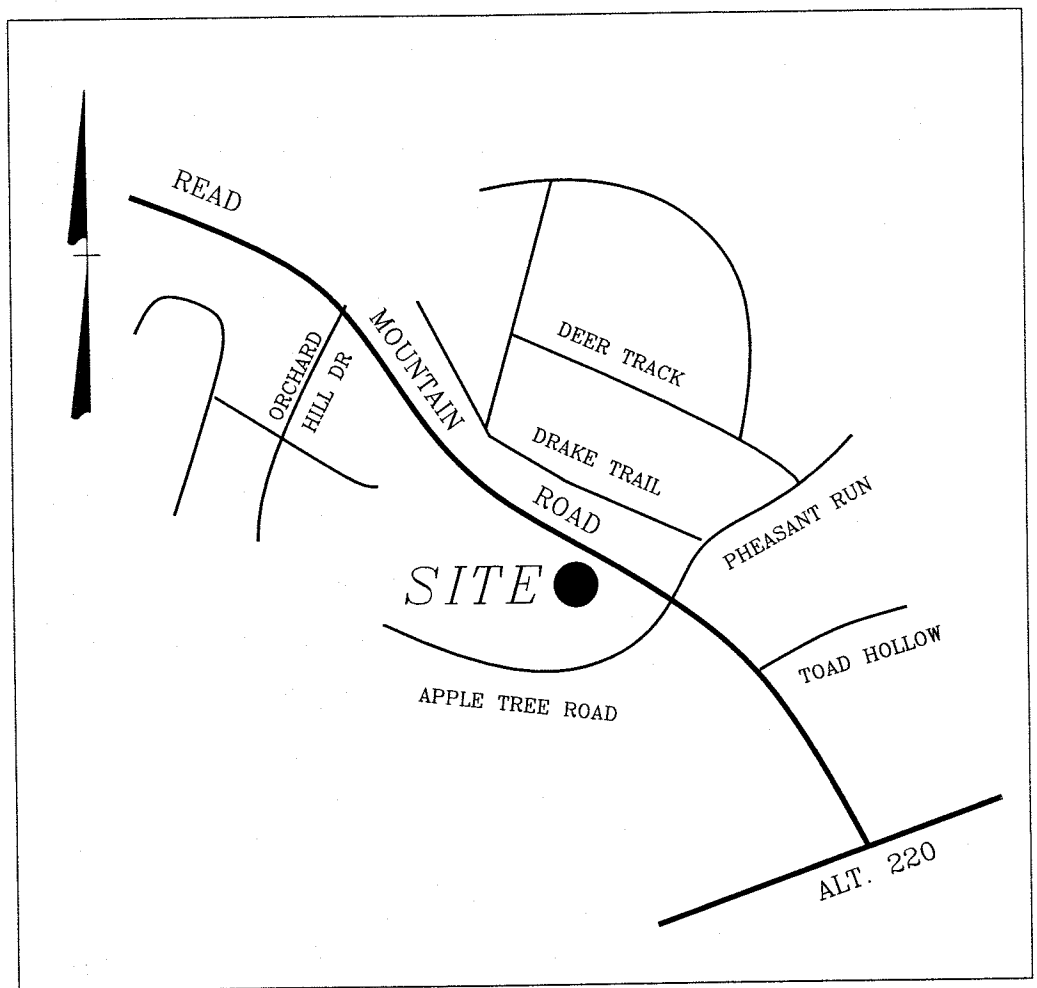


DEVELOPMENT PLANS FOR
POPLAR TREE VILLAGE
VALLEY MAGISTERIAL DISTRICT
BOTETOURT COUNTY, VIRGINIA



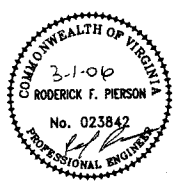
MR. BOBBY BAILEY
304 BOTETOURT ROAD
FINCASTLE, VIRGINIA 20490
PHONE: (540)293-7308

INDEX OF DRAWINGS

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- 2. PLAN SHEET
- 3. PROFILE SHEET
- 4. E & S SHEET
- 5. E & S DETAIL SHEET
- 6. SEWER DETAIL SHEET
- 7. SEWER DETAIL SHEET
- 8. WATER DETAIL SHEET
- 9. SPECIFICATIONS SHEET
- 10. USGS OVERLAY

