# LIST OF GENERAL DETAIL DRAWINGS

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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.
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) ROUNDUP 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.

D = PIPE DIAMETER
1. TRACER WIRES SHALL BE INSTALLED USING MAN-HOLES, TRACER WIRE ACCESS BOXES, VALVE BOXES OR VAULTS, WATER METERS AND FIRE HYDRANTS AS ACCESS POINTS.

2. FOR WATER AND SEWER INSTALLED BY OPEN TRENCHING, HORIZONTAL DIRECTIONAL DRILLING, OR PIPE BURSTING, TRACER WIRE SHALL BE NEPTCO TRACE-SAFE WATER BLOCKING TRACER WIRE OR APPROVED EQUAL.

3. SPLICES SHALL ONLY BE MADE WITH GEL FILLED CONNECTORS DESIGNED FOR WIRE WITH A WOVEN POLYESTER FIBER CORE SUCH AS NEPTCO TRACE-SAFE WATER BLOCKING CONNECTORS OR APPROVED EQUAL. SPLICES SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTRACTOR WILL BE RESPONSIBLE FOR ENSURING CONTINUITY AT ALL SPLICE LOCATIONS.

4. WHERE HDPE PIPE IS INSTALLED WITHOUT STEEL CASING PIPE, SUCH AS A DIRECTIONALLY DRILLED CROSSINGS, AND CONNECTED TO DUCTILE IRON PIPE ON EACH END, TRACER WIRE SHALL BE INSTALLED ALONG FULL LENGTH OF HDPE PIPE WITH AN ACCESS POINT INSTALLED AT EACH HDPE/DUCTILE IRON TRANSITION. TRACER WIRE SHALL BE CONNECTED TO THE ACCESS POINT IN ACCORDANCE WITH THIS DETAIL. ANY TRANSITION FROM DUCTILE IRON MAIN TO NON-DUCTILE IRON MAIN SHALL HAVE AN ACCESS POINT TO BEGIN TRACER WIRE.

5. AS-BUILT SHEL SHALL SHOW TRACER WIRE(S) LOCATION AND ACCESS POINT(S), ALONG WITH BUTT SPLICE LOCATIONS.

6. THE TRACER WIRE SHALL BE PLACED ALONG THE LOWER 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.

7. WIRE SHALL BE BROUGHT TO THE SURFACE EVERY FIVE-HUNDRED (500) FEET AND PLACED IN A WATER METER BOX OR A DRAINAGE & WATER SOLUTIONS, INC. (OR APPROVED EQUAL) ALL CAST IRON TRACER WIRE ACCESS BOX.

8. THE TRACER WILL BE TESTED BY THE PARTICIPATING UTILITY AS PART OF THE PROJECT'S FINAL ACCEPTANCE. CONTRACTOR WILL BE RESPONSIBLE FOR ENSURING ALL CONTINUITY OF TRACER WIRE.

9. THE GROUND WIRE SHALL BE #6 AWG COPPER WIRE AND SHALL BE OF ADEQUATE LENGTH TO EXTEND A MINIMUM OF (5) FEET BEYOND THE TOP OF THE STRUCTURE. THE END OF THE GROUND WIRED SHALL CONNECT TO THE GROUND BAR OR LID TERMINAL USING A BURNDY KA6U MECHANICAL TERMINAL LUG.

10. A GROUND ROD SHALL BE INSTALLED AT EACH LOCATION WHERE GROUND WIRE SURFACES AND CONNECTS TO GROUND BAR. GROUND ROD SHALL BE COPPER COATED WITH A MINIMUM DIAMETER OF 5/8" AND SHALL BE BURIED A MINIMUM OF FOUR (4) FEET INTO THE GROUND.


12. IF USING TRACER WIRE ACCESS BOX AS ACCESS POINT, GROUND BAR WILL NOT BE REQUIRED. WIRES SHALL BE CONNECTED AS SHOWN BELOW. TRACER WIRE SHALL BE OF ADEQUATE LENGTH TO EXTEND FIVE (5) FEET ABOVE THE TOP OF ACCESS BOX.

13. TWO WRAPS OF TRACER WIRE SHALL BE WRAPPED SNUGGLY AROUND BASE OF HYDRANT. WIRE SHALL NOT BE LEFT IN A WAY THAT WOULD INTERFERE WITH MOWING AROUND HYDRANT.

