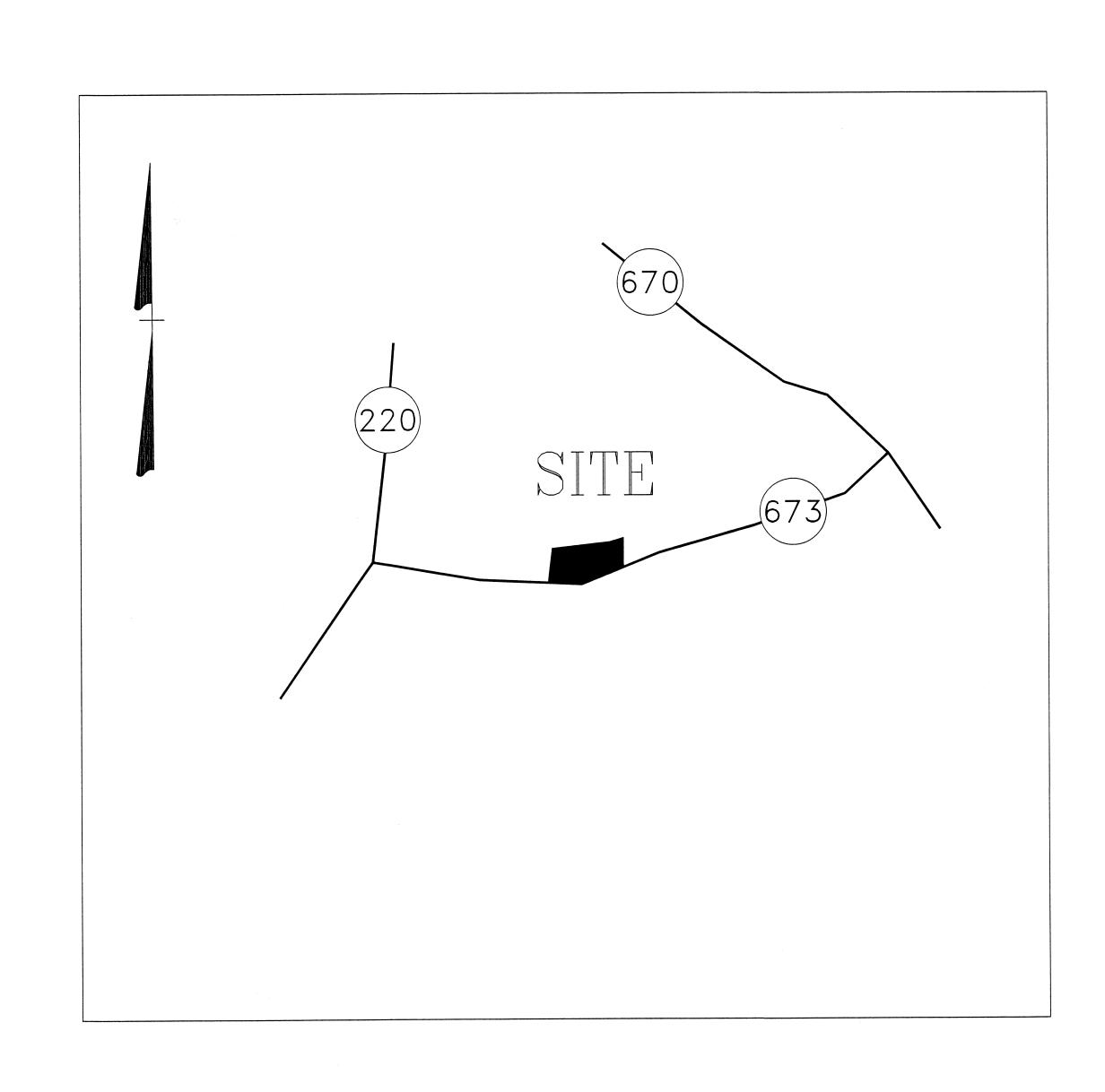
DEVELOPMENT PLANS ASHLEY PLANTATION PHASE 3, SECTION 5 AMSTERDAM MAGISTERIAL DISTRICT BOTETOURT COUNTY, VIRGINIA



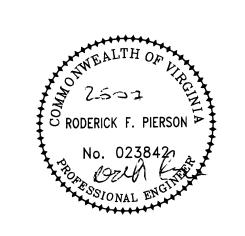
S & R DEVELOPERS, INC. P.O. BOX 950 DALEVILE, VA 24083 PHONE: (540) 293-8575

INDEX OF DRAWINGS

- 1. COVER SHEET
- 2. PLAN SHEET
- 3. PROFILE SHEET
- 4. E & S DETAIL SHEET
- 5. WATER DETAIL SHEET
- 6. SEWER DETAIL SHEET
- 7. SEWER DETAIL SHEET8. WATER AND SEWER NOTES

REV	DATE	DESCRIPTION
1	11/09/05	PER COUNTY COMMENTS
2	12/13/05	PER COUNTY COMMENTS

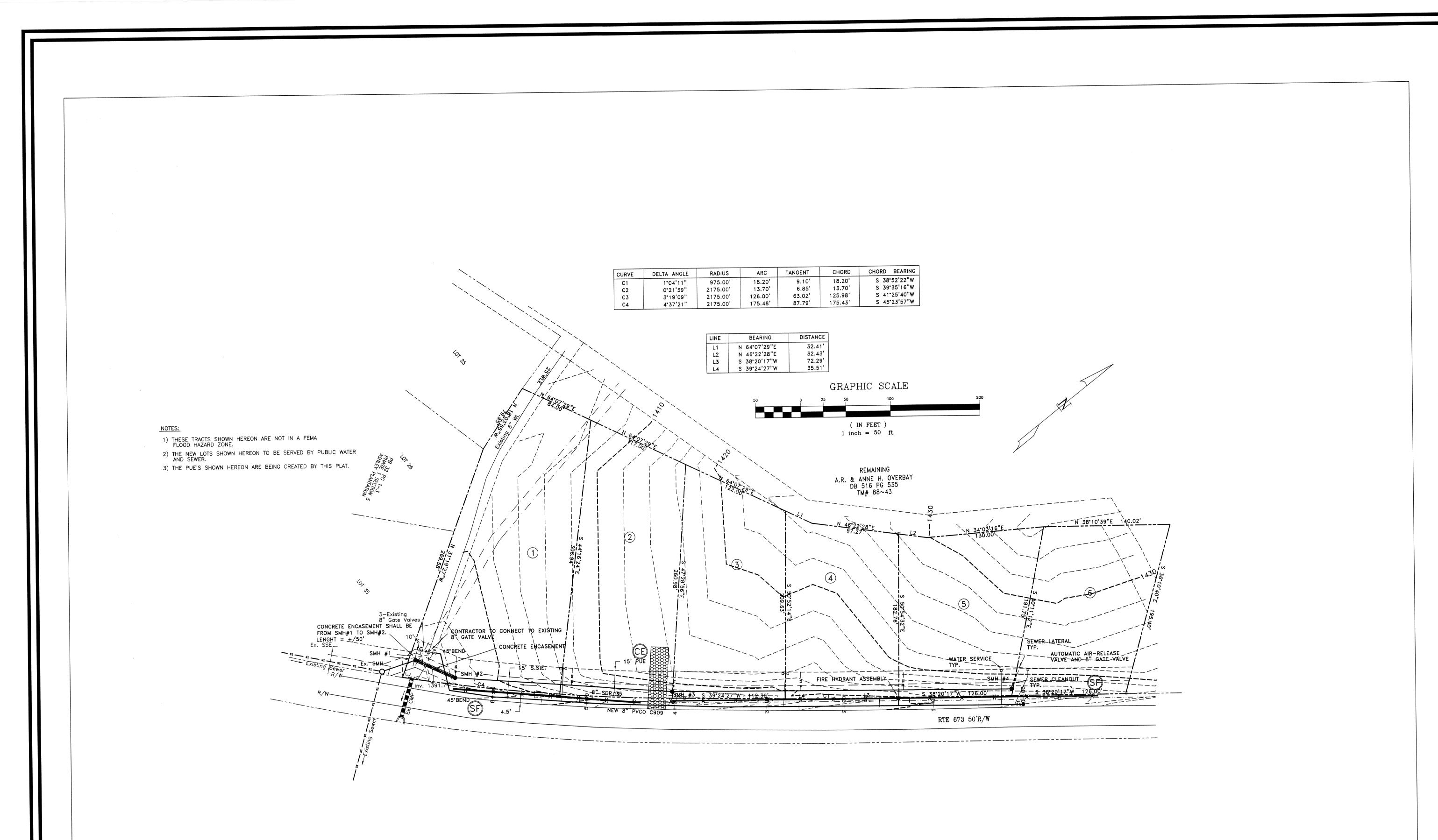
PIERSON ENGINEERING & SURVEYING RODERICK F. PIERSON, LLS, PE P.O. BOX 311 DALEVILLE, VA 24083 540.966.3027 540.966.5906 fax





AS-BUILTS

08/11/05



NO OTHER UTILITIES SHALL BE LOCATED WITHIN THE 15' SANITARY SEWER EASEMENT.

