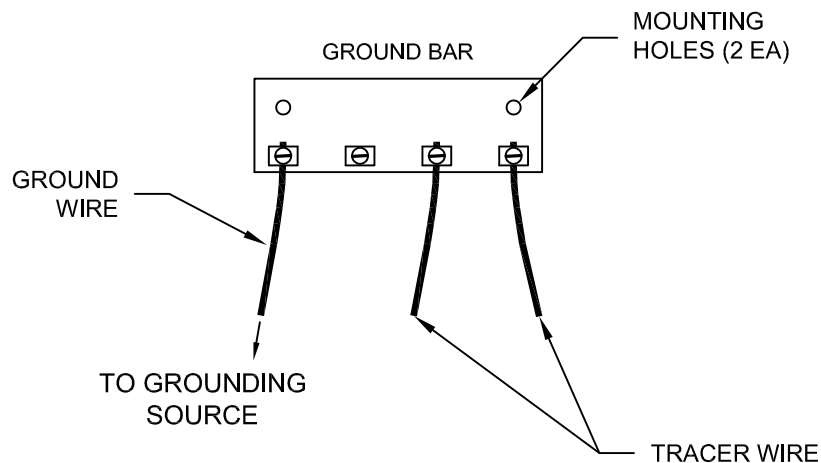
WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

**SANITARY SEWER AND
WATER LINE EASEMENTS**

G-3

09/2024

1. TRACER WIRE SHALL BE INSTALLED ON ALL NEW WATER AND SEWER PIPE INSTALLATION. THIS INCLUDES, BUT IS NOT LIMITED TO, DUCTILE IRON PIPE, PVC PIPE, AND POLYETHYLENE PIPE, INCLUDING SERVICE LINES. TRACER WIRE IS NOT REQUIRED FOR GRAVITY SEWER MAINS BETWEEN MANHOLES. TRACER WIRE WILL BE REQUIRED FOR SEWER LATERALS BETWEEN THE MAIN AND THE CLEANOUT AT THE PROPERTY LINE.
2. TRACER WIRE SHALL BE 14 GAUGE SOLID COPPER ELECTRICAL WIRE WITH A MINIMUM OF 45 MIL POLYETHYLENE COATING. THHN WIRE IS NOT ACCEPTABLE.
3. TRACER WIRE SHALL BE INSTALLED ALONG THE TOP OF THE PIPE AT 3:00 OR 9:00 O'CLOCK POSITION.
4. TRACER WIRE SHALL BE BROUGHT TO THE SURFACE AT LOCATIONS SUCH AS VALVES, WATER VAULTS, AIR VALVES, AND TRACER WIRE ACCESS BOXES IF NECESSARY.
5. TRACER WIRE SHALL BE INSTALLED WITH WATER AND SEWER PIPE INSTALLED BY ALL METHODS INCLUDING OPEN TRENCHING, DIRECTIONAL BORING, JACK AND BORE, OR PIPE BURSTING.
6. SPLICING OF TRACER WIRE SHALL BE MINIMIZED. THE CONTRACTOR WILL BE RESPONSIBLE FOR ENSURING CONTINUITY AT ALL SPLICE LOCATIONS. IT IS THE INTENT OF THIS SPECIFICATION THAT THE SPLICE BE WATERPROOF, CORROSION-PROOF, AND UNABLE TO COME APART.
7. TRACER WIRE USED FOR DIRECTIONAL BORING, PIPE BURSTING, AND JACK AND BORING SHALL BE ATTACHED DIRECTLY TO THE PIPE. THREE STRANDS OF TRACER WIRE SHALL BE USED IN THIS APPLICATION. TRACER WIRE USED FOR BORING SHALL BE STRONGER THAN TYPICAL TRACER WIRE. SEE APPROVED PRODUCT LIST FOR SPECIFICATIONS. TRACER ACCESS BOXES SHALL BE INSTALLED AT EACH END OF ALL BORING/PIPE BURSTING OPERATIONS.
8. RECORD DRAWING SHALL SHOW TRACER WIRE ACCESS POINT LOCATIONS AND SPLICE LOCATIONS.
9. TRACER WIRE SHALL HAVE AN ACCESS POINT EVERY 500'. THIS MAY REQUIRE TRACER WIRE ACCESS BOXES IF OTHER ACCESS POINTS ARE NOT AVAILABLE. TRACER ACCESS BOXES SHALL BE USED IN LAWNS/SIDEWALKS/STREETS. IN FIELDS, USE AN ABOVE GROUND STATION THAT IS A HIGHLY VISIBLE POST.
10. LOCATION TRACER WIRE WILL BE TESTED BY THE PARTICIPATING UTILITY AS PART OF THE FINAL ACCEPTANCE. CONTRACTOR WILL BE RESPONSIBLE FOR ENSURING THAT THE TRACER WIRE CAN BE LOCATED.
11. A GROUND ROD WILL BE REQUIRE AT ALL TRACER WIRE ACCESS POINTS. THIS MAY INCLUDE VALVE BOXES OR TRACER WIRE ACCESS BOXES OR POSTS. THE GROUND ROD SHALL BE COPPER COATED STEEL WITH A MINIMUM DIAMETER OF 5/8" AND SHALL BE BURIED A MINIMUM OF FOUR (4) FEET INTO THE GROUND. THE GROUND WIRE CONNECTED TO THE GROUND ROD SHALL BE #6 AWG COPPER WIRE AND SHALL BE OF ADEQUATE LENGTH TO EXTEND A MINIMUM OF FIVE (5) FEET BEYOND THE TOP OF THE ACCESS POINT.
12. TRACER WIRE SHALL BE GREEN FOR SEWER AND BLUE FOR WATER.



