

City of  
Wilmington  
**WATER**  
**DISTRIBUTION**  
Specifications

Revised 2023

CITY OF WILMINGTON  
WATER DEPARTMENT  
SPECIFICATIONS

PLAN APPROVALS

CITY OF WILMINGTON  
69 N. SOUTH STREET  
WILMINGTON, OHIO 45177  
Director of Public Service (937)-382-6509  
Building and Zoning Department (937) 382-5134

Questions about these specifications  
and requests for inspection

Distribution Crew Leader (937) 302-6300

## WATER MAIN INSTALLATION

1. MAIN DEPTH SHALL BE A MINIMUM OF 4 FEET-6 INCHES AFTER FINAL GRADE.
2. MAIN DEPTH IS NOT TO EXCEED 60 INCHES AFTER FINAL GRADE WITHOUT APPROVAL OF WATER DEPARTMENT.
3. WATER MAINS SHALL BE INSTALLED OUTSIDE OF THE PAVEMENT ON NEW SUBDIVISIONS, UNLESS OTHERWISE APPROVED BY THE CITY. WATER MAINS SHALL BE INSTALLED IN THE CURB-LAWNS, AS SHOWN IN THE DETAIL IN THIS DOCUMENT, WHERE POSSIBLE.
4. ALL NEW WATER MAIN SIZES 6"-12" SHALL MEET AWWA C909 MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PRESSURE PIPE, PC 235 PSI.
5. ALL WATER MAIN 16" AND LARGER SHALL MEET AWWA C-900, PVC POLYVINYL CHLORIDE (PVC) PRESSURE PIPE, DR-18 (PC 235).
6. ALL WATER MAIN EXTENSIONS SHALL BE RUN TO THE FAR END OF THE PROPERTY LINE.
7. COPPERHEAD INDUSTRIES TRACER WIRE, OR EQUIVALENT, SHALL BE INSTALLED WITH THE PIPE. SEE SEPARATE SECTION OF THIS DOCUMENT FOR DETAILS.
8. MAIN AND ALL APPURTENANCES SHALL BE DISINFECTED ACCORDING TO CHLORINATING PROCEDURES LISTED IN THIS DOCUMENT.
9. A HYDROSTATIC TEST SHALL BE PERFORMED IN THE PRESENCE OF CITY PERSONNEL. DETAILS ARE LISTED IN SEPARATE SECTION OF THIS DOCUMENT.
10. THE MAIN WILL BE APPROVED AFTER SATISFACTORILY PASSING TWO BACTERIOLOGICAL ANALYSES, AS DETAILED IN SEPARATE SECTION OF THIS DOCUMENT, PERFORMED BY THE CITY WATER DEPARTMENT.
11. ALL WATER MAIN TRENCHES SHALL BE INSPECTED BY CITY PERSONNEL PRIOR TO BACKFILLING.
12. EVERY 300 FEET OF WATER MAIN INSTALLED SHALL HAVE AN EARTHEN DAM BUILT.
13. MATERIAL USED AROUND ANY WATER SERVICE LINES OR FITTINGS SHALL CONTAIN NO LIME.
14. ALL GATE VALVES SHALL OPEN LEFT (COUNTER-CLOCKWISE), AND BE INSTALLED EVERY 500 FEET.
15. GATE VALVES SHALL MEET ALL VALVE MATERIAL SPECIFICATIONS ON SHEET 800-3.
16. ALL VALVE BOXES IN GRASS AREAS SHALL BE SET IN CONCRETE. CONCRETE PADS SHALL BE 24" SQUARE WITH AN 8" DEPTH. CLUSTER VALVE BOXES MAY BE INSTALLED IN ONE LARGE CONCRETE PAD, WITH PRIOR APPROVAL BY THE CITY. VALVE BOXES AND CONCRETE PADS SHALL BE FLUSH WITH THE GROUND AT FINAL GRADE.

17. ALL FITTINGS IN SIZES 2" THROUGH 48" SHALL BE DUCTILE IRON AND CONFORM TO ALL REQUIREMENTS OF AWWA C-153/ ANSI A21.53-84 SPECS. ALL FITTINGS 12" AND SMALLER SHALL BE CLASS 250. LARGER FITTINGS SHALL BE CLASS 150. FITTINGS SHALL BE RESTRAINED, AS DIRECTED BY THE CITY, WITH MECHANICAL JOINTS.
18. BELL JOINT RESTRAINTS - FOR AWWA C-909 PVCO PIPE (4"-12"), USE EBAA IRON SERIES 1900 RESTRAINT HARNESS OR APPROVED EQUIVALENT.  
  
FOR AWWA C-900 PVC PIPE (16" AND LARGER), USE EBAA IRON SERIES 2800 MEGALUG RESTRAINT HARNESS, OR APPROVED EQUAL.  
  
THE REQUIRED LENGTH OF RESTRAINED JOINTS SHALL BE PER THE RESTRAINED JOINT TABLES ON DWG 800-10, OR BASED ON MANUFACTURER'S RECOMMENDATIONS FOR THE SITE CONDITIONS PRESENT.
19. MECHANICAL JOINT RESTRAINT - FOR PVCO C909 PIPE, USE EBAA MEGA-LUG IRON SERIES 19MJ00, OR APPROVED EQUIVALENT. FOR DUCTILE IRON PIPE, USE EBAA IRON MEGALUG SERIES 1100, OR APPROVED EQUAL. RESTRAINTS SHALL CONFORM TO ASTM A-536.

### WATER MAIN LOOPING NOTE

ALL NEW WATER MAINS SHALL BE LOOPED, EXCEPT FOR TEMPORARY DEAD-ENDS OR SPECIAL CASES AS APPROVED BY THE CITY. THE NEED FOR LOOPING DOES NOT PRECLUDE CUL-DE-SAC STREETS. ALL WATER MAINS ON CUL-DE-SAC STREETS SHALL BE LOOPED TO ADJACENT MAINS, UNLESS OTHERWISE APPROVED BY THE CITY.

### WATER MAIN CROSSING SEPARATION

WHENEVER A SANITARY SEWER AND WATER LINE SHALL CROSS, THE SEWER SHALL BE LAID AT SUCH AN ELEVATION THAT THE CROWN OF THE SEWER IS AT LEAST 18 INCHES BELOW THE BOTTOM OF THE WATER LINE. IF IT IS ABSOLUTELY IMPOSSIBLE TO MAINTAIN THE 18-INCH VERTICAL SEPARATION, THE SANITARY SEWER SHALL BE CONSTRUCTED WITH WATER LINE TYPE MATERIALS WHICH WILL WITHSTAND A 200 PSI PRESSURE TEST.

AT CROSSINGS, THE WATER MAIN SHALL HAVE A MINIMUM VERTICAL DISTANCE OF 18 INCHES FROM STORM AND SANITARY SEWERS. ALSO, ONE FULL LENGTH OF WATER MAIN SHALL BE LOCATED SO THE JOINTS ARE AS FAR FROM THE STORM/SANITARY SEWERS AS POSSIBLE.

HORIZONTAL SEPARATION BETWEEN WATER MAIN AND SANITARY OR STORM SEWERS SHALL BE 10' MINIMUM, MEASURED EDGE TO EDGE.

### SINGULAR WATER SERVICE NOTE

THE WATERWORKS DEPARTMENT SHALL NOT SERVICE MORE THAN ONE LOCATION, RESIDENCE, PLACE OF BUSINESS, OR PREMISES WITH MORE THAN ONE WATER SERVICE.

## HYDRANT INSTALLATION

### EXAMINATION OF MATERIAL

PRIOR TO INSTALLATION, ALL HYDRANTS SHALL BE INSPECTED FOR DIRECTION OF OPENING, NOZZLE THREADING, OPERATING-NUT AND CAP-NUT DIMENSIONS, TIGHTNESS OF PRESSURE-CONTAINING BOLTING, CLEANLINESS OF INLET ELBOW, HANDLING DAMAGE, AND CRACKS. DEFECTIVE HYDRANTS SHALL BE MARKED AND HELD FOR FINAL DISPOSITION.

### PLACEMENT

ALL HYDRANTS SHALL STAND PLUMB AND SHALL HAVE THEIR NOZZLES PARALLEL WITH OR AT RIGHT ANGLES TO THE CURB, WITH PUMPER NOZZLES FACING THE CURB.

HYDRANTS SHALL BE SET AT ESTABLISHED GRADE, WITH THE LOWEST NOZZLE AT LEAST 12 INCHES ABOVE GROUND OR AS REQUIRED BY PROJECT SPECIFICATIONS. THE LOWEST NOZZLE SHALL BE INSTALLED AWAY FROM THE CURB LINE AT A SUFFICIENT DISTANCE TO AVOID DAMAGE FROM OR TO VEHICLES. TRAFFIC MODEL HYDRANTS SHALL BE INSTALLED SO THAT THE BREAKAWAY FLANGE IS NOT LESS THAN 2 INCHES, NOR NO MORE THAN 4 INCHES ABOVE ESTABLISHED GRADE.

EACH HYDRANT SHALL BE CONNECTED TO THE MAIN WITH A 6 INCH OR LARGER DIAMETER BRANCH CONTROLLED BY AN INDEPENDENT VALVE. THE VALVE SHALL BE A RESILIENT SEAT GATE VALVE RESTRAINED TO ALLOW SHUT OFF WHEN THE HYDRANT IS TO BE REMOVED. GATE VALVE SHALL MEET SPECIFICATIONS LISTED ELSEWHERE IN THIS DOCUMENT.

ALL FIRE HYDRANTS SHALL BE "DRY-BARREL" HYDRANTS WITH OPEN DRAIN PORTS PROVIDED. SITES SHALL BE IMPROVED TO ALLOW HYDRANTS TO DRAIN.

WHEN A DRY-BARREL HYDRANT WITH AN OPEN DRAIN PORT IS SET IN CLAY OR OTHER IMPERVIOUS SOIL, A DRAINAGE PIT 2 FT. X 2 FT. X 2 FT. SHALL BE EXCAVATED BELOW EACH HYDRANT. THE DRAINAGE PIT SHALL BE FILLED WITH COARSE GRAVEL OR STONE UNDER AND AROUND THE ELBOW OF THE HYDRANT AND TO A LEVEL OF 6 INCHES ABOVE THE DRAIN PORT. TO PREVENT POSSIBLE CONTAMINATION OF THE WATER SUPPLY, DO NOT CONNECT HYDRANT DRAINS TO A SANITARY SEWER OR STORM SEWER.

### PROTECTION

HYDRANTS THAT ARE INTENDED TO FAIL AT THE GROUND LINE JOINT ON VEHICLE IMPACT (TRAFFIC HYDRANTS), SPECIFIC CARE SHALL BE TAKEN TO PROVIDE ADEQUATE SOIL RESISTANCE TO AVOID TRANSMITTING SHOCK MOVEMENT TO THE LOWER BARREL AND INLET CONNECTION.

### LOCATION

HYDRANTS SHALL BE LOCATED AS SHOWN ON THE APPROVED PLANS:

- ONE HYDRANT SHALL BE LOCATED AT EACH STREET INTERSECTION WITH INTERMEDIATE HYDRANTS LOCATED SO THAT SPACING BETWEEN HYDRANTS DOES NOT EXCEED 500- FEET AND NO POINT IS OVER 300- FEET FROM A HYDRANT.
- ONE HYDRANT SHALL BE LOCATED NOT MORE THAN 100- FEET FROM EACH FIRE DEPARTMENT CONNECTION FOR SPRINKLER OR STANDPIPE SYSTEMS. SAID HYDRANT SHALL BE PLACED SUCH THAT THE FIRE DEPARTMENT APPARATUS CAN CONNECT TO AND SUPPORT THE SPRINKLER OR STANDPIPE IN A TIMELY MANNER.
- ADDITIONAL FIRE HYDRANTS MAY BE REQUIRED BY THE FIRE DEPARTMENT.
- HYDRANTS SHALL BE LOCATED ADJACENT TO PAVED ROADWAYS SUITABLE FOR FIRE APPARATUS.
- HYDRANTS SHALL BE SET WITHIN A DISTANCE OF 10 FEET OF THE CURB LINE.
- CAPS ON YARD HYDRANTS SUPPORTED BY FIRE PUMPS SHALL BE PAINTED YELLOW.
- ALL FIRE HYDRANTS AND FIRE MAINS SHALL BE INSTALLED IN COMPLIANCE WITH THE OHIO FIRE CODE INCLUDING BUT NOT LIMITED TO SECTION FM-500.0 CERTIFICATION AND SECTION FM-516.0 WATER TANKS AND FIRE SERVICE MAINS.
- HYDRANT SHALL BE INSTALLED A MINIMUM OF 50 FEET FROM ANY BUILDING.
- HYDRANT SHALL BE INSTALLED AWAY FROM ANY OBSTRUCTION.

## THRUST RESTRAINT

### HYDRANTS

THE BOWL OF EACH HYDRANT SHALL BE WELL BRACED AGAINST A SUFFICIENT AREA OF UNEXCAVATED EARTH AT THE END OF THE TRENCH WITH THRUST BLOCKS OF CONCRETE OR OTHER SPECIFIED BLOCKING MATERIALS, OR IT SHALL BE TIED TO THE PIPE WITH SUITABLE METAL TIE RODS, CLAMPS, OR RESTRAINED JOINTS, AS SHOWN ON THE PLANS OR AS SPECIFIED.

### FITTINGS

ALL PLUGS, CAPS, TEES, REDUCERS, AND BENDS, UNLESS OTHERWISE SPECIFIED, SHALL BE PROVIDED WITH THRUST BLOCKS OR SUITABLE RESTRAINED JOINTS AS SPECIFIED.

### DESIGN

THE DESIGN PRESSURE IS THE MAXIMUM PRESSURE TO WHICH THE PIPE LINE WILL BE SUBJECTED, WITH CONSIDERATION GIVEN TO THE VULNERABILITY OF THE PIPE-SOIL SYSTEM WHEN THE PRESSURE IS EXPECTED TO BE APPLIED. IN MOST CASES, THIS WILL BE THE TEST PRESSURE OF THE PIPE, APPLIED SHORTLY AFTER INSTALLATION, WHEN THE PIPE-SOIL SYSTEM IS NORMALLY MOST VULNERABLE.

## GATE VALVE SPECIFICATIONS

### VALVE CONSTRUCTION

1. VALVES SHALL MEET OR EXCEED ANSI/AWWA C515, LATEST REVISION FOR WATER SUPPLY SERVICE.
2. VALVES SIZE SHALL BE OF A RESILIENT WEDGE DESIGN WITH A RATED WORKING PRESSURE OF 250 PSIG.
3. ALL CAST FERROUS COMPONENTS SHALL BE DUCTILE IRON AND SHALL BE MANUFACTURED IN COMPLIANCE WITH THE LATEST EDITION OF ANSI/AWWA C515.
4. ALL VALVES SHALL BE CERTIFIED TO NSF/ANSI STANDARD 61.
5. VALVE TO BE DESIGNED FOR USE IN DRINKING WATER, SEWAGE, FIRE PROTECTION SYSTEMS, IRRIGATION, AND BACKFLOW CONTROL SYSTEMS.
6. ALL VALVES WILL COME STANDARD WITH A QR CODE USED FOR MAPPING ASSETS TO BE USED IN CONJUNCTION WITH THE AFC MAPPER MOBILE APPLICATION.

