

TOWN OF PITTSBORO
STANDARD SPECIFICATION
Reclaim Water Distribution System
SECTION 6

JURISDICTIONAL AGENCY APPROVAL

All reclaim water lines shall be designed, and constructed in accordance with the State of North Carolina Administrative Code (NCAC) Title 15A 02U, and as referenced in 02T, North Carolina Department of Environmental, and Natural Resource (DENR), and Division of Water Quality (DWQ). The engineering requirements set forth herein are intended to supplement rather than supersede other applicable local, county, state, and federal requirements. In the case of conflict the more stringent requirements shall apply.

DESIGN CRITERIA FOR DISTRIBUTION LINES

The requirements in this specification apply to all new, and retrofitted distribution lines.

Location

Reclaim water lines shall be extended along the roadway to the adjacent property line. A dedicated street right of way, or Town of Pittsboro utility, and pipe line easement shall be utilized. The dedicated easement shall be twenty (20') feet, and record as "Town of Pittsboro Utility Easement." The dedicated easement shall contain Town utilities unless otherwise approved by the Town Manager, Engineer, or Utility Director through an approved encroachment agreement. Where the twenty (20') feet easement is undersized to due depth/ or diameter requirements for construction, operations, and maintenance the Town Engineering Department may approve an increase in dedicated easement to accommodate the new utility.

Unless approved in a written waiver by the Town Engineer, or Public Works Director no permanent structures, equipment, retaining walls, embankments, impounds, or other elements that would inhibit maintenance operations shall be constructed. The written request waiver shall include the following: description of all special condition, including appropriate protection measures of reclaim/water mains, and access for maintenance purpose.

Fences may cross over easements provided that appropriate access gates have been installed to allow maintenance operations.

At the discretion, and approval by the Town, fill or cut slopes are not allowed to extend into reclaimed water main easements except by specific approval.

All relocations of existing or permitted reclaimed water infrastructure including service piping and meter boxes shall be permitted and inspected in conformance with Town policies and procedures.

Any reclaimed water that leaves the reclaimed water distribution system other than by means of a properly permitted use must be disposed of into the Town of Pittsboro sanitary sewer system, unless otherwise approved by the Town of Pittsboro with special provisions for discharge and disposal. This

includes any reclaimed water from blow offs, testing, line flushing, and/or line breaks. In no case shall reclaimed water from blow offs, testing, flushing, line breaks or other unpermitted uses be discharged onto the ground surface or drainage systems, storm water ponds, streams or other non-treated systems. Any unpermitted discharge of reclaimed water shall be reported to the Town of Pittsboro immediately and treated as a wastewater spill in accordance with established policies by the Town of Pittsboro and NCDEQ.

In all cases where potable water is used to supplement a reclaimed water system, there shall be an approved RPZ or Air Gap between the potable water system and the reclaimed water system.

In all cases where potable water is used to supply reclaimed water distribution mains on an interim basis until such time when reclaimed water is available, there shall be an approved reduced pressure principle backflow preventer, (RPZ), constructed in accordance with the Cross Connection Ordinance. The RPZ backflow preventer shall be provided on the branch supply line feeding the reclaimed water system and shall be located within 25-ft of the branch connection with the main potable water trunk line. A reduced pressure principle backflow preventer located on the branch feed to the reclaimed water system will preclude the need for individual backflow preventers on each service connection and allow all reclaimed water services to be constructed as described herein under typical reclaimed service standards and specifications.

Cross-Connection Control

There shall be no direct cross connections between the reclaimed water and potable water systems. In all cases where reclaimed and municipal potable water are supplied to the same structure and/or other same facility, a reduced pressure principle backflow preventer shall be provided on the municipal potable water service. The privately owned and maintained reclaimed water service piping and other appurtenances shall be identified in conformance with the North Carolina Plumbing Code. When reclaimed water distribution mains are unavailable, but planned for future construction in accordance with the Reclaimed Water System Master Plan; any service lines to secondary water use facilities, shall be constructed in accordance with reclaimed water standards as described herein including all requirements for requisite color and text identification.

Lateral Separation of Reclaim, Sewers and Water Mains.

Reclaimed water distribution lines shall be located 10 feet horizontally from and 18 inches below any water line where practicable.

(A) Water mains shall be laid at least 10 feet laterally from existing or proposed reclaim/sewers, unless local conditions or barriers prevent a 10-foot lateral separation, in which case: The water main is laid in a separate trench, with the elevation of the bottom of the water main at least 18 inches above the top of the reclaim/sewer; or 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 18 inches above the top of the reclaim/sewer.

(B) Crossing a water main over a sewer. Whenever it is necessary for a water main to cross over a reclaim/sewer, the water main shall be laid at such an elevation that the bottom of the water main is at least 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 sewer shall be constructed of ductile

iron materials and with joints equivalent to water main standards (restrained) for a distance of 10 feet on each side of the point of crossing.