REV	DATE	DESCRIPTION
1	11/05/04	PER COUNTY COMMENTS

PIERSON ENGINEERING & SURVEYING
RODERICK F. PIERSON, LLS, PE
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AS-BUILT

DATE: 02/15/05

REVISIONS
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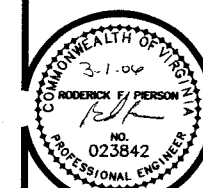
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&
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1324 ROANOKE ROAD
DALEVILLE, VA 24083

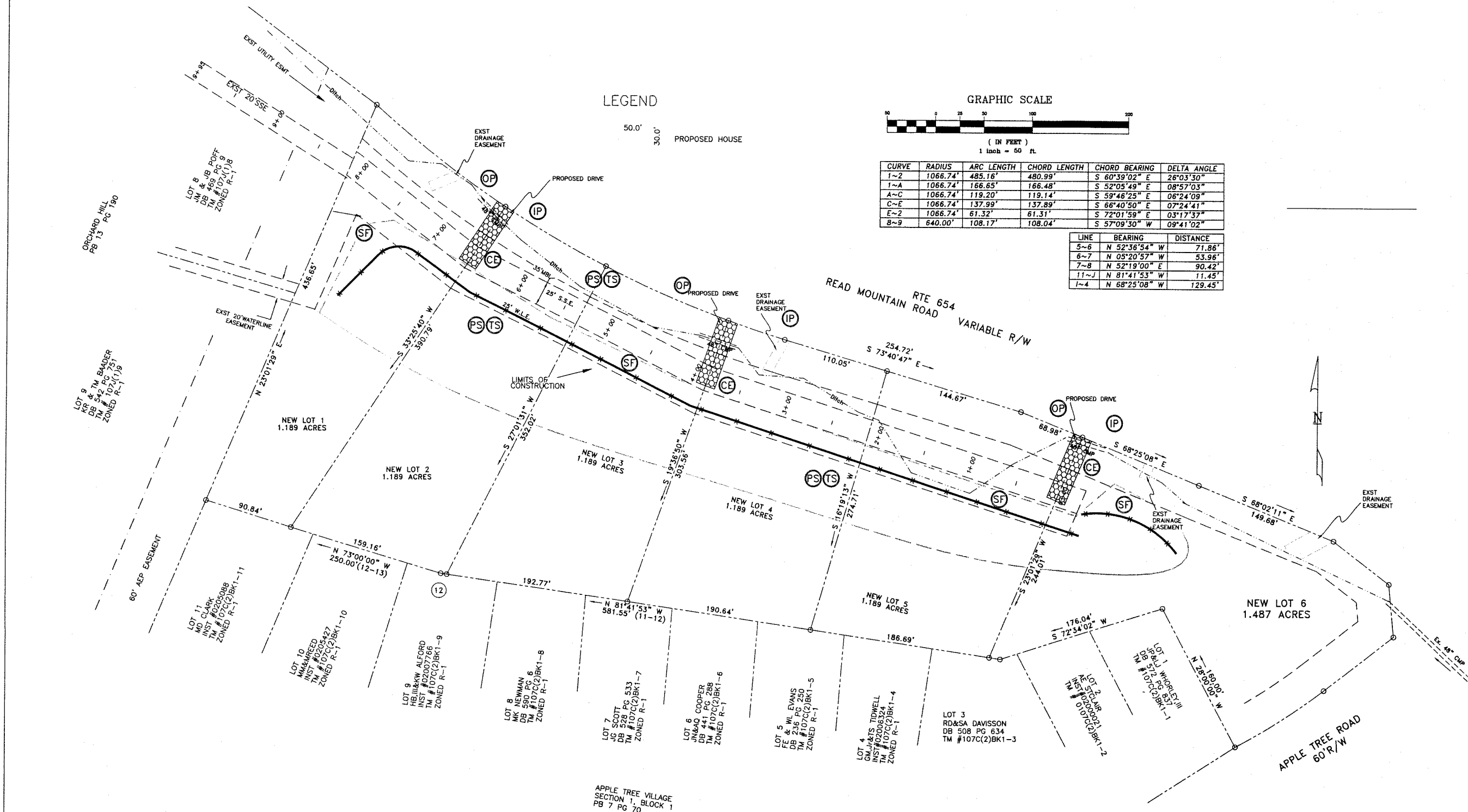
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e-mail: rpierson@rnbnet.com