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&
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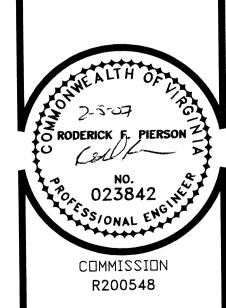
P.O. BOX 311 1324 ROANOKE ROAD DALEVILLE, VA 24083

(540) 966-3027 TEL (540) 966-5906 FAX e-mail: rpierson@rbnet.com

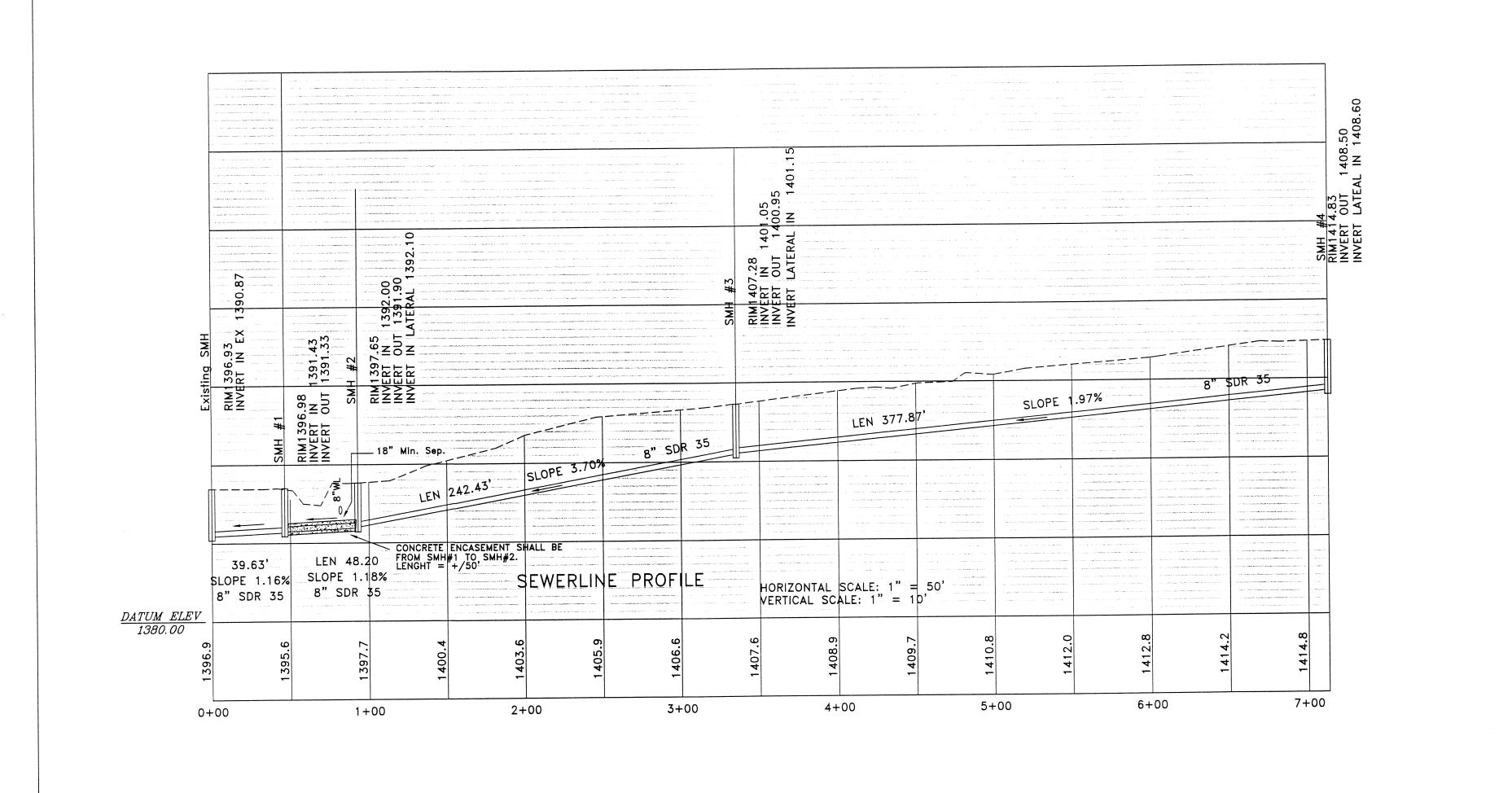
3, SEC. 5

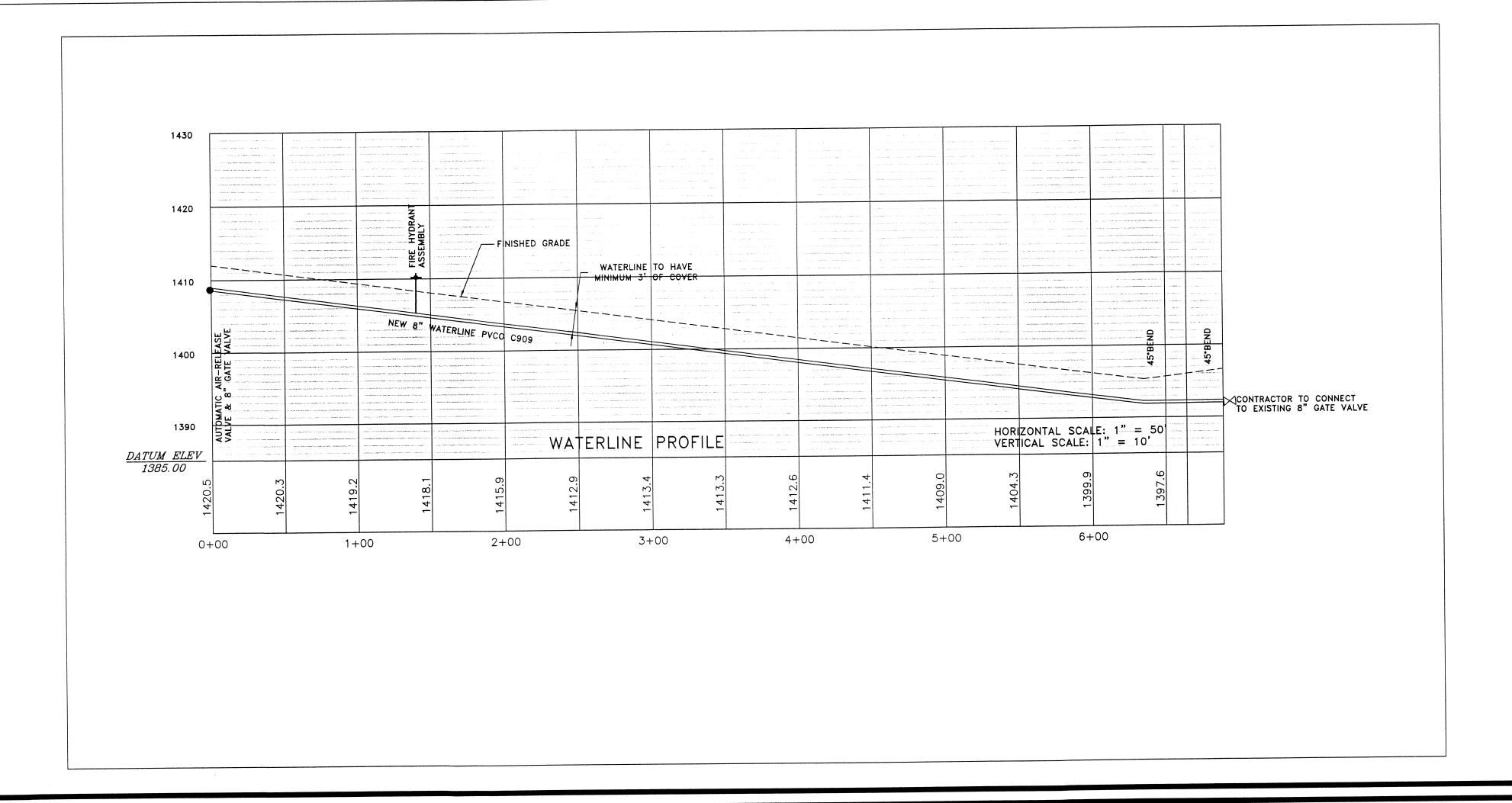
FOR ASHLEY PLANTATION PHASE 3, S BOTETOURT COUNTY, VIRGINIA

PLAN SHEET



AS-BUILTS





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> PEVELOPMET PLANS FOR SHLEY PLANTATION PHASE 3, SEC. BOTETOURT COUNTY, VIRGINIA

PROFILE SHEET

ORDERICK F. RIERSON

NO.

023842

COMMISSION

R200548

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3

AS-BUILTS

Erosion and Control Narrative TITLE SYMBOL Project Description CONSTRUCTION ENTRANCE The project is located in the Ashley area of Botetourt County, Virginia. This plans shows the construction of associated utilities associated with a $\pm/-$ 6 lot subdivision. CONSTRUCTION ROAD STABILIZATION The disturbed area consists of approximately 1.0 acre. It will take approximately 1 month, to install the water, sewer. SILT FENCE *3.05* | —×—×—×—×—× STORM DRAIN INLET PROTECTION Existing Site Condition CULVERT Most of the site consists of sparse trees & fields. INLET PROTECTION The terrain slopes in the 0.5% to 15% range. $\rightarrow \rightarrow \rightarrow$ TEMPORARY DIVERSION DIKE <u> (ST)</u> TEMPORARY SEDIMENT TRAP Adjacent areas The site is bordered on on the north, south and west by open areas, 3.18 OUTLET PROTECTION and to the east by a road. 3.20 ROCK CHECK DAM Soils PS) 3.35 PERMANENT SEEDING Soils found at this site are common to the area. None of these soils have high erosion tendencies.