(C) Crossing a Water Main under a Reclaim/Sewer. Whenever it is necessary for a water main to cross under a sewer, both the water main and the sewer shall be constructed ductile iron and with restrained joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing. A section of water main pipe shall be centered at the point of crossing. Where ductile iron pipe cannot be used (existing piping) the water, reclaim/sewer shall be encased with quick set, non-excavate flowing fill extending three (3') feet on both sides of the crossing. Reclaimed water distribution lines shall meet the separation distances to sewer lines in accordance with 15A NCAC 02T .0305. All piping shall be restrained MJ sleeves, or other approved couplings, and wrapped with purple polyethylene wrap as specified.

(D) Reclaimed water distribution lines shall not be less than 50 feet from a public well unless the piping and integrity testing procedures meet water main standards approved by the Town Engineer, or Utility Director, but in no case shall they be less than 25 feet from a private well.

(E) All privately owned, and maintained reclaim water service piping, and appurtenances shall be identified in conformance with North Carolina Plumbing Code.

Sizing

Reclaim water distribution system piping shall be sized in accordance with the good design procedures, and master plan for reclaim water. The minimum pipe size for reclaim water shall be four (4") inches. The design shall provide adequate pressure throughout the system, or as directed by the Town of Pittsboro.

Installation

All utility extension permits must be obtained prior to construction. All reclaimed water mains shall have a minimum cover of 4 feet measured from the top of the pipe to the finished grade. When reclaimed water mains are installed along a roadway, which does not have curb and gutter, the reclaimed water main shall be installed at sufficient depth to prevent conflict with future road improvements or vertical alignment changes.

DISTRIBUTION PIPING, VALVING, OUTLETS, AND OTHER APPURTENANCES

All new distribution piping in the reclaimed water system, including service lines, valves and other appurtenances shall either be colored purple, and embossed, or be integrally stamped/marked with the words "CAUTION: RECLAIMED WATER – DO NOT DRINK," or be installed with a purple identification tape, and a purple polyethylene vinyl wrap. All PVC pipe shall be colored purple, and text identified as described above, no exceptions. The warning shall be stamped on opposite sides of the pipe and repeated every 3-feet or less.

Existing potable or non-potable water lines that are being converted to reclaimed water use should first be accurately located and tested in accordance with regulatory requirements. If required, the necessary actions to bring the line and appurtenances into compliance with regulatory standards should be taken. If the existing lines meet approval of the reclaimed water supplier and NCDENR,

the lines can be approved for reclaimed water distribution. If verification of the existing lines is not possible, the lines should be uncovered, inspected, and identified prior to use.

- Polyethylene wrap shall be used on all buried ductile iron pipe, fittings, gate valves and other appurtenances shall either be painted Pantone 522 purple and/or wrapped with a Pantone 522 purple polyethylene membrane conforming to ANSI A21.5, or installed in accordance with AWWA C105. The polyethylene sheets shall be 10 mils thick, minimum.
- Marker balls approved by the Town of Pittsboro shall be installed along reclaimed water lines at a maximum spacing of 100-ft and depth not to exceed 2-ft. Generally, these can be the non-programmable type balls. Additionally, the programmable style marker balls shall be provided at all bends, fittings and reducers. These ‘smart balls’ shall be loaded with the following information: depth to pipe (from the ball), diameter of the pipe, type of fitting or feature, pipe material. All electronic marker balls shall be provided in purple color for reclaimed water and shall be designed to reflect a specific signal back to the electronic locator. The electronic marker balls shall be installed during pipe laying and provisions shall be made to assure they are not damaged during backfill operations. Electronic marker balls shall be tested by the utility contractor at the completion of backfill operations to assure they are all working properly. Any defective units shall be replaced. All marker ball locations shall be provided on the as-built drawings and the coordinates of these markers shall be provided as append points file, GIS shape file or equivalent.
- Identification tape shall be required for all reclaimed water piping. Identification tape shall be prepared with white or black printing on a purple field (Pantone 522) having the words “CAUTION: RECLAIMED WATER – DO NOT DRINK.” The overall width of the tape should be at least 3 inches.

Identification tape shall be installed on the top of the distribution piping longitudinally and should be centered over the pipe. Identification tape shall be installed 12-15 inches above the top of the reclaimed water pipe. Identification tape shall be continuous in its coverage or be provided with overlapping flaps and shall not be attached directly to the pipe.

The identification tape differentiating the reclaimed water piping from other utility lines should be consistent throughout the service area.

All PVC piping shall be C900, or C905. Pantone 522 purple or equivalent. Cut sheet of material manufacture shall be submitted for approval by the Town, or Town representative.

Pipe size 4 to 12 inch shall be designed, and manufacture in compliance with AWWA C900. Minimum pressure rate of 200 psi, and standard pipe lengths of twenty (20’) feet.