DEVELOPMENT PLAN
FOR
POPLAR TREE VILLAGE
BOTETOURT COUNTY, VIRGINIA

PLAN SHEET



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SHEET
2



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DATE:	09/27/04
REVISIONS	11/05/04

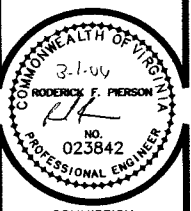
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DALEVILLE, VA 24083

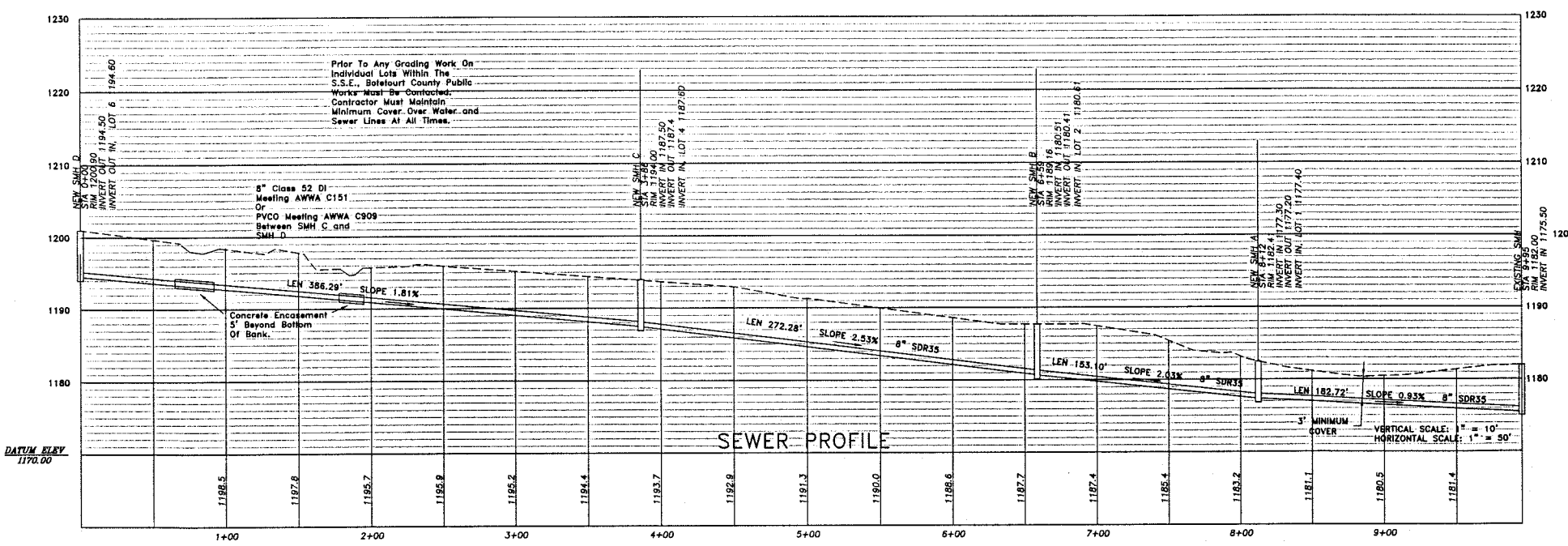
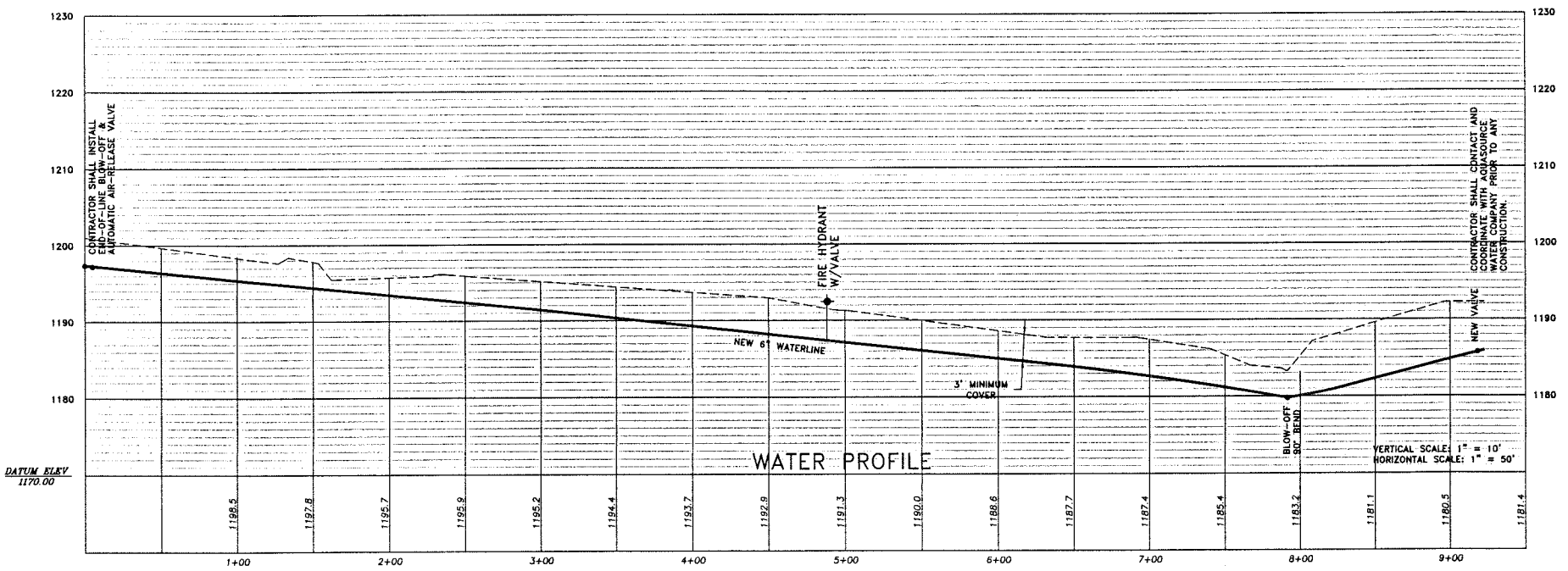
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DEVELOPMENT PLAN
FOR
POPLAR TREE VILLAGE
BOTETOURT COUNTY, VIRGINIA