14. WHEN USING ALL DUCTILE MAIN, TRACER WIRE FOR SERVICES SHALL BE 12 AWG COPPER TRACER WIRE. TRACER WIRE SHALL HAVE BARE WIRE CONTACT TO DUCTILE MAIN.
BLUE = TRACE SAFE TRACER WIRE
BLACK = GROUND WIRE & GROUND BAR
TS19-IL-LC-C = TRACE SAFE LOCATING CLIP AT GROUND BAR
TS19-C = SERVICE LATERAL TRACE SAFE CONNECTOR
GROUND WIRE = #6 AWG COPPER WIRE
NOTE: LEAVE FIVE FEET (5') OF EXCESS TRACER WIRE COILED UP IN VAULT

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
TRACER WIRE SAMPLE
TEE/CROSS INTERSECTION
09/06/16
DOUBLE GATE DETAIL

LINE POST
2.375" O.D. SCH. 40 GALV. STEEL PIPE (5.79 #/FT)

1 5/8" DIA.

CENTER RAIL, CORNER & END POST ONLY
1 5/8" O.D.

7 GAUGE ZINC COATED STEEL WIRE. ATTACH FABRIC 24" ON CENTER

CONCRETE

1'-0"

3'-0"

10' ON CENTER MAX.

3 STRANDS BARBED WIRE SLANTED OUT

CORNER & END POST
3" O.D. SCH. 40 GALV. STEEL PIPE (5.79 #/FT)

TENSION BAR

TENSION BAR BAND
1" WIDE - 11 GAUGE

3/8" TRUSS ROD & TURNBUCKLE

FINISHED GRADE

CONCRETE

1'-0"

6"

3'-6"

CARRY SOCKET INTO GRAVEL PIT & CONCRETE AROUND (12" DIA. MIN.) DOUBLE SWING GATE

12" X 12" GRAVEL PIT TO DRAIN SOCKET

OFFSET TYPE HINGES TO PERMIT 180° SWING

GATE FRAME 2" O.D. PIPE

GATE LATCH

TWO TRUSS RODS (MIN. 3/8" DIA.)

BARBED WIRE

1 5/8" O.D. RAIL BRACE

1 5/8" O.D. CENTER PLUNGER

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

CHAIN LINK FENCE

AS DESIGNATED BY PARTICIPATING UTILITY FOR SECURITY OF UTILITY INSTALLATIONS
1. A 1" DRAIN WILL BE REQUIRED ON THE LOWER END OF THE CASING PIPE.
2. SPACERS SHALL BE RACI HDPE SPACERS OR EQUIVALENT. 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 SEWER 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.

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<tr>
<th>CARRIER PIPE (NOMINAL DIAMETER)</th>
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* ADDITIONAL SPACING ALLOWED AS RECOMMENDED BY PIPE MANUFACTURER.
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.
1. DUCTILE IRON WATER AND SEWER LINES CROSSING STREAMS MUST BE CONCRETE ENCASED UNLESS OTHERWISE SPECIFIED BY PARTICIPATING UTILITY.

READY MIX CONCRETE 3,000 P.S.I. @ 28 DAYS
1. IN ADDITION TO ANCHOR BLOCKS, RESTRAINED JOINT PIPE WILL BE REQUIRED FOR ALL SLOPES EXCEEDING 20%
2. MINIMUM SPACING REQUIREMENTS SHALL BE AS FOLLOW:

   SLOPES 20% TO 35% -- NO MORE THAN 36 FT ON CENTER
   * SLOPES 35% TO 50% -- NO MORE THAN 24 FT ON CENTER
   * SLOPES 50% TO 60% -- NO MORE THAN 16 FT ON CENTER

   * ONLY ALLOWED WITH WRITTEN APPROVAL OF PARTICIPATING UTILITY

FINISHED GRADE

3'-0" MIN.