Critical Areas

Their are no critical erosion areas.

Erosion and Sediment Control Measures

Unless otherwise indicated, all vegetative and structural erosion and sediment control practices shall be constructed and maintained according to minimum standards and specifications of the handbook. The minimum standards of the VESCR shall be adhere to unless otherwise waived or approved by a variance.

Structural Practices

- a. Temporary Construction Entrance (Section 3.02); One temporary construction entrance will be installed.
- b. Silt Fence (Section 3.05)
- Temporary silt fence will be installed as indicated on the site plan.
- c. Culvert Inlet Protection (Section 3.08)
- Culvert Inlet Protection will be installed as indicated on the site plan.
- d. Outlet Protection (Section 3.18)
- Outlet Protection will be installed as indicated on the site plan.

Temporary & Permanent Seeding (Section 3.31 & 3.32) Temporary seeding will be placed on all disturbed areas that will not be brought to final grade within 30 days or less. Temporary seeding will aid in the reduction of dust and sediment. Temporary Seeding (Section 3.31) Rates per acre: Winter - 40 lbs. annual rye and 40 lbs. cereale rye.

Summer - 40 lbs. annual rye and 40 lbs foxtail millet. Fertilizer - 1500 lbs. of 10-18-10 per acre. Lime - 2 tons per acre.

Permanent Seeding (Section 3.32) After final grading, permanent seeding will be employed to reduce erosion and sediment.

Seeding Specifications: Seasonal rates per acre: Aug. 1 to Sept. 15 Feb. 1 to May 15 100 lbs. tall fescue 15 lbs. annual rye

2 lbs. red clover

15 lbs. annual rye 2 lbs. red clover May 16 to July 31 120 lbs. tall fescue 10 lbs foxtail millet

2 lbs. red clover Sept. 16 to Jan. 31 120 lbs. tall fescue 10 lbs. cereale rye

2 lbs. red clover

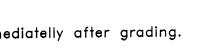
Fertilizer - all seasons - 1500 lbs. of 10-18-10 per acre Lime — all seasons — 2 tons per acre A mulch cover is required on every seeding: Straw at 80 bales per acre or an approved manufactured

mulch/stabilization material. All seeding, with required associated practices, will be in accordance with all applicable sections of the Virginia Erosion and Sediment Control Handbook.

g. Mulching (Section 3.35) To prevent erosion by protecting the soil surface from raindrop impact and reducing velocity of overland flow. Areas which have been permanently seeded shall be mulched immediately following seeding. If fiber mulch is used as part of hydroseeding, no tacking is required. If straw is utilized as mulch, fiber mulch shall be utilized as anchor material and applied by means of a hydrospreader.

h. Dust Control (Section 3.39) If arid condition prevail, dust control practices will be employed as required.

I. Construction Road Stabilization (Section 3.03) Temporary stabilization of roadways with stone immediatelly after grading.



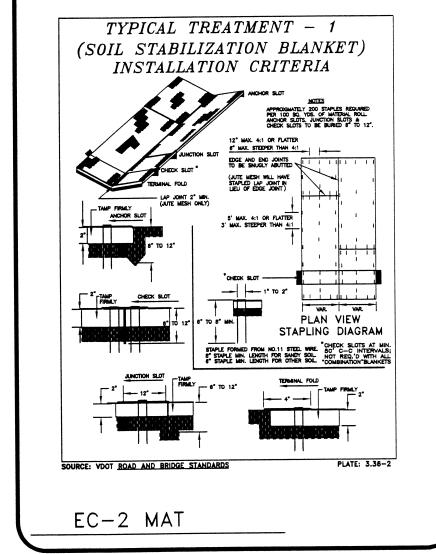
Management

- a. Construction should be sequenced so that grading operations can begin and end as quickly as possible.
- b. Erosion and Sediment control devices shall be installed as the first step of construction.
- c. Areas which are not to be disturbed shall be clearly marked by flags, signs, etc.
- d. The grading contractor shall be responsible for the installation and maintenance of all erosion and sediment control practices. Inspections are to be made periodically and after every significant rainfall.

Maintenance

In general, all erosion and sediment control measures will be checked daily and after each significant rainfall. Any items not found in accordance with the Virginia Erosion and Sediment Control Handbook will be immediately replaced and/or repaired. The following items will be checked inn particular:

- a. The silt fence barrier will be checked regularly for undermining of deterioration of the fabric. Sediment shall be removed when the level of sediment deposition
- The seeded areas will be checked regularly to ensure that a good stand is maintained. Areas should be fertilized, limed and reseeded as needed.
- c. All graveled areas shall be checked for a uniform grade with no ruts or channels and top dressed with new gravel as required.



EC-2 TREATMENT ONE

Soil retention mats shall consist of a machine produced mat of wood fibers, coconut fibers, wood excelsior or manmade fiber that shall intertwine or interlock. Mats shall be of consistent thickness with fiber evenly distributed over its entire area and covered on the top and bottom side with netting having a web strength (not glued) but machine sewn. Staple and installation patterns shall be according to Bedford County Specifications

- d. All erosion and sediment control measures shall remain in place until their removal has been approved by the Botetourt County Erosion and Sediment Control Administrator.
- e. If, during construction, the Erosion and Sediment Control reviewing Officers considers the Erosion and Sediment items to be inadequate, he or she, at their discretion require the addition of other control measures.

General

The erosion and sediment control measures shown on the construction plans are the minimum measures required. Due to construction phasing and other considerations, all measures can not be shown. The owner, through his contractor will employ whatever measures which may be required to assure that sediment laden runoff does not leave the site.

All materials and measures employed for erosion and sediment control will be in accordance with the Virginia Erosion and Sediment Control Handbook, latest edition.

If during construction, additional Erosion and Sediment Control measures are deemed necessary, they shall be installed as directed by the Owner, Engineer or County agent

This project is to be constructed consistent with the Virginia Erosion and Sediment Control Regulations, (Latest Edition).

GENERAL NOTES:

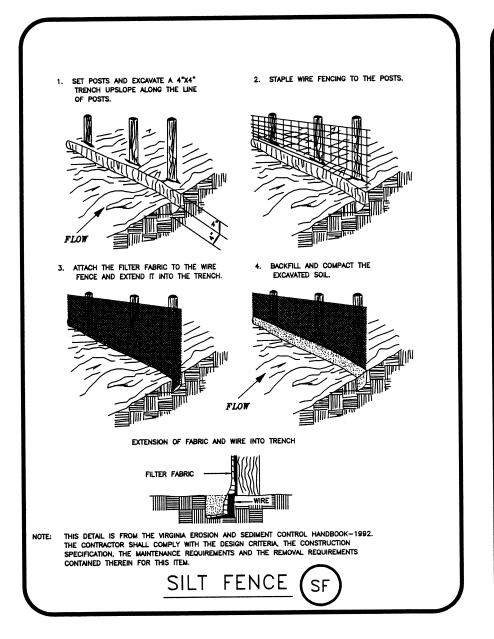
NO SEARCH OF UNDERGROUND UTILITIES WAS CONDUCTED. CONTRACTOR SHALL CONTACT THE COUNTY OF BOTETOURT AND MISS UTILITY PRIOR TO WORK FOR LOCATION OF UNDERGROUND UTILITIES.

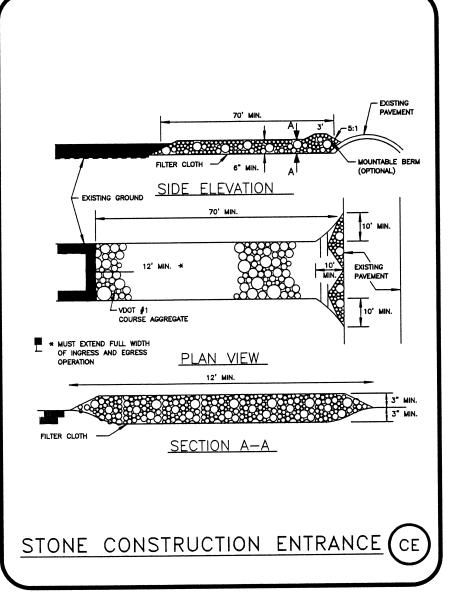
	REV	DATE	DESCRIPTION	BY	APP
Roderick F. Pierson, P.E., L.L.S.					
P.O. Box 311					
1332 Roanoke Road, 220 North					
Daleville, VA 24083					
540.966.3027					

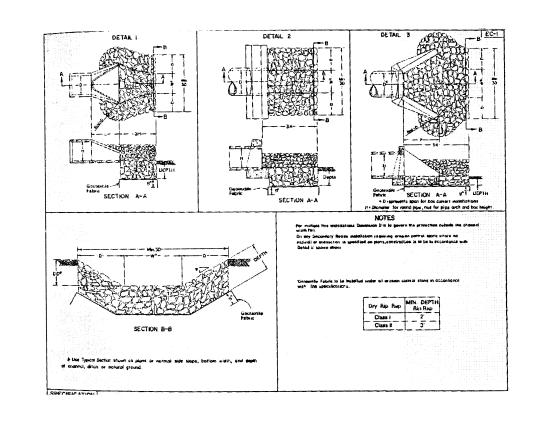
E & S QUANTITIES AND COST ESTIMATE UNIT PRICE COST QUANTITY ITEM \$700 \$700.00 CONSTRUCTION ENTRANCE **\$**1197 1.75/LF 684 LF SILT FENCE \$500Ac. **\$**500 1 Ac. PERM. SEEDING OUTLET PROTECTION SD. INLET PROTECTION RIP RAF EC-2 MAT EC-3 MAT \$300 LS LS MULCHING ROCK CHK. DAM \$250 0.5Ac. \$500Ac. TEMP. SEEDING \$2,722 SUBTOTAL \$545 20% CONTINGENCY \$3,267 TOTAL COST