### DUCTILE IRON COMPONENTS

1. THE VALVE BODY DESIGN SHALL BE LIGHTWEIGHT IN DESIGN AND EASY TO HANDLE. VALVE BODY AND BONNET SHALL BE CONSTRUCTED OF DUCTILE IRON WITH WALL THICKNESS PER TABLE 2 OF ANSI/AWWA C515. HEAVY WALL OR AND/OR CAST GRAY-IRON BODIES ARE NOT ACCEPTABLE.
2. THE VALVE SHALL HAVE A SMOOTH AND OVERSIZE WATERWAY AND HAVE THE MARKING "DI" OR "DUCTILE IRON" CAST ONTO THE BODY.
3. ALL WEDGES SHALL BE CONSTRUCTED OF DUCTILE IRON. WEDGE SHALL BE FULLY ENCAPSULATED WITH EPDM RUBBER AND PROVIDED WITH POLYMER WEDGE GUIDE COVERS.
4. VALVE STUFFING BOX AND WRENCH NUT SHALL BE MADE OF DUCTILE IRON.

### STEM SEALS

1. VALVE STEMS SHALL BE SEALED BY THREE O-RINGS.
2. TWO OF THE STEM O-RINGS SHALL RESIDE ABOVE THE THRUST COLLAR. ONE O-RING SHALL BE LOCATED BELOW THE THRUST COLLAR WHICH CREATES A SEALED LUBRICATION CHAMBER AROUND THE STEM THRUST COLLAR.
3. O-RINGS SET IN A CARTRIDGE SHALL NOT BE ALLOWED.
4. THE VALVE SHALL ALSO BE EQUIPPED WITH THRUST WASHERS ABOVE AND BELOW THE STEM THRUST COLLAR FOR REDUCED OPERATING TORQUE.

### BOLTING AND BODY GASKETS

1. ALL EXTERIOR VALVE BODY BOLTING SHALL BE TYPE 304 STAINLESS STEEL AND SHALL BE PROVIDED WITH HEXAGONAL HEADS WITH DIMENSIONS CONFORMING TO ANSI B18.2.1.
2. METRIC SIZES AND / OR SOCKET HEAD CAP SCREWS, OR BOLTS, ARE NOT ALLOWED.
3. THE OPERATING NUT SHALL BE 2 IN. SQUARE AND SHALL BE CONSTRUCTED OF DUCTILE IRON FITTED TO A SQUARE TAPERED STEM TO HELP ENSURE EVEN DISTRIBUTION OF INPUT TORQUE.
4. THE BODY-TO-BONNET AND STUFFING BOX SEALS ARE PRESSURE ENERGIZED O-RING STYLE DESIGNS THAT REDUCE THE NEED FOR EXCESSIVE BOLT LOADING. THE SEALS SHALL BE REUSABLE.

### COATING

1. ALL INTERNAL AND EXTERNAL FERROUS SURFACES OF THE VALVE BODY AND BONNET SHALL HAVE FUSION-BONDED EPOXY COATING, COMPLYING WITH ANSI/AWWA C550.

### CONNECTION

1. VALVE INLET SHALL BE DESIGNED FOR USE WITH DUCTILE IRON, CAST IRON, HDPE AND PVC PIPE MATERIALS.
2. INLET SHALL INCORPORATE STAB-FIT DESIGN REQUIRING THE USE OF ONLY ONE TYPE 304 STAINLESS STEEL FASTENER. THE ASSEMBLY OF FLANGE OR MECHANICAL JOINT RESTRAINERS USING MULTIPLE FASTENERS OR WEDGE BOLTS IS NOT PERMITTED.
3. RESTRAINT ACCESSORIES SHALL BE FACTORY INSTALLED.
4. REQUIRED INSTALLATION TORQUE WILL BE DISPLAYED ON THE VALVE BODY AND MAY NOT EXCEED 45FT-LBS.
5. ALL VALVE INLETS SHALL BE THE ALPHA DESIGN FURNISHED BY AMERICAN FLOW CONTROL, OR APPROVED EQUAL.

## HYDROSTATIC TESTING

HYDROSTATIC TESTING OF NEW WATER MAINS SHALL BE COMPLETED IN ACCORDANCE OF SECTION 10.3 OF THE MOST RECENT VERSION OF AWWA STANDARD C605. WATER SHALL BE USED FOR ALL PRESSURE TESTING OF NEWLY-INSTALLED WATER MAINS AND NEW WATER SERVICES. AIR TESTING, OR ANY OTHER TYPE MATERIAL, IS PROHIBITED.

## PRESSURE TEST

ALL NEWLY LAID PIPE OR ANY VALVED SECTION THEREOF SHALL BE SUBJECT TO A HYDROSTATIC PRESSURE OF AT LEAST 175 PSI AT THE POINT OF TESTING. BEFORE TESTING, SUFFICIENT BACKFILL SHALL BE PROVIDED TO PREVENT PIPE MOVEMENT.

## TEST PRESSURE REQUIREMENTS

TEST PRESSURE SHALL:

1. NOT BE LESS THAN 175 PSI AT THE HIGHEST POINT ALONG THE TEST SECTION.
2. NOT EXCEED PIPE OR THRUST-RESTRAINT DESIGN PRESSURE.
3. BE OF AT LEAST 2-HOUR DURATION.
4. NOT VARY BY MORE THAN 5 PSI (0.35 BAR) FOR THE DURATION OF THE TEST. NOT EXCEED TWICE THE RATED PRESSURE OF THE VALVES OR HYDRANTS WHEN THE PRESSURE BOUNDARY OF THE TEST SECTION INCLUDES CLOSED GATE VALVES OR HYDRANTS. NOTE: VALVES SHALL NOT BE OPERATED IN EITHER DIRECTION AT DIFFERENTIAL PRESSURE EXCEEDING THE RATED PRESSURE OF THE VALVES WHEN THE PRESSURE BOUNDARY OF THE TEST SECTION INCLUDES CLOSED, RESILIENT-SEATED GATE VALVES OR BUTTERFLY VALVES.

## PRESSURIZATION

EACH VALVED SECTION OF PIPE SHALL BE FILLED WITH WATER SLOWLY AND THE SPECIFIED TEST PRESSURE, BASED ON THE ELEVATION THE LOWEST POINT OF ELEVATION OF THE TEST GAUGE, SHALL BE APPLIED BY MEANS OF A PUMP CONNECTED TO THE PIPE IN A MANNER SATISFACTORY TO THE CITY. VALVES SHALL NOT BE OPERATED IN EITHER THE OPENING OR CLOSING DIRECTION AT DIFFERENTIAL PRESSURES ABOVE THE RATED PRESSURE. IT IS GOOD PRACTICE TO ALLOW THE SYSTEM TO STABILIZE AT THE TEST PRESSURE BEFORE CONDUCTING THE LEAKAGE TEST.

## FLUSHING

FOREIGN MATERIAL LEFT IN PIPELINES DURING INSTALLATION OFTEN RESULTS IN VALVE OR HYDRANT-SEAT LEAKAGE DURING PRESSURE TESTS. EVERY EFFORT SHALL BE MADE TO KEEP LINES CLEAN DURING INSTALLATION. THOROUGH FLUSHING IS RECOMMENDED PRIOR TO A PRESSURE TEST. FLUSHING SHOULD BE ACCOMPLISHED BY PARTIALLY OPENING AND CLOSING VALVES AND HYDRANTS SEVERAL TIMES UNDER EXPECTED LINE PRESSURE, WITH FLOW VELOCITIES ADEQUATE TO FLUSH FOREIGN MATERIAL OUT OF THE VALVES AND FIRE HYDRANTS.

## AIR REMOVAL

BEFORE APPLYING THE SPECIFIED TEST PRESSURE, AIR SHALL BE EXPELLED COMPLETELY FROM THE PIPE, VALVES, AND HYDRANTS. IF PERMANENT AIR VENTS ARE NOT LOCATED AT ALL HIGH POINTS, THE CONTRACTOR SHALL INSTALL CORPORATION COCKS AT SUCH POINTS SO THAT THE AIR CAN BE EXPELLED AS THE LINE FILLS WITH WATER. AFTER ALL THE AIR HAS BEEN EXPELLED, THE CORPORATION COCKS SHALL BE CLOSED AND THE TEST PRESSURE APPLIED. AT THE CONCLUSION OF THE PRESSURE TEST, THE CORPORATION COCKS SHALL BE REMOVED AND PLUGGED OR LEFT IN PLACE AT THE DISCRETION OF THE CITY.

## EXAMINATION

ANY EXPOSED PIPE, FITTINGS, VALVES, HYDRANTS, AND JOINTS SHALL BE EXAMINED CAREFULLY DURING THE TEST. ANY DAMAGED OR DEFECTIVE PIPING, FITTINGS, VALVES, OR HYDRANTS THAT ARE DISCOVERED FOLLOWING THE PRESSURE TEST SHALL BE REPAIRED OR REPLACED WITH SOUND MATERIAL. VISIBLE LEAKAGE SHALL BE REPAIRED, REGARDLESS OF THE AMOUNT OF LEAKAGE. THE TEST SHALL BE REPEATED UNTIL IT IS SATISFACTORY TO THE CITY.

## WATER SERVICE TESTING

WATER SERVICES SHALL BE TESTED FROM THE NEW MAIN TO THE CURB STOP, INCLUDING THE CURB STOP. WATER SERVICE TAPS SHALL BE MADE INTO A PRESSURIZED MAIN. ALL NEW WATER SERVICES SHALL BE TESTED CONCURRENTLY WITH THE WATER MAIN HYDROSTATIC TEST, WITH CORPORATION STOPS OPEN FOR THE TEST.

## ACCEPTANCE OF INSTALLATION

ACCEPTANCE SHALL BE DETERMINED ON THE BASIS OF ALLOWABLE LEAKAGE. IF ANY TEST OF PIPE LAID DISCLOSES LEAKAGE GREATER THAN 5 PSI, THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE AND MAKE REPAIRS AS NECESSARY UNTIL THE LEAKAGE IS WITHIN THE SPECIFIED ALLOWANCE.

## DISINFECTION OF NEW WATER MAINS

THE MOST RECENT VERSION OF AWWA STANDARD C651 SHALL BE FOLLOWED. CONTRACTOR IS RESPONSIBLE TO COMPLETE DISINFECTION AND RE-DISINFECTION, IF NECESSARY.

LISTED BELOW IS THE CITY'S FAVORED PROCEDURE FOR DISINFECTION. OTHER METHODS WILL BE CONSIDERED IF IT CONFORMS TO AWWA STANDARD C651.

ALL EFFORTS SHALL BE MADE TO PREVENT CONTAMINATING MATERIALS FROM ENTERING THE WATER MAIN DURING STORAGE AND CONSTRUCTION. ANY POTENTIAL CONTAMINATION AT THE CONSTRUCTION SITE SHALL BE NOTED AND USED AS A BASIS FOR BOLSTERING DISINFECTION EFFORTS. SECTION 4.8 OF AWWA STANDARD C651 OUTLINES THE BEST PRACTICES FOR PREVENTING CONTAMINATION.

### TABLET METHOD

THE TABLET METHOD CONSISTS OF PLACING NSF-60 CALCIUM HYPOCHLORITE TABLETS IN THE WATER MAIN AS IT IS BEING INSTALLED AND FILLING THE MAIN WITH POTABLE WATER WHEN INSTALLATION IS COMPLETED. USE OF THIS METHOD REQUIRES THE PIPES AND APPURTENANCES ARE PROTECTED DURING CONSTRUCTION.

OTHER METHODS MAY ONLY BE USED WITH PRIOR APPROVAL BY THE CITY.

### WARNING

THIS PROCEDURE SHALL NOT BE USED ON SOLVENT WELDED PLASTIC OR ON SCREWED JOINT STEEL PIPE BECAUSE OF THE REACTION OF THE JOINT COMPOUNDS WITH THE CALCIUM HYPOCHLORITE.

### PLACING OF CALCIUM HYPOCHLORITE TABLETS

DURING CONSTRUCTION, 5-G CALCIUM HYPOCHLORITE TABLETS SHALL BE PLACED IN EACH SECTION OF PIPE AND IN EACH HYDRANT, HYDRANT BRANCH, AND OTHER APPURTENANCE. TABLE 2 SHOWS THE NUMBER OF TABLETS REQUIRED FOR COMMONLY USED SIZES OF PIPE. THE TABLETS SHALL BE ATTACHED BY AN NSF/ANSI 61-APPROVED ADHESIVE. THERE SHALL BE NO ADHESIVE ON THE TABLET EXCEPT ON THE BROAD SIDE ATTACHED TO THE SURFACE OF THE PIPE. ATTACH ALL OF THE TABLETS INSIDE AND AT THE TOP OF THE MAIN, WITH APPROXIMATELY EQUAL NUMBERS OF TABLETS AT EACH END OF A GIVEN PIPE LENGTH. IF THE TABLETS ARE ATTACHED BEFORE THE PIPE SECTION IS PLACED IN THE TRENCH, THEIR POSITION SHALL BE MARKED ON THE SECTION SO IT CAN BE READILY DETERMINED THAT THE PIPE IS INSTALLED WITH THE TABLETS AT THE TOP.

TABLE 2

NUMBER OF 5-g CALCIUM HYPOCHLORITE TABLETS REQUIRED FOR MINIMUM DOSE OF 25 mg/l\*

PIPE DIAMETER (INCHES)	LENGTH OF PIPE SECTION (FEET)				
	13 OR LESS	18	20	30	40
NUMBER OF 5-g CALCIUM HYPOCHLORITE TABLETS					
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

\* BASED ON 3.25 g AVAILABLE CHLORINE PER TABLET.

### FILLING AND CONTACT TIME

WHEN INSTALLATION HAS BEEN COMPLETED, THE MAIN SHALL BE FILLED WITH WATER AT A RATE SUCH THAT THE WATER WITHIN THE MAIN WILL FLOW AT A VELOCITY NO GREATER THAN 1 FT/SEC. FILL RATE SHALL BE CAREFULLY CONTROLLED TO ENSURE TABLETS DO NOT COME LOOSE FROM PIPE. PRECAUTIONS SHALL BE TAKEN TO ASSURE THAT AIR POCKETS ARE ELIMINATED. VALVES SHALL BE POSITIONED SO THAT THE HIGHLY-CHLORINATED WATER WON'T FLOW INTO WATER MAINS IN ACTIVE SERVICE.

