

SECTION 6.00 POTABLE WATER

6.01 WATER DISTRIBUTION

A. DESIGN

LOCATION: WATER LINES SHALL BE EXTENDED ALONG THE ROADWAY TO THE ADJACENT PROPERTY LINE. ALL PUBLIC WATER MAINS SHALL BE LOCATED WITHIN DEDICATED RIGHT OF WAY OR DEDICATED EASEMENTS WITH A MINIMUM WIDTH OF 20 FEET. SEE SECTION 2.10 FOR LANDSCAPE PLANTINGS WITHIN A TOWN EASEMENT.

SIZING: MAJOR TRANSMISSION LINES SHALL BE SIZED IN ACCORDANCE WITH THE "MASTER WATER PLAN OF THE TOWN OF SMITHFIELD" OR AS DIRECTED BY THE PUBLIC UTILITIES DIRECTOR. IN RESIDENTIAL AREAS, MAINS SHALL BE 6-INCH AND 8-INCH IN DIAMETER. SIX (6) INCH MAINS SHALL BE USED ONLY WHEN A GOOD GRID EXISTS. THE TOTAL MAXIMUM LENGTH OF 6-INCH AND 8-INCH MAIN WITHOUT A CONNECTION TO A LARGER MAIN IS 1200 FEET AND 2000 FEET, RESPECTIVELY. WHERE A GOOD GRID DOES NOT EXIST, LINES SHALL BE UPSIZED TO PROVIDE ADEQUATE FIRE FLOW AS DIRECTED BY THE PUBLIC UTILITIES DIRECTOR.

B. MATERIAL

MATERIALS TO BE UTILIZED SHALL BE THOSE AS SPECIFIED HEREIN, UNLESS AN APPROVED EQUAL IS AUTHORIZED BY THE PUBLIC UTILITIES DIRECTOR. UNLESS OTHERWISE AUTHORIZED, ANY WATER LINE 12" OR LARGER SHALL BE DUCTILE IRON PIPE. DUCTILE IRON PIPE OR C-900 PVC SHALL BE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH AWWA C150 AND C151 FOR A LAYING CONDITION TYPE 2 AND A WORKING PRESSURE AS FOLLOWS:

3" - 12"	350 PSI
14" - 20"	250 PSI
24"	200 PSI
30" - 54"	150 PSI

PIPE JOINTS SHALL BE OF THE PUSH-ON TYPE AS PER AWWA C111. PIPE LINING SHALL BE CEMENT MORTAR WITH A SEAL COAT OF BITUMINOUS MATERIAL IN ACCORDANCE WITH AWWA C104. GALVANIZED STEEL PIPE WILL NOT BE ALLOWED AS A MATERIAL FOR MAINS OR SERVICES.

C. INSTALLATION

ALL WATER MAINS SHALL BE INSTALLED WITH A MINIMUM COVER OF 3 FEET MEASURED FROM THE TOP OF THE PIPE TO THE FINISHED SUBGRADE. WHEN WATER LINES ARE INSTALLED ALONG A ROADWAY WHICH DOES NOT HAVE CURB & GUTTER, THE WATER LINE SHALL BE INSTALLED AT EXTRA DEPTH TO PREVENT CONFLICT WITH FUTURE ROAD IMPROVEMENTS OR VERTICAL ALIGNMENT CHANGES.

ALL CONSTRUCTION RELATING TO THE UTILITY IMPROVEMENTS MUST BE PERFORMED BY A CONTRACTOR LICENSED IN NORTH CAROLINA.



STANDARD DETAIL AND SPECIFICATIONS MANUAL

SMITHFIELD, NORTH CAROLINA
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6.02 FIRE HYDRANTS

- A. LOCATION: ALL FIRE HYDRANTS SHALL BE INSTALLED ON A WATER LINE WITH A DIAMETER NO SMALLER THAN 6 INCHES. ONLY ONE FIRE HYDRANT MAY BE INSTALLED ON A DEAD END 6-INCH LINE. THERE SHALL BE AT LEAST ONE FIRE HYDRANT AT EACH STREET INTERSECTION. IN RESIDENTIAL DISTRICTS, THE MAXIMUM DISTANCE BETWEEN FIRE HYDRANTS, MEASURED ALONG STREET CENTERLINES, SHALL BE 500 FEET. WHEN RESIDENTIAL INTERSECTIONS ARE NOT MORE THAN 700 FEET APART, NO HYDRANT IS REQUIRED BETWEEN THE INTERSECTIONS. IN BUSINESS, OFFICE AND INSTITUTIONAL, AND INDUSTRIAL DISTRICTS, THE MAXIMUM DISTANCE BETWEEN HYDRANTS, MEASURED ALONG STREET CENTERLINE, SHALL BE 300 FEET. WHEN BUSINESS, OFFICE AND INSTITUTIONAL, AND INDUSTRIAL INTERSECTIONS ARE NOT MORE THAN 450 FEET APART, NO HYDRANT IS REQUIRED BETWEEN INTERSECTIONS. ON MAJOR THOROUGHFARES OR ARTERIALS AND COLLECTOR STREETS WITH ACCESS POINTS ONLY AT STREET INTERSECTIONS, HYDRANTS SHALL BE LOCATED AT EACH STREET INTERSECTION AND AT 1,000 FOOT INTERVALS ALONG THE STREET. WHERE THESE INTERSECTIONS ARE LESS THAN 1,200 FEET APART, NO HYDRANT IS REQUIRED BETWEEN THE INTERSECTIONS. THE MINIMUM ACCEPTABLE FLOW FOR FIRE HYDRANTS IS 1,000 gpm IN RESIDENTIAL AREAS AND 1,500 gpm IN OTHER DISTRICTS. FIRE HYDRANTS SHALL BE PLACED IN A STAGGERED ARRANGEMENTS ON BOTH SIDES OF ANY ROADWAY CLASSIFIED AS A MAJOR OR MINOR THOROUGHFARE WITH THE HYDRANT SPACING AS REFERENCED ABOVE. VALVES ASSOCIATED WITH FIRE HYDRANT ASSEMBLIES SHALL BE LOCATED WITHIN FIFTEEN (15) FEET OF THE FIRE HYDRANT.

WHEN NEW BUILDINGS ARE CONSTRUCTED OR EXISTING BUILDINGS ARE EXPANDED AND CONTAIN 10,000 SQUARE FEET OF FLOOR SPACE (ALL FLOORS OF ALL BUILDINGS, ADDED TOGETHER), HYDRANTS SHALL BE INSTALLED AT 300 FOOT INTERVALS ALONG ALL SIDES OF THE BUILDING THAT ARE ACCESSIBLE TO FIRE PUMPER. THESE HYDRANTS SHALL BE AT LEAST 40 FEET AWAY FROM THE BUILDING. THE TOTAL NUMBER OF HYDRANTS REQUIRED SHALL NOT EXCEED ONE HYDRANT PER SEPARATION OF BUILDINGS PLUS ONE HYDRANT PER 10,000 SQUARE FEET OF FLOOR SPACE.

WHERE SPRINKLER SYSTEMS ARE USED, A FIRE DEPARTMENT CONNECTION SHALL BE PROVIDED ON THE BUILDING. THE FIRE DEPARTMENT CONNECTIONS SHALL BE LOCATED WITHIN FIFTY (50) FEET OF A FIRE HYDRANT OR AS OTHERWISE DIRECTED BY THE FIRE MARSHALL. WHERE SPRINKLER SYSTEMS OR A RISER ROOM ARE REQUIRED, OUTSIDE ACCESS IN ACCORDANCE WITH NORTH CAROLINA BUILDING CODE SHALL BE PROVIDED. BACKFLOW PREVENTION FOR SPRINKLER SYSTEMS SHALL BE AS SPECIFIED IN SECTION 6.06 OF THESE STANDARDS.

- B. SPECIFICATIONS: HYDRANTS SHALL CONFORM TO AWWA C502 WITH A MINIMUM VALVE OPENING OF $4\frac{1}{2}$ INCHES. HYDRANTS SHALL BE FURNISHED WITH A $4\frac{1}{2}$ INCH STEAMER AND DOUBLE $2\frac{1}{2}$ INCH HOSE CONNECTIONS WITH CAPS AND CHAINS, NATIONAL STANDARD THREADS, MECHANICAL JOINT, $1\frac{1}{2}$ INCH PENTAGON OPERATING NUT, OPEN LEFT, PAINTED FIRE HYDRANT RED, BRONZE TO BRONZE SEATING, A MINIMUM $3\frac{1}{2}$ INCH FOOT BURY DEPTH WITH A BREAK AWAY GROUND LINE FLANGE AND BREAK AWAY ROD COUPLING. THE HYDRANT BONNET WILL BE DESIGNED WITH A SEALED OIL OR GREASE RESERVOIR WITH O-RING SEALS AND A TEFLON THRUST BEARING, AS FURNISHED BY MEULLER "CENTURION" (A-421), KENNEDY "GUARDIAN" OR AMERICAN DARLING (MARK 73-5). FIRE HYDRANT CAPS SHALL BE ATTACHED TO THE BODY OF THE HYDRANT WITH A MINIMUM 2/0 TWIST LINK, HEAVY DUTY, NON-KINKING, MACHINE CHAIN.



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- C. INSTALLATION: HYDRANTS SHALL BE PLUMB, PROPERLY LOCATED WITH THE PUMPER NOZZLE FACING THE CLOSEST STREET. THE BACK OF THE HYDRANT OPPOSITE THE PIPE CONNECTION SHALL BE FIRMLY BLOCKED AGAINST THE VERTICAL FACE OF THE TRENCH WITH $\frac{1}{3}$ CUBIC YARD OF CONCRETE. DOUBLE BRIDLE RODS AND COLLARS SHALL BE CONNECTED FROM THE TEE TO THE HYDRANT. RODS SHALL NOT BE LESS THAN $\frac{5}{8}$ INCH DIAMETER STOCK AND COATED WITH BITUMINOUS PAINT. A MINIMUM OF 8 CUBIC FEET OF STONE SHALL BE PLACED AROUND THE DRAINS. THE BACKFILL AROUND THE HYDRANTS SHALL BE THOROUGHLY COMPACTED. HYDRANT INSTALLATION SHALL BE IN ACCORDANCE WITH STANDARD ROD VALVE RODDING DETAIL.

6.03 VALVES AND APPURTENANCES

- A. LOCATION: VALVES SHALL BE INSTALLED ON ALL BRANCHES FORM FEEDER MAINS AND HYDRANTS ACCORDING TO THE FOLLOWING SCHEDULE: 3 VALVES AT CROSSES; 2 VALVES AT TEES; AND ONE VALVE ON EACH HYDRANT BRANCH. WHEN A LOOP SECTION OF WATERLINE IS CONNECTED BACK INTO THE FEEDER MAIN WITHIN A DISTANCE OF 200 FEET, OR LESS, ONLY ONE VALVE WILL BE REQUIRED IN THE FEEDER MAIN.

WHERE NO WATERLINE INTERSECTIONS ARE EXISTING, A MAIN LINE VALVE SHALL BE INSTALLED AT EVERY 100 FEET PER 1 INCH DIAMETER MAIN UP TO A DISTANCE OF 2,000 FEET BETWEEN VALVES.

BLOWOFFS SHALL BE INSTALLED AT THE END OF ALL DEAD-END WATERLINES.

COMBINATION AIR VALVES SHALL BE INSTALLED AT ALL HIGH POINTS OF WATERLINES 8 INCHES IN DIAMETER OR LARGER AND AT OTHER LOCATIONS AS DIRECTED BY THE TOWN ENGINEER.

THE WATER MAIN SHALL BE INSTALLED AT A GRADE WHICH WILL ALLOW THE AIR TO MIGRATE TO A HIGHPOINT, WHERE THE AIR CAN BE RELEASED THROUGH AN AIR VALVE. A MINIMUM PIPE SLOPE OF ONE (1) FOOT PER 500 FEET SHOULD BE MAINTAINED. THE SIZE OF THE AIR VALVE SHALL BE DESIGNED BY THE ENGINEER.

- B. SPECIFICATIONS: GATE VALVE GREATER THAN 2 INCHES, SHALL MEET ALL REQUIREMENTS OF AWWA C500 FOR A WORKING PRESSURE OF 150 PSI. ALL SHALL BE MECHANICAL JOINT WITH IRON BODY, BRONZE MOUNTING DOUBLE DISC, PARALLEL SEAT TYPE WITH A NON-RISING STEM AND OPEN LEFT, WITH A DOUBLE O-RING SEAL

GATE VALVES, UP TO AND INCLUDING 12 INCHES, SHALL BE INSTALLED IN A VERTICAL POSITION.

GATE VALVES, 16 INCHES OR LARGER, SHALL BE INSTALLED ONLY UNDER THE SUPERVISION OF THE TOWN ENGINEER AND SHALL BE HORIZONTALLY INSTALLED AND EQUIPPED WITH BEVEL GEARS, GREASE CASE, ROLLERS, TRACKS SCRAPERS, AND A BYPASS LOCATED ON THE SIDE OF THE BODY. FULLY REVOLVING DISC VALVES SHALL NOT REQUIRE ROLLERS.

GATE VALVES, 16 INCHES OR LARGER, INSTALLED IN A VERTICAL POSITION SHALL ONLY BE INSTALLED IN SPECIAL CONDITIONS UNDER THE DIRECTION OF THE TOWN ENGINEER AND SHALL BE EQUIPPED WITH SPUR GEARS ENCLOSED IN A GREASE CASE AND WITH A BYPASS LOCATED ON THE SIDE OF THE BODY.