GENERAL FROSION AND SEDIMENT CONTROL NOTES

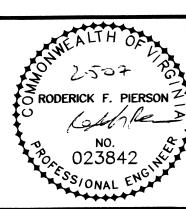
- Unless otherwise indicated, all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Regulations VR 625-02-00 Erosion and Sediment Control Regulations.
- The plan approving authority must be notified one week prior to the preconstruction conference, one week prior to the commencement of land disturbing activity, and one week prior to the final inspection.
- All erosion and sediment control measures are to be placed to or as the first step in clearing.
- A copy of the approved erosion and sediment control plan & narrative, as well as a copy of the Land Disturbing Permit, shall be maintained on the site at all times. The Erosion and Sediment Control Administrator will deliver these materials at the onsite preconstruction conference.
- Prior to commencing land disturbing activities in areas to her than indicated on these plans (including, but not limited to, off—site borrow or waste areas), the contractor shall submit supplementary erosion control plan to the owner for review and approval by the plan approving authority.
- The contractor is responsible for installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the plan approving authority.
- All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved.
- During any dewatering operations, water will be pumped into an approved filtering
- The contractor shall inspect all erosion control measures periodically and after each runoff-producing rainfall event. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices shall be made immediately. An inspections report must be filed with the Botetourt County Erosion and Sediment Administrator once every two weeks, beginning with commencement of the land disturbing activity, and with 48 hours of any runoff—producing rainfall event. Failure to submit a report will be grounds for immediate revocation of the Land Disturbing Permit. Reports must be postmarked within 24 hours of the deadline. A standard inspection report form will be supplied, which should be copied as necessary. This provision in no way waives the right of Botetourt County personnel to conduct site inspections, nor does it deny the right of the permittee(s) to accompany the inspector(s).





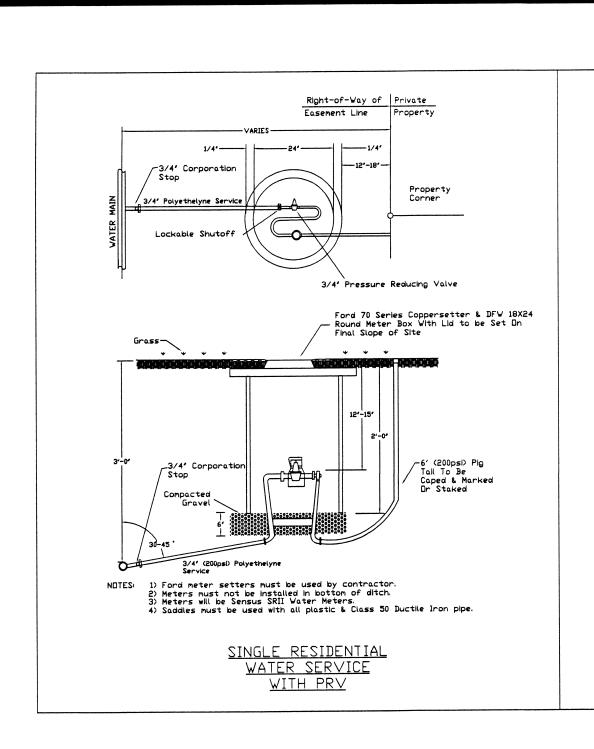


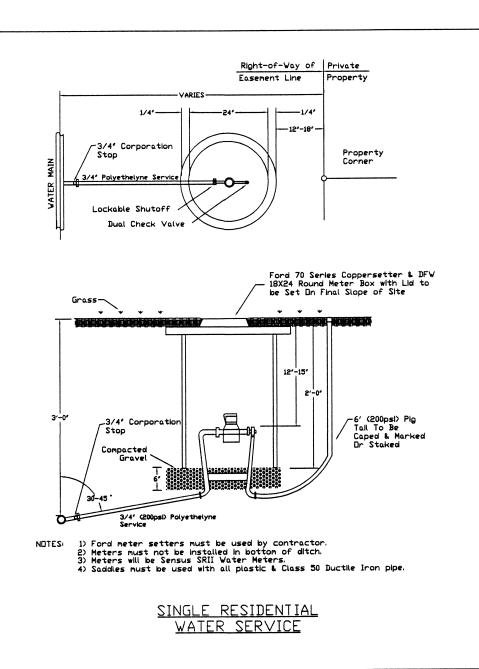
E & S DETAIL SHEET ASHLEY PLANTATION PHASE 3, SEC. 5 BOTETOURT COUNTY, VIRGINIA

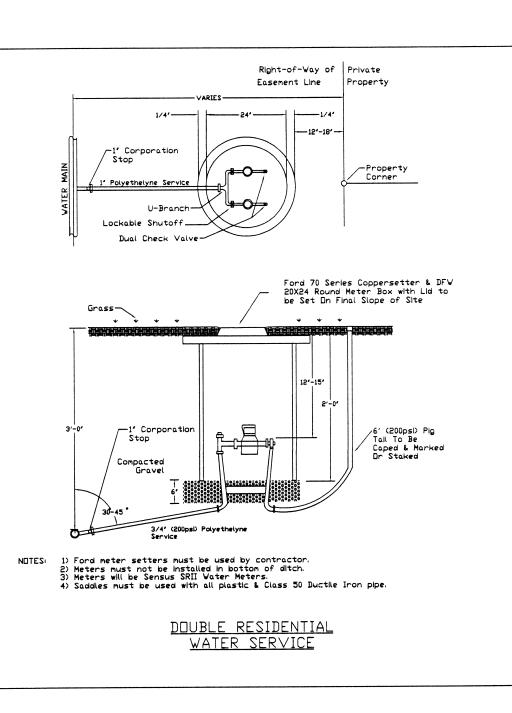


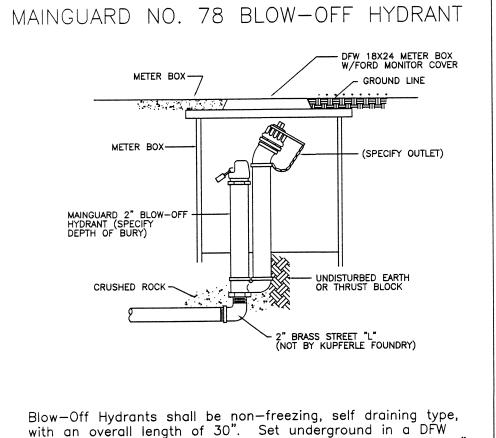
SCALE: -COMM. R200548 DATE: 08/11/05 SHEET

ASHLEYPLANTATION/ASHLEY5/4



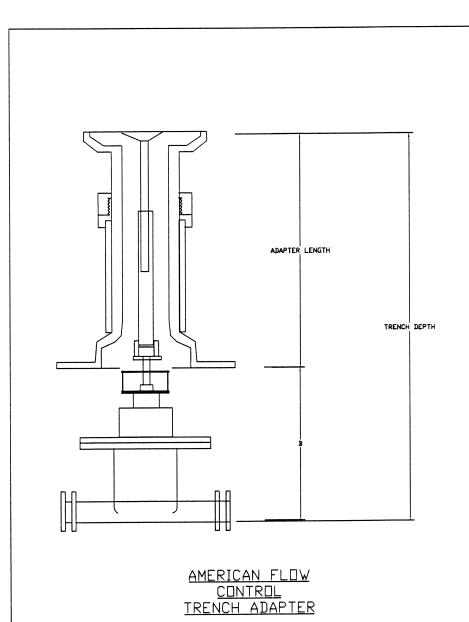




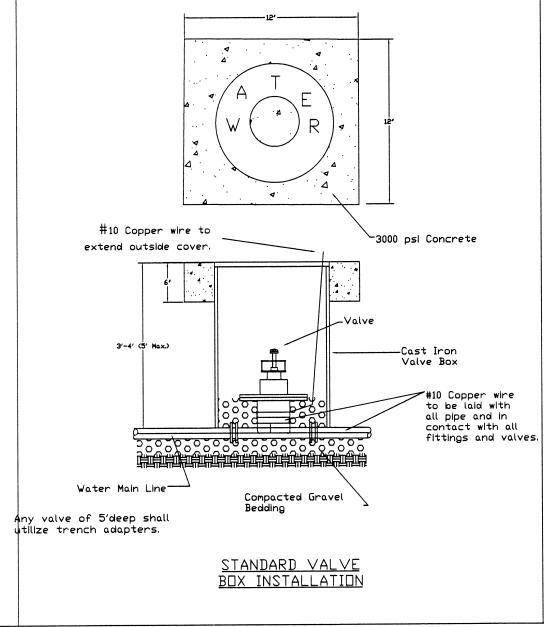


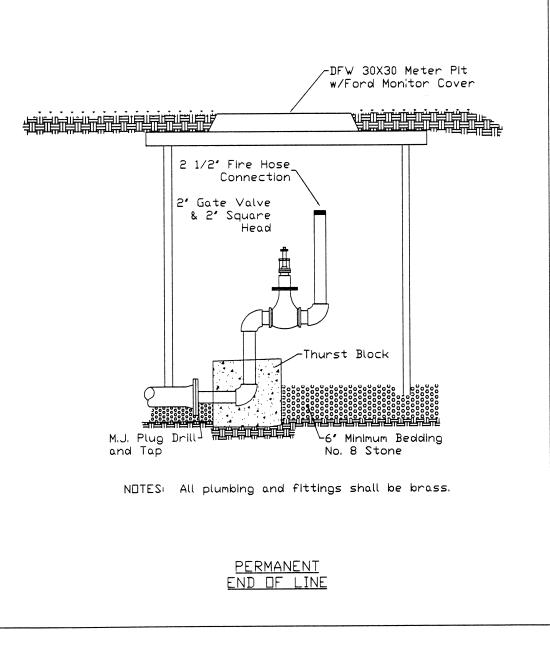
Blow—Off Hydrants shall be non—freezing, self draining type, with an overall length of 30". Set underground in a DFW 18x24 meter box, these hydrants will be furnished with a 2" FIP inlet, a non-turning operating rod, and shall open to the left. All of the working parts shall be of bronze-to-bronze design, and be servicable from above grade with no digging. The outlet shall also be bronze and be 2-1/2" NST. Hydrants shall be lockable to prevent unauthorized use as manufactured by Kupferle Foundry Co., St. Louis, MO, or approved equal.