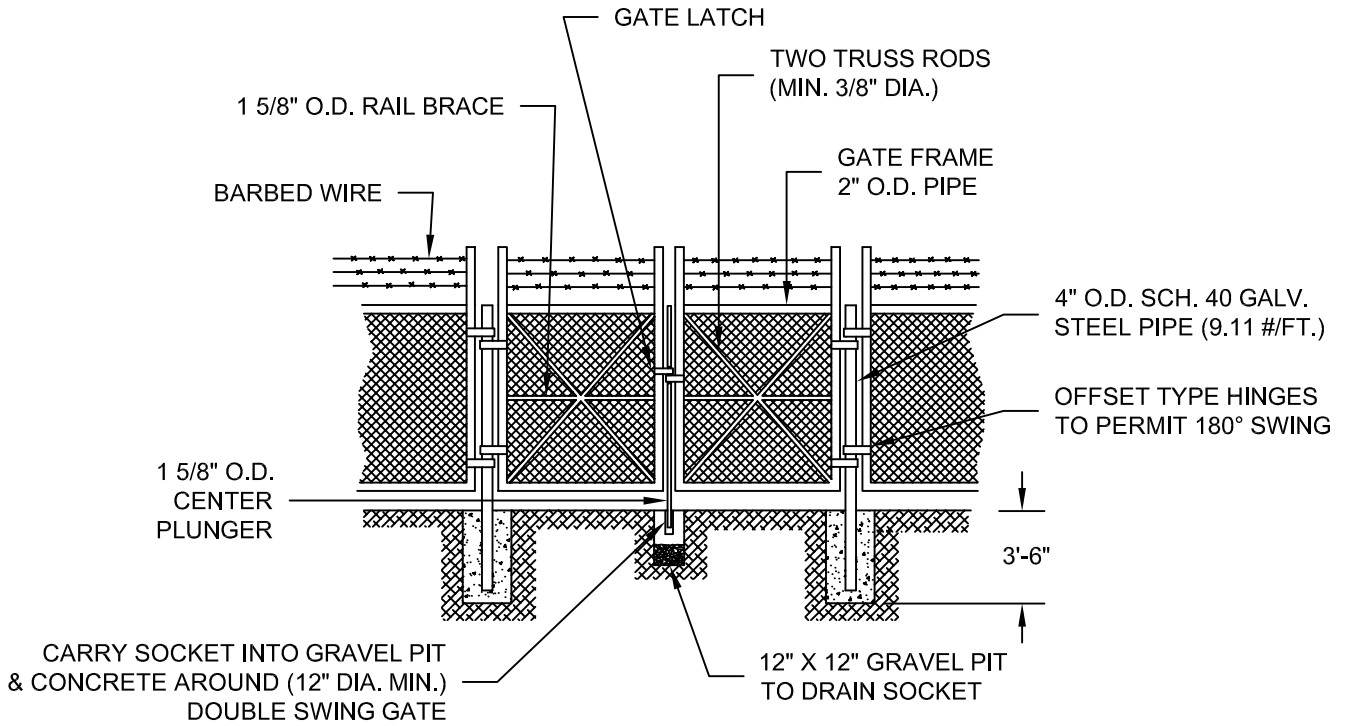
WHEN USING CONCRETE VAULT

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

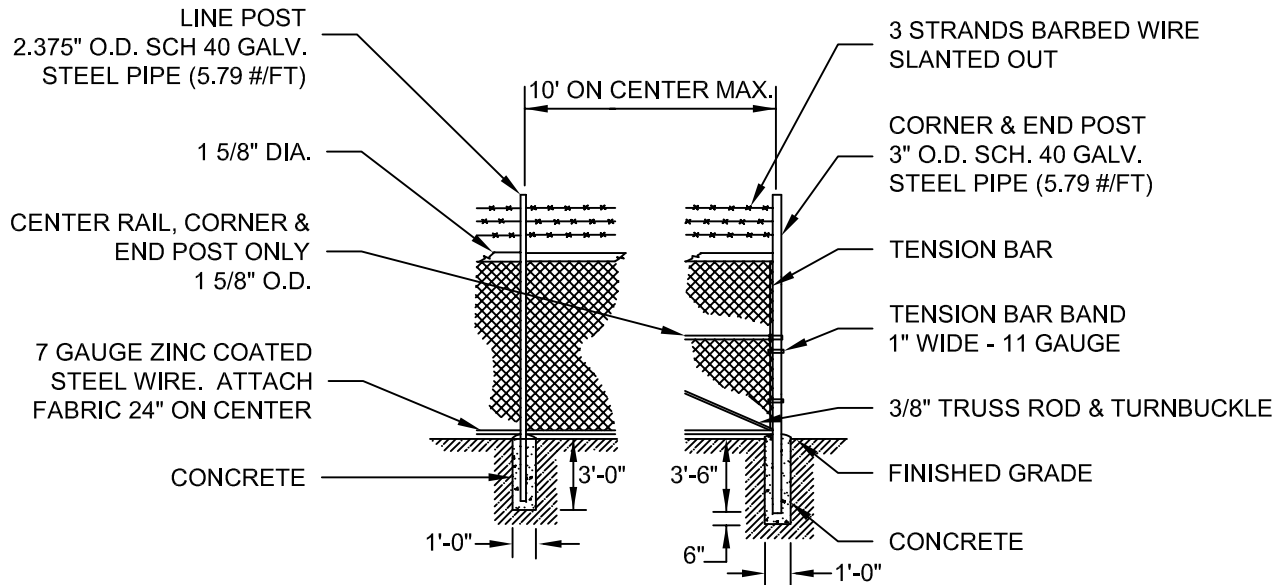
TRACER WIRE

G-4

09/2024



DOUBLE GATE DETAIL



FENCE DETAIL

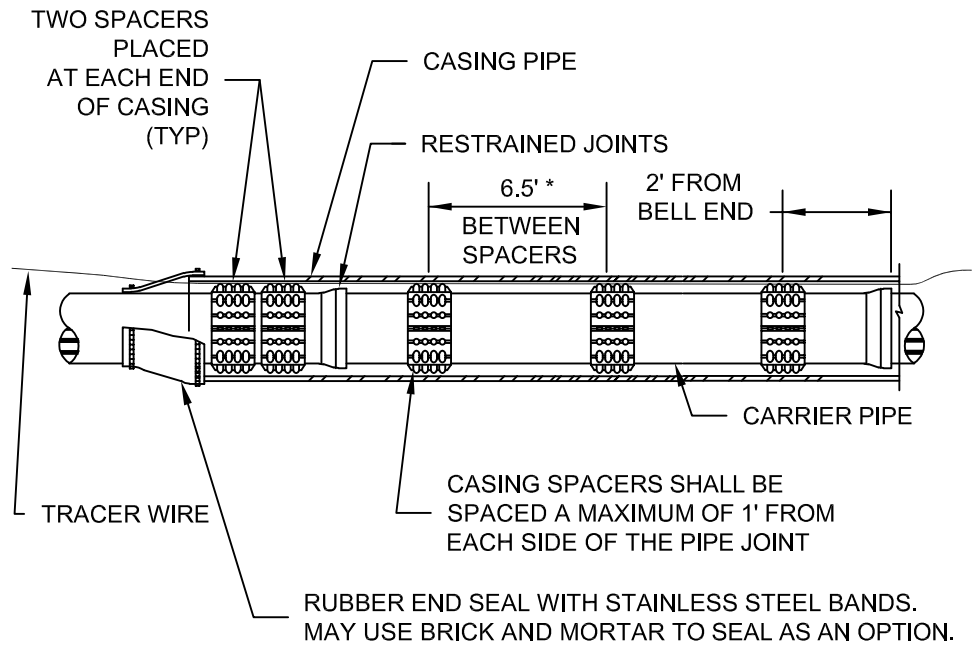
AS DESIGNATED BY PARTICIPATING UTILITY FOR SECURITY OF UTILITY INSTALLATIONS

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

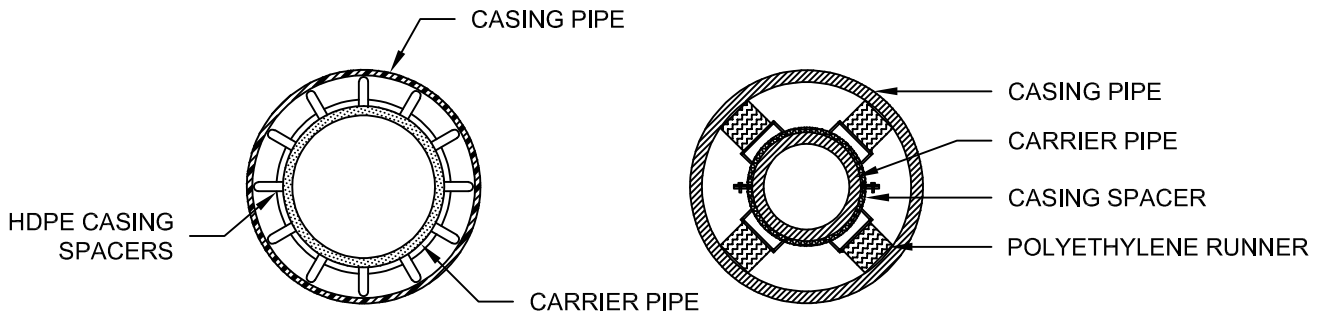
CHAIN LINK FENCE

1. SPACERS SHALL BE HDPE. STAINLESS STEEL SPACERS MAY BE USED IF IN COMPLIANCE WITH THE FOLLOWING CRITERIA:
 - INTERIOR SURFACES OF THE CIRCULAR STAINLESS STEEL BAND SHALL BE LINED WITH EPDM OR NEOPRENE MATERIAL.
 - ABRASION RESISTANT RUNNERS/SKIDS SHALL BE POLYMER MATERIAL WITH EACH END BEVELED TO FACILITATE EASE OF INSTALLATION INTO CASING PIPE.
3. SPACERS SHALL BE SPACED 6 1/2' ON CARRIER PIPE.