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ALL VALVES 16 (16) INCHES AN GREATER SHALL BE INSTALLED IN A MANHOLE AS SHOW IN THE STANDARD DETAILS

RESILIENT SEAT WEDGE GATE VALVES SHALL BE MANUFACTURED IN ACCORDANCE WITH AWWA C509

VALVE BOXES SHALL BE CAST IRON AT THE SCREW OR TELESCOPIC WITH A 5-INCH OPENING WITH "WATER" STAMPED ON THE COVER. VALVE BOX RING ADJUSTMENTS WILL NOT BE ALLOWED.

BUTTERFLY VALVES SHALL BE INSTALLED IN WATERLINES SIXTEEN (16) INCHES, OR GREATER. ALL SHALL MEET THE REQUIREMENTS OF AWWA C504 WITH MECHANICAL JOINTS, 2-INCH OPERATING NUT AND OPEN LEFT. ALL VALVES 16 INCHES AND GREATER SHALL BE INSTALLED IN A MANHOLE AS SHOWN IN STANDARD DETAILS.

BLOW-OFF ASSEMBLIES SHALL BE CONSTRUCTED AS SHOWN IN STANDARD DETAILS. THE VALVE SHALL BE GATE TYPE WITH A NON-RISING STEM AND A 2-INCH OPERATING NUT.

PIPE FITTINGS SHALL BE DUCTILE IRON DESIGNED AND MANUFACTURED AS PER AWWA C110. SIZES OF FITTINGS UP TO AN INCLUDING 12 INCH SHALL BE DESIGNED FOR AN INTERIOR PRESSURE OF 250 PSI; LARGER SIZE FITTINGS SHALL BE DESIGNED FOR AN INTERIOR PRESSURE OF 150 PSI. COMPACT DUCTILE IRON MECHANICAL JOINT FITTINGS ARE ALSO ACCEPTABLE. JOINTS FOR FITTINGS SHALL BE MECHANICAL AND LINED WITH CEMENT MORTAR WITH A SEAL COAT OF BITUMINOUS MATERIAL, ALL IN ACCORDANCE WITH AWWA C104.

REACTION BLOCKING FOR ALL FITTINGS OR COMPONENTS SUBJECT TO HYDROSTATIC THRUST SHALL BE SECURELY ANCHORED BY THE USE OF CONCRETE THRUST BLOCKS POURED IN PLACE. THE REACTION AREAS ARE SHOWN IN STANDARD DETAILS. NO CONCRETE SHALL INTERFERE WITH THE REMOVAL OF FITTINGS. MATERIAL FOR REACTION BLOCKING SHALL BE 3,000 PSI CONCRETE. ALTERNATIVE RESTRAINING METHODS MUST BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN NORTH CAROLINA AND APPROVED BY THE TOWN ENGINEER.

TAPPING SLEEVES SHALL BE TWO PIECE SPLIT CAST IRON SLEEVES. THE SLEEVE SHALL BE MECHANICAL JOINT TO THE MAIN LINE AND FLANGED TO THE TAPPING VALVE. STAINLESS STEEL TAPPING SLEEVES SHALL ONLY BE ALLOWED ON ASBESTOS-CEMENT PIPE.

TAPPING SADDLES SHALL BE USED ON MAINS 16 INCHES AND LARGER. SADDLES SHALL BE MADE OF DUCTILE IRON PROVIDING A FACTOR OF SAFETY OF 2.5 WITH A WORKING PRESSURE OF 250 PSI. SADDLES SHALL BE EQUIPPED WITH A AWWA C110 FLANGE CONNECTION ON THE BRANCH. SEALING GASKETS SHALL BE O-RING TYPE, HIGH QUALITY MOLDED RUBBER, HAVING APPROXIMATELY 70 DUROMETER HARDNESS, PLACED INTO A GROOVE ON THE CURVED SURFACE OF THE SADDLES. STRAPS SHALL BE ALLOY STEEL.

THE MAXIMUM SIZED SADDLE OUTLET FOR EACH SIZE OF PIPE TO BE TAPPED SHALL BE AS FOLLOWS:

SIZE PIPE TO BE TAPPED	MAXIMUM SIZE SADDLE OUTLET
16"	8"
18"	8"
20"	10"
24" AND LARGER	12"



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COMBINATION AIR VALVES SHALL BE OF THE SINGLE HOUSING STYLE THAT COMBINES THE OPERATION OF BOTH AN AIR/VACUUM AND AIR RELEASE VALVE. THE VALVE SHALL BE MANUFACTURED FOR A 150 PSIG WORKING PRESSURE AND BE SIZED BY THE ENGINEER. THE VALVE MUST MEET THE REQUIREMENTS OF AWWA C512 AND BE INSTALLED IN ACCORDANCE WITH STANDARD DETAILS.

- C. INSTALLATION: VALVES SHALL BE PROPERLY LOCATED, OPERABLE AND AT THE CORRECT ELEVATION. ALL VALVES AND REDUCERS SHALL BE RODDED TO THE TEE OR CROSS IF ONE IS LOCATED WITHIN TEN (10) FEET, AS SHOWN IN STANDARD DETAILS. IF REDUCERS CANNOT BE RODDED, CONCRETE BLOCKING OR OTHER RESTRAINING METHODS WILL BE REQUIRED. THE VALVE BOX SHALL BE CENTERED OVER THE WRENCH NUT AND SEATED ON COMPACTED BACKFILL WITHOUT TOUCHING THE VALVE ASSEMBLY. ALL VALVE BOXES IN ROADWAYS SHALL BE ENCASED IN A TROWEL FINISHED 2'x 2'x 6' PAD OF 3,000 PSI CONCRETE BENEATH THE ASPHALT WITH THE COVER FLUSH WITH THE TOP OF THE PAVEMENT OR FLUSH WITH THE FINISHED GRADE. PRECAST CONCRETE VALVE BOX ENCASEMENTS MAY BE USED FOR VALVE BOX ENCASEMENTS OUTSIDE THE PAVED AREAS. THE MAXIMUM DEPTH OF THE VALVE NUT SHALL BE FIVE (5) FEET. WHEN VALVE EXTENSION KITS ARE USED, THEY MUST BE MANUFACTURED BY THE SAME COMPANY WHICH MANUFACTURED THE VALVE.

6.04 WATER SERVICE TAPS

A. MATERIALS

CORPORATION STOPS SHALL BE BRASS, COMPLETE WITH A FLARED COUPLING AND AWWA STANDARD THREADS AS PER AWWA C800. TAPS SHALL BE LOCATED AT 10:00 OR 2:00 ON THE CIRCUMFERENCE OF THE PIPE. SERVICE TAPS SHALL BE STAGGERED, ALTERNATING FROM ONE SIDE OF THE WATER MAIN TO THE OTHER AND AT LEAST 12 INCHES APART. THE TAPS MUST BE A MINIMUM OF 24 INCHES APART IF THEY ARE ON THE SAME SIDE OF THE PIPE.

THE MAXIMUM SIZE OF DIRECT TAPS WITHOUT A FITTING, TAPPING SLEEVE, OR SADDLE FOR DUCTILE IRON WATER MAINS SHALL BE AS FOLLOWS:

SIZE PIPE TO BE TAPPED	MAXIMUM SIZE TAP
4"	3/4"
6"	1"
8"	1-1/4"
10"	1-1/2"
12"	2"

NO BURNED TAPS WILL BE ALLOWED AND EACH CORPORATION STOP WILL BE WRAPPED WITH TEFLON TAPE FOR DUCTILE IRON PIPE WATER MAINS.

SERVICE SADDLES SHALL BE BRONZE BODY (85-5-5 WATERWORKS BRASS) AND DOUBLE STRAP FOR TAPS OVER 1 INCH WITH SILICON BRONZE NUTS CONFORMING TO ASTM A98 AND FACTORY INSTALLED GRADE 60 RUBBER GASKETS.

COPPER SERVICE TUBING SHALL BE TYPE K SOFT COPPER TUBING PER ASTM B88. THE LONGEST AVAILABLE LENGTH OF SERVICE LINE SHOULD BE USED WITH NO UNIONS. AS AN EXAMPLE, FOR A 3/4 INCH SERVICE CONNECTION, NO UNION SHALL BE USED IN THE INSTALLATION OF 100 FEET OR LESS. FOR 3/4 INCH, ONLY ONE (1) UNION WILL BE ALLOWED FOR EACH 100 FOOT SECTION OF FRACTION THEREOF. UNIONS SHALL BE MADE WITH FLARE TYPE COUPLINGS.



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METER BOXES FOR 3/4 INCH SERVICES SHALL BE CAST IRON AND A COMPLETE UNIT (LESS METER) FOR SETTING A 5/8 INCH BY 3/4 INCH WATER METER. METER STOPS SHALL BE O-RING SEALED AND HAVE AN INLET ANGLE OF 60 DEGREES WITH A LOCKING LID. RESIDENTIAL SERVICE METERS SHALL BE INSTALLED BY THE TOWN OF SMITHFIELD. METER BOX GRADE ADJUSTER RINGS ARE NOT ACCEPTABLE.

METER BOXES FOR 1 INCH SERVICES SHALL BE CAST IRON BOX AND COVER WITH A METER YOKE AND A COPPER RESETTER.

METER BOXES FOR 1-1/2 AND 2 INCH SERVICES SHALL BE LIGHT WEIGHT POLYMER CONCRETE AS INDICATED IN STANDARD DETAILS. PIPING FOR 1-1/2 AND 2 INCH SERVICES SHALL BE CONSTRUCTED FROM BRASS AND COPPER TUBING AND SHALL BE EQUIPPED WITH ANGLED CHECK VALVE OUTLETS AND BY-PASS FLANGED VALVE OR BY-PASS FLANGED BALL VALVE INLETS

WATER SERVICES GREATER THAN 2 INCHES SHALL BE MADE BY A PRIVATE CONTRACTOR OF THE PROPERTY OWNER OR DEVELOPER. A STRAINER SHALL BE PROVIDED UPSTREAM OF THE METER ON LINES GREATER THAN 2 INCHES.

METER VAULTS WITHIN STREET RIGHT-OF-WAY SHALL MEET HS-20 LOADING REQUIREMENTS AND SHALL BE LOCATED OUTSIDE OF TRAVEL AREAS. THE ACCESS DOOR SHALL BE ALUMINUM WITH A FLUSH DROP LIFT HANDLE, STAINLESS STEEL HINGES & BOLTS, STAINLESS STEEL SLAM LOCK, AN AUTOMATIC HOLD OPEN ARM, AND COMPRESSION SPRINGS TO ALLOW FOR EASY OPENING. POSITIVE DRAINAGE SHALL BE PROVIDED FOR ALL METER VAULTS.

- B. INDIVIDUAL WATER SERVICES SHALL BE PROVIDED FROM THE MAIN TO EACH WATER METER FOR SINGLE FAMILY RESIDENCES IN ACCORDANCE WITH STANDARD DETAILS. CONNECTIONS TO EXISTING MAINS SHALL BE MADE BY WET TAPS.

SERVICE CONNECTIONS SHALL BE MADE PERPENDICULAR FROM THE MAIN LINE AND SHALL RUN STRAIGHT TO THE METER WHICH SHALL BE LOCATED AT THE EDGE OF THE SERVICED LOT'S RIGHT-OF-WAY, OR EASEMENT. NO WATER METER BOX OR VAULT SHALL BE LOCATED IN STREETS, SIDEWALKS, OR PARKING AREAS IN RESIDENTIAL AREAS. IN NON-RESIDENTIAL AREAS, METER LOCATION SHALL BE CONSIDERED ON A CASE-BY-CASE BASIS. PROVISIONS FOR BACKFLOW PREVENTION SHALL BE AS SPECIFIED IN SECTION 6.06 OF THESE STANDARDS.

SERVICE TAPS TO WATER MAINS SHALL BE MADE BY A LICENSED UTILITY CONTRACTOR THAT IS LICENSED IN NORTH CAROLINA AND SHALL BE THE RESPONSIBILITY OF THE OWNER OR DEVELOPER. TAPS SHALL BE INSPECTED BY THE TOWN OF SMITHFIELD UTILITY DEPARTMENT AND SHALL BE IN ACCORDANCE WITH STANDARD DETAILS.