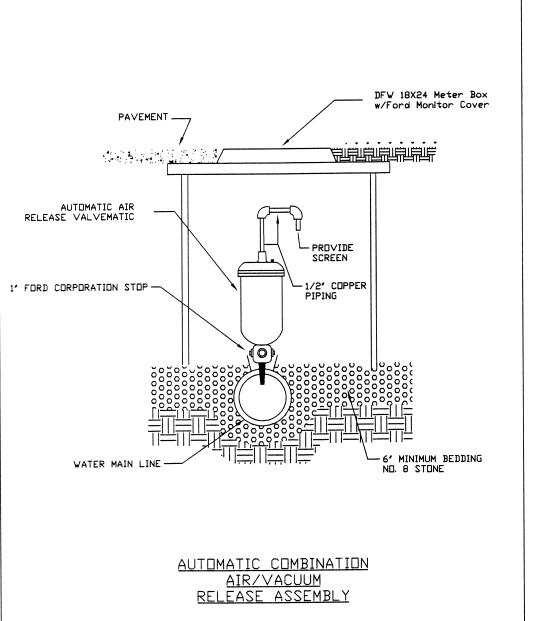
(Specify overall length 6" shorter than normal depth of bury. Minimum opening in meter box should be 10".)



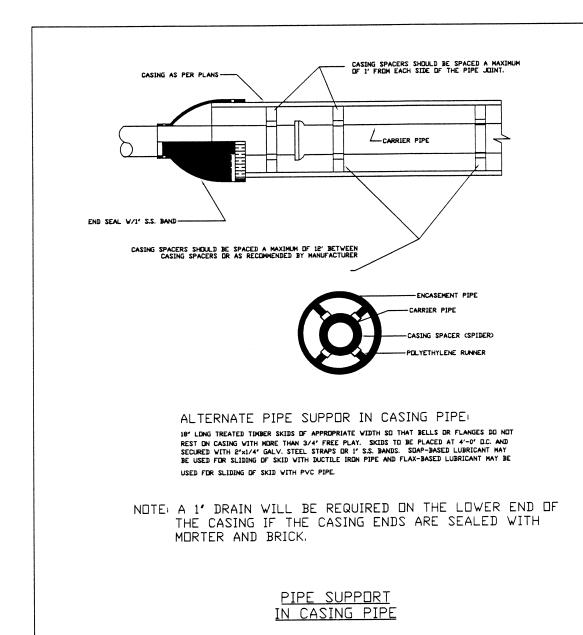
(FOR TRENCH DEPTHS GREATER THAN 4')

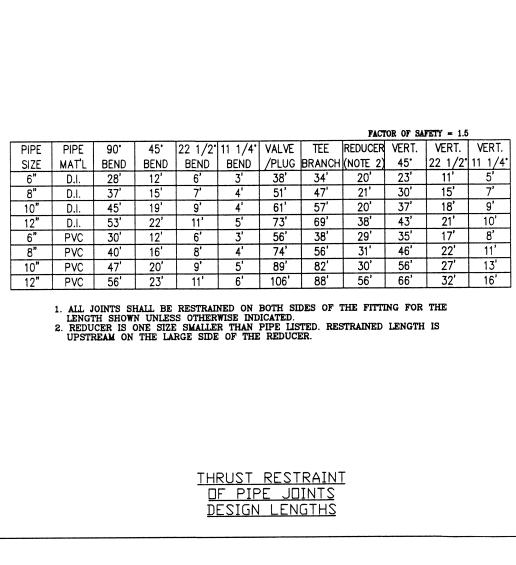


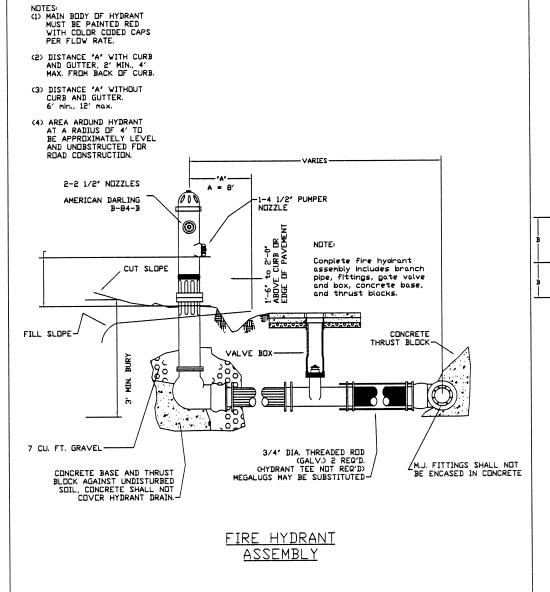


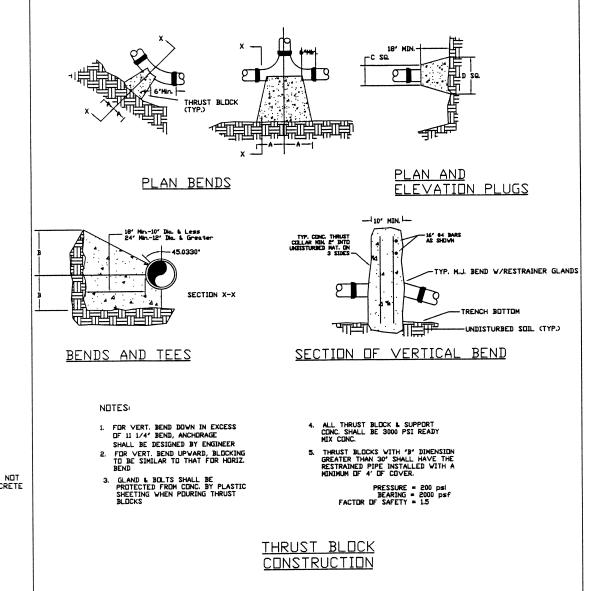


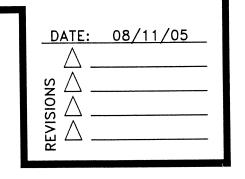
CONTRACTOR SHALL INSTALL PIPE LOCATOR TAPE AND/OR OTHER MATERIALS REQUIRED BY COUNTY TO LOCATE BURIED WATER PIPE.