4. CARRIER PIPE SHALL BE DUCTILE OR HDPE IN ACCORDANCE WITH REGIONAL STANDARDS.
5. IF HDPE CARRIER PIPE IS USED AND PRECISE GRADES ARE NOT REQUIRED THROUGH CASING, SPACERS MAY BE OMITTED.
6. CASING PIPE TO BE STEEL IN ACCORDANCE WITH VDOT STANDARD DETAIL EP-1 OR HDPE AS SPECIFIED IN THE STANDARDS IF APPROVED BY THE PARTICIPATING UTILITY.
7. CONCRETE CASING PIPE WILL NOT BE ALLOWED.
8. DIAMETER OF CASING PIPE SHALL BE AS SHOWN IN THE TABLE BELOW UNLESS OTHERWISE SPECIFIED BY THE PARTICIPATING UTILITY. WHERE SPACERS ARE NOT REQUIRED, CASING PIPE SHALL BE MINIMUM DIAMETER TO ADEQUATELY INSTALL AND PASS CARRIER PIPE THROUGH AND TO MINIMIZE VOID SPACE BETWEEN CARRIER AND CASING PIPES.
9. ATTACH TRACER WIRE TO CARRIER PIPE.

CASING PIPE SIZE CHART	
CARRIER PIPE (NOMINAL DIAMETER)	CASING PIPE (DIAMETER)
6"	12"
8"	16"
10"	24"
12"	24"
14"	24"
16"	30"
18"	30"
24"	42"
30"	42"