THE WATER METER SHALL BE SIZED BASED ON THE WATER DEMAND. WATER METER SIZE CAN BE DETERMINED AS FOLLOWS:

TABLE 5.1
WATER METER SIZING FOR FLUSH TANKS

METER SIZE (INCHES)	LOAD RANGE (FIXTURES)	FLOW RANGE (FIXTURES)
3/4" PD	1 - 22	0 - 20
1" PD	22 - 140	20 - 50
1-1/2" PD	140 - 450	50 - 100
2" PD	450 - 1000	100 - 200
3" T or C	1000 - 2500	200 - 400
4" T or C	2500 - 5000	400 - 600



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WATER METER SIZING FOR FLUSH VALVES

METER SIZE (INCHES)	LOAD RANGE (FIXTURES)	FLOW RANGE (FIXTURES)
3/4" PD	1 - 8	0 - 20
1" PD	9 - 50	20 - 50
1-1/2" PD	50 - 275	50 - 100
2" PD	275 - 1000	100 - 200
3" T or C	1000 - 2500	200 - 400
4" T or C	2500 - 5000	400 - 600

PD = POSITIVE DISPLACEMENT

T = TURBINE

C = COMPOUND (MUST BE SIZED ON A CASE BY CASE BASIS)

6.05 RELATION OF WATER MAINS TO SANITARY AND STORM SEWERS

- A. LATERAL SEPARATION OF SEWERS AND WATER MAINS. WATER MAINS SHALL BE LAID AT LEAST TEN (10) FEET Laterally FROM EXISTING OR PROPOSED SEWERS, UNLESS LOCAL CONDITIONS OR BARRIERS PREVENT A 10-FOOT LATERAL SEPARATION; IN WHICH CASE:
1. THE WATER MAIN IS LAID IN A SEPARATE TRENCH, WITH THE ELEVATION OF THE BOTTOM MAIN AT LEAST EIGHTEEN (18) INCHES ABOVE THE TOP OF THE SEWER; OR
 2. THE WATER MAIN IS LAID IN THE SAME TRENCH AS THE SEWER WITH THE WATER MAIN LOCATED AT ONE SIDE ON A BENCH OF UNDISTURBED EARTH, AND WITH THE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST EIGHTEEN (18) INCHES ABOVE THE TOP OF THE SEWER.
- B. CROSSING A WATER MAIN OVER A SEWER. WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS OVER A SEWER, THE WATER MAIN SHALL BE LAID AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST EIGHTEEN (18) INCHES ABOVE THE TOP OF THE SEWER, UNLESS LOCAL CONDITIONS OR BARRIERS PREVENT AN 18-INCH VERTICAL SEPARATION; IN WHICH CASE BOTH THE WATER MAIN AND THE SEWER SHALL BE CONSTRUCTED OF FERROUS MATERIALS AND WITH JOINTS THAT ARE EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF TEN (10) FEET ON EACH OF THE POINT OF CROSSING.
- C. CROSSING A WATER MAIN UNDER A SEWER. WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS UNDER A SEWER, BOTH THE WATER MAIN AND THE SEWER SHALL BE CONSTRUCTED OF FERROUS MATERIALS AND WITH JOINTS THAT ARE EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF TEN (10) FEET ON EACH OF THE POINT OF CROSSING. A SECTION OF WATER MAIN PIPE SHALL BE CENTERED AT THE POINT OF CROSSING.

6.06 BACKFLOW PREVENTION

WHEN A FIRE PROTECTION SYSTEM IS PROPOSED AND NO ANTI-FREEZE CHEMICALS ARE TO BE USED, A DOUBLE CHECK VALVE ASSEMBLY INCLUDING 2 CHECK VALVES, 2 GATE VALVES, AND 4 TEST COCKS SHOULD BE INSTALLED ON THE SPRINKLER FIRE PROTECTION LINE. IF ANY CHEMICALS ARE PROPOSED TO BE ADDED TO A SPRINKLER FIRE PROTECTION SYSTEM, A REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER, APPROVED BY THE UNDERWRITERS LABORATORIES AND/OR THE FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH, UNIVERSITY OF SOUTHERN CALIFORNIA SHALL BE USED.

ALL WATER SERVICES SHALL BE PROVIDED WITH BACKFLOW PREVENTION DEVICES ADJACENT TO OR WITHIN THE METER BOX VAULT



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ALL IRRIGATION SYSTEMS WITH CHEMICAL ADDITIVES OR BOOSTER PUMP, SHALL BE PROVIDED WITH REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION, INSTALLED IN ACCORDANCE WITH THE FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH. REDUCED PRESSURE ZONE BACKFLOW PREVENTERS MUST HAVE AN APPROPRIATELY SIZED DRAINAGE SYSTEM OR BE INSTALLED ABOVE GROUND. ABOVE GROUND INSTALLATION SHALL HAVE AN INSULATED BOX.

A POST INDICATOR VALVE SHALL BE PROVIDED AT THE RIGHT-OF-WAY OR EDGE OF EASEMENT. WHEN BACKFLOW PREVENTION DEVICES ARE CONTAINED WITHIN A BUILDING; OUTSIDE ACCESS, ABOVE THE FINISHED FLOOR ELEVATION, SHALL BE PROVIDED. THE TOP OF THE POST INDICATOR VALVE SHALL BE INSTALLED AT 36 INCHES ABOVE THE FINISHED GRADE. THE TOWN SHALL MAINTAIN UP TO AND INCLUDING THE POST INDICATOR VALVE, BUT NOT BEYOND.

6.07 AUTOMATIC FIRE SPRINKLER SYSTEM STANDARD

A. GENERAL

FOUR (4) COMPLETE SETS OF WORKING PLANS FOR ALL FIRE SPRINKLER SYSTEMS AND STANDPIPE SYSTEMS ARE TO BE SUBMITTED TO THE TOWN WITH A CURRENT AND PROPERLY SIGNED AND SEALED N.C.P.E. STAMP. ALL FIRE SPRINKLER SYSTEMS SHALL BE INSTALLED WITH AN ALARM CHECK VALVE INSTALLED IN EACH RISER, WITH ALL THE TRIMMINGS (EXAMPLE: RETARD CHAMBER, WATER MOTOR GONG, PRESSURE GAUGES, ETC.) COMPLETE WORKING PLANS SHALL BE APPROVED BY THE TOWN BEFORE AN INSTALLATION OF THE SPRINKLER SYSTEMS BEGINS. IF TWENTY (20) SPRINKLER HEADS OR MORE ARE ADDED TO AN EXISTING SPRINKLER SYSTEM, OR IF A NEW SPRINKLER SYSTEM IS INSTALLED, COMPLETE PLANS AND CALCULATIONS ARE REQUIRED. EXISTING SYSTEM ADDITIONS OR THE DISABLING OF ANY SPRINKLER SYSTEM SHALL REQUIRE NOTIFICATION TO THE FIRE OFFICIAL TWENTY-FOUR (24) HOURS IN ADVANCE.

B. DESIGN

FULL WORKING PLANS ARE TO BE IN COMPLETE COMPLIANCE WITH NFPA #13, 13D, 13R, 14 231C AND TOWN OF SMITHFIELD SPECIFICATIONS. AN NFPA ABOVE GROUND MATERIAL AND TEST CERTIFICATE AND AN NFPA UNDERGROUND MATERIAL AND TEST CERTIFICATE ARE REQUIRED TO BE PRESENTED AFTER COMPLETION OF DESIGNATED, APPROVED WORK.

C. HYDRAULIC DESIGN

IF A SYSTEM IS HYDRAULICALLY DESIGNED, THE FOLLOWING DESIGN CRITERIA MUST BE FOLLOWED:

1. SAFETY MARGIN: A TEN (10) PERCENT SAFETY MARGIN MUST BE INCLUDED IN ALL HYDRAULIC CALCULATIONS. SYSTEM SUPPLY MUST EQUAL OR EXCEED 1.1 TIMES THAT OF THE SYSTEM DEMAND. (EXAMPLE: DEMAND = 50 psi; SUPPLY > 55 psi)
2. HOSE ALLOWANCE: A MINIMUM OF 500 GPM OUTSIDE HOSE ALLOWANCE MUST BE CALCULATED ON ALL SPRINKLER SYSTEMS. INTERIOR HOSE ALLOWANCES ARE TO FOLLOW NFPA 13 REQUIREMENTS.

D. POST INDICATOR VALVE

POST INDICATOR VALVES SHALL BE IN ACCORDANCE WITH SECTION 6.06

E. BACKFLOW PREVENTION

BACKFLOW PREVENTION SHALL BE IN ACCORDANCE WITH SECTION 6.06



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- F. FIRE DEPARTMENT CONNECTION
WHERE AUTOMATIC FIRE SPRINKLER SYSTEMS ARE USED, A FIRE DEPARTMENT CONNECTION SHALL BE PROVIDED ON THE BUILDING. THE FIRE DEPARTMENT CONNECTION SHALL BE LOCATED WITHIN FIFTY (50) FEET OF A FIRE HYDRANT OR AS OTHERWISE DIRECTED BY THE FIRE OFFICIAL. WHEN A SPRINKLER SYSTEM SERVES ONLY PART OF A LARGE STRUCTURE, THE FIRE DEPARTMENT CONNECTION SHALL BE LABELED AS TO WHICH SECTION OF THE STRUCTURE THAT SPRINKLER RISER SERVES. THIS LABELING SHALL BE A MINIMUM OF TWO (2) INCH LETTERING ON A PERMANENT SIGN.
- G. DEDICATED RISER ROOM
A DEDICATED SPRINKLER RISER ROOM IS REQUIRED PROVIDING AN ENTRY DOOR TO THE ROOM FROM THE EXTERIOR OF THE BUILDING.
- H. ALARM COMMUNICATION
ALL SPRINKLER SYSTEMS ARE TO HAVE ALARM COMMUNICATION EQUIPMENT TO FULLY COMPLY WITH NFIPA 72. EQUIPMENT MUST BE FULLY FUNCTIONAL AND REPORTING TO A U.L. APPROVED CENTRAL RECEIVING STATION (NFIPA 71) BEFORE A CERTIFICATE OF OCCUPANCY IS ISSUED FOR THE FACILITY.
- I. ACCESS
ALL BUILDINGS WHICH HAVE A FIRE SPRINKLER PROTECTION SYSTEM SHALL PROVIDE A "KNOX BOX" KEY ENTRY SYSTEM. THIS KNOX BOX SHALL BE MOUNTED ON THE MAIN EXTERIOR ENTRANCE TO THE BUILDING OR AS OTHERWISE DIRECTED BY THE FIRE OFFICIAL. MOUNT KNOX BOX ON WALL AT 5 FEET A.F.F. ON DOOR HANDLE SIDE OF THE DEDICATED RISER ROOM DOOR. THIS KNOX BOX SHALL BE ORDERED THROUGH THE TOWN OF SMITHFIELD FIRE DEPARTMENT AND SHALL BE IN PLACE BEFORE A CERTIFICATE OF OCCUPANCY IS ISSUED. FORMS ARE AVAILABLE FROM THE TOWN OF SMITHFIELD FIRE DEPARTMENT. AVERAGE DELIVERY TIME IS FIVE (5) TO SIX (6) WEEKS. KEYS SHALL BE PROVIDED TO THE TOWN OF SMITHFIELD FIRE DEPARTMENT BY THE OWNER/MANAGER.
- J. IDENTIFICATION
THE EXTERIOR DOOR LEADING TO THE DEDICATED SPRINKLER RISER ROOM SHALL BE LABELED WITH MINIMUM TWO (2) INCH LETTERING DESIGNATING "SPRINKLER RISER ROOM" IN A CONTRASTING COLOR. DURABLE VINYL LETTERING IS SUGGESTED.
- K. FIRE ALARM PANEL LOCATION
WHEN A BUILDING IS PROTECTED BY AN AUTOMATIC SPRINKLER SYSTEM AND HAS A FIRE ALARM SYSTEM, THE FIRE ALARM CONTROL PANEL OR A REMOTE ANNUNCIATOR OF THE FIRE ALARM CONTROL PANEL SHALL BE PLACED WHERE THE FIRE DEPARTMENT IS MOST LIKELY TO ACCESS THE BUILDING OR AS DIRECTED BY THE FIRE OFFICIAL. THIS CONTROL PANEL SHALL HAVE THE CAPACITY OF SILENCING AND RESETTING. A FRAMED ZONE MAP SHALL BE ADJACENT TO THE FIRE ALARM CONTROL PANEL. NOMENCLATURE SHALL CORRESPOND WITH THE ZONE MAP.

6.08 TESTING AND INSPECTION

ALL MATERIALS USED MUST HAVE A PRELIMINARY INSPECTION BY THE INSPECTOR BEFORE THEY SHALL BE ALLOWED TO BE INSTALLED. MATERIALS REJECTED BY THE INSPECTOR SHALL BE IMMEDIATELY REMOVED FROM THE JOBSITE.



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THE CONTRACTOR SHALL FURNISH ALL MATERIALS, LABOR, AND EQUIPMENT TO PERFORM ALL TESTING AND INSPECTIONS TO THE SATISFACTION OF THE INSPECTOR. THE TOWN OF SMITHFIELD SHALL PROVIDE WATER FOR TESTING PURPOSES ON WATER MAINS.

A. PIGGING AND FLUSHING

ALL NEW MAINS LESS THAN SIXTEEN (16) INCHES IN DIAMETER SHALL BE PIGGED WITH A POLYETHYLENE "PIG". PIGGING SHALL OCCUR PRIOR TO HYDROSTATIC TESTING AND CHLORINATION. THE PIG SHOULD BE INSERTED IN THE FIRST JOINT OF PIPE AND BLOWN OUT ALONG WATER LINE THROUGH A BLOW-OFF ASSEMBLY OR A FIRE HYDRANT. THE USE OF A DISASSEMBLED FIRE HYDRANT TO REMOVE THE PIG MAY ONLY OCCUR ON SMALL WATER LINES. A BLOW-OFF ASSEMBLY IN ACCORDANCE WITH STANDARD DETAILS IS REQUIRED AT THE END OF ALL MAINS.

FOLLOWING PIGGING OF THE WATER LINE, FLUSHING MUST OCCUR UNTIL CLEAR WATER IS DISCHARGED FORM THE BLOW-OFF. EXCESSIVE FLUSHING IS DISCOURAGED IN AN EFFORT TO CONSERVE WATER.

WHEN A NEW SHORT WATER LINE IS INSTALLED BETWEEN TWO (2) EXISTING WATER LINES, THE TOWN ENGINEER MAY WAIVE THE REQUIREMENT FOR PIGGING. IF THE WTAER LINE IS LONG, TEMPORARY PIG LAUNCHING AND RETRIEVING STATIONS MUST BE INSTALLED NEAR THE TIE POINTS TO THE EXISTING LINES.