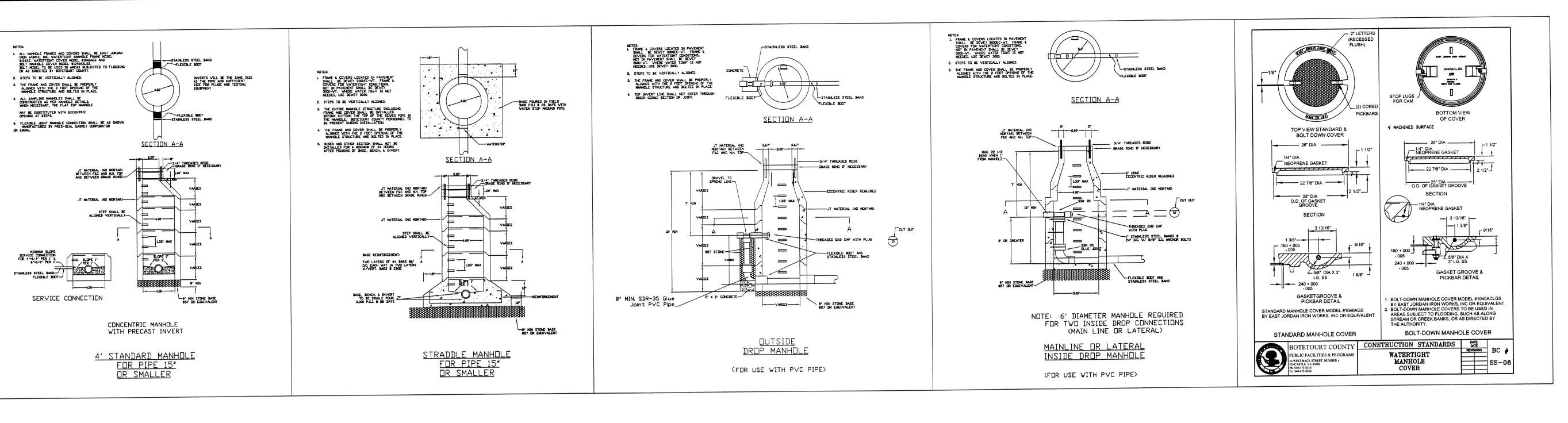
PIERSON ENGINEERING SURVEYING

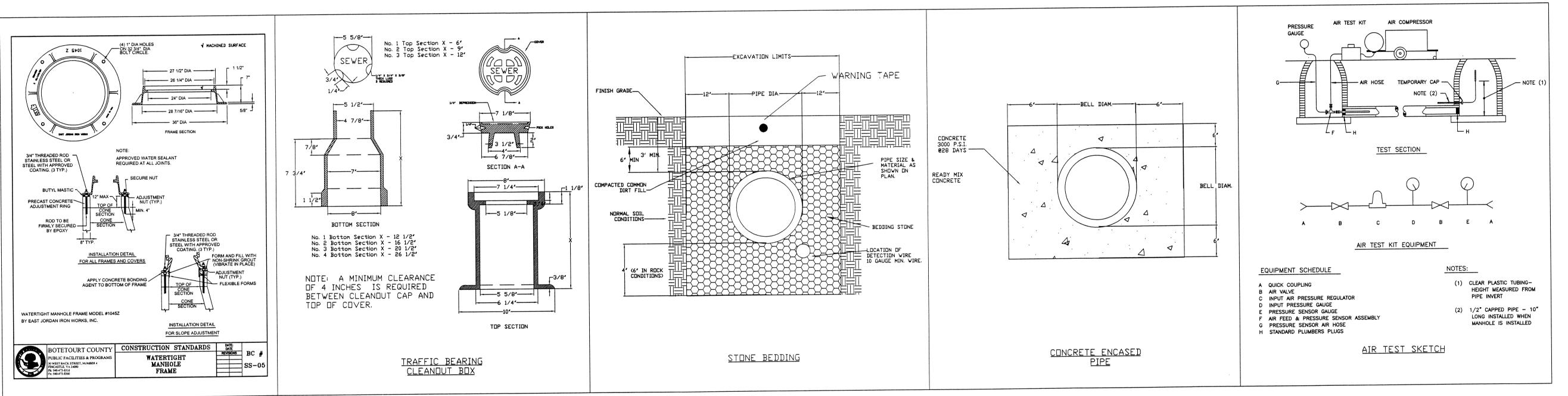
P.O. BOX 311 1324 ROANOKE ROAD DALEVILLE, VA 24083

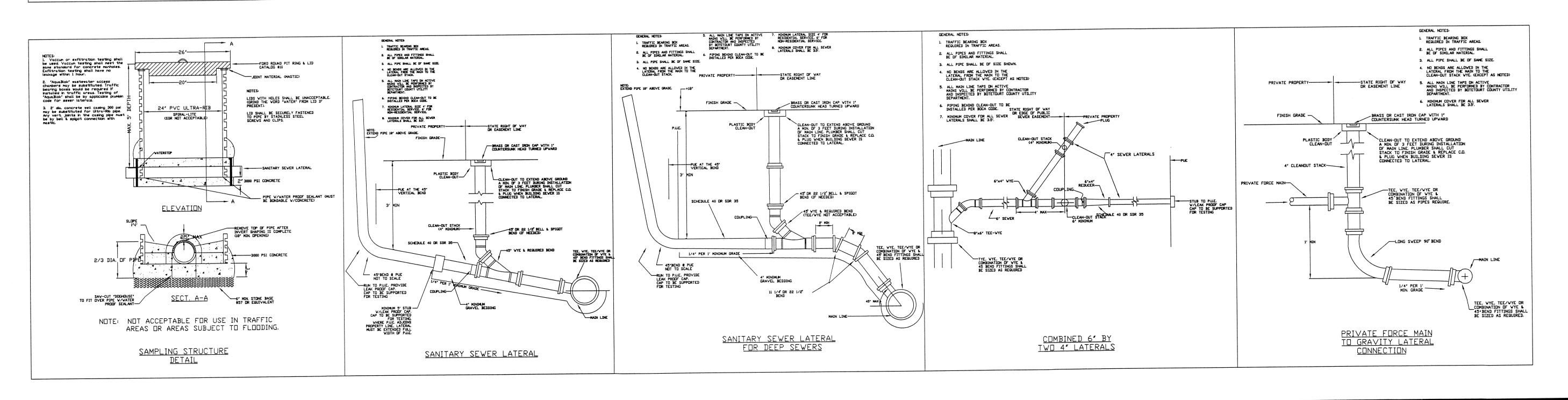
(540) 966-3027 TEL (540) 966-5906 FAX e-mail: rpierson@rbnet.com

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WATER DETAILS 023842 COMMISSION R200548 SHEET







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DEVELOPMENT PLANS FOR LANTATION PHASE 3, SEC. TOURT COUNTY, VIRGINIA

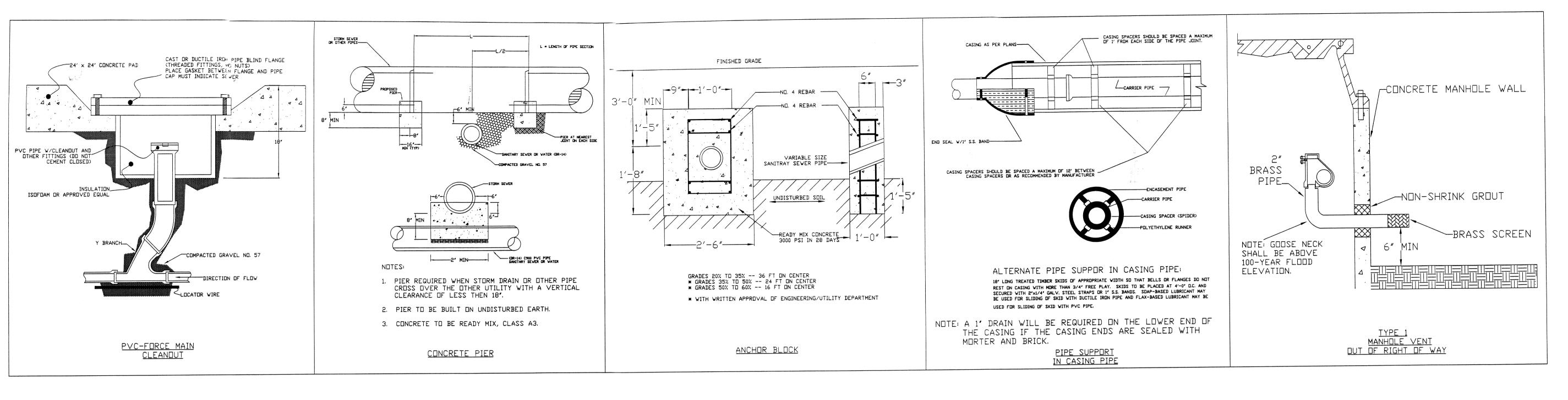
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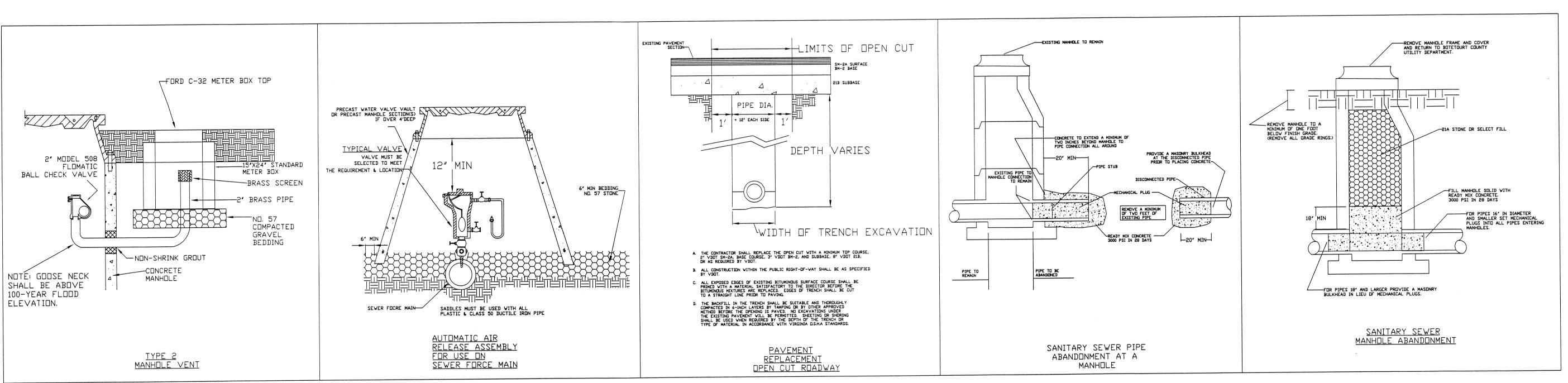
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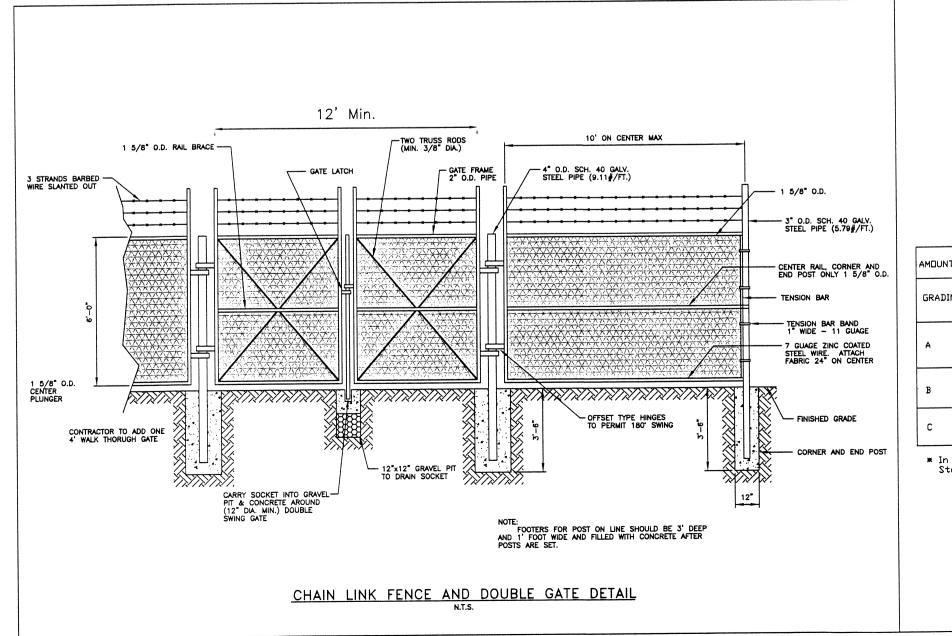