THE HIGHLY-CHLORINATED WATER SHALL REMAIN IN THE PIPE FOR AT LEAST 24 HOURS. IF THE WATER TEMPERATURE IS LESS THAN 41 DEGREES F, THE WATER SHALL REMAIN IN THE PIPE FOR AT LEAST 48 A DETECTABLE FREE CHLORINE RESIDUAL ( $\geq 0.2$  MG/L) SHALL BE FOUND AT EACH SAMPLING POINT AFTER THE 24-HR OR 48-HR PERIOD.

### FINAL FLUSHING

#### CLEARING THE MAIN OF HEAVILY CHLORINATED WATER

AFTER THE APPLICABLE RETENTION PERIOD, HEAVILY CHLORINATED WATER SHOULD NOT REMAIN IN PROLONGED CONTACT WITH PIPE. IN ORDER TO PREVENT DAMAGE TO THE PIPE LINING OR CORROSION DAMAGE TO THE PIPE ITSELF, THE HEAVILY CHLORINATED WATER SHALL BE FLUSHED FROM THE MAIN UNTIL CHLORINE MEASUREMENTS SHOW THAT THE CONCENTRATION IN THE WATER LEAVING THE MAIN IS NO HIGHER THAN THAT GENERALLY PREVAILING IN THE SYSTEM OR IS ACCEPTABLE FOR DOMESTIC USE.

#### DISPOSING OF HEAVILY CHLORINATED WATER

THE ENVIRONMENT TO WHICH THE CHLORINATED WATER IS TO BE DISCHARGED SHALL BE INSPECTED. IF THERE IS ANY QUESTION THAT THE CHLORINATED DISCHARGE WILL CAUSE DAMAGE TO THE ENVIRONMENT, THEN A REDUCING AGENT SHALL BE APPLIED TO THE WATER TO BE WASTED TO NEUTRALIZE THE CHLORINE RESIDUAL REMAINING IN THE WATER. AWWA STANDARD C655 DETAILS BEST PRACTICES FOR DECHLORINATION.

## BACTERIOLOGICAL TESTS

FOR NEW MAINS, THE CITY HAS TWO OPTIONS FOR THE BACTERIOLOGICAL TESTING FOR TOTAL COLIFORM ANALYSIS. THE CITY SHALL DECIDE WHICH OPTION TO USE, IN CONSULTATION WITH THE CONTRACTOR.

OPTION A: BEFORE APPROVING A MAIN FOR USE, TAKE AN INITIAL SET OF SAMPLES AND THEN RESAMPLE AGAIN AFTER A MINIMUM OF 16 HOURS USING THE SAMPLING SITE PROCEDURES OUTLINED BOTH SETS OF SAMPLES SHALL PASS FOR THE MAIN TO BE APPROVED FOR USE.

OPTION B: BEFORE APPROVING A MAIN FOR USE, LET IT SIT FOR A MINIMUM OF 16 HOURS WITHOUT ANY WATER USE. THEN COLLECT, USING THE SAMPLING SITE PROCEDURES OUTLINED BELOW AND WITHOUT FLUSHING THE MAIN, TWO SETS OF SAMPLES A MINIMUM OF 15 MINUTES APART WHILE THE SAMPLING TAPS ARE LEFT RUNNING. BOTH SETS OF SAMPLES SHALL PASS FOR THE MAIN TO BE APPROVED FOR USE.

### STANDARD CONDITIONS

SAMPLES SHALL BE COLLECTED FROM EVERY 1,200 FEET OF THE NEW WATER MAIN, PLUS ONE SET AT THE END OF THE LINE AND ONE SET FROM EACH BRANCH GREATER THAN ONE PIE LENGTH. ALL SAMPLES SHALL BE TESTED FOR BACTERIOLOGICAL QUALITY IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AND SHALL SHOW THE ABSENCE OF COLIFORM ORGANISMS. THE TEST WILL BE PERFORMED AND READ BY CERTIFIED CITY PERSONNEL.

### SPECIAL CONDITIONS

IF TRENCH WATER HAS ENTERED THE NEW MAIN DURING CONSTRUCTION OR, IF IN THE OPINION OF THE CITY, EXCESSIVE QUANTITIES OF DIRT OR DEBRIS HAVE ENTERED THE NEW MAIN, BACTERIOLOGICAL SAMPLES SHALL BE TAKEN AT INTERVALS OF APPROXIMATELY 200 FT. AND SHALL BE IDENTIFIED BY LOCATION. SAMPLES SHALL BE TAKEN OF WATER THAT HAS STOOD IN THE NEW MAIN FOR AT LEAST 16 HOURS AFTER FINAL FLUSHING HAS BEEN COMPLETED.

### SAMPLING PROCEDURES

SAMPLES FOR BACTERIOLOGICAL ANALYSIS SHALL BE COLLECTED BY CITY PERSONNEL IN STERILE BOTTLES TREATED WITH SODIUM THIOSULFATE, IN ACCORDANCE WITH SECTION 9060—SAMPLES OF STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER.

HOSES AND FIRE HYDRANTS ARE NOT RECOMMENDED FOR THE COLLECTION OF SAMPLES THAT WILL BE USED TO MAKE DECISIONS ON THE BACTERIOLOGICAL QUALITY OF DRINKING WATER. HOWEVER, IF NO SAMPLING PORT IS AVAILABLE, CLEANED FIRE HYDRANTS THAT HAVE BEEN CLEARED OF STANDING WATER AND/OR OTHER SANITIZED SAMPLING APPARATUS (I.E., SANITIZED TUBING, HOSE, GOOSENECK, MAY BE USED WITH THE UNDERSTANDING THAT THEY DO NOT REPRESENT OPTIMUM ACCESS TO THE WATER MAIN FOR BACTERIOLOGICAL SAMPLING. THERE SHOULD BE NO WATER IN THE TRENCH UP TO THE CONNECTION FOR SAMPLING. THE SAMPLING PIPE SHALL BE DEDICATED, CLEANED, DISINFECTED AND FLUSHED PRIOR TO SAMPLING. A CORPORATION COCK MAY BE INSTALLED IN THE MAIN WITH A GOOSENECK ASSEMBLY. AFTER SAMPLES HAVE BEEN COLLECTED, THE GOOSENECK ASSEMBLY MAY BE REMOVED AND RETAINED FOR FUTURE USE AND THE CORPORATION COCK SHOULD BE CAPPED OR TAPED FOR FUTURE REUSE.

### RE-DISINFECTION

IF THE INITIAL DISINFECTION FAILS TO PRODUCE SATISFACTORY BACTERIOLOGICAL RESULTS, OR IF OTHER RESULTS INDICATE UNACCEPTABLE WATER QUALITY, THE MAIN MAY BE RE-FLUSHED AND SHALL BE RESAMPLED. IF CHECK SAMPLES FAIL TO PRODUCE ACCEPTABLE RESULTS, THE MAIN SHALL BE RECHLORINATED BY THE CONTINUOUS- FEED OR SLUG METHOD (DESCRIBED IN AWWA STANDARD C651) UNTIL SATISFACTORY RESULTS ARE OBTAINED.

THE CONTRACTOR SHALL PAY FOR THE RE-DISINFECTION OF THE MAIN AND ANY ADDITIONAL SAMPLING REQUIRED.



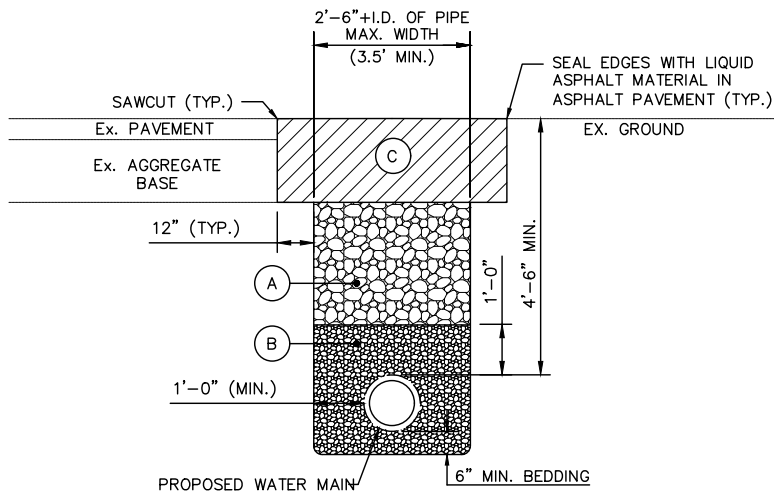
## BACTERIOLOGICAL TESTS

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**WATER MAIN TRENCH DETAIL**  
(SHOWN AS "IN PAVEMENT" APPLICATION)

**TRENCH DETAIL NOTES:**

A. ALL TRENCH EDGES NOT UNDER OR WITHIN 5' OF PROPOSED OR EXISTING PAVEMENT, CURB, DRIVEWAYS, ALLEYS, STONE AREA OR WALKS CAN BE BACKFILLED WITH COMPACTED EXISTING NATIVE MATERIAL IN 12" MAXIMUM LIFTS OR AS APPROVED BY THE CITY. NO MATERIAL SHALL BE USED FOR BACKFILLING THAT CONTAINS STONE, ROCKS, ETC., GREATER THAN 4" DIAMETER.

ALL TRENCH EDGES UNDER OR WITHIN 5' OF PROPOSED OR EXISTING PAVEMENT, CURB, DRIVEWAYS, ALLEYS, OR GRAVEL AREAS SHALL BE BACKFILLED WITH ODOT ITEM 613, LOW STRENGTH MORTAR BACKFILL, TYPE 1 (LSM 50), UNLESS OTHERWISE REQUIRED OR ALLOWED BY THE CITY OF WILMINGTON.

UNDER SIDEWALKS, THE TRENCH SHALL BE FILLED WITH 411.02 STONE COMPACTED EVERY FOUR (4) INCHES.

B. STRUCTURAL BEDDING SHALL BE NATURAL CRUSHED STONE, ODOT 703.11 TYPE 3 (#57 STONE, NO LIMESTONE).

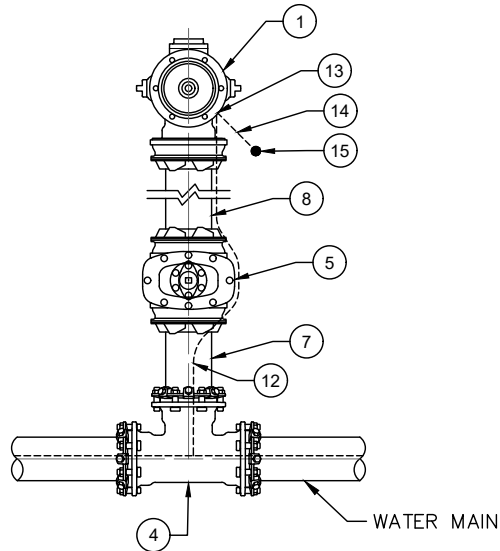
C. OFF-PAVEMENT AREAS SHALL BE PROVIDED WITH A MINIMUM OF 6" OF TOPSOIL OVER THE COMPACTED MATERIAL AND THEN SEEDED AND MULCHED PER ODOT ITEM 659.

IN-PAVEMENT AREAS SHALL FOLLOW MISCELLANEOUS ROADWAY NOTES SHOWN ON 300-15.

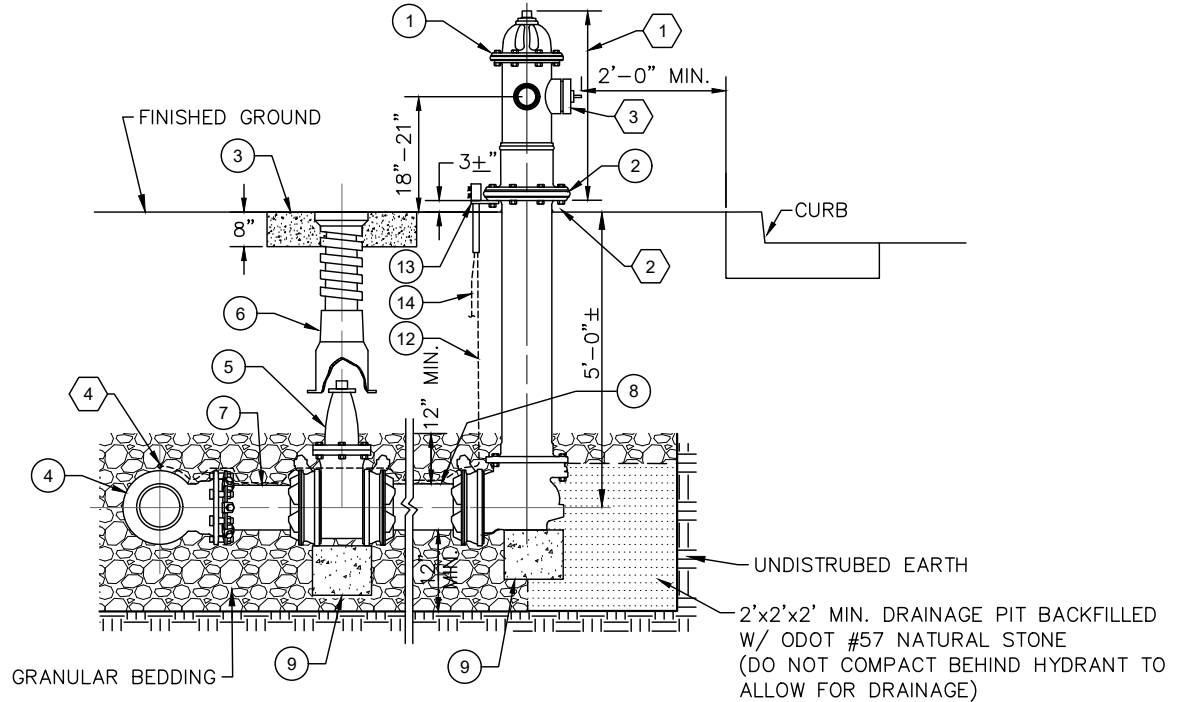
CONCRETE PAVEMENT SHALL BE REPLACED IN FULL PANELS. DRIVE APRONS ARE TO BE INSTALLED PER THE CITY'S REQUIREMENTS.

WHERE THE EXISTING PAVEMENT IS THICKER, THE CONTRACTOR SHALL INCREASE THE COURSE THICKNESS TO MATCH EXISTING.