C-900 PVC PIPE SIZES

Nominal Pipe Diameter	Pressure Rating	Diameter Ratio	Wall Thickness (inches)	Outside Diameter
4 – inch	200	18	.267	4.8
6 - inch	200	18	.383	6.9
8 - inch	200	18	.503	9.05
10 - inch	200	18	0.617	11.10
12- inch	200	18	0.733	13.20

Pipe size 16 to 24 inch shall be designed, and manufacture in compliance with AWWA C905. Minimum pressure rate of 200 psi, and standard pipe lengths of twenty (20') feet.

C-905 PVC PIPE SIZES

Nominal Pipe Size	Pressure Rating	Diameter Ratio	Wall Thickness (inches)	Outside Diameter
16 – inch	200	21	.829	17.4
18 – inch	200	21	.929	19.5
20 – inch	200	21	1.029	21.6
24 – inch	200	21	1.229	25.8

All PVC bell joints shall be restrained for both C900 and C905 PVC pipe. The bell joint restraint shall consist of either an approved restrained PVC joint provided by the same manufacturer of the PVC pipe or an approved bell joint restraint harness. All bell joint restraint harness assemblies shall be made of DIP, coated with a manufacturer applied epoxy coating or polyester powder coating, including stainless steel bolts, nuts and rods. The bell joint restraint harness shall be manufacturer approved for use with PVC pipe and rated for at least 200-psi with a 3:1 safety factor.

INSTALLATION AND EXECUTION: The Owner or Contractor shall provide all materials, labor, tools, equipment and incidentals required for excavation, installation, backfilling and testing of water mains and associated appurtenances shown on approved plans.

1. Pipe Installation: Reclaimed water main piping shall be installed in accordance with AWWA C600. Pipe shall be installed on reasonably consistent grade and straight alignments, and all joints shall be properly fitted. All pipe and appurtenances shall be placed in trenches with suitable equipment to prevent damage to materials. Pipe and appurtenances shall not be dropped into the trench. Damaged or defective materials shall be permanently marked and removed from the project.

All foreign matter or dirt shall be removed from pipe and fittings. Pipe interior shall be clean. Pipe that cannot be swabbed clean shall not be used. Materials with evidence of oil, tar or grease shall be permanently marked and removed from the project. Chlorine powder or tablets shall not be placed in pipe during installation.

Pipe jointing shall be accomplished according to manufacturer requirements. Bell and spigot shall be cleaned and lubricated before jointing. Pipe installation shall progress with bell ends facing the laying direction. Manufacturer's maximum allowable joint deflection shall not be exceeded.

Pipe cutting for inserting valves, fittings or closure pieces shall be square, neat and properly chamfered according to manufacturer requirements.

During installation, electrical continuity shall be maintained between valves. If a wire is cut or otherwise requires splicing, the ends of the wire shall be bared, twisted together and connected with an electrical "twist cap".

While backfilling the reclaim water main trench, locator tape shall be placed 24 inches above pipe. Locator tape shall bear the words: "Warning – Reclaim Water Main Below".

2. When a water main must cross over a sewer main, the bottom of the water main shall be at least 18 inches above the top of the sewer main. If this separation cannot be obtained while maintaining the required cover, both the water and sewer mains shall be ductile iron pipe, with joints equivalent to water main standards, for 10 feet on each side of the point of crossing. A joint of water main pipe shall be centered at the point of crossing.
3. When a water main must cross under a sewer main, both the water and sewer mains shall be ductile iron pipe, with joints equivalent to water main standards, for 10 feet on each side of the point of crossing. A section of water main pipe shall be centered at the point of crossing. Vertical separation between the top of the water main and the bottom of the sewer main shall be minimum 12 inches.
4. When a water main crosses over or under a storm sewer, vertical separation between the pipes shall be minimum 18 inches unless both pipes are ductile iron or encased in concrete for 10 feet either side of the crossing.
5. All pipe material shall be installed in accordance with AWWA C605. All pipe material shall be installed at a Type 4 laying condition as specified by AWWA C605 for depth of installation from 4-ft to 10-ft measured from the top of the pipe. The Type 4 laying condition requires the pipe to be bedded on a minimum of 4-inches of select granular material that will conform to the bottom of the pipe. The same material shall be used for backfill around haunches, and to a minimum of 12-inches above top of pipe. Select granular material shall consist of Class 1 or Class 2, well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain no more than 10 percent by weight of material passing a 0.075 mm (No. 200) mesh sieve and no less than 95 percent by weight passing the 25 mm (1 inch) sieve as defined by ASTM D2321. Pipe laying on a flat bottom trench is unacceptable.