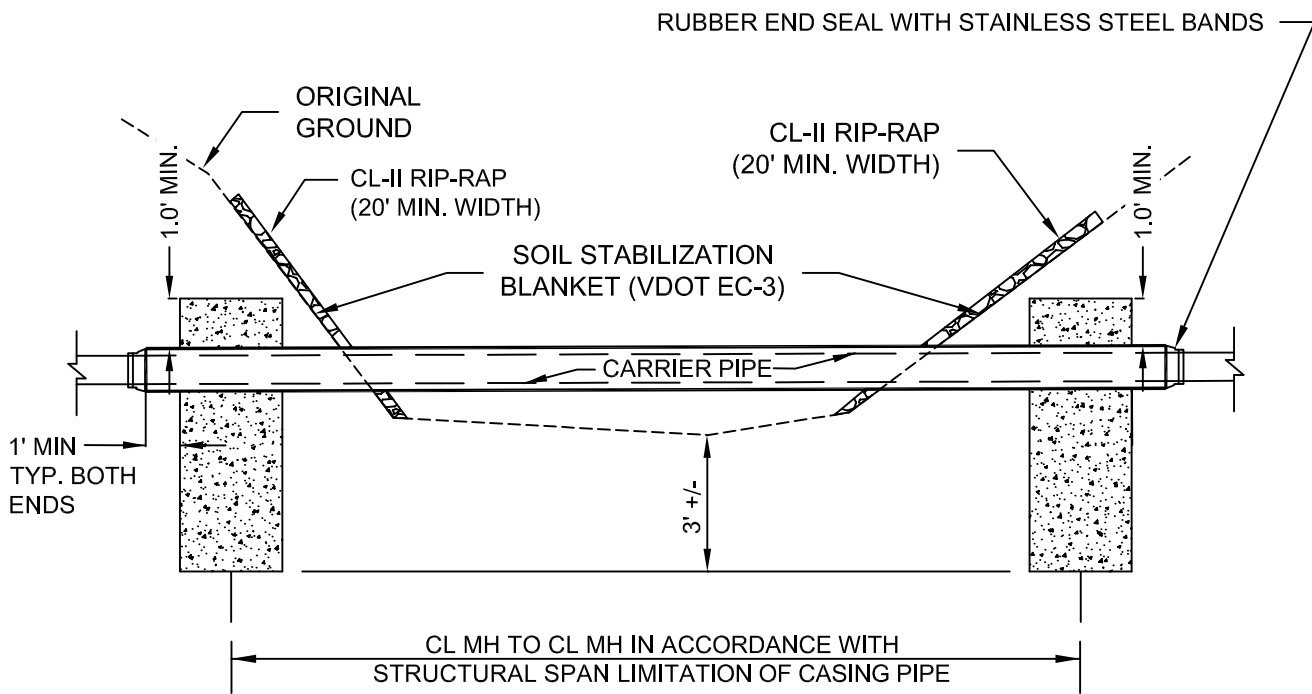
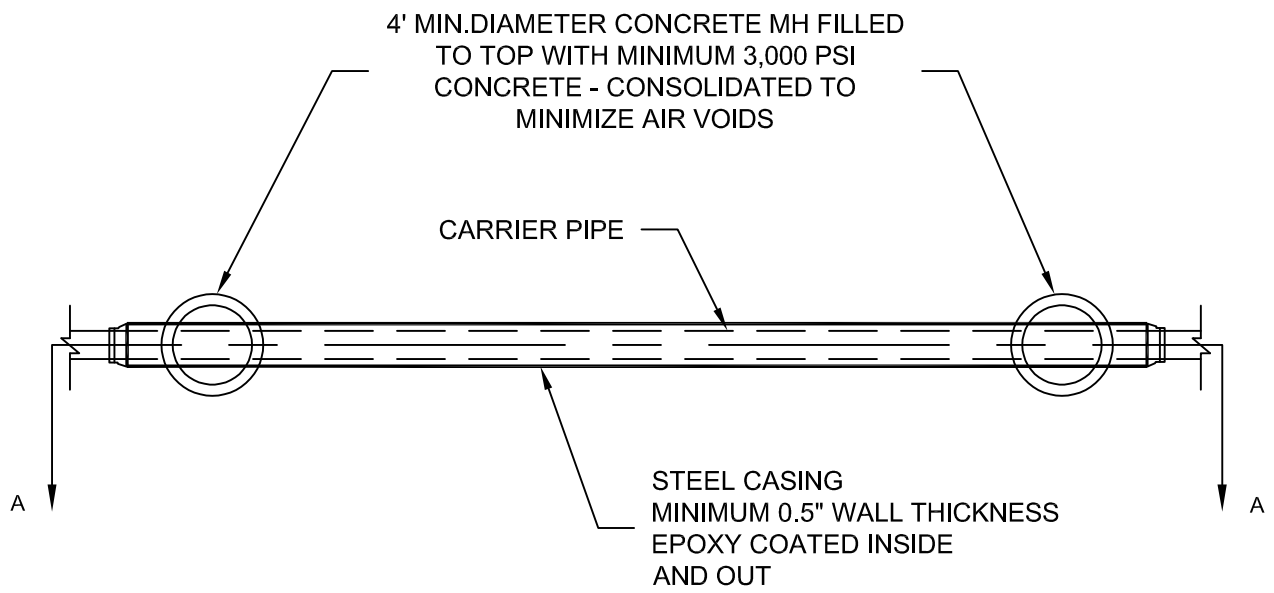


* ADDITIONAL SPACING ALLOWED AS RECOMMENDED BY PIPE MANUFACTURER.



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

**PIPE SUPPORT
IN CASING PIPE**



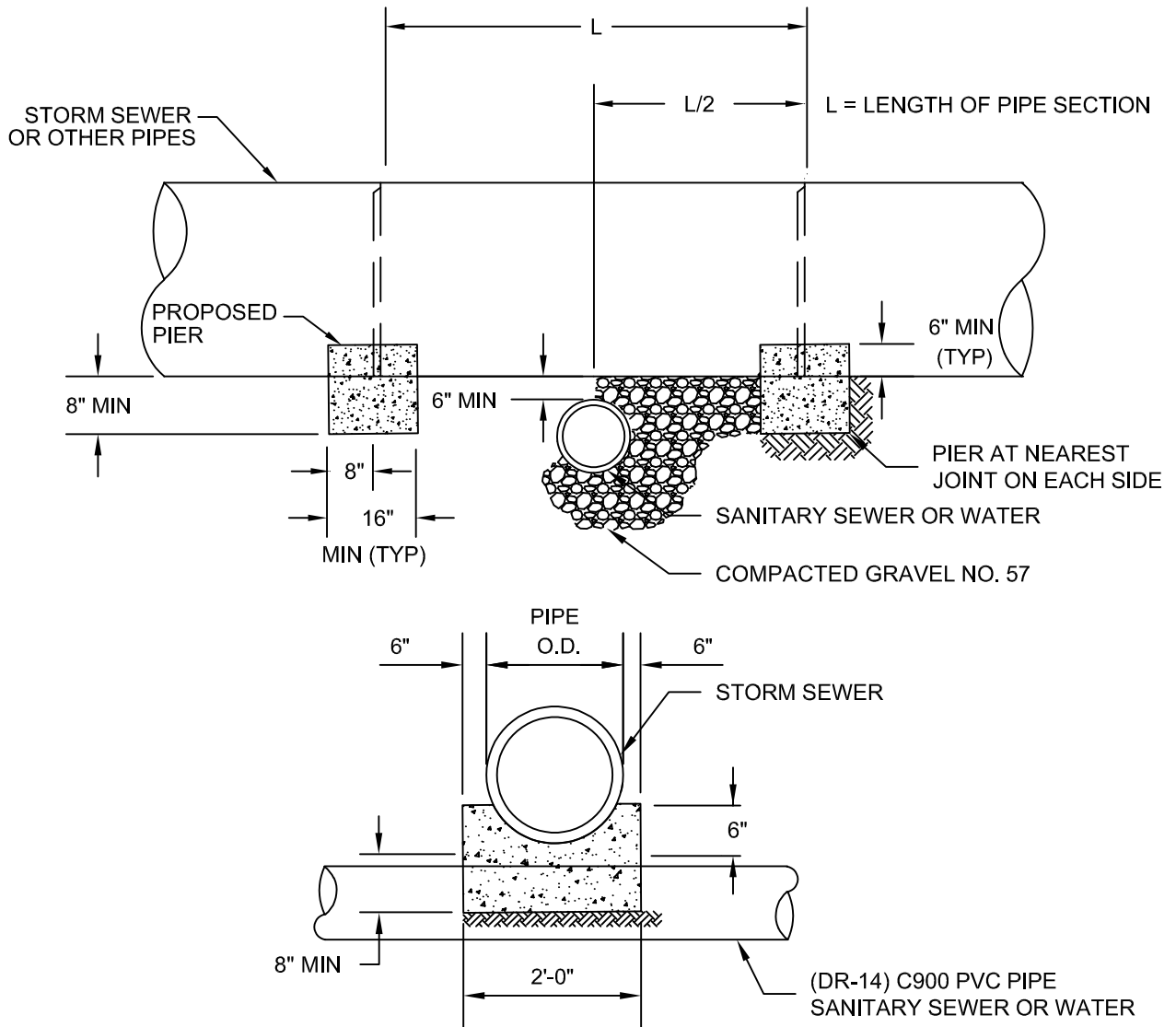
WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