D. THE OPEN ENDS OF ALL PIPES SHALL BE PLUGGED TO THE APPROVAL OF THE CITY BEFORE WORK IS SUSPENDED FOR THE DAY.



**STANDARD HYDRANT PLAN**



**STANDARD HYDRANT SECTION**

**MATERIAL LEGEND**

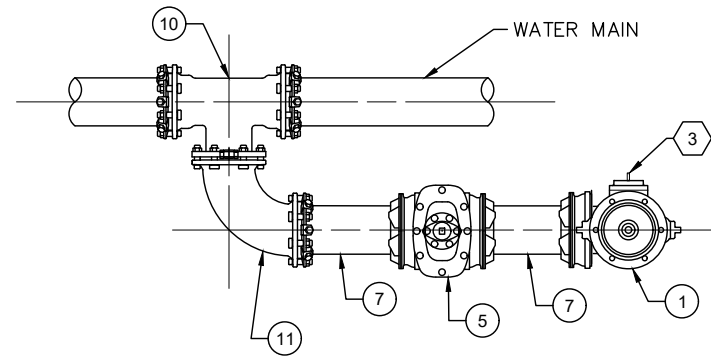
NO.	DESCRIPTION
①	FIRE HYDRANT
②	BREAK FLANGE
③	24"x24"x8" CONCRETE SLAB AROUND ALL VALVE BOXES OUTSIDE OF PAVEMENT
④	MJM TEE W/ 6" BRANCH
⑤	6" GATE VALVE – AMERICAN FLOW CONTROL 2500 SERIES W/ ALPHA INLET DESIGN, OR APPROVED EQUAL
⑥	6" NOM. DIA. CAST IRON 3-PIECE VALVE BOX – TO BE LOCATED IN STREET OR BEHIND CURB
⑦	6" PVC AWWA C-909 PC-235 PIPE, 18" MIN. CUT LENGTH
⑧	6" PVC AWWA C-909 PC-235 PIPE, CUT TO LENGTH
⑨	8"x8"x16" SOLID CONCRETE BLOCK INSTALLED UNDER VALVE (TYPICAL)
⑩	ANCHORING TEE W/ 6" BRANCH
⑪	6" MJxMJ ELBOW
⑫	BLUE TRACER WIRE, IN ACCORDANCE WITH TRACER WIRE SPECIFICATIONS
⑬	ABOVE GRADE TRACER WIRE ACCESS POINT, SECURED TO BOTTOM OF GRADE FLANGE W/ BRACKET (SEE TRACER WIRE NOTES)
⑭	TRACER WIRE (RED) FACTORY CONNECTED TO GROUND ROD
⑮	DRIVE-IN MAGNESIUM GROUND ROD (AWAY FROM STREET)

**FIRE HYDRANT KEY NOTES**

NO.	DESCRIPTION
①	HYDRANT COLOR SHALL BE FEDERAL SPEC RED #1664
②	IF FH EXTENSIONS ARE REQ. DUE TO GRADE, ALL RISER SECTIONS MUST USE CENTERING SPIDERS AT EACH RISER SECTION. ONE (1) 18" MAX. RISER MAY BE USED.
③	PUMPER NOZZLE TO FACE PAVEMENT WHEN PLACED IN SERVICE. FH TO BE BAGGED IF OUT OF SERVICE
④	3-WAY TRACER WIRE CONNECTOR TO BE PROVIDED AT MAIN

**NOTES**

- A. SEE DWG. 800-7 FOR FIRE HYDRANT MATERIAL SPECIFICATIONS.
- B. SEE DWG. 800-2 FOR FIRE HYDRANT INSTALLATION NOTES.

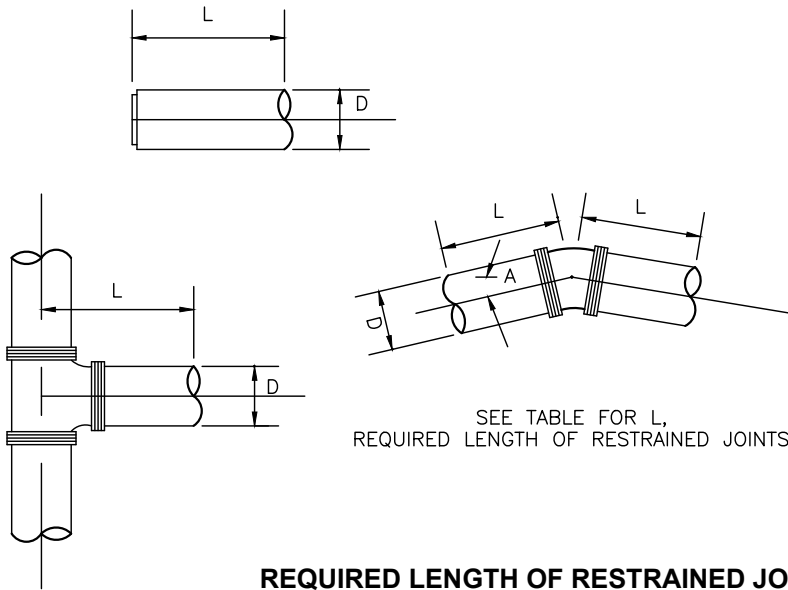


**ROTATED HYDRANT BRANCH DETAIL**

\*TO BE UTILIZED IN SPECIAL CASES ONLY, AND MUST BE APPROVED FOR USE BY CITY

**FIRE HYDRANT MATERIAL SPECIFICATIONS**

1. HYDRANTS SHALL BE THE AMERICAN FLOW CONTROL AMERICAN-DARLING 5-1/4" B-84-B-5 W/ ALPHA BASE, OR APPROVED EQUIVALENT.
  
1. TRAFFIC BREAK FEATURE TO BE DESIGNED FOR 360° ROTATION OF NOZZLE SECTION AND INCORPORATE THE USE OF A 2-PIECE SQUARE ROD AND SINGLE CAST-IRON ROD COUPLING SECURED WITH STAINLESS STEEL COUPLING PINS.
  
2. THE HYDRANT SHALL HAVE A TRAVEL STOP NUT IN THE TOP OF THE HYDRANT TO LIMIT THE TRAVEL OF THE HYDRANT ROD. HYDRANT DESIGNS THAT ALLOW THE VALVE BOTTOM TO STOP AGAINST THE SHOE OR EMPLOY A STOP IN THE DRAIN MECHANISM RESULTING IN A BENDING MOMENT IN THE ROD ASSEMBLY ARE NOT ALLOWED.
  
3. HYDRANT UPPER AND LOWER BARRELS AND BASE SHALL BE MADE OF DUCTILE IRON.
  
4. HYDRANT TO BE CERTIFIED TO NSF/ANSI STANDARD 61 AND NSF/ANSI 372.
  
5. THE HYDRANT SHALL INCORPORATE A DRAINING SYSTEM CONSTRUCTED ENTIRELY OF BRONZE AND POSITIVELY ACTIVATED BY THE COMPRESSION OF AN E-COATED STAINLESS STEEL SPRING.
  
6. HYDRANT DRAINS SHALL CLOSE COMPLETELY AFTER NO MORE THAN 3 TURNS OF THE OPERATING NUT.
  
7. THERE SHALL BE A MINIMUM OF TWO INTERNAL DRAIN PORTS IN THE HYDRANT SEAT AND FOUR OUTLETS IN THE HYDRANT DRAIN RING DIRECTING WATER TO THE EXTERIOR OF THE HYDRANT.
  
8. HYDRANTS EMPLOYING SLIDING-STYLE DRAINS ARE NOT PERMITTED.
  
9. ALL PUMPER AND HOSE NOZZLES SHALL BE RETAINED BY A SINGLE-PIECE THREADED DUCTILE IRON RETAINING COLLAR. THREADED-IN NOZZLES AND NOZZLES USING SET SCREWS OR WEDGE PINS ARE NOT ALLOWED.
  
10. FIRE HYDRANTS SHALL HAVE 2EA. 2-1/2" HOSE NOZZLES WITH NST THREADS AND 1EA. 4-1/2" PUMPER NOZZLE WITH NST THREAD. THE OPERATION NUT AND NOZZLE CAP NUTS SHALL BE 1-1/2" NST PENTAGON, AND SHALL OPEN IN THE COUNTER CLOCKWISE DIRECTION. HYDRANT OPERATION NUT SHALL BE SUPPLIED WITH A GREASE ZERK FOR LUBRICATION PURPOSES. HYDRANTS SHALL BE DRAINING AND FEDERAL SPEC RED #1664 IN COLOR. ALL BOLTING ABOVE AND BELOW GRADE SHALL BE TYPE 304 STAINLESS STEEL.
  
11. FIRE HYDRANT BASE INLET SHALL INCORPORATE A STAB-FIT DESIGN REQUIRING THE USE OF ONLY ONE TYPE 304 STAINLESS STEEL FASTENER. FLANGE OR MECHANICAL JOINT RESTRAINERS USING MULTIPLE FASTENERS OR WEDGE BOLTS IS NOT PERMITTED.
  - HYDRANT BASE SHALL BE AMERICAN FLOW CONTROL ALPHA XL BASE W/ 6" ALPHA INLET, OR APPROVED EQUAL.
  - RESTRAINT ACCESSORIES SHALL BE FACTORY INSTALLED.



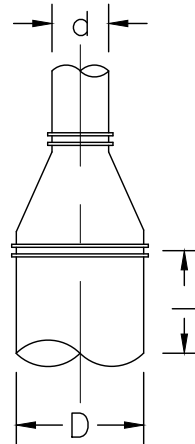
SEE TABLE FOR L,  
REQUIRED LENGTH OF RESTRAINED JOINTS

REQUIRED LENGTH OF RESTRAINED JOINTS									
D-DIAMETER OF PIPE									
A ~ DEGREE OF BEND/FITTING TYPE		4"	6"	8"	10"	12"	16"	20"	24"
	11 1/4°	4	5	6	7	9	11	13	15
	22 1/2°	7	9	12	14	17	22	26	31
	45°	13	19	24	29	34	44	54	63
	90°	28	40	52	63	74	96	116	136
	TEE/END	28	40	52	63	74	96	116	136
	VALVE	28	40	52	63	74	96	116	136

\*THE FITTING OR VALVE SHALL BE RESTRAINED, AT MINIMUM, IN ALL CASES.

**REQUIRED LENGTH OF RESTRAINED JOINTS FOR BENDS, TEES, VALVES, AND DEAD ENDS**

		REQUIRED LENGTH OF RESTRAINED JOINTS FOR REDUCERS("L")							
		DIAMETER OF SMALLER PIPE ("d")							
		4"	6"	8"	10"	12"	16"	20"	24"
DIAMETER OF LARGER PIPE ("D")	6"	21'							
	8"	38'	22'						
	10"	51'	39'	21'					
	12"	64'	54'	39'	22'				
	16"	88'	81'	70'	57'	41'			
	20"	111'	105'	96'	86'	73'	41'		
	24"	132'	127'	120'	111'	101'	75'	41'	



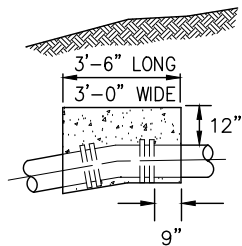
RESTRAINED JOINT REQUIREMENTS CALCULATED BASED ON THE FOLLOWING PARAMETERS:

- PIPE MATERIAL: PVC0 C-909 OR PVC C-900
- SOIL TYPE: GRANULAR BACKFILL/BEDDING
- SAFETY FACTOR: 1.5
- TRENCH TYPE: 4
- DEPTH OF BURY: 4'-6"
- TEST PRESSURE: 150 PSI

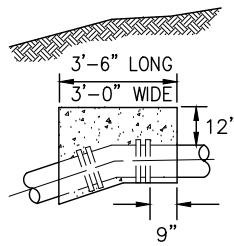
\*ALL RESTRAINT CALCULATIONS FOR BENDS ARE BASED ON VERTICAL BENDS DOWNWARD.

**REQUIRED LENGTH OF RESTRAINED JOINTS FOR REDUCERS**

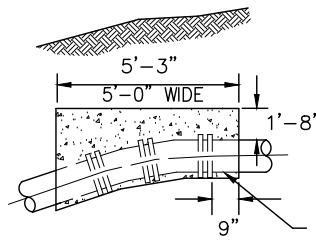
**WATER MAIN RESTRAINED JOINT DETAIL**



11 1/4"



22 1/2"



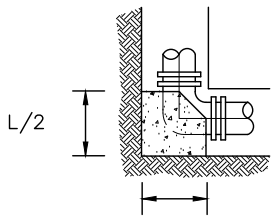
11 1/4" & 22 1/2"

BOND BREAK REQUIRED ON ALL CONCRETE BLOCKING.

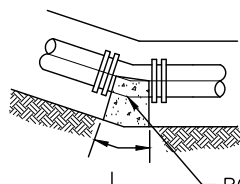
**CONCRETE BLOCKING FOR VERTICAL BENDS**

SIZE OF PIPE		BENDS							
		DEGREE OF BEND							
		11 1/4"		22 1/2"		45°		90°	
		L	D	L	D	L	D	L	D
3", 4", 6"		6"	6"	10"	6"	20"	6"	36"	6"
8"		9"	6"	14"	6"	24"	9"	50"	9"
12"		14"	12"	22"	12"	30"	16"	60"	16"
16"		18"	6"	24"	18"	33"	30"	70"	22"

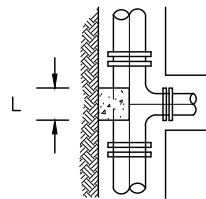
RUN	TEES							
	BRANCH							
	3", 4", 6"		8"		12"		16"	
	L	D	L	D	L	D	L	D
3", 4", 6"	16"	7"						
8"	14"	8"	16"	12"				
12"	9"	12"	16"	12"	24"	18"		
16"	8"	16"	14"	16"	28"	16"	30"	26"