B. HYDROSTATIC TESTING

NO VALVE IN THE EXISTING TOWN OF SMITHFIELD WATER SYSTEM SHALL BE OPERATED WITHOUT AUTHORIZATION FOR THE PUBLIC UTILITIES DEPARTMENT. A SECTION OF LINE WHICH IS TO BE HYDROSTATICALLY TESTED, SHALL BE SLOWLY FILLED WITH WATER AT A RATE WHICH WILL ALLOW COMPLETE EVACUATION OF AIR FROM THE LINE. HAND PUMPS SHALL NOT BE USED FOR THE PRESSURE TESTING OF WATER MAINS. TAPS USED FOR TESTING PURPOSES SHALL BE REMOVED AFTER TESTING AND REPAIRED USING A STAINLESS STEEL FULL CIRCLE REPAIR CLAMP IN ACCORDANCE WITH STANDARD DETAILS.

THE LINE SHALL BE TESTED TO A PRESSURE OF 200 PSI, AS MEASURED AT THE LOWEST ELEVATION OF THE LINE, FOR A DURATION OF TWO (2) HOURS. THE PRESSURE GAUGE USED IN THE HYDROSTATIC TEST SHALL BE CALIBRATED IN INCREMENTS OF 10 PSI, OR LESS. AT THE END OF THE TEST PERIOD, THE LEAKAGE SHALL BE MEASURED WITH AN ACCURATE WATER METER.

PIPE SIZE (INCHES)	ALLOWABLE LEAKAGE (GALLONS PER 1,000 FEET OF PIPE)
4	0.85
6	1.28
8	1.70
12	2.56
16	3.40
20	4.24
24	5.10

ALL VISIBLE LEAKS ARE TO BE REPAIRED, REGARDLESS OF THE AMOUNT OF LEAKAGE.

C. CHLORINATION

ALL ADDITIONS OR REPLACEMENTS TO THE WATER SYSTEM SHALL BE CHLORINATED BEFORE BEING PLACED IN SERVICE. SUCH CHLORINATION MUST TAKE PLACE UNDER THE SUPERVISION OF AN INSPECTOR.



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CHLORINATION OF A COMPLETED LINE SHALL BE CARRIED OUT IN THE FOLLOWING MANNER:

- a) TAPS WILL BE MADE AT THE CONTROL VALVE AT THE UPSTREAM END OF THE LINE. THE LINE SHALL HAVE A UNIFORM CONCENTRATION OF 100 PPM TOTAL CHLORINE AT ALL EXTREMITIES, INCLUDING VALVES.
- b) A SOLUTION OF WATER CONTAINING HIGH TEST HYPOCHLORITE (70%) AVAILABLE CHLORINE SHALL BE INTRODUCED INTO THE LINE BY REGULATED PUMPING AT THE CONTROL VALVE TAP. THE CHART BELOW SHOWS THE REQUIRED QUANTITY OF 70% HTH COMPOUND TO BE CONTAINED IN A SOLUTION IN EACH 1,000 FEET SECTION OF LINE TO PRODUCE THE DESIRED CONCENTRATION OF 100 PPM.

PIPE SIZE (INCHES)	POUNDS HIGH TEST HYPOCHLORITE (70%) PER 1,000 FEET OF LINE
6	1.76
8	3.12
10	4.84
12	7.00
14	9.52
16	12.44
20	19.52
24	28.00

THE HTH SOLUTION SHALL BE CIRCULATED IN THE MAIN BY OPENING THE CONTROL VALVE AND SYSTEMATICALLY MANIPULATING HYDRANTS AND TAPS AT THE LINE EXTREMITIES. THE HTH SOLUTION MUST BE PUMPED IN AT A CONSTANT RATE FOR EACH DISCHARGE RATE IN ORDER THAT A UNIFORM CONCENTRATION WILL BE PRODUCED IN MAINS.

HTH SOLUTION SHALL REMAIN IN LINES FOR NO LESS THAN 24 HOURS OR AS DIRECTED BY THE TOWN ENGINEER.

EXTREME CARE WILL BE EXERCISED AT ALL TIMES TO PREVENT THE HTH SOLUTION FROM ENTERING EXISTING MAINS.

- D. BACTERIOLOGICAL SAMPLING
FREE RESIDUAL CHLORINE AFTER 24 HOURS SHALL BE AT LEAST 10 PPM OR THE INSPECTOR WILL REQUIRE THAT THE LINES BE RECHLORINATED.

FLUSHING OF LINES MAY PROCEED AFTER 24 HOURS, PROVIDED THE FREE RESIDUAL CHLORINE ANALYSIS IS SATISFACTORY. FLUSHING SHALL BE CONTAINED UNTIL AN ORTHOTOLIDINE CHECK SHOWS THAT THE LINES CONTAIN ONLY THE NORMAL CHLORINE RESIDUAL. SAMPLES FOR BACTERIOLOGICAL ANALYSIS SHALL BE COLLECTED IN THE PRESENCE OF A TOWN OFFICIAL 24 HOURS AFTER FLUSHING IS COMPLETED. THE CONTRACTOR SHALL PROVIDE PROPER CERTIFICATION OF THE BACTERIOLOGICAL ANALYSIS TO THE TOWN UPON COMPLETION OF TESTING AND PRIOR TO UTILIZATION OF THE LINE.

IF TEST RESULTS ARE UNSATISFACTORY, THE CONTRACTOR SHALL IMMEDIATELY RECHLORINATE LINES AND PROCEED WITH SUCH MEASURES AS ARE NECESSARY TO SECURE STERILE LINES.



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THE NEW WATER SYSTEM SHALL BE VALVED OFF FROM THE EXISTING SYSTEM UNTIL A SATISFACTORY BACTERIOLOGICAL SAMPLE HAS BEEN OBTAINED AND THE INSPECTOR HAS AUTHORIZED THE USE OF THE NEW WATER SYSTEM.

6.09 FIRE PROTECTION DURING CONSTRUCTION

THE FIRE PROTECTION WATER SUPPLY SYSTEM, INCLUDING FIRE HYDRANTS, SHALL BE INSTALLED AND BE IN AT LEAST THE FUNCTIONAL STATUS PRIOR TO PLACING COMBUSTIBLE MATERIALS ON THE PROJECT SITE. IF PHASED CONSTRUCTION IS PLANNED, COORDINATED INSTALLATION OF THE FIRE PROTECTION WATER SYSTEM IS PERMITTED. COORDINATION OF THE WATER SYSTEM WILL BE DONE THROUGH THE PUBLIC UTILITIES DEPARTMENT AND THE SMITHFIELD FIRE DEPARTMENT. FUNCTIONAL STATUS WOULD INCLUDE MEETING ALL STANDARDS SET FORTH IN SECTION 6.08 - TESTING AND INSPECTION.

6.10 IRRIGATION SYSTEMS

ALL IRRIGATION SYSTEMS WITHIN PUBLIC STREET RIGHT OF WAY SHALL OBTAIN AN ENCROACHMENT AGREEMENT FOR THE TOWN, PRIOR TO INSTALLATION OF THE SYSTEM. PLANS DESIGNATING THE LOCATION, SIZE, MATERIAL DEPTH, ETC. SHALL BE SUBMITTED WITH THE APPLICATION FOR AN ENCROACHMENT AGREEMENT.

PIPE MATERIAL FOR THE MAINLINE PROPOSED TO BE USED WITHIN THE PUBLIC RIGHT OF WAY SHALL BE SCHEDULE 40 PVC OR GREATER. A DISTANCE OF AT LEAST TWO (2) FEET SHALL BE PROVIDED FROM THE BACK OF THE CURB. A MINIMUM DEPTH OF TWO (2) FEET SHALL BE PROVIDED.

THE IRRIGATION MAINLINE PIPE SYSTEM SHALL BE HYDROSTATICALLY TESTED AS PER SECTION 6.08, WITH A MINIMUM PRESSURE OF 250 PSI OR 50 PSI ABOVE WORKING PRESSURE.

IRRIGATION SYSTEMS SHALL HAVE A BACKFLOW PREVENTER INSTALLED IN ACCORDANCE WITH SECTION 6.06

ALL STREET CROSSINGS OF IRRIGATION SYSTEMS SHALL BE CONTAINED WITHIN AN ENCASEMENT CONDUIT. DUCTILE IRON CASING SHALL BE USED. IRRIGATION SYSTEMS INSTALLED IN THE MEDIANS OF TOWN MAINTAINED ROADWAYS MUST ALSO HAVE FRENCH DRAINS INSTALLED BEHIND THE CURB AND GUTTER, WHICH IS PIPED TO A STORM DRAIN SYSTEM.

6.11 REPAIR OF WATER LINES

JOINT LEAKS OF CAST IRON PIPE, DUCTILE IRON PIPE, AND PVC PIPE SHALL USE A BELL JOINT LEAK REPAIR CLAMP, AS MANUFACTURED BY ROCKWELL, OR OTHER APPROVED EQUAL.

LINE BREAKS OR PUNCTURES SHALL BE REPAIRED BY A FULL CIRCLE CLAMP AS MANUFACTURED BY ROCKWELL, OR OTHER APPROVED EQUAL.

LINE SPLITS OR BLOW OUTS SHALL BE REPAIRED BY REPLACING THE DAMAGED SECTION WITH DUCTILE IRON PIPE, OR C900 PVC PIPE, WITH REPAIR COUPLINGS AT EACH END. REPAIR COUPLING SHALL BE KRAUSZ HYMAX COUPLING, OR APPROVED EQUAL.



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- A. WATER SERVICE LINE REPAIRS
A WATER SERVICE LINE SEVERED BETWEEN THE WATER MAINS AND THE WATER METER SHALL BE REPAIRED USING NEW TYPE K COPPER TUBING AND BRASS THREE (3) PIECE COMPRESSION UNIONS.

A CORPORATION STOP PULLED OUT OF A PVC PIPE WATER MAIN SHALL HAVE A NEW SERVICE SADDLE AND A NEW CORPORATION STOP INSTALLED ON THE WATER MAIN.

A CORPORATION STOP PULLED OUT OF A DUCTILE IRON PIPE WATER MAIN SHALL HAVE A FULL CIRCLE REPAIR CLAMP PLACE OVER THE OLD TAP HOLE. A NEW TAP SHALL BE MADE AND A NEW CORPORATION STOP INSTALLED ON THE WATER MAIN.

END OF SECTION 6.00



STANDARD DETAIL AND
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SMITHFIELD, NORTH CAROLINA
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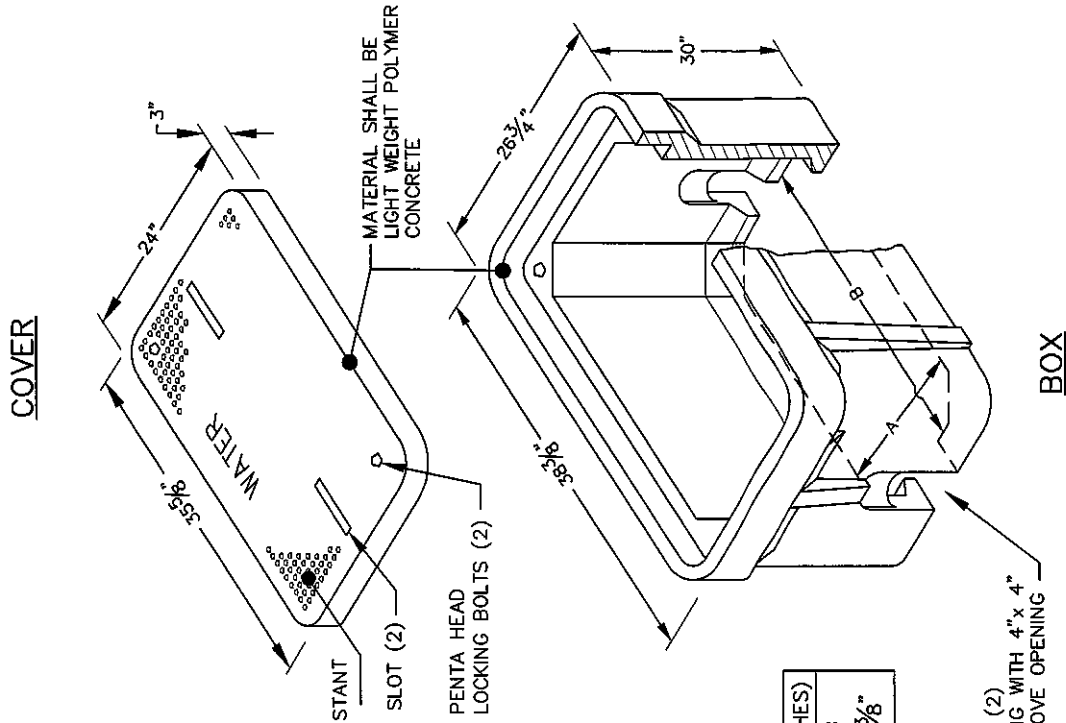
STANDARD 1-1/2 AND 2 INCH METER INSTALLATION

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

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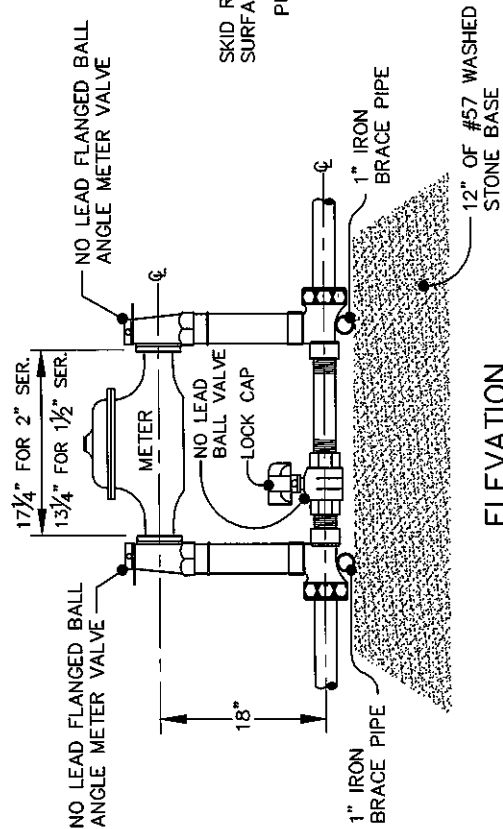
DETAIL NO.
06.02