Class 1 or Class 2 embedment material shall be compacted to the top of the pipe at 95% or greater Proctor density. Careful attention shall be placed on compacting embedment under the haunches of the pipe to prevent any potential voids. When using mechanical compactors, avoid contact with the pipe. When compacting over the pipe crown, a minimum cover of at least 12-inches or more in conformance with the manufacturer's requirements shall be maintained over the top of the pipe prior to compacting. The maximum embedment sizing shall be limited to materials passing a 3/4-inch sieve for angular materials or 1-1/2-inches for rounded rock. Embedment materials consisting of select material or native soils shall be well

drained, granular, free of rocks, and other foreign materials and shall be selected and placed to prevent gouges, crimping, or puncture of pipe, joints or appurtenances.

Valves, and appurtenance

Valves shall be installed on all branches from feeder-reclaimed water mains according to the following schedule: 4 valves cross, and 3 valves at tees.

Setting Valves and Valve Boxes: Valves shall be set at locations shown in approved plans. Valve to pipe connections shall be mechanical joint. A cast iron valve box shall be installed, accurately centered over the valve operating nut. Valve boxes shall be installed to the project finished grade. When not in pavement, the valve box shall be protected with a precast concrete donut. The donut shall be dug into the ground approximately two inches so the donut is level, fully flush with the ground and even with the top of the valve box. Valve boxes in paved sections shall be finished flush with final grade and shall be supported at the top with a poured concrete collar at least 2-1/2 feet in diameter.

Testing standards when connecting to an existing system may require that 4 valves ultimately be located at crosses, 3 valves at tees, etc. beyond the minimum standard to assure adequate testing can be achieved. In such cases, the valves shall be shown on the plan drawings and included in the testing plan submitted by the Engineer of record.

Where no reclaimed water line intersections exist, a main line valve shall be installed at every distance of 500 feet between valves, or as approved by Town Engineer, Public Works Director, or the representative.

All valves for reclaimed water applications, 12-inches in diameter and smaller shall be resilient seated wedge gate valves in conformance with the requirements of AWWA C509, (grey or ductile iron body) or AWWA C515, (reduced wall ductile iron body) and provided with a full circumferential pipe opening. All gate valves shall be designed for a working pressure of 250-psi with a minimum ULFM rating of 200-psi. Gate valves shall be fusion-bonded epoxy, (FBE) coated both interior and exterior at a minimum of 10mils and the FBE coating shall be provided in conformance with AWWA C550. All gate valves shall be assembled with stainless steel bolts.

All gate valves 12-inches in diameter and smaller shall be installed in the vertical position and shall be provided with mechanical joint fittings. Gate valves shall be restrained by wedge action retainer glands or other approved manufacturer provided restraining systems. In all cases, the valve and piping shall be restrained on both sides to sufficiently allow the valve to function as a dead end.

All gate valves shall open left with a non-rising stem and be provided with a 2-inch square operating nut. All gate valves shall be constructed with triple O-ring seals in which 2 O-rings are located above the thrust collar and 1 O-ring is located below the thrust collar. The two upper O-rings shall be replaceable with the valve fully open and subjected to full rated working pressure.

The gate valve wedge shall be fully encapsulated in molder rubber and fully retractable. All valves shall be rated for bi-directional flow. All sealing gaskets shall be made of EPDM rubber materials.

Gate valves 16-inches through 24-inches shall comply with all specifications outlined for gate valves

12-inches and smaller in the previous section including the 250-psi pressure rating. Gate valves 16-inches through 24-inches shall be fabricated exclusively with ductile iron construction in conformance with AWWA C515.

As additional requirement, gate valves 16-inches through 24-inches if installed vertically shall be provided with a minimum of 2-ft of overhead clearance between the top of the operator nut and the finished subgrade. Gate valves 16 through 24 inches in diameter shall be provided with a 4:1 spur gear reducer.

Gate valves, sixteen (16) inches and larger, installed in a horizontal position, shall only be provided, as permitted by the Director of Engineering for special circumstances where vertical alignment is not possible. All horizontal gate valves shall meet or exceed the specifications outlined herein for vertical gate valves including the 250-psi pressure rating. All horizontal gate valves shall be equipped with bevel gears resulting in 4:1 or 6:1 turn ratios through 24-inches in diameter.

All gate valves for reclaimed water applications shall be painted purple, Pantone 522 with approved field application paint by the contractor prior to installation or otherwise wrapped in purple polyethylene wrap for required identification as a reclaimed water valve.

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 10 feet as shown in the Details. If reducers cannot be rodded, concrete blocking or other restraining methods will be required. The maximum depth of the valve nut shall be 5 feet. When valve extension kits are used, they must be manufactured by the same company, which manufactured the valve.