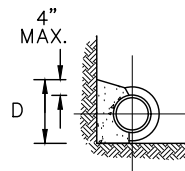
90° BENDS



BENDS LESS THAN 90°



TEES

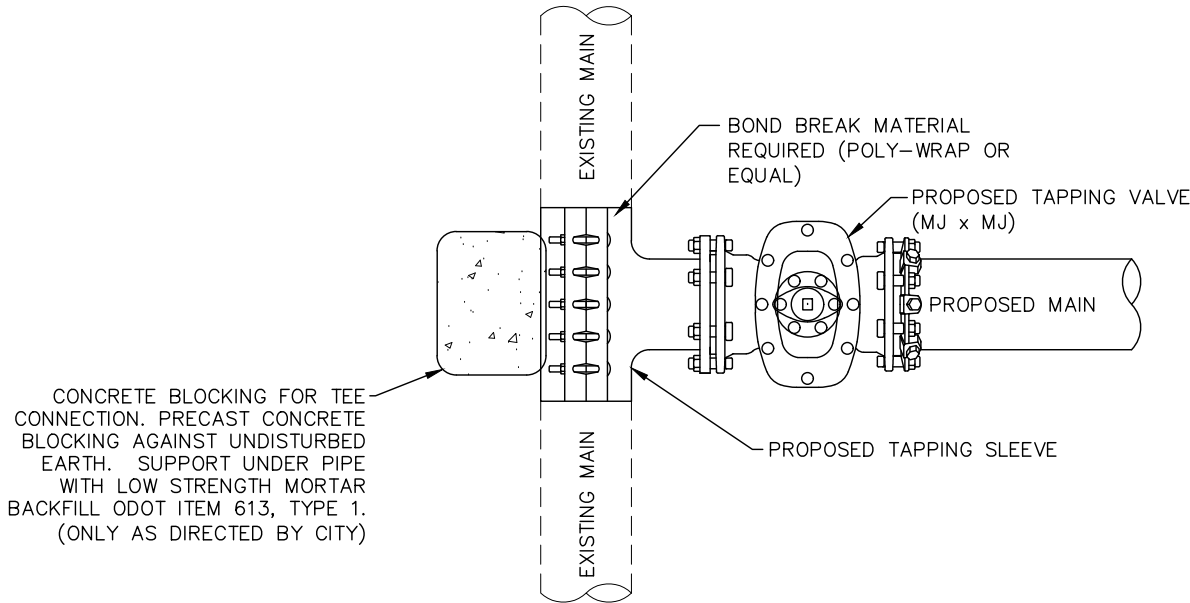


TYPICAL SECTION

**CONCRETE BLOCKING FOR HORIZONTAL BENDS**

**NOTES**

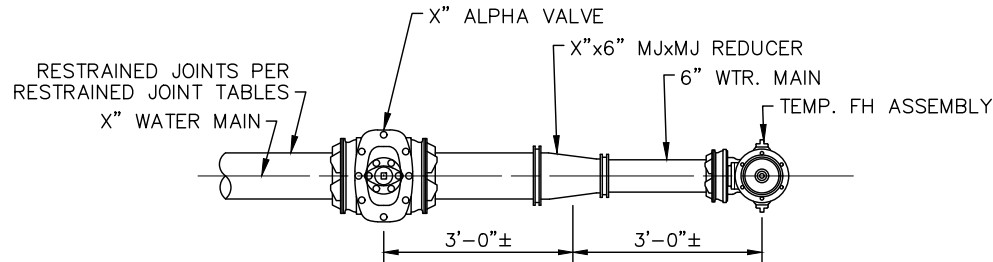
- A. CARE SHALL BE TAKEN TO KEEP CONCRETE AWAY FROM MECHANICAL JOINTS BY PLACING VISQUEEN OR OTHER APPROVED MATERIAL OVER PIPE BEFORE PLACING OF CONCRETE. BOLTS MUST NOT BE ENCASED IN CONCRETE.
- B. CONCRETE FOR BLOCKING VALVES AND FITTINGS SHALL CONFORM TO SECTION ODOT QC MISC.
- C. **CONCRETE THRUST BLOCKING MAY ONLY BE USED IN SPECIAL CASES WITH PRIOR APPROVAL BY THE CITY. RESTRAINED JOINTS SHALL BE THE STANDARD MEANS OF THRUST RESTRAINT, PER DETAIL 800-10.**



**TAPPING SLEEVE AND VALVE DETAIL**

**TAPPING SLEEVE AND VALVE NOTES:**

1. TAPPING SLEEVE SHALL BE 18-8 STAINLESS STEEL DESIGNED FOR USE ON THE CLASS OF PIPE BEING TAPPED INCLUDING PIPE MATERIALS CAST IRON, DUCTILE IRON, STEEL, PVC, HDPE AND ASBESTOS CEMENT PIPE MATERIALS WITH NO SPECIAL SPRINGS OR WASHERS REQUIRED.
2. TAPPING SLEEVE SHALL HAVE MECHANICAL JOINT (MJ) OUTLET.
3. THE TAPPING SLEEVE SHALL HAVE A RANGE UP TO 0.9" (NINE TENTHS OF AN INCH).
4. THE TAPPING SLEEVE SHALL BE TESTED AND SHOWN TO BE ABLE TO ACCOMMODATE A SIMULATED 360 DEGREE PIPELINE BEAM BREAK TEST, PERFORMED AT 1.5 TIMES RATED PRESSURE ON A TEST PIPE OUTFITTED WITH A 1/8" WIDE 3/16" DEEP HYDROSTATICALLY PRESSURIZED GROOVE.
5. SLEEVE SHALL BE RATED AT 175 PSI MAXIMUM WORKING PRESSURE AND SHALL HAVE NSF-61 APPROVED NBR RUBBER GASKET. NUTS, BOLTS AND WASHERS SHALL BE TYPE 304 STAINLESS STEEL DOUBLE COATED WITH A FLUOROELASTOMER COATING TO PREVENT GALLING.
6. SLEEVES SHALL BE TOTAL PIPING SOLUTIONS TRIPLE TAP OR APPROVED EQUIVALENT.



**WATER MAIN DEAD END DETAIL**

## NOTES

TRACER WIRE IS REQUIRED ON ALL WATER MAIN, REGARDLESS OF PIPE MATERIAL. TRACER WIRE SHALL BE INSTALLED ON ALL NEW WATER MAINS, HYDRANT LATERALS AND SERVICE LINES. THIS SPECIFICATION PROVIDES THE TECHNICAL REQUIREMENTS NECESSARY TO ENSURE PROPER INSTALLATION OF TRACER WIRE AND RELATED COMPONENTS FOR THE PURPOSES OF LOCATING UNDERGROUND WATER UTILITIES. IT RECOGNIZES THAT THE FIRST STEP IN PROTECTING UNDERGROUND UTILITY ASSETS IS INSTALLING A QUALITY, RELIABLE LOCATING SYSTEM.

## MATERIALS

### GENERAL

- ALL SYSTEM COMPONENTS, INCLUDING TRACER WIRE, CONNECTORS, GROUND RODS AND ACCESS POINTS, SHALL BE COMPATIBLE TO COPPERHEAD INDUSTRIES COMPLETE UTILITY LOCATING SYSTEM. FOR CONVENIENCE, COPPERHEAD PARTS ARE LISTED.
- ALL TRACER WIRE SHALL HAVE HDPE INSULATION FOR DIRECT BURY, BLUE-COLOR CODED.

### TRACER WIRE

- OPEN TRENCH – TRACER WIRE SHALL BE COPPERHEAD COPPER-CLAD STEEL 12-AWG HIGH STRENGTH, HIGH CARBON WITH MINIMUM 450 LB. BREAK LOAD, MINIMUM 30 MIL HDPE INSULATION THICKNESS.
- DIRECTIONAL DRILLING/BORING – TRACER WIRE SHALL BE COPPERHEAD COPPER-CLAD STEEL 12-AWG EXTRA HIGH STRENGTH WITH MINIMUM 1,150 LB. BREAK LOAD, MINIMUM 45 MIL HDPE INSULATION THICKNESS.

### CONNECTORS

- ALL MAINLINE TRACER WIRES SHALL BE INTERCONNECTED AT INTERSECTIONS, AT MAINLINE TEES AND MAINLINE CROSSES. AT TEES, THE THREE WIRES SHALL BE JOINED USING A SINGLE, THREE-WAY SNAKEBITE LOCKING CONNECTOR (LSC1230C). AT CROSSES, THE FOUR WIRES SHALL BE JOINED USING TWO, THREE-WAY COPPERHEAD SNAKEBITE LOCKING CONNECTORS (LSC1230C) WITH A SHORT JUMPER WIRE BETWEEN THEM.
- DIRECT BURY WIRE CONNECTORS SHALL INCLUDE THREE-WAY LOCKABLE COPPERHEAD SNAKEBITE™ LOCKING CONNECTORS (LSC1230C) AND COPPERHEAD MAINLINE-TO-SERVICE CONNECTORS (3WB-01) SPECIFICALLY MANUFACTURED FOR USE IN UNDERGROUND TRACER WIRE INSTALLATION. CONNECTORS SHALL BE DIELECTRIC SILICONE FILLED TO SEAL OUT MOISTURE AND CORROSION AND SHALL BE INSTALLED IN A MANNER AS TO PREVENT ANY UNINSULATED WIRE EXPOSURE.
- NON-LOCKING, FRICTION FIT OR TAPED CONNECTORS ARE PROHIBITED.

### GROUNDING

- TRACER WIRE SHALL BE PROPERLY GROUNDED AT ALL DEAD-ENDS/STUBS.
- GROUNDING OF TRACER WIRE SHALL BE ACHIEVED BY USING A 1.5-LB, DRIVE-IN, MAGNESIUM COPPERHEAD GROUND ROD (ANO-12) WITH A MINIMUM 20-FEET, #12 RED HDPE INSULATED COPPER-CLAD STEEL WIRE CONNECTED TO THE ROD SPECIFICALLY MANUFACTURED FOR THIS PURPOSE.

### TERMINATION/ACCESS

- ALL TRACER WIRE TERMINATION POINTS SHALL PROVIDE A DIRECT CONNECTION POINT TO THE TRACER WIRE BY A UTILITY LOCATE TRANSMITTER (ABOVE GROUND OR AT GRADE) SPECIFICALLY MANUFACTURED FOR LIGHT DUTY, CONCRETE/DRIVEWAY, OR ROADWAY APPLICATIONS.
- ALL AT-GRADE ACCESS POINTS SHALL BE APPROPRIATELY IDENTIFIED WITH "WATER" ON THE CAP AND BE COLOR CODED BLUE.
- ALL TWO-TERMINAL TRACER WIRE ACCESS POINTS SHALL INCLUDE A MANUALLY INTERRUPTIBLE CONDUCTIVE/CONNECTIVE LINK BETWEEN THE TERMINAL FOR THE TRACER WIRE CONNECTION AND THE TERMINAL FOR THE GROUND ROD WIRE CONNECTION.
- ALL TWO-TERMINAL TRACER WIRE ACCESS POINTS SHALL HAVE EXTERNAL DIRECT CONNECTION POINTS TO BOTH THE TRACER WIRE AND GROUND ROD WIRE FROM TOP OF LID.
- ALL AT-GRADE ACCESS POINTS SHALL INCLUDE AN ENCAPSULATED MAGNET MOLDED INTO THE TOP PORTION OF THE TUBE, TO ALLOW FOR DETECTION BY A FERROUS METAL DETECTOR.
- ALL AT-GRADE ACCESS POINTS SHALL BE SUPPLIED WITH ANTI-CORROSION WAX/GEL TO PROTECT WIRES.
- SERVICE LATERALS ON PUBLIC PROPERTY – TRACER WIRE SHALL BE ACCESSIBLE FROM THE CURB BOX. THE TRACER WIRE SHALL TERMINATE AT THE CURB BOX OR MAY BE EXTENDED ONTO PRIVATE PROPERTY WITH APPROVAL OF THE CITY.
- SERVICE LATERALS ON PRIVATE PROPERTY – TRACER WIRE SHALL TERMINATE AT AN APPROVED COPPERHEAD SINGLE-TERMINAL ACCESS POINT (WHEN GROUNDING IS NOT REQUIRED) AFFIXED TO OR NEAR THE BUILDING EXTERIOR DIRECTLY ABOVE WHERE THE UTILITY ENTERS THE BUILDING, OR AT A TWO-TERMINAL ACCESS POINT (WHEN GROUNDING IS REQUIRED) LOCATED WITHIN TWO LINEAR FEET OF THE BUILDING BEING SERVED BY THE UTILITY.
- HYDRANTS – TRACER WIRE SHALL TERMINATE AT AN APPROVED ABOVE-GRADE COPPERHEAD COBRA ACCESS POINT PROPERLY AFFIXED TO THE HYDRANT-GRADE FLANGE (T2-B-FLPKG-5/8 FOR HYDRANTS WITH 5/8" BOLTS, AND T2-B-FLPKG-3/4 FOR HYDRANTS WITH 3/4" BOLTS). AFFIXING WITH TAPE OR PLASTIC TIES SHALL NOT BE ACCEPTABLE. TRACER WIRE MAY ALSO TERMINATE AT AN APPROVED ATGRADE COPPERHEAD SNAKEPIT LITE DUTY (LD14B2T-SW), LITE DUTY ADJUSTABLE (LD14B2T-ADJSW), LITE DUTY XL (LDXL36B2T-SW), OR CONCRETE/DRIVEWAY (CD14B2TP-SW) ACCESS POINT.
- LONG-RUNS, MORE THAN 2,500 LINEAR FEET, WITHOUT SERVICE LATERALS OR HYDRANTS – TRACER WIRE ACCESS SHALL BE PROVIDED UTILIZING AN APPROVED AT-GRADE COPPERHEAD SNAKEPIT® ACCESS POINT AND GROUNDED AT DEAD-ENDS UTILIZING A DRIVE-IN MAGNESIUM COPPERHEAD GROUND ROD (ANO-12).



Wilmington, Ohio



# TRACER WIRE NOTES

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## INSTALLATION

### GENERAL

- TRACER WIRE INSTALLATION SHALL BE PERFORMED IN SUCH A MANNER THAT ALLOWS PROPER ACCESS FOR CONNECTION OF LINE TRACING EQUIPMENT, PROPER LOCATING OF WIRE WITHOUT LOSS OR DETERIORATION OF LOW FREQUENCY (512 HZ) SIGNAL, AND WITHOUT DISTORTION OF SIGNAL CAUSED BY MORE THAN ONE WIRE BEING INSTALLED IN CLOSE PROXIMITY TO ONE ANOTHER.
- TRACER WIRE SYSTEMS SHALL BE INSTALLED AS A SINGLE CONTINUOUS WIRE, EXCEPT WHERE USING APPROVED CONNECTORS. NO LOOPING OR COILING OF WIRE IS ALLOWED.
- ANY DAMAGE OF THE TRACER WIRE OCCURRING DURING INSTALLATION SHALL BE IMMEDIATELY REPAIRED BY REMOVING THE DAMAGED WIRE AND INSTALLING A NEW SECTION OF WIRE WITH APPROVED CONNECTORS. TAPING AND/OR SPRAY COATING SHALL NOT BE ALLOWED.
- TRACER WIRE SHALL BE INSTALLED AT THE BOTTOM HALF OF THE PIPE AND SECURED (TAPED/TIED) AT 5-FOOT INTERVALS.
- MAINLINE TRACER WIRE SHALL NOT BE CONNECTED TO EXISTING CONDUCTIVE PIPES. TREAT AS A MAINLINE DEAD-END GROUND USING AN APPROVED WATERPROOF CONNECTOR TO A GROUND ROD DRIVEN INTO VIRGIN SOIL BENEATH AND IN LINE WITH THE UTILITY.
- ALL SERVICE LATERAL TRACER WIRE SHALL BE A SINGLE WIRE, CONNECTED TO THE MAINLINE TRACER WIRE USING A THREE-WAY MAINLINE-TO-SERVICE CONNECTOR, INSTALLED WITHOUT CUTTING/SPLICING THE MAINLINE TRACER WIRE.
- IN OCCURRENCES WHERE AN EXISTING TRACER WIRE IS ENCOUNTERED ON AN EXISTING UTILITY THAT IS BEING EXTENDED OR TIED INTO, THE NEW TRACER WIRE AND EXISTING TRACER WIRE SHALL BE CONNECTED USING APPROVED CONNECTORS.
- ONE FOOT OF EXCESS/SLACK WIRE IS REQUIRED IN ALL TRACER WIRE ACCESS POINTS AFTER MEETING FINAL ELEVATION.
- TRACER WIRE SHALL BE PROPERLY GROUNDED AS SPECIFIED.
- AT ALL MAINLINE DEAD-ENDS, TRACER WIRE SHALL GO TO GROUND USING AN APPROVED CONNECTION TO A DRIVE-IN MAGNESIUM GROUND ROD.
- WHEN GROUNDED THE TRACER WIRE AT DEAD-ENDS/STUBS, THE GROUND ROD SHALL BE DRIVEN INTO VIRGIN SOIL DIRECTLY BENEATH AND IN LINE WITH THE UTILITY.