TABLE II-1 FINE AGGREGATE

GRADING	3/8	ND. 4	ND. 8	N□. 16	ND. 30	ND. 50	ND. 100
A	MIN 100	97+/-3	90+/-10	67+/-18	42+/-17	17+/-	MAX 10
В	MIN 100	97+/-3					MAX 10
С		MIN 100	97+/-				MAX 25

* In Inches, except wher otherwise indicated. Numbered sieves are those of the U.S. Standard Sieve Series

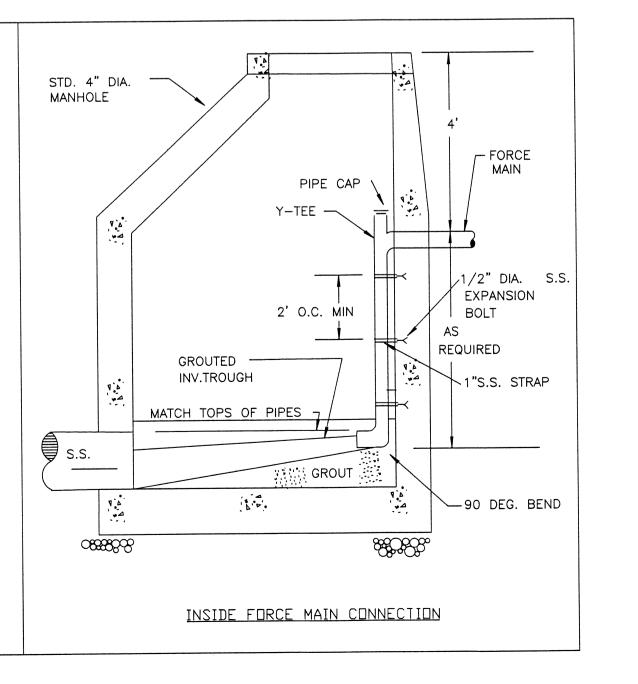
AIR TI BACK P EQUIV FINE AGGREGATE

EQUIVALENT PSI	HEIGHT OF GROUND WATER ABOVE PIPE INV. (FT.)
0.43	1
0.87	2
1.30	3
1.73	4
2.17	5
2.60	6
3.03	7
3.47	8
3.90	9
4.34	10
4.77	11
4.98	11.5
For anything above	11.5 VF, allow maximum 5.0 PSI.

NOTES:

- Table based on 1.0 v.f. of water = 0.4335 PSI.
 The appropriate PSI allowance for average vertical foot of ground water shall be added to the base starting pressure of 4.0 PSI, but in no case shall the resulting pressure be more than 9.0 PSI.
- 3. Interpolate for fractions of a foot of water.

AIR TESTING BACK PRESSURE EQUIVALENCY TABLE



DATE: 08/11/05

A

A

B

Colored Technology

A

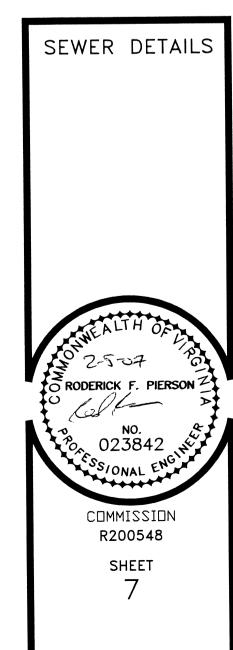
Colored Technology

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(540) 966-3027 TEL (540) 966-5906 FAX e-mail: rpierson@rbnet.com

DEVELOPMENT PLANS
FOR
ASHLEY PLANTATION PHASE 3, SEC. 5
BOTETOURT COUNTY, VIRGINIA



GENERAL WATER AND SEWER CONDITIONS

All work shall be subject to inspection by Botetourt County inspectors. The Contractor shall notify the proper County officials prior to the start of the work.

All materials and construction shall comply with the most current version of the Water and Sewer Regulations of Botetourt County as adopted by the Botetourt County Board of

All existing utilities adjacent to the proposed work are not necessarily shown on the plans and where shown, are only approximately located. The contractor shall on his own initiative locate all underground lines and structures as necessary.

All materials and construction shall comply with the most current version of the Water and Sewer Regulations of Botetourt County as adopted by the Botetourt County board of Supervisors.

All water and sewer pipes shall have a minimum of three (3.0) feet of cover measured from the top of the pipe, over the centerline of pipe. This includes all fire hydrant lines, service laterals, and water lines, etc.

Permanent twenty—five (25) foot wide easements for sewer and/or water lines, centered on the pipeline and appurtenances shall be dedicated to the County, except where the line is in a public road right—of—way or an access easement, in which case the access easement shall also be dedicated as an utility easement. Temporary easements should be sufficient width to allow contractor enough room to construct the utility while working safely and in compliance with OSHA Regulations.

All water and sewer appurtenances are to be located outside of roadside ditches.

Provide testing specifications on the plans for water and sewer in accordance with Botetourt County Water and Sewer Construction Standards and Specifications.

The contractor shall obtain a copy of the most current edition of Botetourt County Water and Sewer Construction Standards and Specifications and provide proof (a letter) that the contractor has and is familiar with the requirements therein.

A professional engineer registered in the State of Virginia shall document all testing.

All water shop drawings / cut sheets shall be submitted by the contractor to both the design engineer and Botetourt County for approval prior to installation / construction. Botetourt County will require (3) complete sets of shop drawings for review.

The contractor shall schedule a pre—construction meeting to be attended by the contractor's site superintendent, design engineer, the design engineer's field representative / inspector, Botetourt County Utility Department, Botetourt County Engineering Department and any materials suppliers the contractor feels necessary. The pre—construction meeting shall not be scheduled until all shop drawings have been approved by Botetourt County.

The contractor shall obtain a copy of the most current edition of Botetourt County Water and Sewer Construction Standards and Specifications and provide proof (a letter) that the contractor has and is familiar with the requirements therin.)

As built plan submittals — Bounty County will require the following as built / record drawing information to be submitted by the owner or developer:

- One (1) complete reproducible set of water as—built / record drawings sealed by a Professional Engineer registered in the Commonwealth of Virginia.
- One (1) complete digital (AutoCad 2000 version) set of water as—built precord drawings.

All as built / record drawings shall show actual field surveyed locations (horizontal and vertical) of structures (manholes, clean—outs, service stub—outs, fire hydrants, valve boxes, water meter boxes, air release valves, etc.) and show recomputed pipe lengths and slopes based upon actual field locations.

Prior to conveyance of the water and sewer system (main lines and associated structures) we will require the following information to be submitted:

- One (1) letter of documentation sealed by a Professional Engineer registered in the Commonwealth of Virginia, stating that the system has been built in accordance with the approved plans and specifications.
- 2. Deed of conveyance from the owner to botetourt County.
- 3. Plat showing all water and sewer easements.
- Warranty to Botetourt County for one (1) year following date of acceptance by the Botetourt County Board of Supervisors.
- Two (2) complete copies of documentation sealed by a Professional Engineer registered in the Commonwealth of Virginia, of all required sewer testing to include at least the follow items:
 - a. Main line sewer line air pressure testing up to and against the first clean—out on service lines.
 - b. Main line sewer deflection mandrel testing.
 - c. Sewer manhole vacuum testing up to and including the manhole frame.
 - d. Main line water line pressure testing.
- d. Main line water line pressure testing.
- e. Main line water line acceptable bacteriological testing results.

The process of conveyance is as follows:

- Submit all information as outlined above and provide written request that Botetourt County accept ownership and operation of the system.
- 2. Schedule a pre-final inspection of the system.
- 3. Address any inspection / punch list items.
- 4. Schedule a final inspection of the system.
- Botetourt County Department of Public Works makes formal recommendation to Botetourt County Board of Supervisors that the system is complete and ready for ownership and operation by Botetourt County.
- Botetourt County Board of Supervisors takes official action to either accept or reject ownership and operation of the system.

The contractor shall be responsible for notifying "Miss Utility" and comply with Virginia's underground utility damage prevention act, (1-800-552-7001).