AERIAL CROSSING DETAIL

G-7

09/2024

1. PIER REQUIRED WHEN STORM DRAIN OR OTHER PIPES CROSSES OVER THE OTHER UTILITY WITH A VERTICAL CLEARANCE OF LESS THAN 18".
2. PIER TO BE BUILT ON UNDISTURBED EARTH.
3. CONCRETE TO BE READY MIX, CLASS A3.



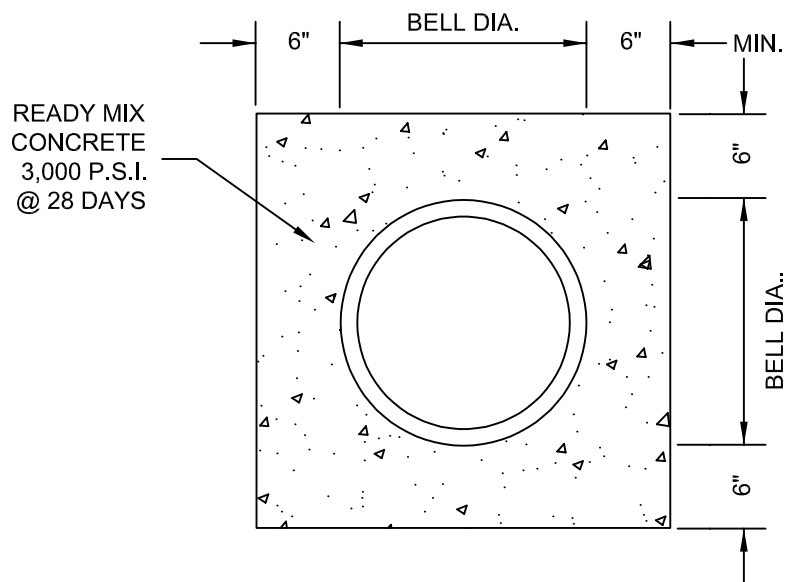
WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

CONCRETE PIER

G-8

09/2024

1. DUCTILE IRON WATER AND SEWER LINES CROSSING STREAMS MUST BE CONCRETE ENCASED UNLESS OTHERWISE SPECIFIED BY PARTICIPATING UTILITY.
2. ANY JOINTS OR FITTINGS WITHIN THE CONCRETE ENCASEMENT SHALL HAVE RESTRAINED JOINTS.



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

CONCRETE ENCASED PIPE

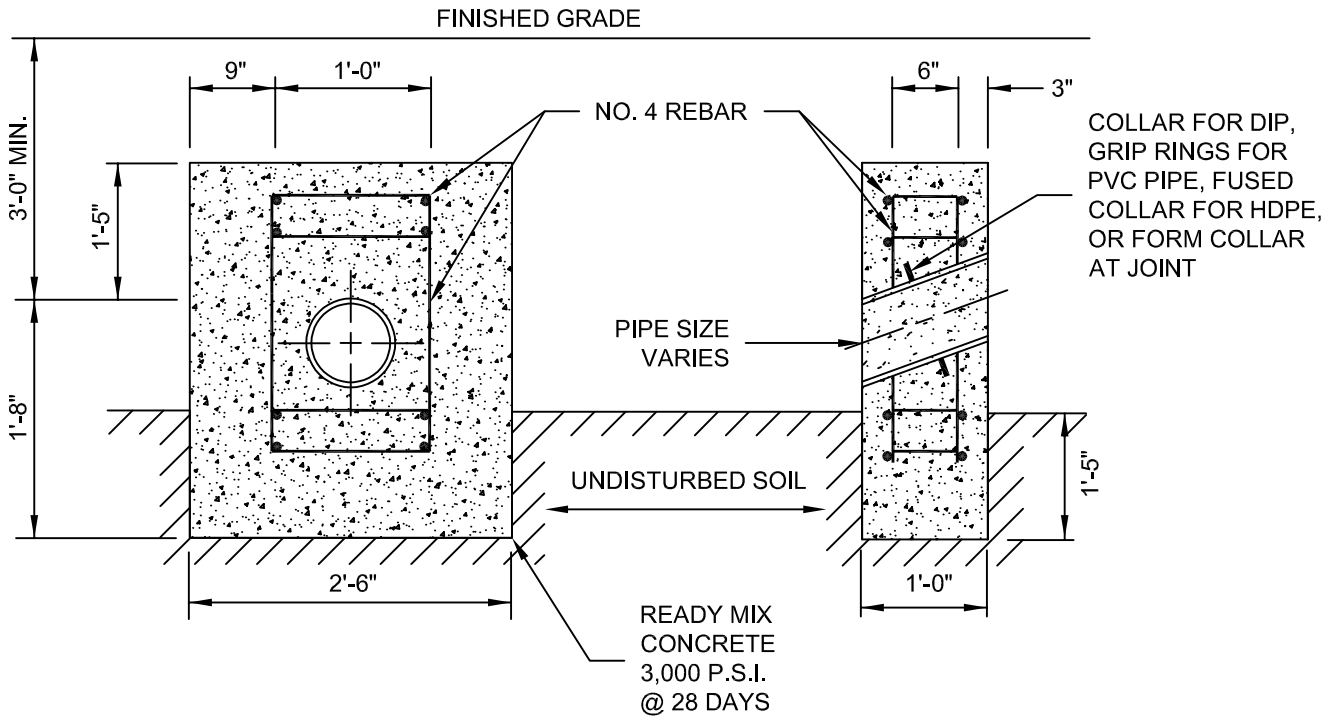
G-9

09/2024

1. IN ADDITION TO ANCHOR BLOCKS, RESTRAINED JOINT DUCTILE IRON PIPE WILL BE REQUIRED FOR ALL SLOPES EXCEEDING 20%
2. MINIMUM SPACING REQUIREMENTS SHALL BE AS FOLLOW:

SLOPES 20% TO 35% -- NO MORE THAN 40 FT ON CENTER
 * SLOPES 35% TO 50% -- NO MORE THAN 20 FT ON CENTER
 * SLOPES 50% TO 60% -- NO MORE THAN 20 FT ON CENTER

* ONLY ALLOWED WITH WRITTEN APPROVAL OF PARTICIPATING UTILITY



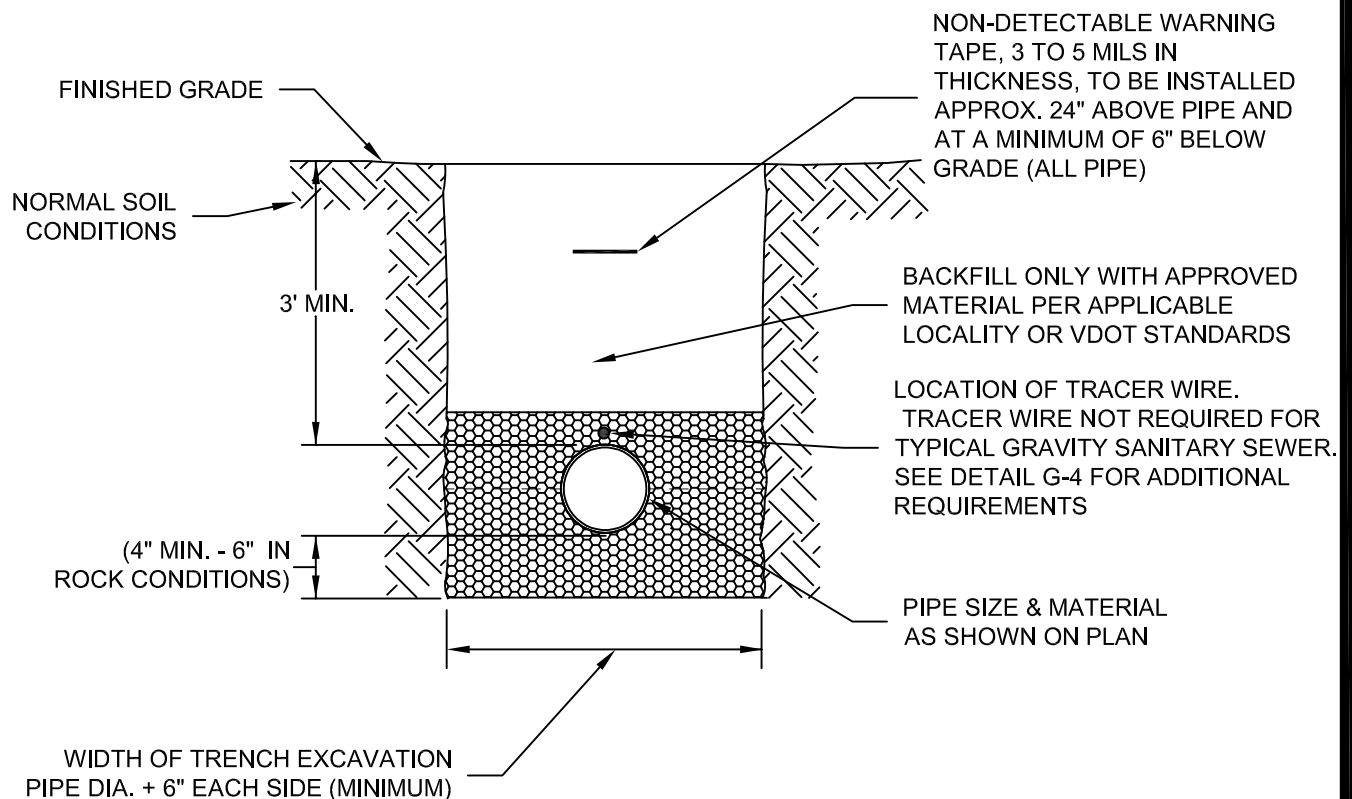
WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

ANCHOR BLOCK

G-10

09/2024

1. BEDDING AND HAUNCHING MATERIAL; USE #57'S OR #68'S.
2. INITIAL BACKFILL MATERIAL; USE ANY CRUSHED STONE, TYPICALLY 21A'S (CRUSHER RUN)
3. FINAL BACKFILL MATERIAL IN PAVEMENT; USE ANY CRUSHED STONE, TYPICALLY 21A'S (CRUSHER RUN)
4. PVC WATER PIPE, AS A MINIMUM, SHALL BE BEDDED AND HAUNCHED UP TO THE SPRING LINE FOR INSTALLATION IN PAVED OR OUTSIDE OF PAVED AREAS.
5. PVC SEWER PIPE, AS A MINIMUM, SHALL BE BEDDED, HAUNCHED, AND INITIAL BACKFILL TO 6" ABOVE PIPE FOR INSTALLATION IN PAVED OR OUTSIDE OF PAVED AREAS.
6. DIP SEWER PIPE, SHALL BE BEDDED AND HAUNCHED UP TO THE SPRING LINE FOR INSTALLATION IN PAVED OR OUTSIDE OF PAVED AREAS.
7. DIP WATER PIPE DOES NOT REQUIRE ANY BEDDING OR SPECIAL BACKFILL EXCEPT IN PAVED AREAS WHERE IT SHALL BE BEDDED AND BACKFILLED WITH ANY TYPE OF CRUSHED STONE.
8. IN ALL CASES, PROVIDE AT LEAST 6" OF CLEARANCE FROM LEDGE ROCK, BOULDERS, LARGE STONES AND BACKFILL SHALL BE FREE OF LARGE STONES PERISHABLE MATERIAL, FROZEN CLOUDS, STICKY MASSES OF CLAY, AND OTHER UNSUITABLE MATTER
9. ALL EXCAVATIONS SHALL COMPLY WITH OSHA PART 1926 - SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION, SUBPART P - EXCAVATIONS, AND THE OSHA TECHNICAL MANUAL, SECTION V CONSTRUCTION OPERATIONS, CHAPTER 2, EXCAVATIONS: HAZARD RECOGNITION IN TRENCHING AND SHORING.
10. THE TRACER WIRE SHALL BE PLACED ALONG THE UPPER QUADRANT OF THE PIPE. THE WIRE SHALL NOT TOUCH THE PIPE, BUT SHALL BE A MAXIMUM OF 6" FROM THE PIPE. NON-METALLIC SPACERS MAY BE USED TO MAINTAIN A SET DISTANCE FROM THE UTILITY.