DATE: 06/05/2018

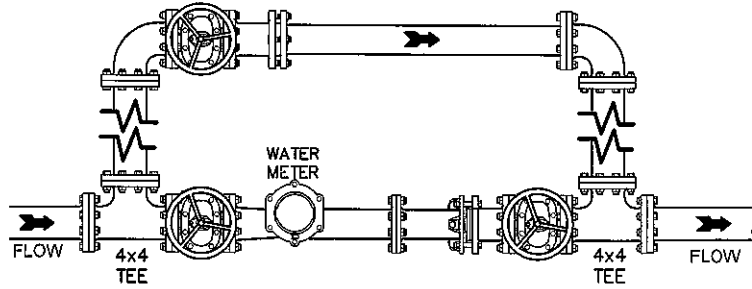


DIMENSIONS (INCHES)	
A	B
18 3/4"	30 3/8"

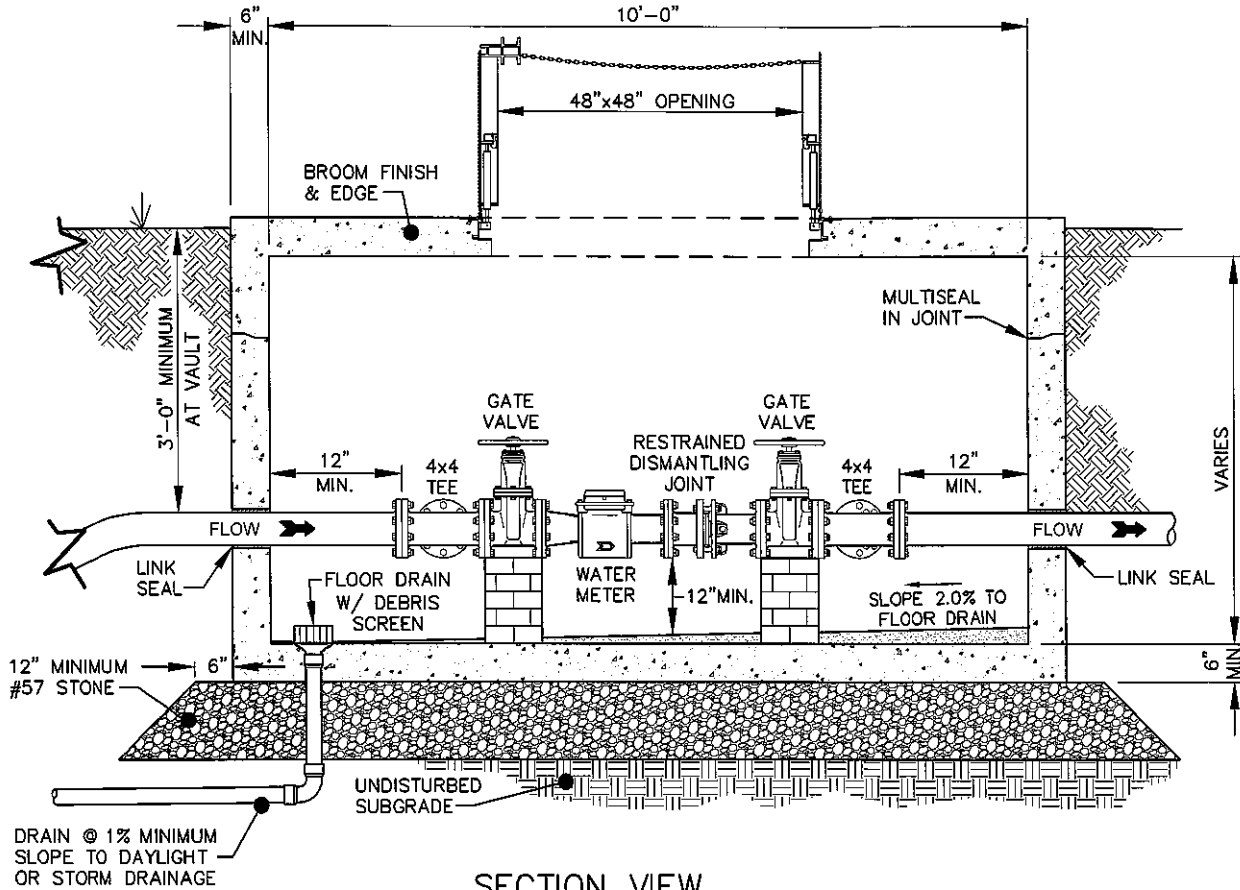
MOUSE HOLES (2)
4" x 4" OPENING WITH 4" x 4"
KNOCKOUT ABOVE OPENING



- NOTES:**
1. PIPING TO BE 'NO LEAD' BRASS AND COPPER TUBING. METER INLET AND OUTLET TO BE EQUIPPED WITH FLANGED BALL ANGLE METER VALVES.
 2. ALL BRASS COMPONENTS SHALL BE 'NO LEAD' BRASS MEETING UNS C89833 AS PER ASTM B584.
 3. ALL APPLICATIONS REQUIRE A SEPARATE ABOVE GROUND BACKFLOW PREVENTER.
 4. TO ENSURE POSITIVE DRAINAGE, THE VAULT SHALL HAVE AN OPEN BOTTOM TO ALLOW DRAINAGE THROUGH STONE



PLAN VIEW



SECTION VIEW

GENERAL NOTES:

1. METER AND BYPASS ASSEMBLY PIPING TO BE DUCTILE IRON FLANGED PIPE INSIDE THE VAULT.
2. METER FACE TO BE A MAXIMUM OF 2 FEET BELOW FINISHED GRADE.
3. ACCESS DOOR SHALL BE H-20 RATED ALUMINUM DOUBLE DOOR WITH A MINIMUM OPENING OF 48" x 48".
4. VALVES SHALL BE IRON BODY TYPE, RESILIENT WEDGE GATE VALVES WITH NON-RISING STEM, HANDWHEEL OPERATORS AND FLANGE CONNECTIONS.
5. ALL VALVES SHALL BE SUPPORTED AND THE BYPASS LINE SHALL HAVE A TOTAL OF TWO SUPPORTS. SUPPORTS SHALL BE EITHER SOLID BRICK, SOLID BLOCK, OR STAINLESS STEEL.
6. TO ENSURE POSITIVE DRAINAGE, THE VAULT SHALL BE TIED INTO THE EXISTING STORM DRAINAGE SYSTEM, IF POSITIVE DRAINAGE IS UNOBTAINABLE, A SUMP PUMP SHALL BE LOCATED AND OPERATED IN THE VAULT.
7. ALL COMMERCIAL OR OTHER NON-RESIDENTIAL APPLICATIONS REQUIRE AN ABOVE GROUND BACKFLOW PREVENTER.
8. DOUBLE DOORS SHALL BE LOCKABLE WITH OWNER-SUPPLIED PADLOCK.
9. SEPARATE STRAINER MAY BE REQUIRED IF PROPOSED METER DOES NOT HAVE AN INTEGRAL STRAINER.



STANDARD 3 AND 4 INCH
METER INSTALLATION

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

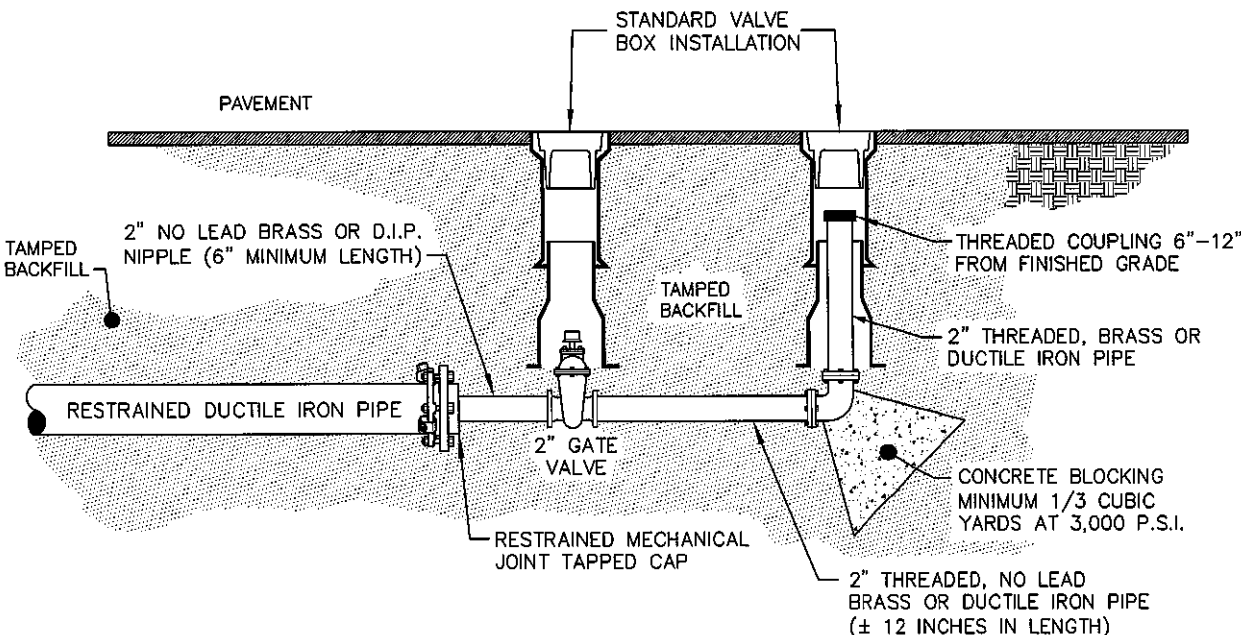
SCALE:
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MAIN SIZE	END PIPE SIZE
4" - 12"	2" BLOW-OFF
14" & GREATER	APPROVED BY UTILITY DIRECTOR

STANDARD VALVE
BOX INSTALLATION
(SEE DETAIL 06000.08)



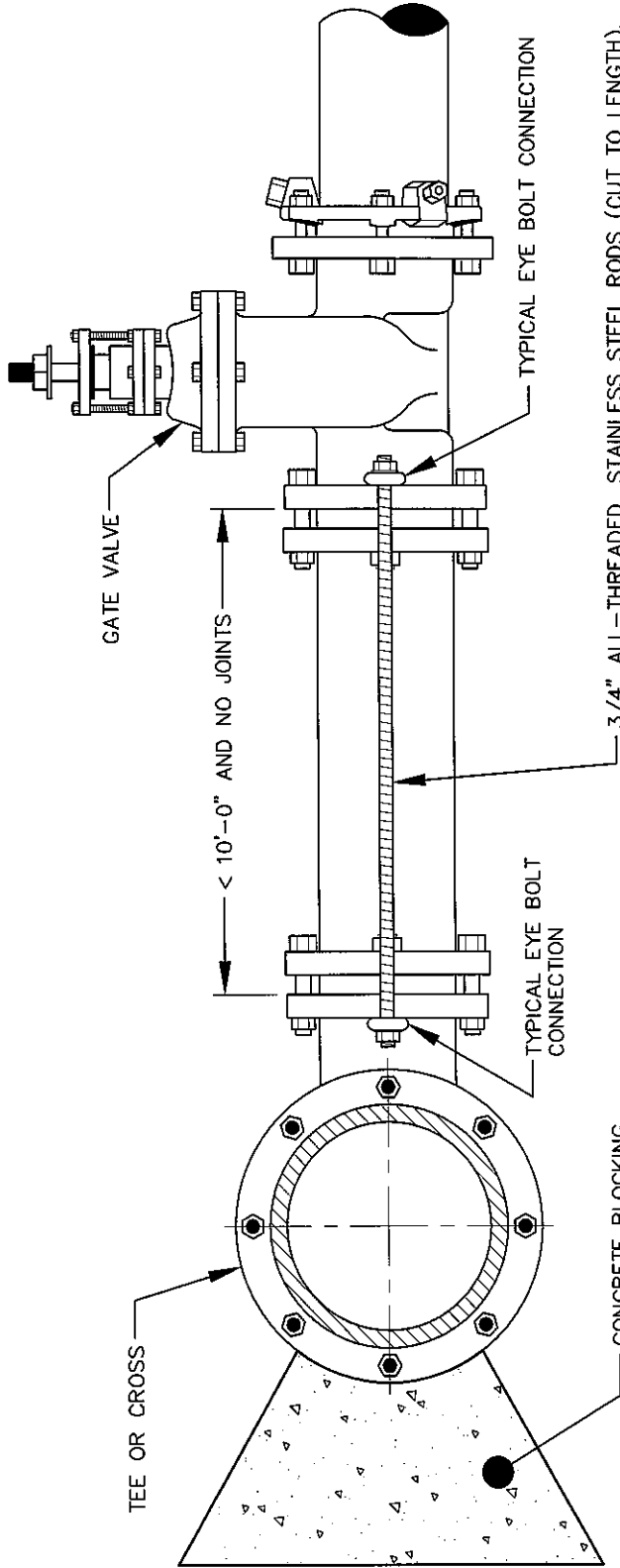
- NOTE:
1. FOR MAINS THAT RE TO BE EXTENDED, USE A VALVE EQUAL TO THE MAIN SIZE AS THE BLOW-OFF VALVE AND THEN REDUCE TO THE 2-INCH STANDARD PIPE
 2. WHEN BLOW-OFF IS EXPOSED TO TRAFFIC, THE DETAIL FOR A PAVED AREA SHALL BE USED EVEN IF THE BLOW-OFF IS OUTSIDE THE PAVEMENT



STANDARD 2" BLOW-OFF
ASSEMBLY

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

SCALE: NTS
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DATE: 06/05/2018



3/4" ALL-THREADED, STAINLESS STEEL RODS (CUT TO LENGTH).
FASTENERS SHALL ALSO BE STAINLESS STEEL.
NOTE: RODDING SHALL NOT EXCEED 10 FEET IN LENGTH.