Waterline Testing

All new water mains shall be tested, after backfilling to a hydrostatic pressure of not less than 100 psi above design water pressure for the system or 150 psi, whichever is greater. Allowable leakage shall be calculated by the following formula:

 $L = \frac{SDP^{1/2}}{133.200}$

Where: L = allowable leakage in gallons per hour
S = length of pipe tested in feet.
D = nominal diameter of pipe in inches.
P = average test pressure during leakage test in psi.

No water line shall be placed in service until the leakage is less than the allowable leakage as indicated above. Testing of water mains shall only be done after installation of all valves, taps and service laterals are complete. All portions of the water system, including hydrants and service lines, shall be subject to the hydrostatic pressure during the leakage test. Testing of water mains shall be observed and documented by a County Utility or Engineering Inspector.

All high points and service lines in the portion of the system under test shall be vented and all air shall be expelled from the system prior to beginning the test.

All fittings and hydrants shall be property braced or blocked before applying pressure. Where concrete thrust blocks are used, they shall have attained their set prior to testing.

After the portion of the system under the test has reached the required pressure as stated herein, said pressure shall be maintained for two (2) hours. At the conclusion of the pressure test, the volume of makeup water required to refill the pipeline shall be determined by measurement with a displacement meter or by pumping from a vessel of known volume.

All joints or fittings at which leakage occurs shall be re-worked to insure tightness. All visible leaks shall be repaired regardless of amount of leakage. If the measured amount of leakage exceeds the valves for the appropriate size as found in AWWA Specifications C600, Hydrostatic Testing (Table 6), the pipe-line shall be repaired prior to re-testing will be done the Utility or Engineering Departments approval and inspection. Repairs of new construction will be by adjustment or replacement of replacement of material only. The use of repairs clamps or bell clamps will not be acceptable.

SANITARY SEWER TESTING

Manhole Acceptance Tests (Vacuum Testing)

Manholes, including frame, shall be tested by vacuum testing from the top of the frame. Inflatable stoppers shall be used to plug all lines into and out of the manhole being tested including any vent line. The stoppers shall be positioned in the lines far enough from the manhole to insure testing to those portions of the lines not air tested. Vacuum tests shall be made with a vacuum of 10" Hg. The time for the vacuum to drop from 10" to 9" of Hg must be greater than 60 seconds.

Contractor shall furnish weirs, stand pipes, pipe plugs, water, pressure gauges, stop watches, air compressor, vacuum pump, hose and such materials and assistance as required to perform these tests. All acceptance tests shall be conducted by Contractor in the presence of a County Inspector.

Acceptance tests shall not be made until sanitary sewer, manholes and proposed sewer service connections, as shown on the approved sewer plans, have been installed, the sewer trenches (including manholes and cleanout stacks) backfilled and compacted to finish sub—grade.

Contractor shall schedule all acceptance tests with the project inspector at least forty—eight (48) hours in advance. Each section of completed sewer shall be tested from manhole to manhole. No sewers or sewer service connections are to be excluded from this testing procedure.

Sewer Pipe Testing Procedure

Whenever it is necessary to construct underdrains or place gravel under pipe lines in order to dewater trench during construction of sewers, acceptance test will not be made until any pumps, which have been used in dewatering process, have been disconnected of drains have been taken out of service.

Contractor shall schedule all acceptance tests with the Engineering/Utility Department at least forty—eight (48) hours in advance. Each section of completed sewer shall be tested. Generally, sewers will be tested from manhole to manhole. No sewer or sewer service connection is to be excluded from this testing procedure.

Low Pressure Air Testing Procedure — The test procedure shall be conducted in the following manner: (Vacuum test of manholes is generally inverse of low pressure air test of sewer lines)

- a. Contractor shall thoroughly clean and remove all debris, silt, earth or other materials from the sewer prior to acceptance testing.
- b. Proper test plugs shall be supplied and installed by Contractor Test gauges used in air test procedure shall have a range of 0-10 psi and shall be calibrated in divisions of 0.10 psi with an accuracy of +/- one percent. Test gauges shall be calibrated at least once a year and the date and results displayed on the equipment including date of calibration. Calibrations shall be certified by an independent testing lab. Test gauges shall be located outside of manhole during testing.
- c. If pipe to be tested is expected to be below ground water table, Contractor shall either:
- Install a small diameter perforated vertical pipe from invert elevation of the sewer to the surface prior to backfilling; or
- Insert a pipe probe by boring or driving into the backfilling material adjacent to the invert elevation of the pipe, and determine the depth of the ground water level above the pipe invert immediately prior to acceptance testing the sewer.
- All gauge pressures for test shall be increased by the amount of this back pressure due to ground water over the invert of the pipe.
- In lieu of the above water depth determination, Contractor may add three (3) psi to the gauge pressure in the test.
- d. Contractor shall add air slowly to the portion of the pipe under test until the internal air pressure is raised to 4.0 psi gauge plus the ground water pressure.
- e. As a safety precaution, <u>no one shall be allowed in manhole after air pressure is increased in the sewer line.</u> If the inspector suspects that the test plug may be leaking, pressure shall first be relieved before any adjustments are made to eliminate air leakage at the plug.
- f. Contractor shall allow air temperature to stabilize for at least two (2) minutes with the pipe subjected to an internal pressure of 4.0 psi by adding only the amount of air required to maintain the pressure.
- g. After temperature stabilization, the test will begin. If the internal air pressure decreases, the time required for the pressure to drop from 3.5 to 2.5 psi gauge will be observed and recorded. The time interval shall be compared with the standards in accordance with the DD-30 or DD-31 for time and length of test section for various diameters of the sewer. All pipes 15 inches or less shall be tested for a pressure drop of 1.0 psi gauge.
- h. Pipe which fails to maintain the stipulated pressure for a period equal to or greater than the holding time shown in Table I shall be deemed to have failed the low pressure air test and is unsatisfactory for acceptance by the County. Any sewer the fails to pass this test shall be replaced by the Contractor at his expense.

Sewer Force Main Testing Procedure — Sewer force mains shall be hydrostatically tested at 150% of the design operating pressure of (60 psi) for 30 minutes. Allowable leakage shall be the same as established for water pipe lines in the Botetourt County Water and Sewer Stabdard and Specifications.

Mandrel Testing

The Contractor shall deflection test the entire length of pipe by means of a go-no-go mandrel to assure that a 5.0% deflection has not been exceeded. The testing shall be performed completely at the expense of the Contractor and shall be performed in the presence of Engineer. Mandrel and proving ring details shall be approved by the Engineer and shall be sized at 5% less than ASTM dimensions for the sewer pipe (In accordance with ASTM D-3034 and F-679). The mandrel test shall be performed no sooner than three (3) months after backfill of the pipe is completed. All pipe that fails the deflection test shall be removed and replaced at the Contractor's expense. The "rerounder" technique shall not be allowed. The Contractor shall use approved nine (9) arm mandrels and proving rings for each size of mainline pipe. The contract length "L" of the mandrel arms and the actual mandrel diameter "D" (ID of the ring) shall equal the dimensions in Table I below. Critical mandrel dimensions shall carry a tolerance of +/-.01.

		TABLE						
		9 Arm Mandr	-el					
	D Dimension							
	(MIN)	ASTM D3034	ASTM D2751 (6" only)*					
Nom. Dia.	L	SDR 35	ASTM D2680					
6"	6"	5.65"	5.65" (SDR 35) 5.49" (SDR 23.5)					
· ·			5.49" (SDR 23.5)					
8"	8"	7.56"	7.40"					
10"	10"	9.45"	9.31"					
12"	12"	11.26"	11.22"					
15"	15"	13.78"	14.09"					
18"	18"	16.69"						
21"	18"	19.67"						
24"	18"	22.13"						
27"	18"	24.95"						

Mandrel and proving ring may be obtained from Wortco, Inc., 220 High Street, Franklin, Ohio 45005 (1-513-746-6439), or Hurco Enterprises (1-800-843-1300), or Cherne Industries (1-800-843-7584).

All tests are to be performed in the presence of the design engineer and properly documented by the design engineer for submittal with record drawings to Botetourt County prior to conveyance to Botetourt County. Tests submittals documented by anyone other than the design engineer (ie. the contractor) will not be acceptable as proof of compliance.

Developer to provide video camera inspection documentation prior to conclusion 1—year warrantly period. Video camera inspection work to be performed no sooner the 6 months after the date of system acceptance by Botetourt County and no later than 8 months after the date of system acceptance by Botetourt County. One (1) copy of the videotape to be provided to Botetourt County. Video camera inspection work to be coordinated with Botetourt County such that County personnel can be present during video inspection operations.

The contractor shall schedule a pre—construction meeting to be attended by no less than the following: Botetourt County representatives, contractor representative including the proposed sewer contractor site superintendent, design engineer, any meterial suppliers or subcontractors that the sewer contractor feels necessary to attend.

All sewer and water pipes (mains and service lines) shall have both magnetically locatable detection wire and or tape AND warning tape. Magnetically locatable detection wire and or tape shall be installed at same elevation of spring line of pipe. Warning tape (Caution!! Buried Sewer / Water Pipe Below) to be installed no more than 18 inches above top of the pipe.

All water and sewer shop drawings / cut sheets shall be submitted by the contractor to both the design engineer and Botetourt County for approval prior to installation. Botetourt County will require three (3) complete sets of shop drawings for review.

DATE:	08/11/05	
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SEWER NOTES

RODERICK E. PIERSON

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WATER &

COMMISSION R200548 SHEET