Combination Air Values

Combination air valves shall be provided to purge air from the system at startup, vent small pockets of air while the system is being pressurized and running, and prevent critical vacuum conditions during draining. Combination air valves approved for use in reclaimed water installations shall be installed at all high points of reclaimed water lines 8 inches in diameter or larger and at other locations, such as major changes in slope, as directed by the Town. A high point shall be determined as any high location where the difference between the high elevation and adjacent low elevation exceeds 10-ft unless otherwise determined by the Public Works Director based on special circumstances. The combination air valve shall automatically exhaust large volumes of air from the system when it is being filled and allow air to re-enter the pipe when the system is being drained. The reclaimed water main shall be installed at a grade, which will allow the air to migrate to a high point where the air can be released through an air valve. A minimum pipe slope of 1 foot in 500 feet should be maintained. The valve shall have a minimum two (2) inch NPT inlet and 200-PSI working pressure. Combination air valves shall be sized by the Engineer and approved by the Town.

Combination air valves shall be of the single housing style with Type 304 or 316 stainless steel body that combines the operation of both an air/vacuum and air release valve. The valve must meet the requirements of AWWA C512 and be installed in accordance with the Details.

The valve shall have a minimum two (2) inch NPT inlet and the inlet body shall be rated for minimum 250-PSI working pressure. Combination air valves sized from 2-inches to 4-inches shall be provided with NPT inlets and outlets unless otherwise submitted for approval with flanged connections. The combination air valve shall be provided with cylindrical shaped floats and anti-

shock orifice made of high-density polyethylene. Combination air valves with spherical floats shall not be accepted. All combination air valves shall be installed in accordance with the Details.

The combination air valve shall be installed in standard eccentric manhole as shown in the Town approved detail drawings. The combination air valve shall be provided with a controlled diameter saddle tap in the same sizing as the combination air valve assembly and isolated with a gate valve of the same size. The isolation gate valve shall be provided with NPT threads and connected with “no lead” brass or bronze ball valves may be used in lieu of gate valves for installations’ 2-inches or smaller. The isolation valve shall be rated for 200-psi service or **greater**.

The contractor shall paint the inside of all manholes housing ARV’s with Pantone 522 purple paint and stencil the words “CAUTION: RECLAIMED WATER – DO NOT DRINK” on the outside of the manhole in at least 2 locations on both sides of the ASRV. The lettering shall be at least 3-inches in height and be painted in black visible paint that can be easily noticed from ground level.

Valve Boxes

Valve boxes shall be cast iron, screw or telescopic type, with a 5 inch opening. Valve box ring adjustments will not be allowed.

Valve box covers shall be square in shape (NOT round) and shall be designed for AASHTO H-20 truck loadings. All valve box covers shall be of non-interchangeable shape with potable water covers, and cast on the top surface with a recognizable inscription indicating “RECLAIMED WATER”. All valve box covers shall be painted, Pantone 522.

The valve box shall be centered over the operating nut and seated on compacted backfill without touching the valve assembly. All valve boxes shall be encased in a trowel finished 2' x 2' x 6" pad of 3000-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 not be used for valve box encasement outside of paved areas. The maximum depth of the valve nut shall be 5 feet. When valve extension kits are used, they must be manufactured by the same company that manufactured the valve.

Appurtenances

Pipe fittings shall conform to AWWA C153 for compact fittings. Fittings shall be mechanical joint in accordance with AWWA C111. Fittings shall be ductile iron with a minimum working pressure rating of 250 psi.

Fittings shall be cement mortar lined and seal coated in accordance with AWWA C104. Fittings shall have an outside coating of bituminous material that is maintained through storage, handling and installation. Fittings shall not be installed without a complete and thorough bituminous coat. All fittings shall be restrained to C900 or C905 pipe with an approved wedge action retainer gland or other approved restraining method. All DIP fittings for reclaimed water use shall be identified by painting or wrapping with polyethylene wrap in Pantone 522 purple. At the discretion of the Town of Pittsboro, Meg-a-lug retainer glands may be accepted in certain instances when joint restraint is required.

Blow offs installed on reclaimed water mains at the end of cul-de-sacs shall be a minimum of 2 inches. Where there is not sufficient pressure to thoroughly flush the system, a larger blow off will be required.

Blow off assembly sizing for distribution mains, 4-inches through 8-inches in diameter, shall be the typical 2-inch assembly as shown in the Town approved details. The 2-inch valves shall be gate type provided with threaded connections with a non-rising stem and a 2- inch operating nut, O-ring seals and screwed ends. A full size valve is required on mains that are planned to be extended. Typical 2-inch blow off assemblies shall be provided with SDR 21 purple PVC pipe rated at 200-psi and labeled for use with reclaimed water systems. The SDR 21 PVC pipe shall be joined with bell and spigot joints restrained by solvent weld. The PVC pipe shall be joined to the threaded connections of the 2-inch gate valve with PVC transition couplings with metal threads. The metal inserts of the transition couplings shall be made of stainless steel, “no lead” brass or bronze. The transition couplings shall be connected to the gate valve with threaded “no lead” brass nipples. Threaded PVC pipe and joints with connections threaded in PVC shall not be allowed. All threaded connections shall be provided with metal threads to maintain the pressure rating of the blow off assembly.