PROFILES



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3



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DATE: 09/27/04

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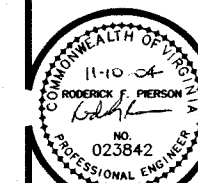
PIERSON
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DEVELOPMENT PLAN
FOR
POPLAR TREE VILLAGE
BOTETOURT COUNTY, VIRGINIA

E & S SHEET



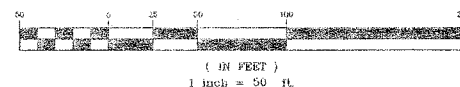
COMMISSION
R2004115
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LEGEND



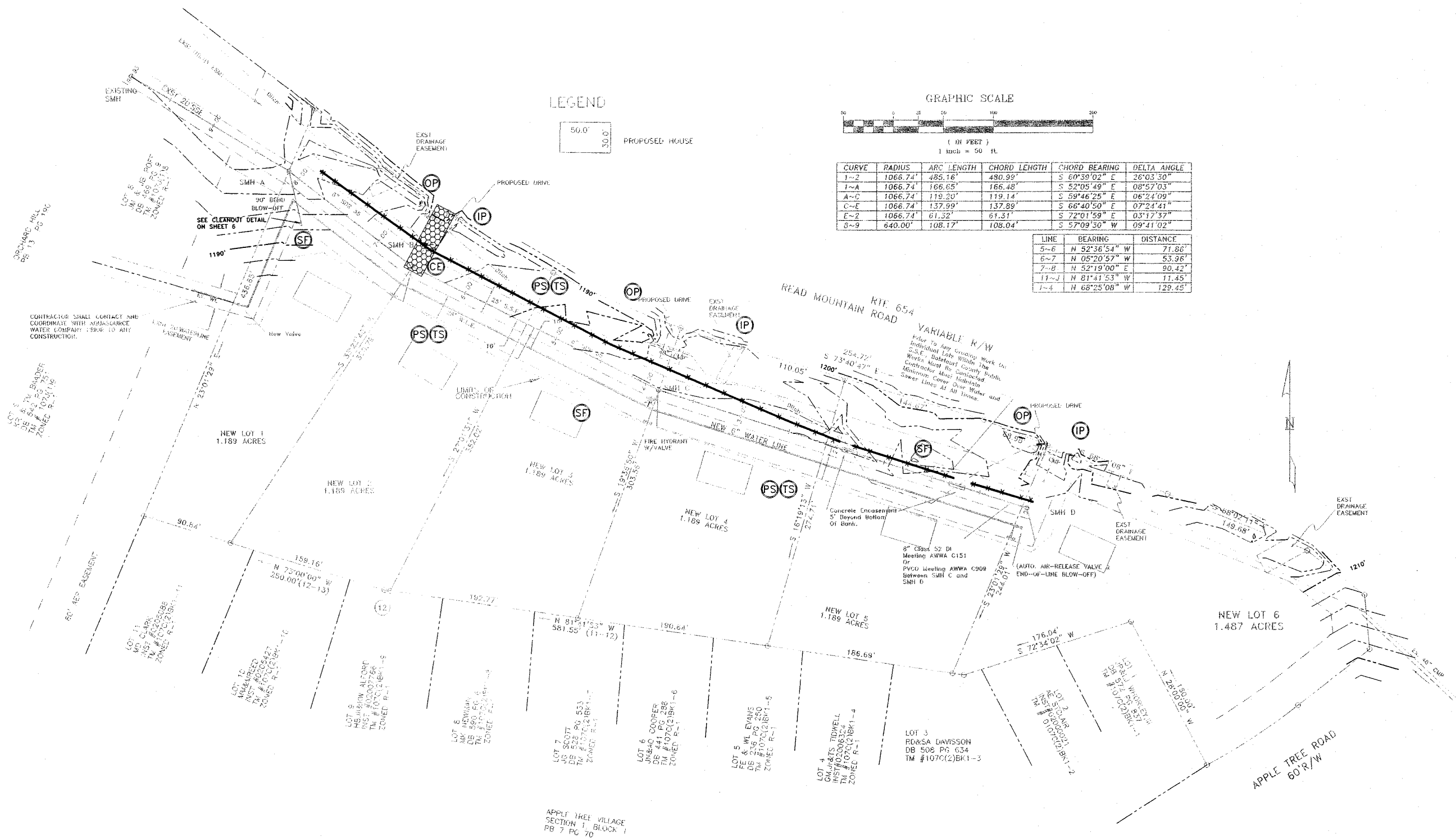
PROPOSED HOUSE

GRAPHIC SCALE



CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
1-2	1066.74'	485.16'	480.99'	S 60°39'02" E	26°03'30"
1-A	1066.74'	166.65'	166.48'	S 52°05'49" E	08°57'03"
A-C	1066.74'	119.30'	119.14'	S 59°46'25" E	06°24'09"
C-E	1066.74'	137.99'	137.89'	S 66°40'50" E	07°24'41"
E-2	1066.74'	61.32'	61.31'	S 72°01'59" E	03°17'37"
2-9	640.00'	108.17'	108.04'	S 57°09'30" W	09°41'02"

LINE	BEARING	DISTANCE
5-6	N 52°36'54" W	71.86'
6-7	N 05°20'57" W	53.36'
7-8	N 52°19'00" E	90.42'
11-12	N 81°41'53" W	11.45'
1-4	N 68°25'08" W	129.45'



Erosion and Control Narrative

Project Description

The project is located in the Read Mountain area of Botetourt County, Virginia. This plans shows the construction of utilities associated with a +/- 6 lot subdivision. The disturbed area consists of approximately 1.6 acres. It will take approximately 2 months to grade the road and install the water, sewer, drainage utilities.

Existing Site Condition

Most of the site consists of woods. The terrain slopes in the 0.5% to 15% range.

Adjacent areas

The site is bordered on the north by Read Mountain Road, to the east by a residential road, to the south by a Apple Tree Village Subdivision and to the west by Orchard Hill Subdivision.

Soils

Soils found at this site are common to the area. Soils are Moomaw Loam and Tumbling Cobbly Loam.

Critical Areas

There 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

- Temporary Construction Entrance (Section 3.02) : One temporary construction entrance will be installed.
 - Silt Fence (Section 3.05) Temporary silt fence will be installed as indicated on the site plan.
 - Culvert Inlet Protection (Section 3.08) Culvert Inlet Protection will be installed as indicated on the site plan.
 - 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. cereal 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.