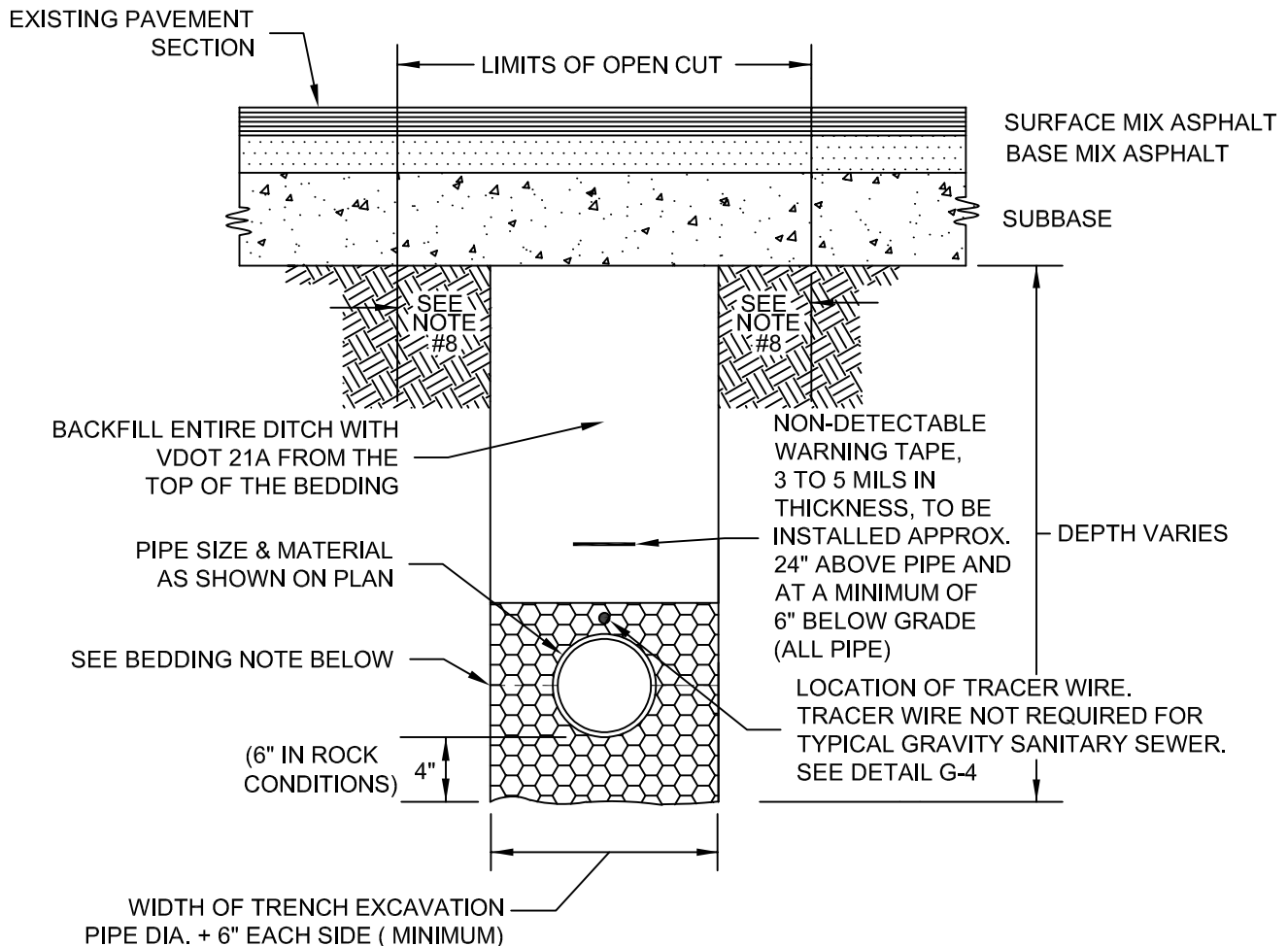
WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