- GROUND ROD WIRE SHALL BE CONNECTED TO THE GROUND ROD TERMINAL ON THE TWO-TERMINAL SNAKEPIT ACCESS POINT LID OR TO THE BOTTOM TERMINAL ON THE TWO-TERMINAL COBRA ACCESS POINT.
- WHERE THE GROUND ROD WIRE WILL BE CONNECTED TO A TRACER WIRE ACCESS POINT, ONE FOOT OF EXCESS/SLACK WIRE IS REQUIRED AFTER MEETING FINAL ELEVATION.

### WATER SYSTEM

- A MAINLINE TRACER WIRE SHALL BE INSTALLED, WITH ALL SERVICE LATERAL TRACER WIRES PROPERLY CONNECTED TO THE MAINLINE TRACER WIRE, TO PROMOTE TRACING/LOCATING CAPABILITIES FROM A SINGLE CONNECTION POINT.
- LAY MAINLINE TRACER WIRE CONTINUOUSLY, BY-PASSING AROUND THE OUTSIDE OF VALVES AND FITTINGS ON THE NORTH OR EAST SIDE.
- TRACER WIRE ON ALL WATER SERVICE LATERALS SHALL TERMINATE AT AN APPROVED TRACER WIRE ACCESS POINT, COLOR CODED BLUE AND LOCATED DIRECTLY ABOVE THE SERVICE LATERAL AT THE EDGE OF ROAD RIGHT-OF-WAY.
- TRACER WIRE ACCESS POINTS WILL BE INSTALLED AT ALL FIRE HYDRANTS.
- ALL CONDUCTIVE AND NON-CONDUCTIVE SERVICE LINES SHALL INCLUDE TRACER WIRE.

### PROHIBITED PRODUCTS AND METHODS

#### THE FOLLOWING PRODUCTS AND METHODS SHALL NOT BE ALLOWED OR ACCEPTABLE:

- UNINSULATED TRACER WIRE
- STAINLESS STEEL TRACER WIRE
- TRACER WIRE INSULATIONS OTHER THAN HDPE
- NON-LOCKING, FRICTION FIT OR TAPED CONNECTORS
- BRASS OR COPPER GROUND RODS
- WIRE CONNECTIONS UTILIZING TAPING OR SPRAY-ON WATERPROOFING
- LOOPED WIRE OR CONTINUOUS WIRE INSTALLATIONS THAT HAVE MORE THAN ONE WIRE LAID SIDE-BY-SIDE OR IN CLOSE PROXIMITY TO ONE ANOTHER
- TRACER WIRE WRAPPED AROUND THE CORRESPONDING UTILITY
- BRASS FITTINGS WITH TRACER WIRE CONNECTION LUGS
- WIRE TERMINATIONS WITHIN THE ROADWAY IN VALVE BOXES, CLEANOUTS, MANHOLES, ETC.
- CONNECTING TRACER WIRE TO EXISTING CONDUCTIVE UTILITIES.

### TESTING

ALL NEW TRACER WIRE INSTALLATIONS SHALL BE LOCATED USING TYPICAL LOW FREQUENCY (512 HZ) LINE TRACING EQUIPMENT, WITNESSED BY THE CITY OR DESIGNEE, AS APPLICABLE, PRIOR TO ACCEPTANCE OF THE CITY. THIS VERIFICATION SHALL BE PERFORMED UPON COMPLETION OF ROUGH GRADING AND AGAIN PRIOR TO FINAL ACCEPTANCE OF THE PROJECT. CONTINUITY TESTING IN LIEU OF ACTUAL LINE TRACING SHALL NOT BE ACCEPTED.



Wilmington, Ohio



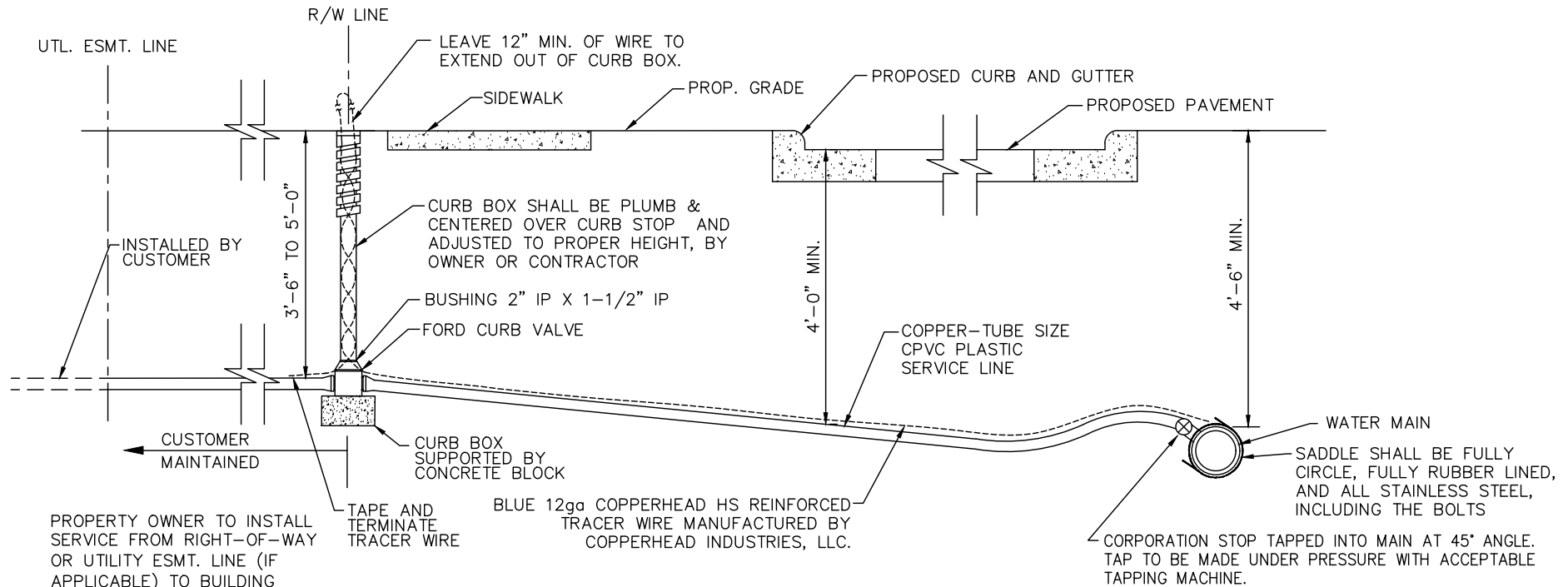
## TRACER WIRE NOTES (CONT.)

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**WATER MAIN SERVICE CONNECTION**

**MATERIAL NOTES**

- A. MINIMUM 3/4" WATER SERVICE SHALL BE COPPER-TUBE SIZE CPVC SDR-11 OR APPROVED MATERIAL BY THE UTILITY DIRECTOR.
- B. TAPPING SADDLE SHALL BE 18-8 STAINLESS STEEL DESIGNED FOR USE ON THE CLASS OF PIPE BEING TAPPED INCLUDING PIPE MATERIALS CAST IRON, DUCTILE IRON, STEEL, PVC, HDPE AND ASBESTOS CEMENT PIPE MATERIALS WITH NO SPECIAL SPRINGS OR WASHERS REQUIRED. THE TAPPING SLEEVE SHALL HAVE A RANGE UP TO 0.9" (NINE TENTHS OF AN INCH). THE TAPPING SLEEVE SHALL BE TESTED AND SHOWN TO BE ABLE TO ACCOMMODATE A SIMULATED 360 DEGREE PIPELINE BEAM BREAK TEST, PERFORMED AT 1.5 TIMES RATED PRESSURE ON A TEST PIPE OUTFITTED WITH A 1/8" WIDE 3/16" DEEP HYDROSTATICALLY PRESSURIZED GROOVE. SLEEVE SHALL BE RATED AT 175 PSI MAXIMUM WORKING PRESSURE AND SHALL HAVE NSF-61 APPROVED NBR RUBBER GASKET. NUTS, BOLTS AND WASHERS SHALL BE TYPE 304 STAINLESS STEEL DOUBLE COATED WITH A FLUOROELASTOMER COATING TO PREVENT GALLING. TAPPING SADDLE SHALL BE TPS TRIPLE-TAP TAPPING SADDLE, OR APPROVED EQUAL.
- C. THE CORPORATION STOP AND CURB STOP SHALL BE FULL-PORT BALL VALVES WITH COMPRESSION STYLE CONNECTIONS. CORP STOP AND CURB STOP SHALL BE FORD PRODUCTS, PER THE TABLE BELOW, OR APPROVED EQUAL.

APPROVED FORD PARTS				
	3/4"	1"	1-1/2"	2"
CORPORATION	F-1000-3	F-1000-4	FB-1000-6	FB-1000-7
CURB STOP	B-44-333	B-44-444	B-44-666	B-44-777

- D. CURB BOX SHALL BE CAST IRON 2-PIECE SCREW TYPE, TYLER UNION 6500 SERIES 93E, OR APPROVED EQUAL.

**NOTES**

- A. WATER SERVICE SHALL BE A MINIMUM OF 10' MEASURED HORIZONTALLY FROM THE SEWER LATERAL AND SHALL BE A MINIMUM OF 18" ABOVE THE CROWN OF THE SANITARY SEWER MAIN WHERE THE WATER SERVICE CROSSES THE SEWER MAIN. WATER SERVICE MAY BE LAID ON BENCH IN THE SEWER LATERAL TRENCH IF CROWN IS AT LEAST 18" BELOW INVERT OF WATER SERVICE, AND THE MINIMUM DISTANCE BETWEEN THE WATER SERVICE AND THE SEWER LATERAL IS 5'-0".
- B. THE CURB BOX TO BE PLACED AT THE RIGHT-OF-WAY LINE.
- C. WATER SERVICE SHALL BE HYDROSTATICALLY TESTED FROM THE MAIN TO THE CURB STOP.

## METER PIT NOTES

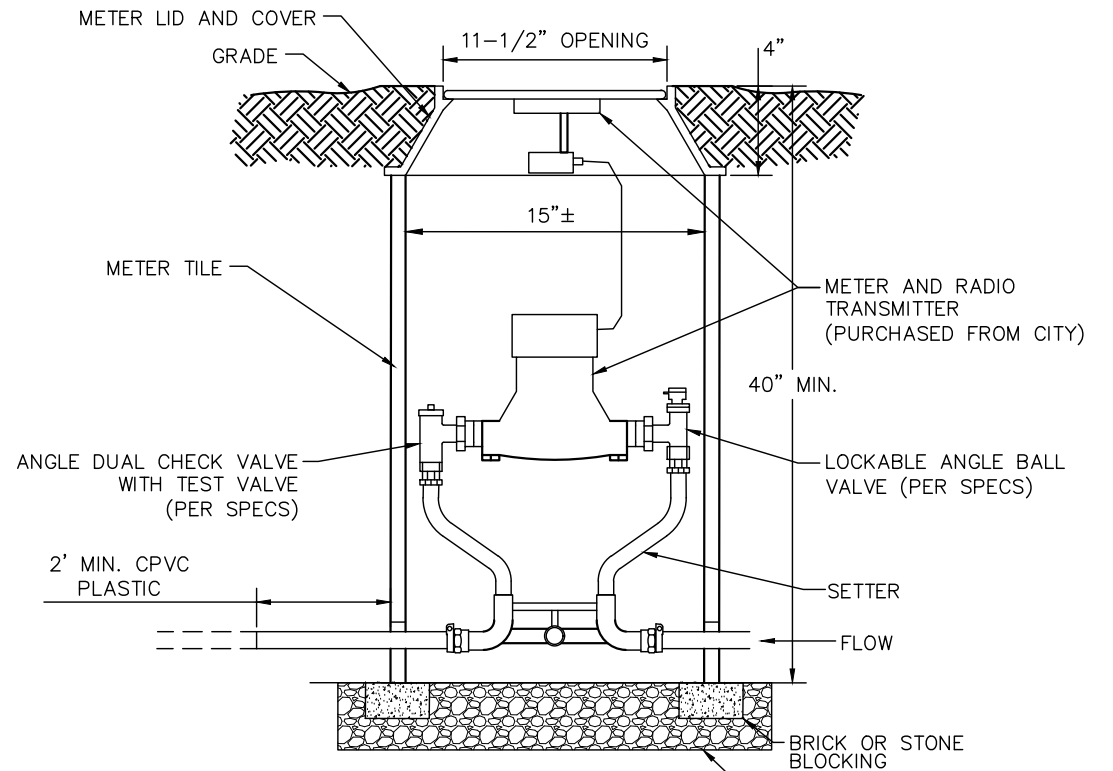
1. METER TILE SHALL BE 15" DIAMETER SMOOTHED WALLED HDPE PLASTIC TILE, 36" MIN. LENGTH, W/ MOUSE HOLES CUT.
2. PROVIDE LOCKING VALVE ON THE INLET SIDE OF THE COPPER SETTER.
3. PROVIDE DUAL CHECK VALVE ON THE OUTLET SIDE OF COPPER SETTER, UNLESS BACKFLOW PREVENTER IS REQUIRED.
4. FORD OR AY MCDONALD COPPER SETTER OR EQUAL TO BE SUPPLIED (SEE DRAWING). THE CITY MAY ELECT TO HAVE SAMPLING SETTERS INSTALLED.
5. LID AND COVER SHALL BE FORD A31 PR, OR APPROVED EQUAL, WITH 1-7/8" HOLE PROVIDED FOR TRANSMITTER PAD.
6. INSERT 1/2" INCH PIPE INTO SETTER HOLE FOR STABILITY. PIPE SHOULD NOT INTERFERE WITH METER TILE.
7. THE CITY SHALL INSPECT ALL PIPING FROM WATER MAIN TO BUILDING, PRIOR TO BACKFILLING.
8. THE CITY RECOMMENDS INSTALLING AN EXPANSION TANK ON THE WATER LINE RIGHT BEFORE THE WATER HEATER.
9. GROUNDING ELECTRIC TO WATER SERVICE IS PROHIBITED DUE TO INCREASED CORROSION OF LINE AND FITTINGS.
10. THE METER PIT SHALL HAVE SUFFICIENT DRAINAGE TO PRECLUDE STANDING WATER.