STAINLESS STEEL ROD REQUIREMENTS

BRANCH SIZE	No. OF RODS
4"	2
6"	2
8"	4
12"	4
16"	8

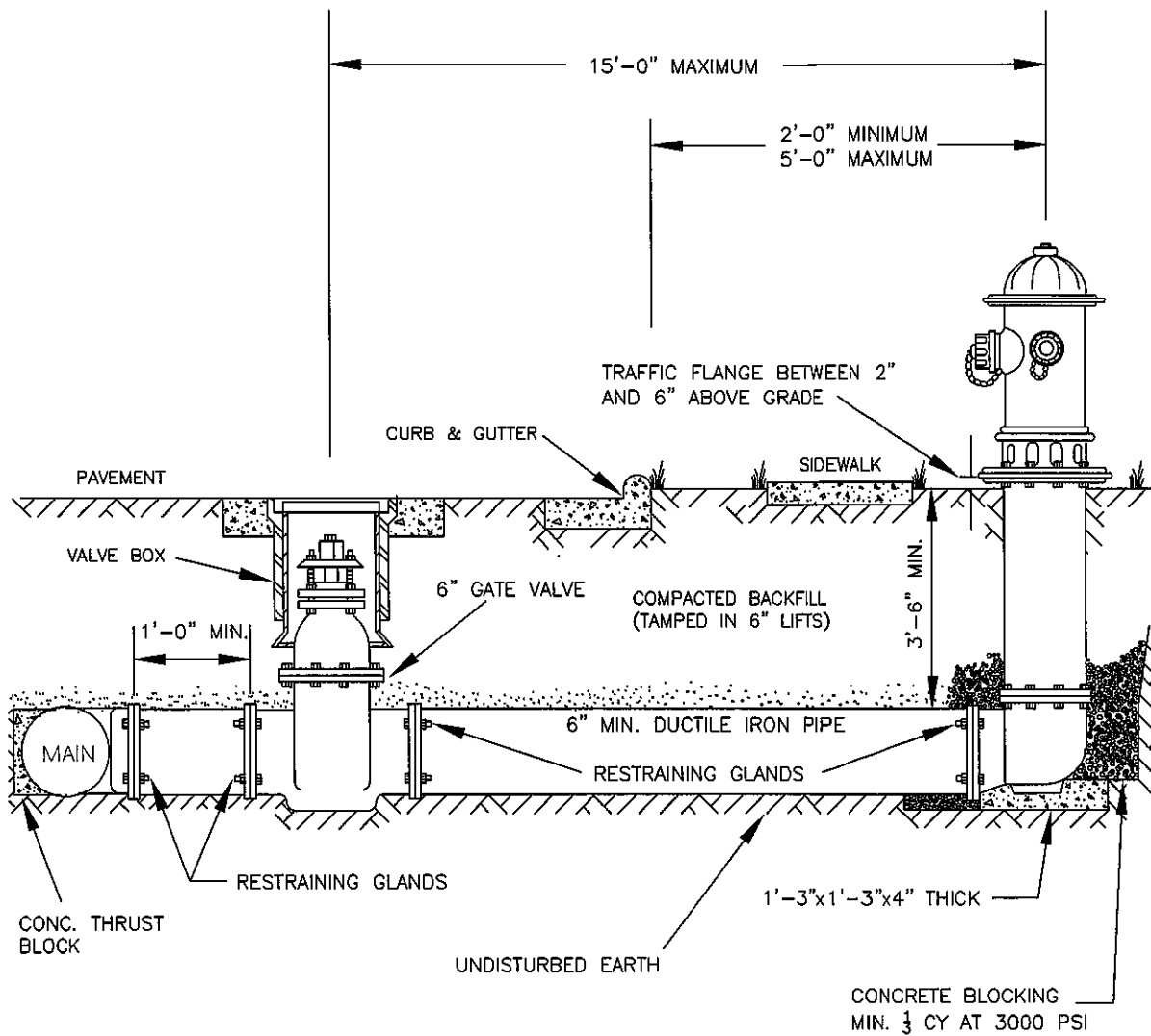
GENERAL NOTES:

1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL FITTINGS.
2. RODS SHALL NOT BE COUPLED.



STANDARD VALVE
RODDING
SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

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NOTE:

1. 6" PIPE SHALL MEET AWWA C150-96
2. 6" GATE VALVE SHALL BE AWWA C500-86 OPEN LEFT
3. STEEL BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED
4. HYDRANT TO BE PLACED WITH PUMPER NOZZLE FACING THE CLOSEST CURB
5. HYDRANT SHALL HAVE 36" MINIMUM CLEARANCE TO ALL OBJECTS



STANDARD HYDRANT
INSTALLATION

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

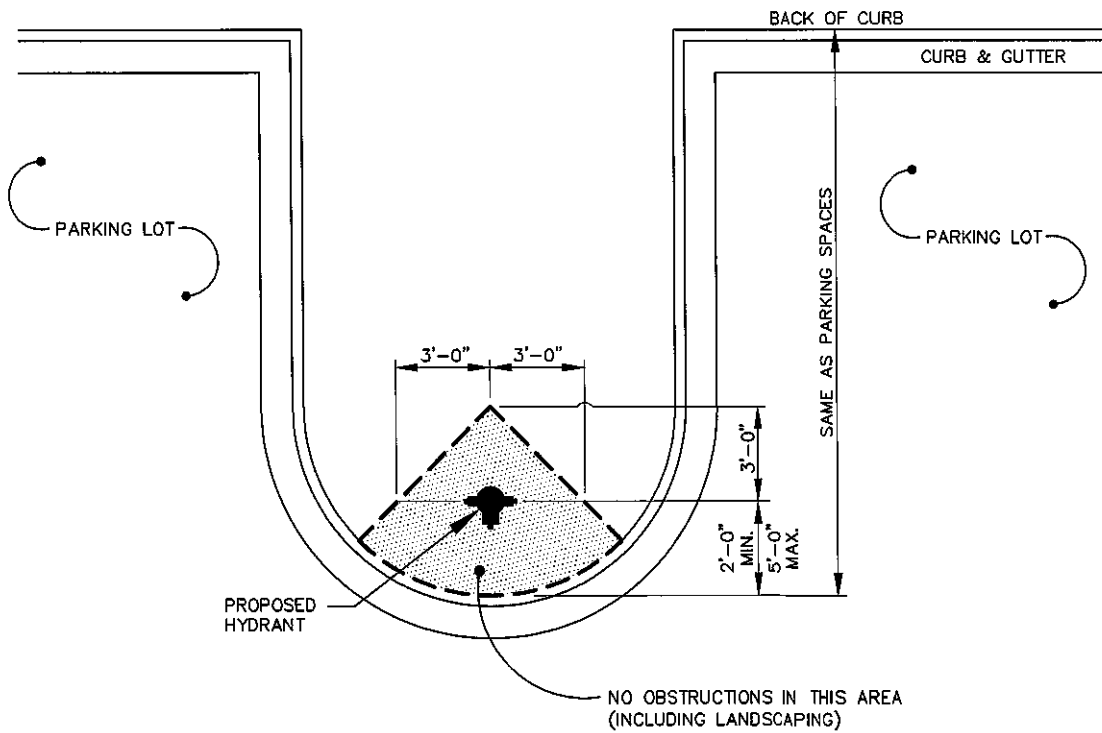
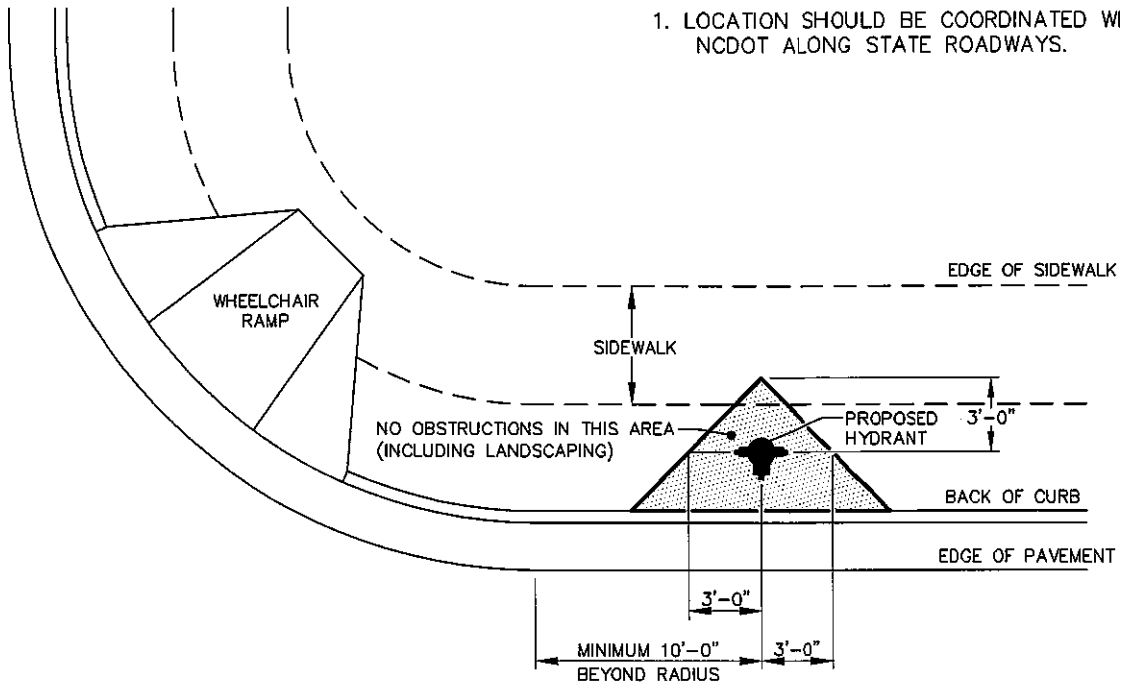
SCALE:
NTS

DETAIL NO.
06.06

DATE: 06/05/2018

GENERAL NOTES:

1. LOCATION SHOULD BE COORDINATED WITH NCDOT ALONG STATE ROADWAYS.



STANDARD HYDRANT
LOCATION

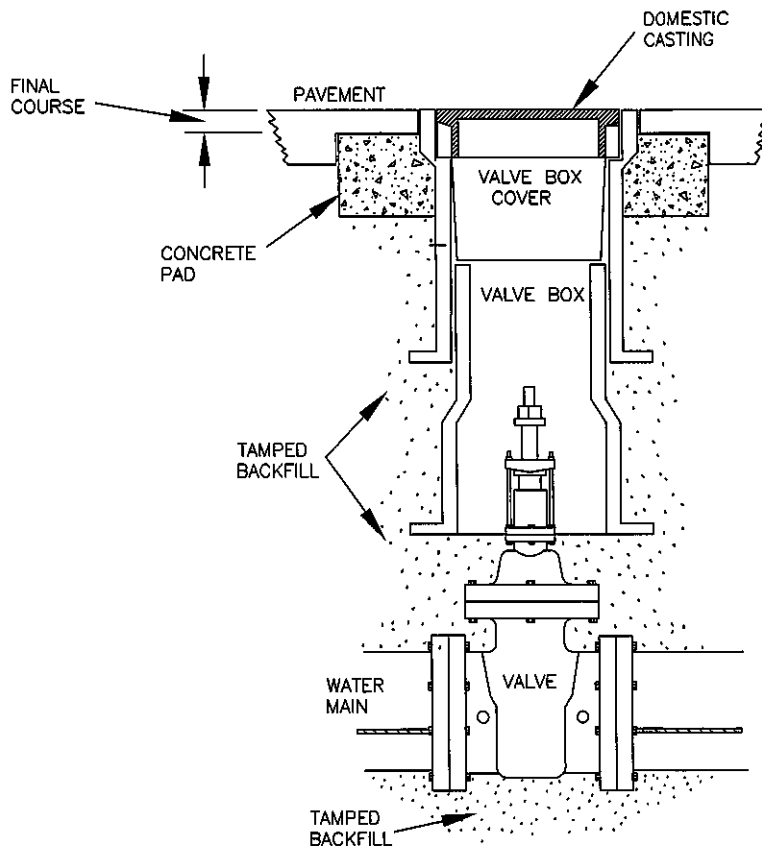
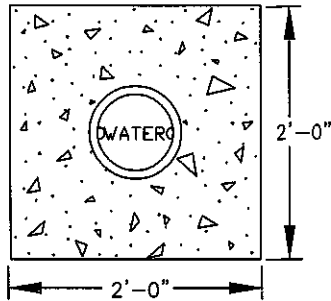
SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

SCALE:
NTS

DETAIL NO.
06.07

DATE: 06/05/2018

NOTE:
 2'X2'X6" CONCRETE PAD REQUIRED ON ALL VALVES.
 NO PRECAST CONCRETE DOUGHNUT ALLOWED.