For blowoff assemblies on main lines larger than 8-inches in diameter, a blowoff assembly design including calculations for sizing shall be provided by the design engineer of record and approved by the Engineering Department.

- a) All blowoffs shall drain to the nearest sanitary sewer manhole when there is a sewer manhole within 200-ft. In cases where a sewer manhole is not within 200-ft, the blowoff assembly may be omitted at the discretion of the Town Engineer, and or Public Works Director in cases where another blowoff assembly is in close proximity.
- b) All blowoff assemblies for reclaimed water installations in which the system will be initially charged with potable water, shall be required to maintain an air gap separation from the blowoff discharge pipe to the sanitary sewer manhole.
- c) A typical potable water blowoff assembly may be utilized in lieu of a standard reclaimed water blowoff assembly, in cases where a dead end reclaimed water main

An approved Pantone 522 purple is required to meet color identification requirements and referenced herein as the color code identification for reclaimed water piping, valves and other appurtenances. Field application of Pantone 522 purple to valves, fittings, manholes and other appurtenances shall be implemented in conformance with manufacturer specifications including surface preparation. In all cases a minimum film thickness of 10-mils shall be applied. For applications open to daylight, the paint shall have UV protection. The paint shall consist of a two coat system consisting of a part high solids cured epoxy as the primer with a polyurethane top coat. For applications not exposed to sunlight, the paint shall be a two coat application of a high solids cured epoxy.

All fittings, valves, blowoffs and appurtenances other than pipeline joints shall be restrained with approved wedge action retainer glands. All wedge action retainer glands shall be manufactured as a one piece retainer gland for use with typical DIP mechanical joint fittings, gate valves and PVC C900 or C905 pipe. The wedge action retainer glands shall be rated to provide restraint up to a 200-psi pressure rating for sizes through 24-inches with a safety factor of 3:1. Approved wedge action retainer glands shall be made of ductile iron, coated with a manufacturer applied epoxy coating or polyester powder coating, including stainless steel bolts and nuts.

RECLAIMED WATER SERVICE TAPS

Individual reclaimed water services and multiple branch services shall be provided from the reclaimed water main to each reclaimed water meter in accordance with the Town approved details. Multiple branch services for reclaimed water shall not exceed 2 branch lines unless otherwise approved by the Public Works Director. All connections shall be made by wet taps. Service connections shall be made perpendicular to the reclaimed water main and shall run straight to the reclaimed water meter.

All reclaimed water meter boxes and vaults shall be located at the edge of the serviced lot's right of way or easement. Reclaimed water meter boxes shall not be placed in streets, sidewalks, parking areas or obstructed by fencing or buildings. Exceptions to these conditions will be at the direction of the Public Works Director.

Provisions for backflow prevention shall be in accordance with the NC Plumbing Code for plumbing. Normally no backflow provisions will be necessary on reclaimed water systems. Approved backflow prevention devices shall be required on the potable water system for all customers with reclaimed water service.

The reclaimed water meter shall be sized based on applicant water budget calculations using the approved method. The minimum size of reclaimed water meters and services shall be 1-inch diameter. Multiple branch service sizing shall be determined by the designer.

Service taps to existing reclaimed water mains shall be made by a licensed utility Contractor of the Developer.

Materials

Direct taps shall not be allowed with C900 or C905 PVC pipe for reclaimed water mains. The maximum size for saddle taps is 2-inches in diameter.

All taps larger than 2-inches shall be installed by inline fittings or tapping sleeves. All tapping of C900 or C905 PVC reclaimed water mains shall be implemented with shell type cutting tools classified for use with PVC pipe that retains the coupon cut while penetrating the pipe wall. Twist drill bits and auger bits shall be prohibited.

All service saddles shall be fabricated with an 85-5-5-5 waterworks brass and fabricated in a controlled diameter configuration to prevent over tightening the bolts and distorting or stressing the PVC pipe. Service saddles shall provide full support around the entire circumference of the pipe. All service saddles shall be manufacturer approved for use with C900 PVC pipe in conformance with AWWA C800. Service saddles shall be provided in a 2-piece bolted design for 4-inch through 8-inch pipe diameters and in a 3-piece assembly for 10-inch and 12-inch diameters. All service saddles shall be provided with an EPDM rubber gasket o-ring design in conformance with ASTM D2000. Service saddle outlets shall be provided with AWWA tapered threads.

MJ tapping sleeves shall be fabricated of cast iron or ductile iron construction in a two-piece assembly with mechanical joint connections to the main line and flanged connection to the tapping valve. All MJ tapping sleeves shall be rated for a working pressure of 200-psi or greater and provided

with a 1-inch test plug for testing. All tapping sleeves shall be hydrostatically tested up to 200-psi before a tap is made. Tapping sleeves shall NOT be air tested.