## METER INSTALLATION NOTES

1. TO ENSURE THAT METER IS COMPATIBLE WITH THE CITY'S READ SYSTEM, IT SHALL BE PURCHASED FROM THE WATER DEPARTMENT AND PAID FOR AT THE SAME TIME AS OTHER ACCESS AND TAPPING FEES.
2. CITY PERSONNEL WILL INSTALL THE METER, ONLY AFTER ALL OTHER PLUMBING REQUIREMENTS ARE MET.

## SAMPLING PIT NOTES

1. A MIN. OF ONE (1) METER PIT SHALL DOUBLE AS A SAMPLING PIT FOR EACH NEW RESIDENTIAL OR MULTI-FAMILY DEVELOPMENT, NEAR THE MOST REMOTE POINT IN THE DEVELOPMENT.
2. A SAMPLING SETTER SHALL BE USED IN THESE LOCATIONS.
3. THE SAMPLING STATION LOCATION SHALL BE SHOWN AND CONSTRUCTED AS SHOWN IN THE CONSTRUCTION PLANS. THE LOCATION SHALL BE APPROVED BY THE CITY.

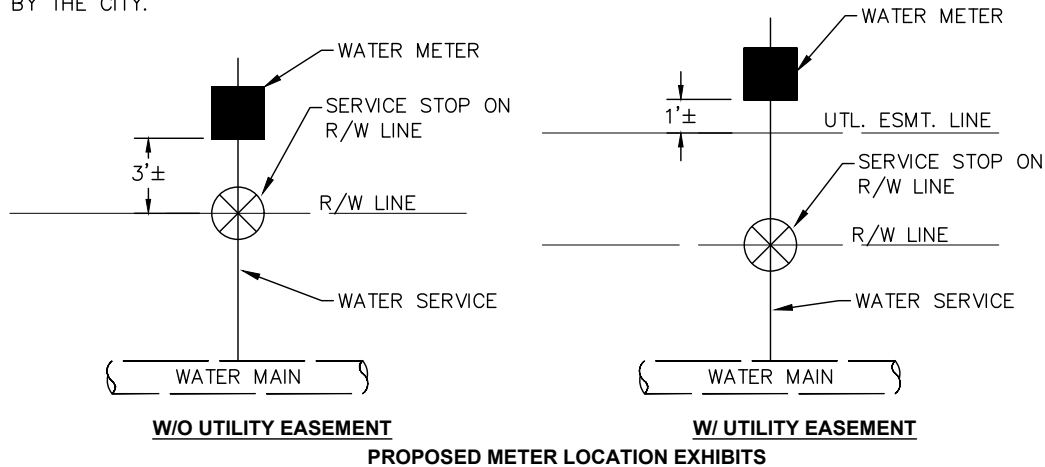


### APPROVED METER PARTS LIST

**COPPER SETTER** - FORD, AY MCDONALD, OR APPROVED EQUAL.

FORD COPPERSETTER SETTING	
5/8"-METER	VBHH81W-44-XX-Q-NL
3/4"-METER	VBHH83W-44-33-Q-NL
1"-METER	VBHH84W-44-44-Q-NL

AY MCDONALD COPPERSETTER SETTING	
5/8"-METER	731-1WDQQ33
3/4"-METER	731-3WDQQ33
1"-METER	21-412WDQQ44



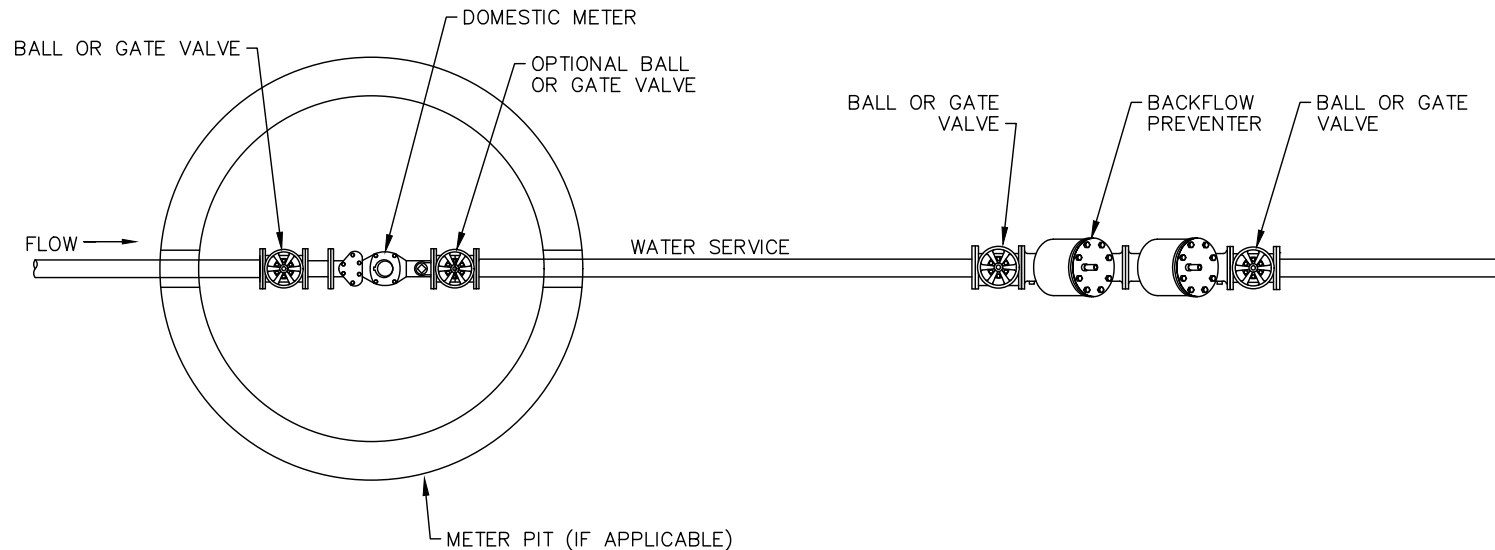
**W/O UTILITY EASEMENT**

**W/ UTILITY EASEMENT**

**PROPOSED METER LOCATION EXHIBITS**

## BACKFLOW PREVENTION NOTES

1. WILMINGTON CITY ORDINANCE 927.19 GIVES THE WATER DEPARTMENT SUPERINTENDENT AUTHORITY TO DETERMINE WHICH CONNECTIONS TO THE CITY MAINS NEED BACKFLOW AND CROSS CONNECTION PROTECTION.
2. ALL INSTALLATIONS OF NEW TAPS AND WATER SERVICES WILL BE ASSESSED BY THE CITY, USING OHIO EPA GUIDELINES, FOR THE NEED OF A BACKFLOW PREVENTER. THE CITY WILL SPECIFY THE TYPE OF THE PREVENTER REQUIRED BASED ON SPECIFIC APPLICATION. ALL BACKFLOW PREVENTERS SHALL BE APPROVED BY THE CITY OF WILMINGTON WATER DEPARTMENT PRIOR TO INSTALLATION. THE MODEL INSTALLED SHALL MEET APPLICABLE AWWA STANDARDS.
3. A BACKFLOW PREVENTER SHALL BE INSTALLED ON ALL FIRE LINES. IN MOST CASES, A DOUBLE DETECTOR CHECK, DETECTOR-CHECK TYPE DEVICE WILL BE REQUIRED.
4. THE CITY SHALL HAVE ACCESS TO DEVICES AT ALL TIMES.
5. DEVICES SHALL BE INSTALLED SO THEY ARE ACCESSIBLE FOR TESTING AND INSPECTION.
6. THE DEVICE CANNOT BE MORE THAN FOUR FEET OFF THE FLOOR.
7. ALL DEVICES WILL BE TESTED AT THE TIME OF INSTALLATION AND EVERY TWELVE MONTHS THEREAFTER.
8. ALL TESTS WILL BE PERFORMED BY PROFESSIONALS CERTIFIED BY THE OHIO DEPARTMENT OF COMMERCE.
9. THERE SHALL BE EXPANSION TANKS FOR THERMAL EXPANSION OF ALL SYSTEMS WHERE THERE ARE BACKFLOW PREVENTERS INSTALLED.
10. NO BYPASS MAY INSTALLED AROUND ANY BACKFLOW PREVENTER.
11. NO GALVANIZED FITTINGS ARE TO BE USED FOR SERVICES 2" AND UNDER; ONLY COPPER OR BRASS ARE ACCEPTABLE.
12. IF A REDUCED PRESSURE BACKFLOW PREVENTER IS REQUIRED, IT SHALL BE INSTALLED INSIDE A HEATED BUILDING (NOTE: OHIO EPA STANDARDS REQUIRE REDUCED PRESSURE BACKFLOW DEVICES IN NEARLY ALL COMMERCIAL, MEDICAL, AND INDUSTRIAL APPLICATIONS.)
13. ALL BACKFLOW PREVENTER DEVICES SHALL BE INSTALLED IN THE HORIZONTAL POSITION.
14. COMBINATION FIRE/DOMESTIC SERVICES ARE NOT PERMITTED, REGARDLESS OF FIRE LINE SIZE.



## BACKFLOW PREVENTER SETTING DETAIL

**METER PIT NOTES**

1. METER PIT SHALL BE PRECAST MANHOLE STRUCTURE, CONCRETE TYPE QC-MISC.
2. FULL PORT BALL VALVES SHALL BE IN ACCORDANCE WITH THE TABLE BELOW.
3. THE CITY SHALL INSPECT ALL PIPING FROM WATER MAIN TO BUILDING, PRIOR TO BACKFILLING.
4. THE CITY RECOMMENDS INSTALLING AN EXPANSION TANK ON THE WATER LINE RIGHT BEFORE THE WATER HEATER.
5. GROUNDING ELECTRIC TO WATER SERVICE IS PROHIBITED DUE TO INCREASED CORROSION OF LINE AND FITTINGS.
6. THE METER PIT SHALL HAVE SUFFICIENT DRAINAGE TO PRECLUDE STANDING WATER.

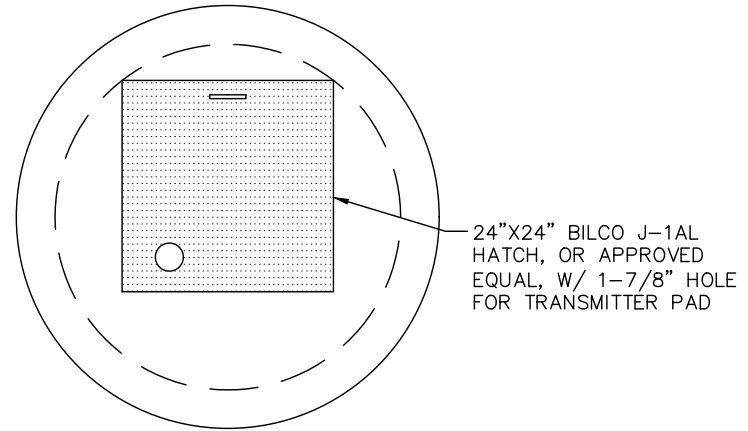
**METER INSTALLATION NOTES**

1. TO ENSURE THAT METER IS COMPATIBLE WITH THE CITY'S READ SYSTEM, IT SHALL BE PURCHASED FROM THE WATER DEPARTMENT AND PAID FOR AT THE SAME TIME AS OTHER ACCESS AND TAPPING FEES.
2. CITY PERSONNEL WILL INSTALL THE METER, ONLY AFTER ALL OTHER PLUMBING REQUIREMENTS ARE MET.
3. METER SPREADS ARE TO BE CONFIRMED WITH THE WATER DEPARTMENT.

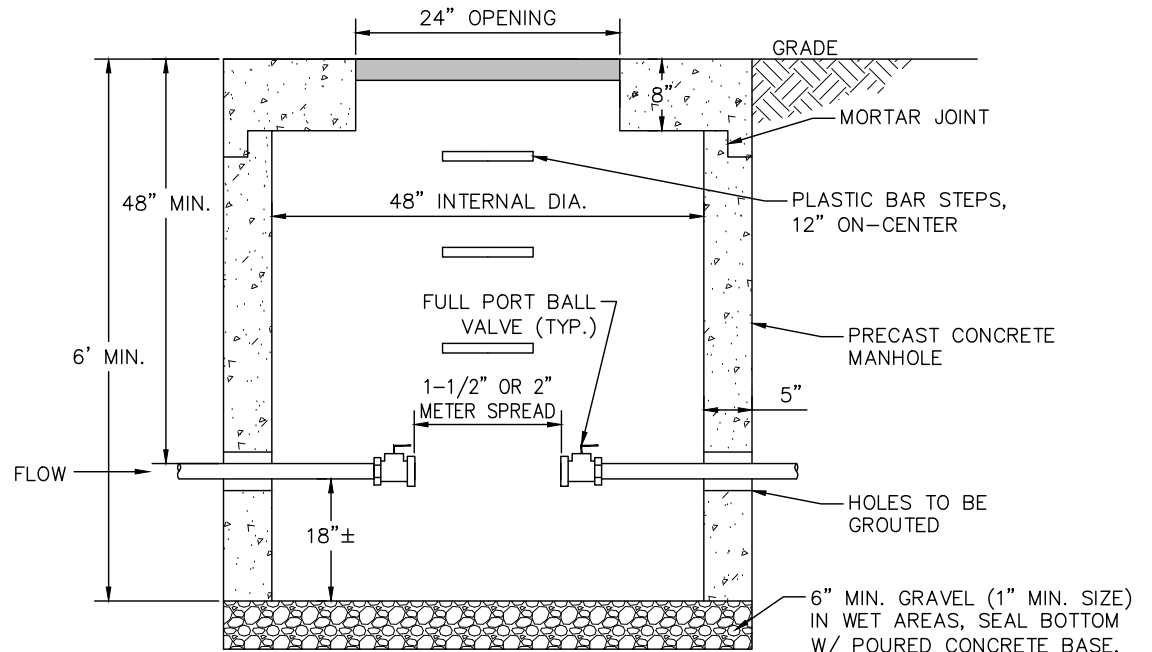
**APPROVED METER PARTS LIST**

METER SPREAD BALL VALVE – FIPT x METER FLANGE  
 BRASS STRAIGHT BALL VALVE W/ PAD WING HANDLE  
 AND COMPRESSION x MNPT COUPLING, FORD OR EQUAL.