- NOTE:
1. VALVE BOX NOT TO CONTACT WATER MAIN
 2. ALL TRAFFIC CASTINGS MUST BE CLASS 35 OR GREATER
 3. FOR ANY VALVES OVER 10' DEEP, A VALVE STEM EXTENSION MUST BE USED TO BRING TO A DEPTH OF NO MORE THAN 5', EXTENSION MUST BE A MINIMUM OF 1" SOLID STOCK



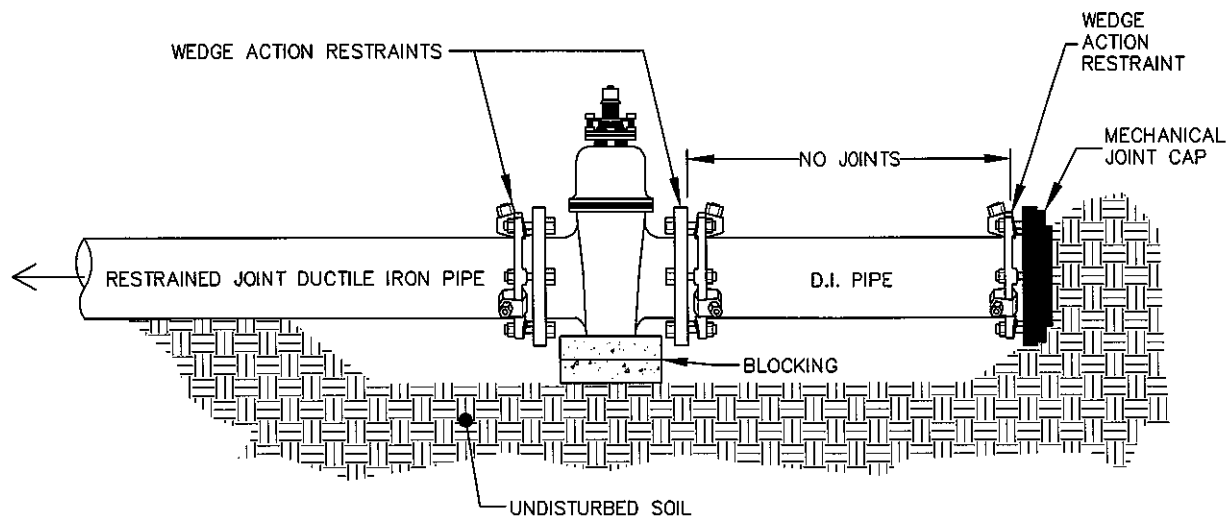
STANDARD VALVE BOX INSTALLATION

SMITHFIELD, NORTH CAROLINA
 PUBLIC UTILITIES

SCALE:
 NTS

DETAIL NO.
 06.08

DATE: 06/05/2018



NOTES:

1. THIS DETAIL SHALL APPLY ONLY TO TEMPORARY CAPPING. PERMANENT DEAD END LINES TO BE IN ACCORDANCE WITH STANDARD DETAIL 06.04
2. REQUIRED RESTRAINT AWAY FROM THE DEAD END MAY BE MJ PIPE WITH WEDGE ACTION RESTRAINTS FOR PIPE \leq 12 INCH DIAMETER.



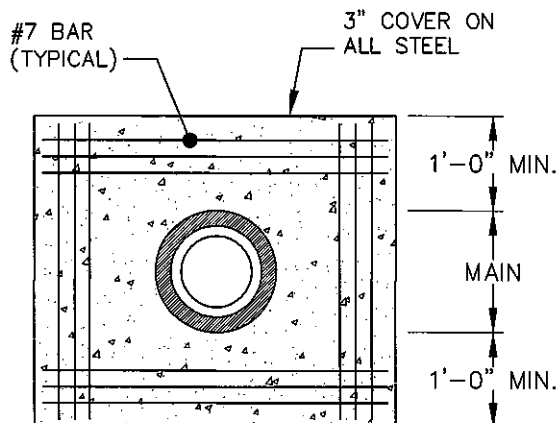
STANDARD CAPPING
DETAIL

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

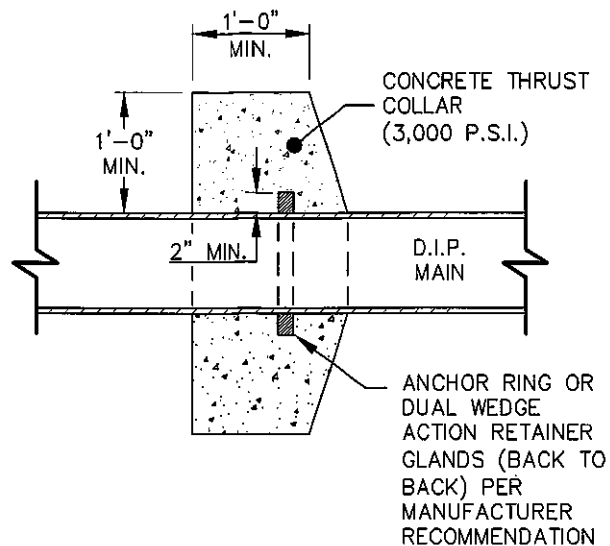
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DETAIL NO.
06.09

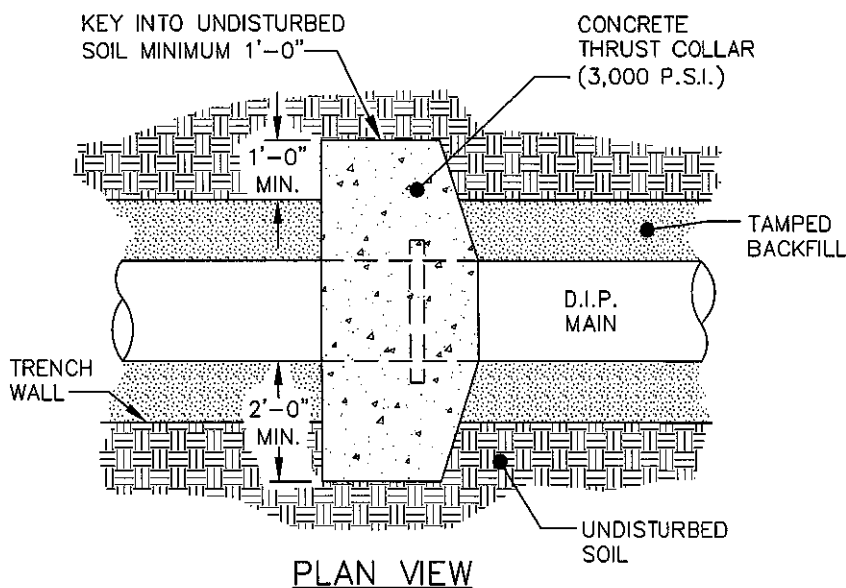
DATE: 06/05/2018



REINFORCING
CROSS SECTION



PROFILE VIEW



PLAN VIEW

NOTES:

1. THRUST COLLAR SHALL ONLY BE USED IF OTHER RESTRAINING METHODS CANNOT.
2. THRUST COLLARS FOR PIPE BEYOND 12 INCHES SHALL BE DESIGNED BY THE ENGINEER.
3. TWELVE (12) #7 BARS SHALL BE USED IN EACH COLLAR.



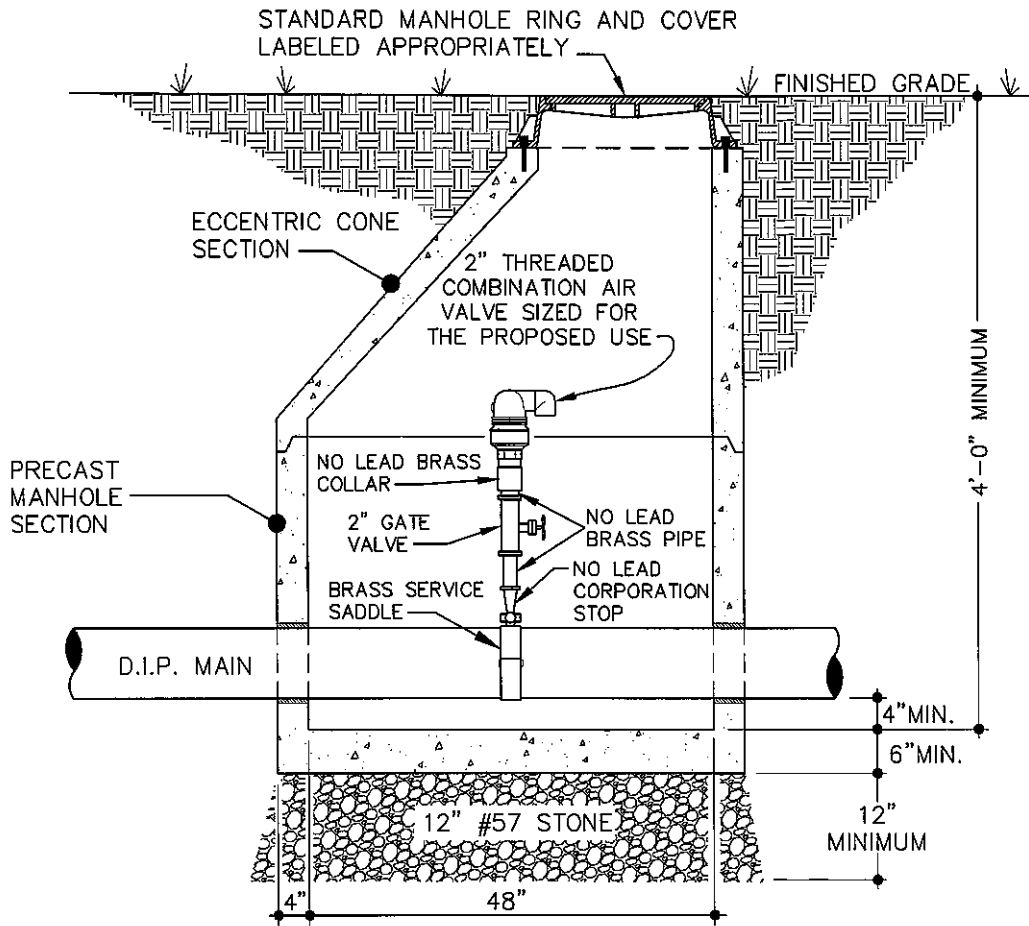
STANDARD THRUST COLLAR
INSTALLATION

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

SCALE:
NTS

DETAIL NO.
06.10

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NOTES:

1. TAP SIZE AND ISOLATION VALVE TO BE SAME SIZE AS AIR VALVE.
2. ALL PIPING AND FITTINGS, IN THE MANHOLE, SHALL BE 'NO LEAD' BRASS OR BRONZE UNLESS NOTED.
3. ARV MANHOLE SHALL BE PROVIDED WITHOUT STEPS.
4. CONCENTRIC CONES MAY BE USED FOR AIR VALVE MANHOLES LESS THAN 5 FEET IN DEPTH.
5. RESILIENT CONNECTORS OR BOOTS MEETING ASTM C923 SHALL BE USED AT THE MANHOLE AND PIPE INTERFACE.
6. MANHOLES DEEPER THAN 12 FEET REQUIRE AN EXTENDED BASE.



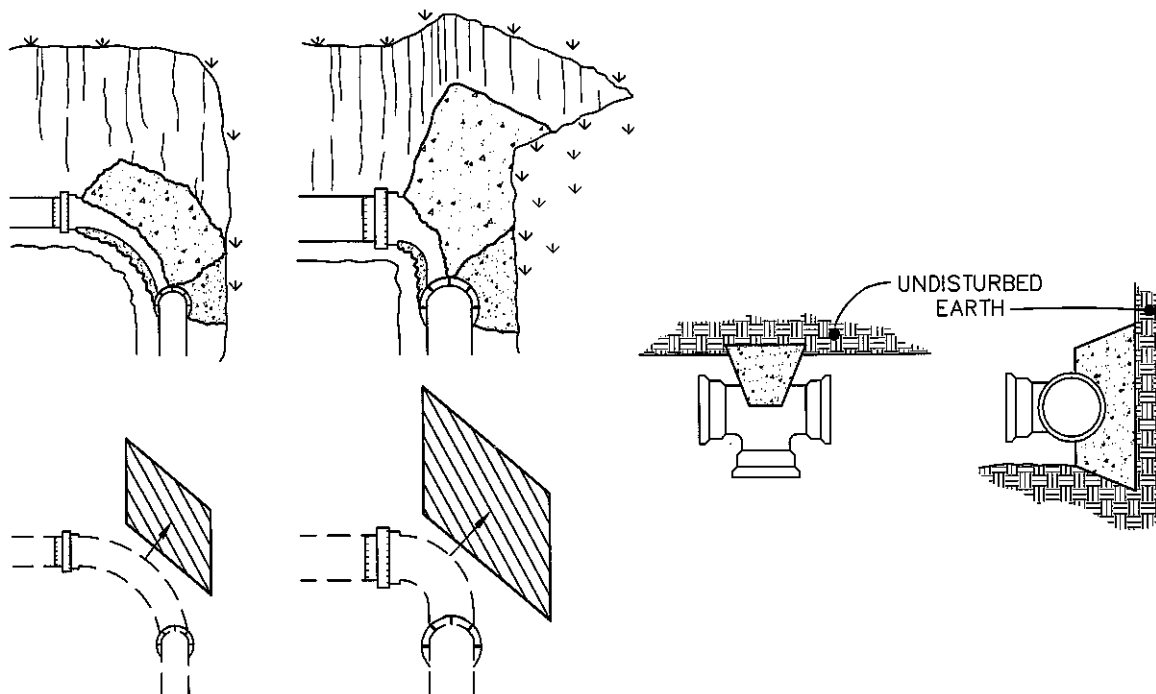
**STANDARD AIR VALVE FOR
WATER MAINS**

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

SCALE:
NTS

DETAIL NO.
06.11

DATE: 06/05/2018



MINIMUM CONCRETE BLOCKING (C.Y.)					
NOMINAL PIPE DIAMETER INCHES	TEES & DEAD ENDS	90° BEND	45° BEND	22½° BEND	11¼° BEND
4	1/3	1/3	1/3	1/3	1/3
6	1/3	1/3	1/3	1/3	1/3
8	1/3	1/2	1/3	1/3	1/3
10	2/3	3/4	1/2	1/3	1/3
12	3/4	1.0	2/3	1/3	1/3

NOTES:

1. FITTING SHALL BE WRAPPED WITH A MINIMUM 4 MIL PLASTIC.
2. NO CONCRETE SHALL COVER BOLTS OR GLANDS.
3. CONCRETE SHALL BE 3,000 PSI MIX.
4. PIPE DIAMETERS BEYOND 12 INCHES SHALL UTILIZE A PROFESSIONAL ENGINEER'S SEALED DESIGN CONSISTING OF RESTRAINED JOINT PIPE OR BLOCKING.