All mechanical joint tapping sleeves shall be manufacturer fabricated and approved for installation on the specific main line pipe material, whether C900 or C905 PVC pipe. In all MJ tapping sleeve applications, the tapping sleeve and tapping valve shall be provided by the same manufacturer.

Stainless steel tapping sleeves may be used in lieu of mechanical joint tapping sleeves for C900 PVC reclaimed water mains 6- inch through 12-inch in diameter at sizing as shown in the following table. All stainless steel tapping sleeves shall be manufactured in conformance with AWWA C223. All SS tapping sleeves shall be provided in a two piece assembly with a full circumferential gasket and a ¾ inch teat plug. The back band shall be a minimum 14 gauge stainless steel and the front band (where the outlet is located) shall be a minimum 12 gauge stainless steel. The bolt bars shall be a minimum 7 gauge stainless steel. All SS tapping sleeves shall be manufacturer rated for a working pressure of 200-psi or greater and hydrostatically tested to 200-psi before a tap is made. Stainless steel tapping sleeves shall NOT be air tested.

STAINLESS STEEL TAPPING SLEEVE SIZES

NOMINAL MAIN SIZE (inches)	NOMINAL BRANCH Size (inches)
6	4
8	4
8	6
10	4
10	6
12	4
12	6
12	8

Tapping saddles shall not be used with PVC pipe.

Corporation Stops shall be ball type, fabricated with “no Lead” brass. The inlet shall have AWWA Standard threads as per AWWA C800. Taps shall be located at 10:00 or 2:00 o'clock on the circumference of the pipe. The outlet connection of the corporation stop shall be sized for IPS, Iron Pipe Size polyethylene piping and provided with a solid stainless steel insert stiffener manufactured by the same manufacturer of the corporation stop ball valve. The outlet connection to the polyethylene service piping shall be by compression connections provided with the corporation stop ball valve.

Service taps shall be staggered alternating from one side of the reclaimed 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. No tapping shall be made within 3-ft of the end of the reclaimed water main.

Polyethylene service piping shall be provided as minimum 1-inch to maximum 2-inch, IPS, (iron

pipe size), inside diameter controlled, piping in conformance with ASTM D2239 and rated for 200-psi. All polyethylene service piping shall comply with NSF14, AWWA C901 and meet all requirements of PE 3710 code designation. The piping shall be provided with no breaks or fittings in service installation lengths of 100-ft or less. All polyethylene service piping shall be provided in purple color, Pantone 522, for reclaimed water applications with the words, “CAUTION – RECLAIMED WATER DO NOT DRINK” labeling the piping as reclaimed water service piping. All PE piping shall be provided with tracer wire. Tracer wire shall be a 12 AWG, UL listed solid copper conductor wire with a minimum 30-mil purple polyethylene jacket, rated for buried service and attached in at least 3-ft intervals with non-metallic fasteners. The tracer wire may be attached to the pipe by the pipe manufacturer or attached in the field. The tracer wire shall be connected visibly inside the meter box for use by Town of Pittsboro utility locating staff. All connections to PE piping shall be provided with stainless steel insert stiffeners provided by the same manufacturer of the corporation stops and/or the meter setters and approved by the manufacturer for use with PE piping.

The minimum service size for reclaimed water copper setters is 1-inch in diameter. “Coppersettters” shall consist of “no lead” brass components (meeting UNS C89833 as per ASTM B584) and be installed in reclaimed water applications as shown in the details and provided with a lockable, full port “no lead” ball valve on the inlet side of the meter and a second full port “no lead” ball valve on the outlet side of the meter. “Coppersettters” shall be provided in a 15-inch vertical rise at the shape and configuration shown in the Town approved details. “Coppersettters” shall be installed in the center of the meter box such that the top of the inlet and outlet piping is visible for inspection. “Coppersettters” shall be provided with “no lead” compression connections sized for polyethylene piping as specified herein for both inlet and outlet connections. Typical saddle nuts shall be provided with reverse or left hand threads for connecting reclaimed water meters with reverse or left hand threads. The top of the ball valve shall be text identified for use with reclaimed water by a manufacturer installed metal tag.

Reclaimed water meters for 1-inch services will be provided by the Town of Pittsboro with reverse or left hand threads. Reclaimed water meters shall be color identified by purple Pantone 522 cover and casing.

Meter boxes for 1-inch reclaimed water services shall be made of heavy duty fiberglass reinforced polymer. The box shall be molded as one piece and provided in a circular shape with a diameter of 20-inches and a depth of 24-inches. The box shall be provided with pre-cut entry areas approximately 3-inches wide by 4-inches high for the service pipe entrance and exit. The plastic box shall be provided in purple color dyed into the fiberglass construction. The meter box cover shall be made of light weight polymer concrete dyed purple, Pantone 522 with the words, “CAUTION RECLAIMED WATER-DO NOT DRINK”, embossed in the cover. The meter box cover shall be provided as a solid polymer cement cover with no reader door. The meter box cover shall be provided with 1 stainless steel locking bolt. The stainless steel locking bolt shall be provided in a penta head configuration. The box and cover shall be load rated for a vertical load of 20,000-lbs. The inside of meter box shall be labeled indicating, “CAUTION RECLAIMED WATER-DO NOT DRINK” in lettering at least 1-1/2 inches in height that is clearly legible when opening the cover. All fittings and connections shall be “no lead” brass conforming to UNS C89833 as ASTM B584.