METER SIZE	VALVE SIZE	MODEL NUMBER
1-1/2"	1-1/2"	BF13-666W-HB-67S-NL
1-1/2" OR 2"	2"	BF13-777W-HB-67S-NL



**PLAN VIEW**



**SECTION VIEW**

**TYPICAL 1-1/2" AND 2" WATER METER PIT INSTALLATION**

### METER PIT NOTES

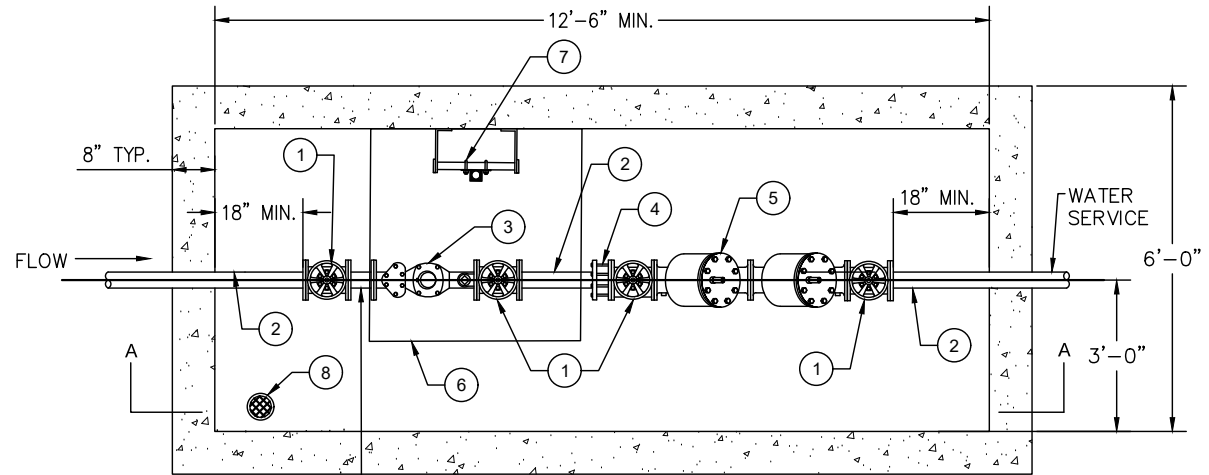
1. METER PIT SHALL BE PRECAST CONCRETE STRUCTURE.
2. CONCRETE REINFORCEMENT DESIGN SHALL BE PROVIDED BY PRECAST MANUFACTURER.
3. REINFORCEMENT DESIGN SHALL BE APPROVED BY THE CITY, AS REQUIRED.
4. FULL PORT BALL VALVES SHALL BE IN ACCORDANCE WITH THE TABLE BELOW.
5. THE CITY SHALL INSPECT ALL PIPING FROM WATER MAIN TO BUILDING, PRIOR TO BACKFILLING.
6. GROUNDING ELECTRIC TO WATER SERVICE IS PROHIBITED DUE TO INCREASED CORROSION OF LINE AND FITTINGS.
7. NO BYPASS OF THE METER OR BACKFLOW SHALL BE INSTALLED.
8. THE VAULT SHALL BE BACKFILLED WITH 6" OF ODOT ITEM 304 AGGREGATE BASE.
9. THE METER PIT SHALL HAVE SUFFICIENT DRAINAGE TO PRECLUDE STANDING WATER.

### METER INSTALLATION NOTES

1. TO ENSURE THAT METER IS COMPATIBLE WITH THE CITY'S READ SYSTEM, IT SHALL BE PURCHASED FROM THE WATER DEPARTMENT AND PAID FOR AT THE SAME TIME AS OTHER ACCESS AND TAPPING FEES.
2. CITY PERSONNEL WILL INSTALL THE METER, ONLY AFTER ALL OTHER PLUMBING REQUIREMENTS ARE MET.
3. METER SPREADS ARE TO BE CONFIRMED WITH THE WATER DEPARTMENT.

### MATERIAL LEGEND

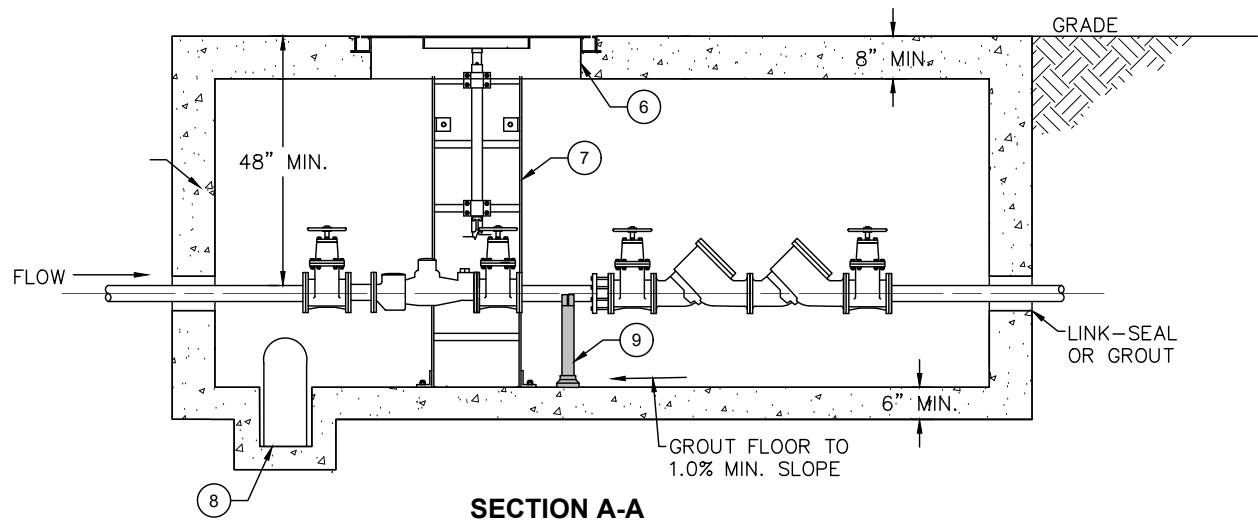
NO.	DESCRIPTION
①	GATE VALVE, FLxFL
②	D.I.P. CL-53 MIN. SPOOL PIECES, MANUFACTURED TO LENGTH, WITHIN PIT
③	SENSUS OMNI+ (C <sup>2</sup> ) COMPOUND METER
④	FLANGED COUPLING ADAPTER
⑤	BACKFLOW PREVENTER
⑥	48"x48" S.S. ACCESS HATCH, BILCO MODEL JD-2AL, OR APPROVED EQUAL
⑦	ALUMINUM LADDER, OSHA APPROVED HALLIDAY SERIES L-1B W/ SERIES L-1E SAFETY POST, OR APPROVED EQUAL
⑧	DRAIN OR SUMP PIT IF GRAVITY DRAIN IS NOT POSSIBLE. DISCHARGE PIPE TO DRAIN TO NEAREST STORM SEWER.
⑨	PIPE SUPPORT; GRINNELL FIG. 264, MASONRY SUPPORT, OR APPROVED EQUAL.



6" MINIMUM STRAIGHT PIPE BETWEEN VALVE AND METER FLANGES. (STRAINER SIDE OF METER)

NOTE: SIDES SHALL BE DOWLED TO TOP AND BOTTOM WITH REINFORCING STEEL

**PLAN**

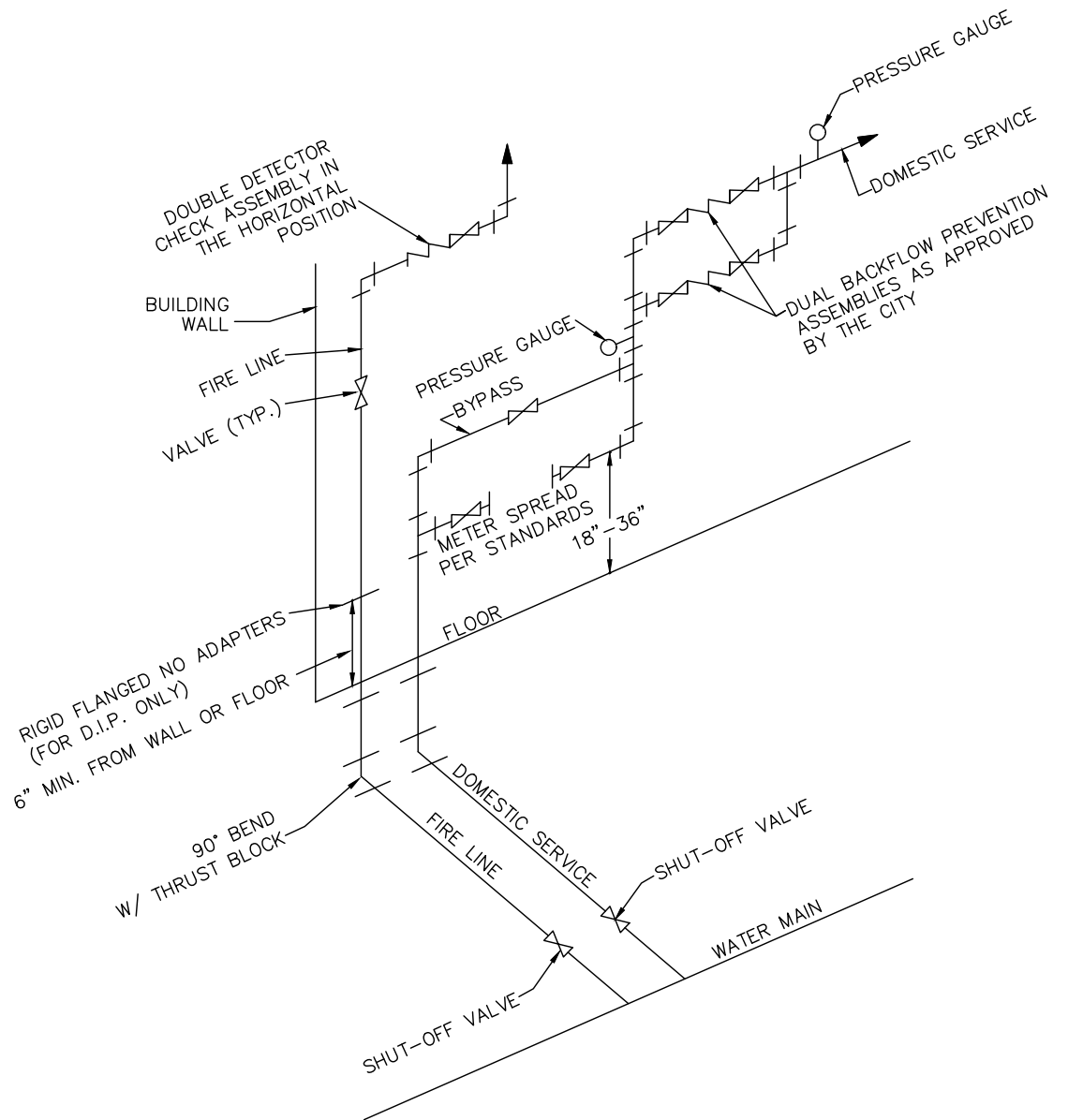


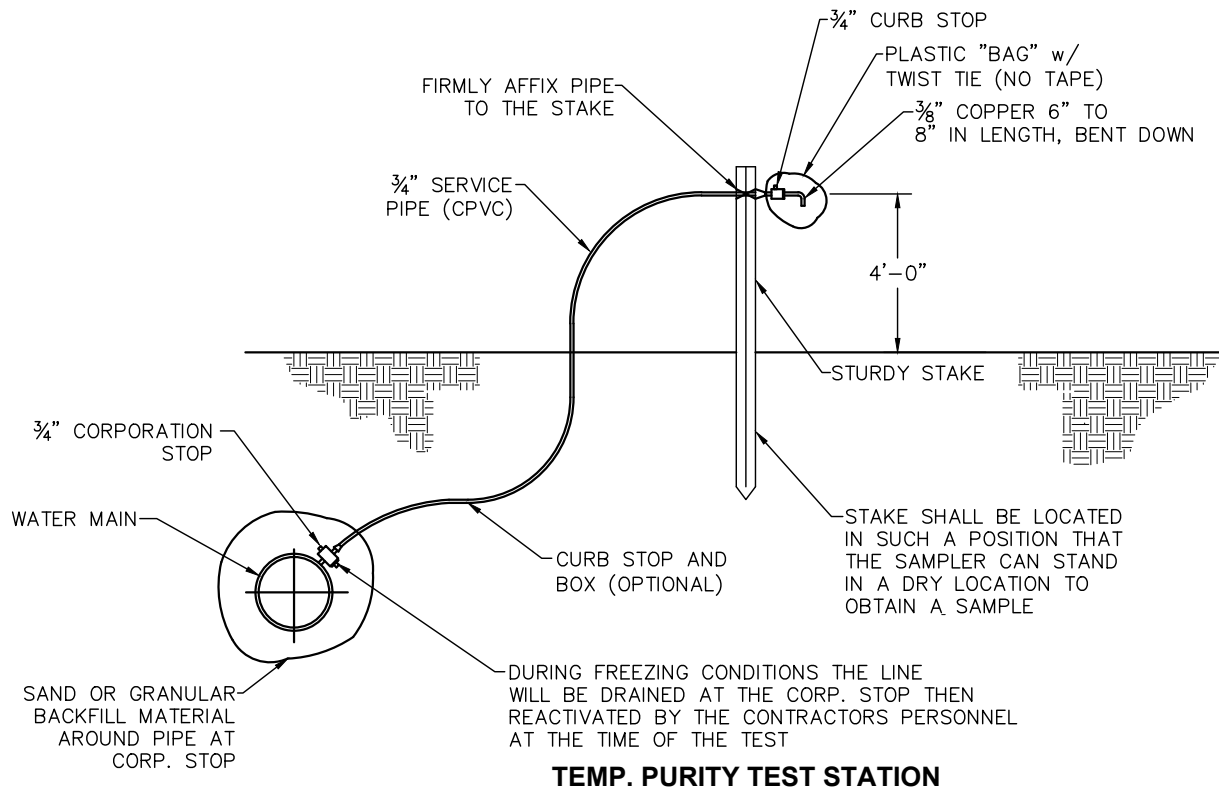
**SECTION A-A**

## TYPICAL 3", 4", AND 6" METER PIT INSTALLATION

**NOTES**

- A. NO COMBINATION FIRE/DOMESTIC SERVICES ARE ALLOWED, REGARDLESS OF FIRE LINE SIZE.
- B. ALL UNDERGROUND JOINTS SHALL BE RESTRAINED.
- C. INSIDE PIPING FOR 4" PIPE SHALL BE D.I.P. CL-52 MIN. TO THE BACKFLOW PREVENTERS. MATERIALS FOR SMALLER SIZES SHALL BE APPROVED BY THE CITY.
- D. WATER METER SHALL BE 1-1/2" MIN. SIZE.
- E. ALTERNATE DESIGN MAY BE SUBMITTED FOR WATER DEPARTMENT APPROVAL.
- F. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE DELIVERED FOR INSTALLATION COMPLETELY ASSEMBLED BY THE ORIGINAL MANUFACTURER WITH ALL COMPONENTS AS APPROVED.
- G. ADDITION OF BACKFLOW DEVICE ONTO EXISTING FIRE SUPPRESSION SYSTEMS WILL AFFECT ORIGINAL FLOW CALCULATIONS.
- H. COMBINATION SERVICE NOT PERMITTED INSIDE BUILDING IF THE DOMESTIC METER IS MORE THAN 75 FEET FROM THE PROPERTY/EASEMENT LINE.





Wilmington, Ohio



## TEMPORARY PURITY TEST STATION DETAIL

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