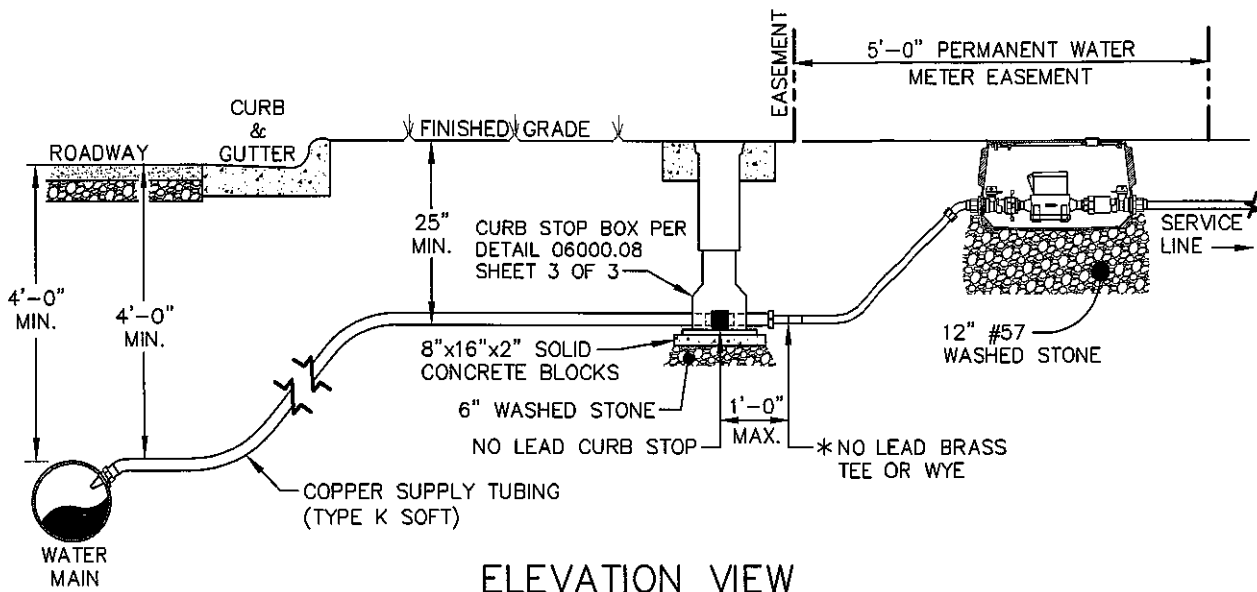
**STANDARD REACTION
BLOCKING**

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

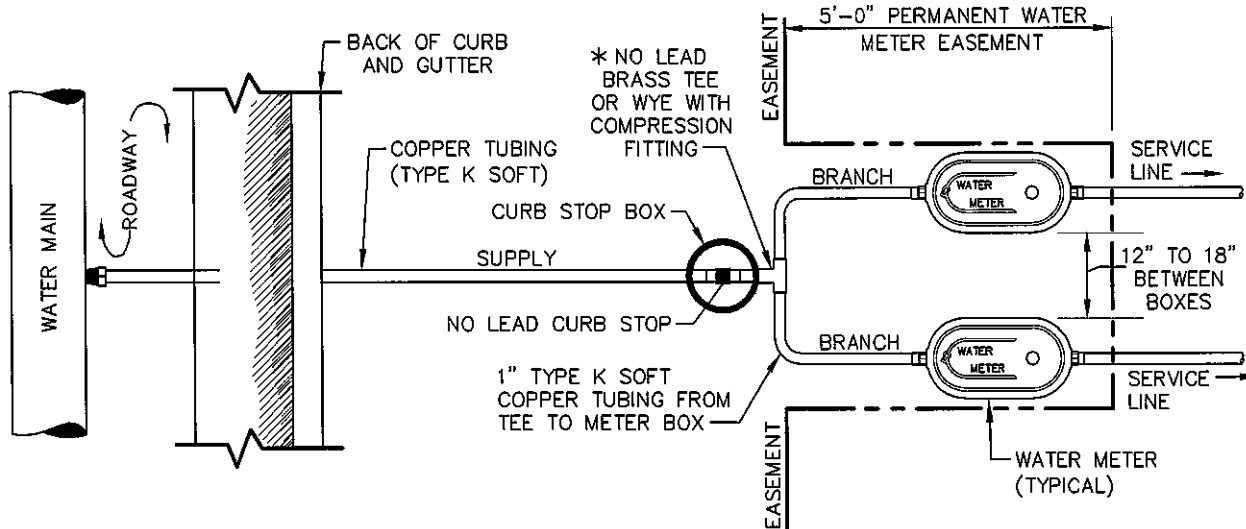
SCALE:
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06.13

DATE: 06/05/2018



ELEVATION VIEW



PLAN VIEW

* NO LEAD BRASS TEE OR WYE: INLET SIZE X 1 INCH

MAXIMUM BRANCH CONNECTIONS

SUPPLY LINE SIZE (INCHES)	MAXIMUM NUMBER OF BRANCHES
1	1
1.5	2
2	2

NOTES:

1. THERE SHALL BE NO MULTIPLE CONNECTIONS FROM EXISTING 3/4 INCH SERVICE LINES.
2. METER BOXES SHALL NOT BE LOCATED IN AREAS SUBJECT TO VEHICULAR TRAFFIC.
3. NO LEAD CURB STOP SHALL BE CENTERED ON MULTIPLE BRANCH SERVICE.
4. ALL BRASS COMPONENTS SHALL BE 'NO LEAD' BRASS MEETING UNS C89833 AS PER ASTM B584.
5. MARKING TAPE SHALL BE INSTALLED FOR ALL SERVICE CONNECTIONS FROM THE MAIN LINE TO THE METER FOR ALL NEW CONSTRUCTION OR RETROFIT INSTALLATIONS USING OPEN TRENCH METHODS.



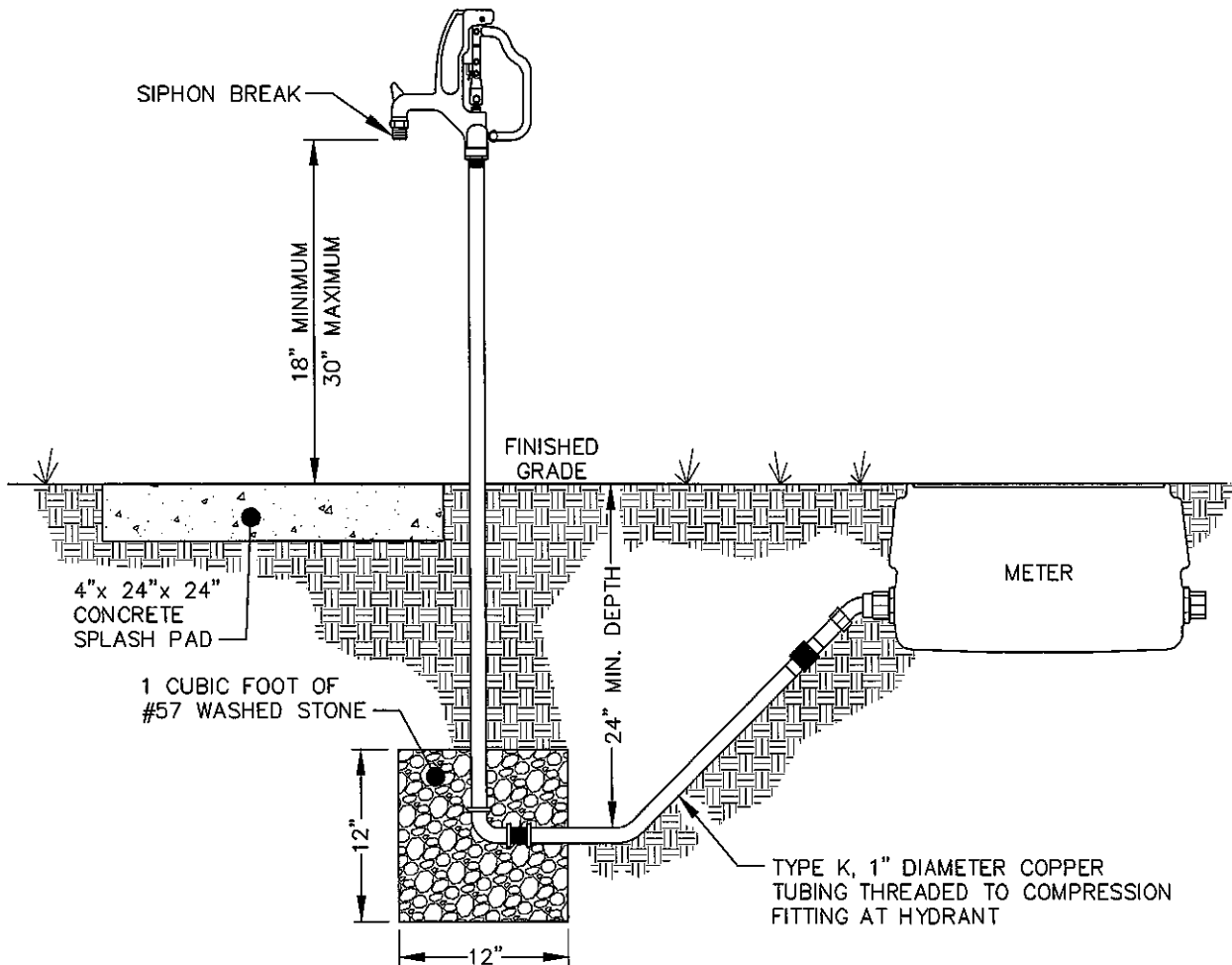
STANDARD MULTIPLE BRANCH SERVICE

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

SCALE:
NTS

DETAIL NO.
06.14

DATE: 06/05/2018



NOTES:

1. HOSE BIB SHALL ACCOMMODATE STANDARD 3/4 INCH GARDEN HOSE.
2. ALL FITTINGS SHALL BE 'NO LEAD' BRASS MEETING UNS C89833 AS PER ASTM B584.
3. RPZ MAY BE REQUIRED, DEPENDING IN SOME APPLICATIONS OF USE.



**STANDARD YARD
HYDRANT**

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

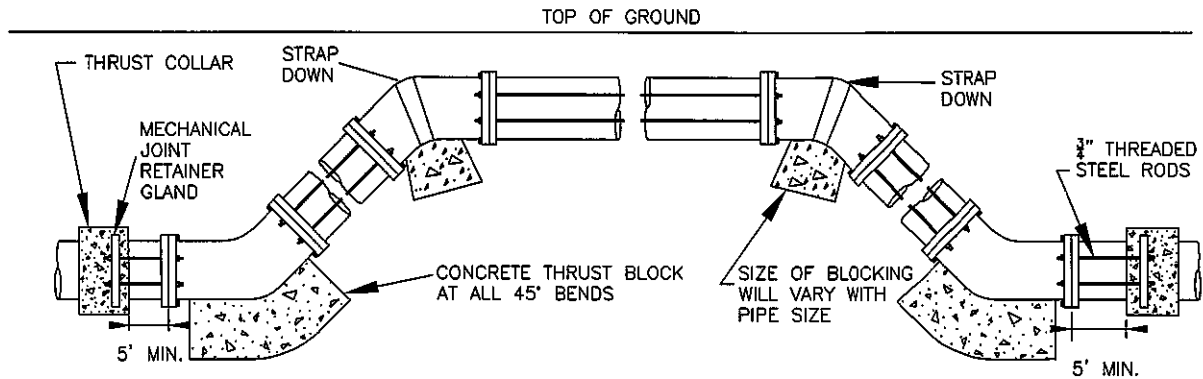
SCALE:
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DETAIL NO.
06.15

DATE: 06/05/2018

ROD REQUIREMENTS

SIZE OF 45 BEND	STATIC THRUST IN POUNDS	NO. OF RODS REQUIRED
6"	4,328	2
8"	7,694	4
12"	17,312	4
16"	30,779	8
24"	69,252	8



ADD MECHANICAL JOINT
RETAINER GLANDS
THROUGHOUT ASSEMBLY

NOTE:

1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTING
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY
5. 3' MINIMUM COVER MUST BE MAINTAINED ON ALL WATER MAINS



STANDARD VERTICAL
BEND

SMITHFIELD, NORTH CAROLINA
PUBLIC UTILITIES

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06.20

DATE: 06/05/2018