1'-0"

1'-5"

2'-6"

9"

1'-0"

1'-0"

6"

3"

PIV SIZE VARIES

UNDISTURBED SOIL

NO. 4 REBAR

COLLAR FOR DIP, GRIP RINGS FOR PVC PIPE, FUSED COLLAR FOR HDPE, OR FORM COLLAR AT JOINT

READY MIX CONCRETE 3,000 P.S.I. @ 28 DAYS
1. BEDDING, HAUNCHING AND INITIAL BACKFILL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THIS DETAIL AND MANUFACTURER'S RECOMMENDATION.
2. ALL PVC PIPE SHALL BE BEDDED IN COMPACTED VDOT #57 OR #68 STONE, OR CRUSHER RUN.
3. IN AREAS SUBJECT TO VEHICULAR TRAFFIC, BEDDING STONE AND FILL SHALL BE PLACED IN 6" LIFTS FROM BOTTOM OF TRENCH TO 1' ABOVE THE PIPE AND THE REMAINING SHALL BE PLACED IN 10" LIFTS AND SHALL BE COMPACTED TO AT LEAST 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D 698.
4. BEDDING REQUIREMENTS FOR DUCTILE IRON WATER LINE ARE DEPENDENT ON MANUFACTURER'S BEDDING CRITERIA.
5. ALL EXCAVATIONS SHALL COMPLY WITH OSHA TECHNICAL MANUAL, CHAPTER 2, TITLED "EXCAVATIONS: HAZARD RECOGNITION IN TRENCHING AND SHORING."
6. THE TRACER WIRE SHALL BE PLACED ALONG THE LOWER 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.

NON-DETECTABLE WARNING TAPE, 3 TO 5 MILS IN THICKNESS, TO BE INSTALLED APPROX. 24" ABOVE PIPE AND AT A MINIMUM OF 6" BELOW GRADE (ALL PIPE)

BACKFILL ONLY WITH APPROVED MATERIAL PER APPLICABLE LOCALITY OR VDOT STANDARDS

PIPE SIZE & MATERIAL AS SHOWN ON PLAN

FOR WATERLINES INSTALL BEDDING STONE TO SPRING LINE OF PIPE AT A MINIMUM, OR PER MANUFACTURER'S RECOMMENDATION FOR SEWER LINES BEDDING SHALL BE MIN. 6" ABOVE PIPE

LOCATION OF TRACER WIRE WITH NON-METALLIC PRESSURE PIPE. TRACER WIRE NOT REQUIRED FOR TYPICAL GRAVITY SANITARY SEWER. SEE DETAIL G-4 FOR ADDITIONAL REQUIREMENTS
1. BEDDING, HAUNCHING AND INITIAL BACKFILL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THIS DETAIL AND MANUFACTURER'S RECOMMENDATION.
2. ALL PVC PIPE SHALL BE BEDDED IN COMPACTED VDOT #57 OR #68 STONE.
3. 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.
4. ALL CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE AS SPECIFIED BY VDOT OR APPLICABLE LOCALITY.
5. PRIOR TO CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR SECURING ALL REQUIRED PERMITS FROM VDOT AND/OR APPLICABLE LOCALITY.
6. IN AREAS SUBJECTED TO VEHICULAR TRAFFIC, BEDDING STONE AND FILL SHALL BE PLACED IN 6" LIFTS AND SHALL BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D 698.
7. ALL SEWER LINE PIPE SHALL BE BEDDED IN COMPACTED GRANULAR MATERIAL. BEDDING REQUIREMENTS FOR DUCTILE SEWER LINE ARE DEPENDENT ON MANUFACTURER'S BEDDING CRITERIA.
8. BENCH CUT ON EACH SIDE OF PAVEMENT SHALL BE IN ACCORDANCE WITH VDOT OR APPLICABLE LOCALITY'S SPECIFICATIONS.
9. ALL EXCAVATIONS SHALL COMPLY WITH OSHA TECHNICAL MANUAL, CHAPTER 2, TITLED "EXCAVATIONS: HAZARD RECOGNITION IN TRENCHING AND SHORING."
10. THE TRACER WIRE SHALL BE PLACED ALONG THE LOWER 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.

BEDDING: FOR WATERLINES, INSTALL BEDDING STONE TO SPRING LINE OF PIPE AT A MINIMUM, OR PER MANUFACTURER'S RECOMMENDATION. FOR SEWER LINES, BEDDING SHALL BE MINIMUM 6" ABOVE PIPE.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

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