Meter Boxes for 1-1/2” and 2” services shall be made of fiberglass reinforced polymer and provided with heavy duty rated polymer concrete covers as indicate in the Standard Details. All meter box covers shall be consistently color-coded purple (Pantone 522 C) and marked on the top surface with recognizable inscription indicating “RECLAIMED WATER-DO NOT DRINK”.

TESTING AND INSPECTION

Pressure Testing Water Mains: Following installing, pressure testing shall be performed on all pipe, valves, hydrants, and fittings. Pressure tests shall be conducted on line segments from shut valve to shut valve in segments not exceeding 1,000 linear feet except as directed or approved by the Town of Pittsboro. Longer test sections may be allowed on transmission mains where valve spacing is greater.

The Contractor shall provide a suitable pump and an accurate pressure gauge. Hydrostatic pressure and leakage testing shall conform to ANSI/AWWA C600 for ductile iron pipe and ANSI/AWWA C605 for PVC pipe.

Pressure tests shall be conducted at 150 psi or 1.5 times the maximum operating pressure, whichever is greater. Test duration shall be 2 hours minimum. The acceptable leakage rate shall be as follows.

$$Q = \frac{L * D * \sqrt{P}}{148,000}$$

Where: Q = allowable leakage rate, in gallons per hour
 L = length of pipe tested, in feet
 D = nominal diameter of the pipe, in inches
 P = average test pressure (gauge) during the leakage test, in psi

Acceptance of water mains shall be based on allowable leakage, as described above. The Contractor shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance. All visible leaks shall be fixed regardless of measured leakage.

Pressure tests will not be considered acceptable and will not be approved without a representative of the Town of Pittsboro present. 48-hour notice shall be given to the Town prior to pressure testing.

The Contractor shall pre-test all water mains before requesting pressure test observation from the Town of Pittsboro. No pressure tests will be observed without the Contractor's first pre-testing the water mains.

Excessive site visits will not be tolerated. In the event that more than two site visits are required for a segment of water main to pass pressure testing, the Town of Pittsboro shall bill the Owner for the additional visits at a rate of \$105 per hour.

Disinfecting Reclaimed Water Mains and Other Appurtenances

Disinfection of new potable water supply system components shall be in accordance with the North Carolina Department of Environment, and Natural Resources, Rules Governing Public Water Systems, NCAC Title 15A, Subchapter 18C Section .1003 and the requirements of AWWA C651.

Reclaimed Water mains shall not be placed in service until all final submittals are provided and the Town of Pittsboro has approved the project for service. It is the responsibility of the Owner/Contractor to coordinate water main disinfection with the submittal of close-out materials.

All water mains shall be pigged and thoroughly flushed prior to disinfecting.

Disinfection shall be performed by pumping a solution of HTH and water (potable water obtained from the metered connection) into the new reclaimed water mains (and services) so that a chlorine residual concentration of at least 50 milligrams per liter (50 ppm) remains in the lines. The chlorine solution shall be pumped in at a constant rate so that a uniform distribution is produced in the lines. Valves and hydrants shall be adequately exercised to aid in uniformly distributing the chlorine solution.

The chlorine solution shall remain in the lines for a minimum of 24 hours and a maximum of 48 hours at which time the residual concentration shall be no less than 10 ppm. Residual chlorine levels shall be demonstrated to be at least 10 pm or the Town shall require the lines to be re-chlorinated before bacteriological testing is conducted.

At the end of the contact period and prior to bacteriological testing, the chlorine solution shall be thoroughly flushed from the water mains to no more than the normal chlorine residual in the distribution system. Flushing shall occur at hydrants and/or service connections and discharge shall be to a suitable point that will not result in flooding, erosion or flow into the sanitary sewer system

Extreme care shall be taken to insure that high-concentration chlorine solution does not enter existing water mains.

Bacteriological Sampling: After Reclaimed water mains have been disinfected and flushed, the Owner/Contractor shall collect samples for turbidity and bacteriological analysis for each section of pipe tested. At least one sample shall be collected for every 1000 feet of water main. Sample collection shall be performed under the supervision of the Town of Pittsboro or a certified laboratory and shall follow proper chain of custody procedures. Samples shall be collected at locations determined by the Town of Pittsboro. Samples shall be analyzed by a certified laboratory meeting the certification requirements of NCDENR.