

Proposed changes to current Town of Pittsboro Standard Specifications, and Details

Monday, November 09, 2015

Proposed changes to Standard Specification Section 6 General Provision Reclaimed Water Distribution System

Current	New
	This is a new Specification all together

Town of Pittsboro Standard Specification

Section 6

General Provision Reclaimed Water Distribution System

JURISDICTIONAL AGENCY APPROVAL

All reclaimed 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 Quality (DEQ), 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

Reclaimed 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 wide, and recorded as "Town of Pittsboro Utility Easement." The dedicated easement shall contain Town utilities unless otherwise approved by the Town Manager, Town Engineer, or Public Utilities Director through an approved encroachment agreement. Where the twenty (20') feet wide 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 Utilities 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 (s), including appropriate protection measures of potable water, reclaimed water, and sanitary sewer mains, and access for maintenance purposes.

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

(A) Water mains shall be laid at least 10 feet laterally from existing or proposed reclaimed/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 reclaimed/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 Reclaimed Water, or Sanitary 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 reclaimed water service piping, and appurtenances shall be identified in conformance with North Carolina Plumbing Code.

Sizing

Reclaimed 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 three (3') feet measured from the top of the pipe

Each of these variables may affect the anodic and cathodic polarization characteristics of a metal in soil. The most corrosive soils have high content of:

- Moisture
 - Electrical conductivity
 - Acidity
 - Dissolved salts
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- 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.
 - Where approved by the Town of Pittsboro the use of tracer wire maybe used instead of the marking balls. The tracer wire shall be purple in color, and 18 gauge wire
 - 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 twenty-four (24") 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. **The use of C901 rolled tube/pipe is not allowable.**

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 – Reclaimed Water Main Below".

2. PVC pipe shall be installed in accordance with AWWA C605. At a minimum, all PVC pipe shall be installed at a Type 4 laying condition as specified by AWWA C605 for depth of installation from three (3') feet to ten (10") feet 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. 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 8-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

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 Public Utilities Director 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

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

All reclaimed water meter boxes and vaults shall be located at the right of way or easement of private property. 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 discretion of the Public Utilities 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, or Ductile Iron 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 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.

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. "Coppersettlers" 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.

"Coppersettlers" shall be provided in a 15-inch vertical rise at the shape and configuration shown in the Town approved detail. "Coppersettlers" shall be installed in the center of the meter box such that the top of the inlet and outlet piping is visible for inspection. "Coppersettlers" 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 one (1) stainless steel locking bolt. The stainless steel locking bolt shall be

drop below the minimum prescribed test pressure. If the pressure in the pipe test section has not stabilized by the end of the testing period, a hydrostatic retest will be required. Each section of a new line between sectionalizing valves or between the last sectionalizing valve and the end of the project shall be tested separately as required in AWWA C-600, and/or as modified in these specifications, except that any such section less than 500 feet in length may be tested with the adjacent section, if both sections of line have the same pipe class rating. No section greater than 1/2 mile in total pipe length shall be tested without special written permission of the Public Utilities Director.

Testing Allowance/Makeup Water: Makeup water volume shall be determined after the pressure test has been satisfactorily completed and all backfilling and compaction has been completed to top of trench. Testing allowance shall be defined as the maximum quantity of makeup water necessary to be supplied into the pipe line section under test to restore the ending test pressure to the beginning test pressure, after the pipe line has been filled with water and all air expelled. The Contractor shall furnish the necessary apparatus and assistance to conduct the test.

The duration of each makeup water test shall be at least 2 hours. To pass the allowance testing, the quantity of makeup water from the pipe line shall not exceed the makeup water quantity allowed by the following formula, from AWWA C-600:

$$M = \frac{SD \sqrt{P}}{148,000}$$

- M = testing Allowance (makeup water), in gallons per hour.
- S = length of pipe tested, in feet
- D = nominal diameter of pipe, in inches.
- P = test pressure of the pipe being tested, per 610.15 (A)

Should the test on any section of the pipe line require more makeup water than allowed by the above formula, the Contractor shall locate and repair the defective pipe, fittings, or joint until the makeup water volume is within the specified allowance. All repairs and retests, if required, shall be made at the Contractor's expense. Connections to the existing pipelines or existing valves shall not be made until after that section of new construction has satisfactorily passed the hydrostatic tests.

Ductile iron pipe used in conjunction with ACP will be tested to the ACP standards, unless otherwise directed by the Engineer.

High pressure systems of all ductile iron pipe will be tested in accordance with AWWA C-600, Section 4.1. 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.

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 NCDEQ.

CONTRACTOR CERTIFICATION OF INSTALLATION PROCEDURES:

When requested in the Special Provisions or by the design engineer prior to installation, the Contractor shall furnish to the Town of Pittsboro an affidavit (certification) from the pipe manufacturer (or his designee) stating that the Contractor is familiar with the manufacturer's suggested installation methods and procedures and the manufacturer's suggested installation methods and, procedures are consistent with The Town's requirements.

When required by the Special Provisions, the pipe manufacturer or his designee will review the Contractor's methods and, procedures for pipe installation in the field. The Contractor will make any adjustments in the installation as recommended by the manufacturer or his representative. If necessary, the Contractor may be required to reinstall or provide corrections to pipe installed prior to the field review at no cost to the Town. Once the manufacturer, or his representative has reviewed the Contractor's installation methods and the Contractor has adjusted his installation methods as recommended by the same, the manufacturer or his representative shall furnish to the Town of Pittsboro an affidavit (certification) that the Contractor's installation methods and procedures, at the time of the review, complied with the manufacturer's installation practices. The affidavit must provide the name of the manufacturer's representative witnessing the pipe installation