**BEDDING AND BACKFILL
OUTSIDE OF PAVED AREAS**

G-11

09/2024

1. BEDDING AND HAUNCHING MATERIAL; USE #57'S OR #68'S.
2. INITIAL BACKFILL MATERIAL; USE ANY CRUSHED STONE, TYPICALLY 21A'S (CRUSHER RUN)
3. FINAL BACKFILL MATERIAL IN PAVEMENT; USE ANY CRUSHED STONE, TYPICALLY 21A'S (CRUSHER RUN)
4. PVC WATER PIPE, AS A MINIMUM, SHALL BE BEDDED AND HAUNCHED UP TO THE SPRING LINE FOR INSTALLATION IN PAVED OR OUTSIDE OF PAVED AREAS.
5. PVC SEWER PIPE, AS A MINIMUM, SHALL BE BEDDED, HAUNCHED, AND INITIAL BACKFILL TO 6" ABOVE PIPE FOR INSTALLATION IN PAVED OR OUTSIDE OF PAVED AREAS.
6. DIP SEWER PIPE, SHALL BE BEDDED AND HAUNCHED UP TO THE SPRING LINE FOR INSTALLATION IN PAVED OR OUTSIDE OF PAVED AREAS.
7. DIP WATER PIPE DOES NOT REQUIRE ANY BEDDING OR SPECIAL BACKFILL EXCEPT IN PAVED AREAS WHERE IT SHALL BE BEDDED AND BACKFILLED WITH ANY TYPE OF CRUSHED STONE.
8. IN ALL CASES, PROVIDE AT LEAST 6" OF CLEARANCE FROM LEDGE ROCK, BOULDERS, LARGE STONES AND BACKFILL SHALL BE FREE OF LARGE STONES PERISHABLE MATERIAL, FROZEN CLOUDS, STICKY MASSES OF CLAY, AND OTHER UNSUITABLE MATTER
9. IN VDOT ROW, THE CONTRACTOR SHALL REPLACE THE PAVEMENT AS REQUIRED AND SPECIFIED BY VDOT. IN ROANOKE CITY, CONTRACTOR SHALL REPLACE PAVEMENT AS REQUIRED BY CITY OF ROANOKE RIGHT OF WAY EXCAVATION AND RESTORATION STANDARDS, LATEST EDITION.
10. ALL CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE AS SPECIFIED BY VDOT OR APPLICABLE LOCALITY.
11. BENCH CUT ON EACH SIDE OF PAVEMENT SHALL BE IN ACCORDANCE WITH VDOT OR APPLICABLE LOCALITY'S SPECIFICATIONS.
12. ALL EXCAVATIONS SHALL COMPLY WITH OSHA PART 1926 - SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION, SUBPART P - EXCAVATIONS, AND THE OSHA TECHNICAL MANUAL, SECTION V CONSTRUCTION OPERATIONS, CHAPTER 2, EXCAVATIONS: HAZARD RECOGNITION IN TRENCHING AND SHORING.
13. THE TRACER WIRE SHALL BE PLACED ALONG THE UPPER QUADRANT OF THE PIPE. THE WIRE SHALL NOT TOUCH THE PIPE, BUT SHALL BE A MAXIMUM OF 6" FROM THE PIPE. NON-METALLIC SPACERS MAY BE USED TO MAINTAIN A SET DISTANCE FROM THE UTILITY.



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

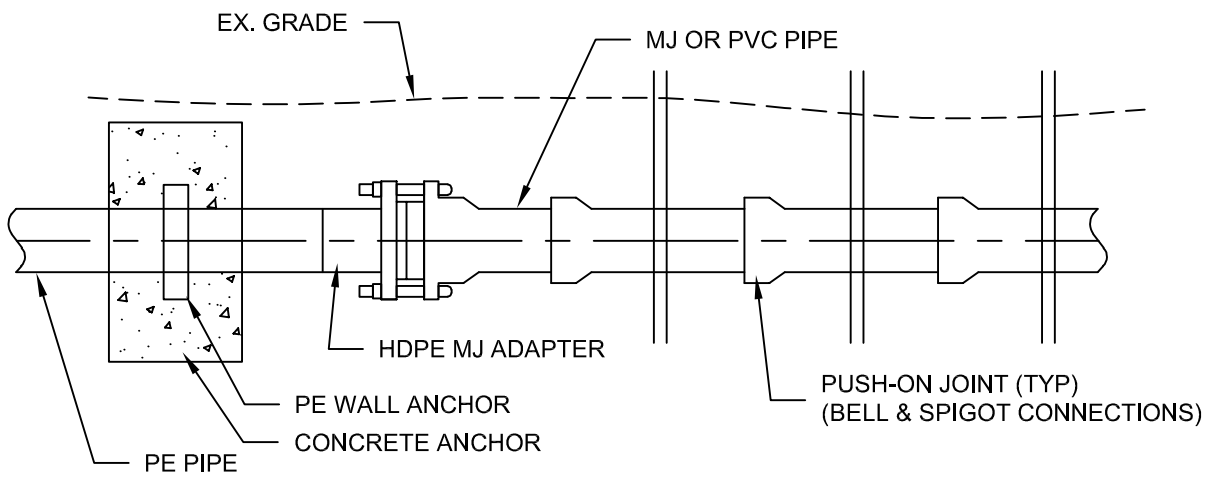
BEDDING AND BACKFILL UNDER PAVEMENT AND IN RIGHT-OF-WAY

G-12

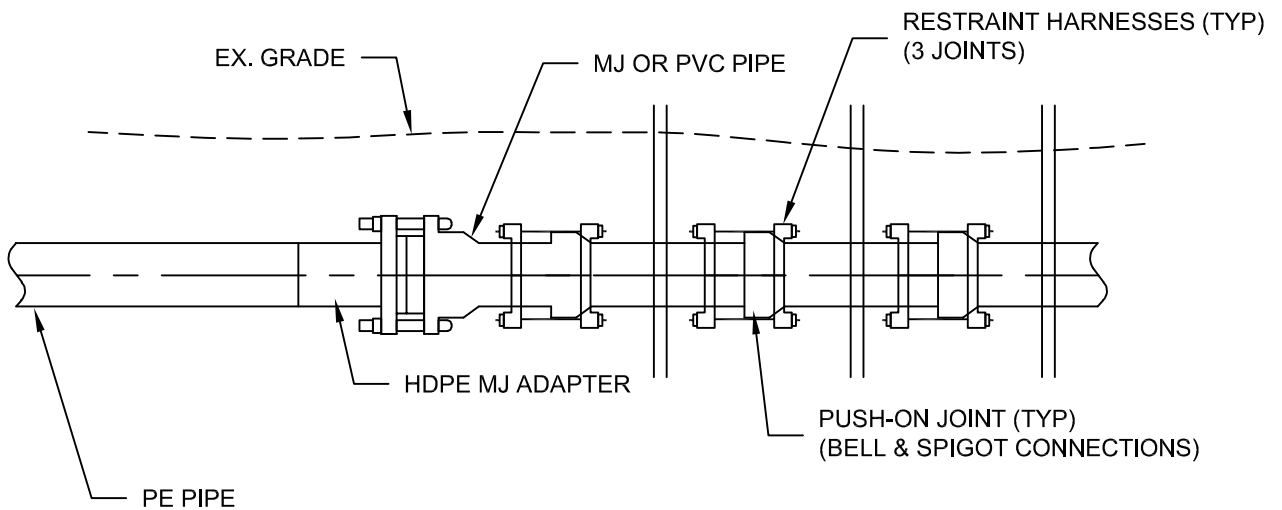
09/2024

1. CHOOSE FROM ALT A OR ALT B BELOW WHEN JOINING HDPE PIPE TO OTHER PIPES.

ALT A



ALT B



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

HDPE TO OTHER PIPE TRANSITION

G-13

09/2024