TS

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

PS

Seeding Specifications:

Seasonal rates per acre:

Feb. 1 to May 15
100 lbs. tall fescue
15 lbs. annual rye
2 lbs. red clover

Aug. 1 to Sept. 15
100 lbs. tall fescue
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

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 hydrosprayer.

MU

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 immediately after grading.

CRS

Management

- Construction should be sequenced so that grading operations can begin and end as quickly as possible.
- Erosion and Sediment control devices shall be installed as the first step of construction.
- Areas which are not to be disturbed shall be clearly marked by flags, signs, etc.
- 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

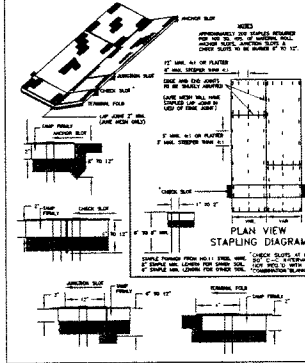
In general, all erosion and sediment control measures will be checked daily and after each significant rainfall. Any items not found in accordance with the Virginia Erosion and Sediment Control Handbook will be immediately replaced and/or repaired. The following items will be checked in particular:

- The silt fence barrier will be checked regularly for undermining or 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.
- All graveled areas shall be checked for a uniform grade with no ruts or channels and top dressed with new gravel as required.

STORMWATER MANAGEMENT

Stormwater Management not included in project. Project is an utility project. No increase of stormwater is associated with the installation of the water and sewer utilities.

TYPICAL TREATMENT - 1 (SOIL STABILIZATION BLANKET) INSTALLATION CRITERIA



EC-2 MAT

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

- 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.
- 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.

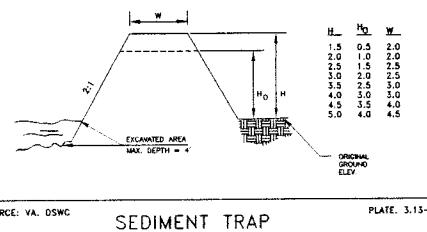
If during construction, additional Erosion and Sediment Control measures are deemed necessary, they shall be installed as directed by the Owner, Engineer or County agent.

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.

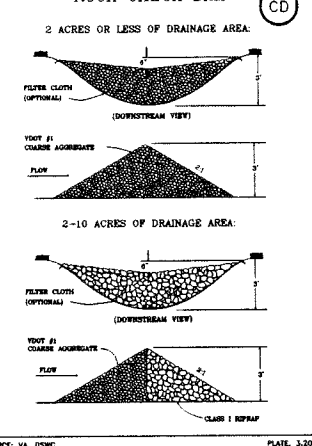
MINIMUM TOP WIDTH (W) REQUIRED FOR SEDIMENT TRAP EMBANKMENTS ACCORDING TO HEIGHT OF EMBANKMENT (FEET)



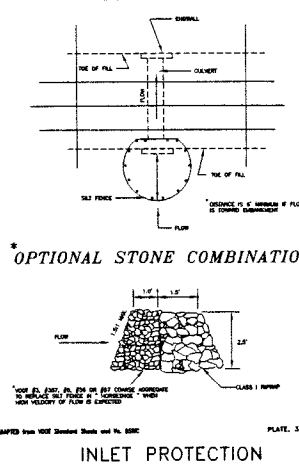
E & S QUANTITIES AND COST ESTIMATE

ITEM	QUANTITY	UNIT PRICE	COST
CONSTRUCTION ENTRANCE	1	\$700.00	\$700
SILT FENCE	750 LF	\$1.75/LF	\$1,315
PERM. SEEDING	1.5 Ac.	\$1,500/ac.	\$2,250
OUTLET PROTECTION	3	\$100	\$300
INLET PROTECTION	3	\$100	\$300
RIP RAP	100/TN	\$15/TN	\$1,500
EC-2 MAT			
EC-3 MAT			
MULCHING	LS	LS	\$1500
CONSTRUCTION ROAD STAB.			
ROCK CHK. DAM			
TEMP. SEEDING	0.2Ac.	\$1,200/ac.	\$240
SUBTOTAL			\$8,105
20% CONTINGENCY			\$1,625
TOTAL COST			\$9,730

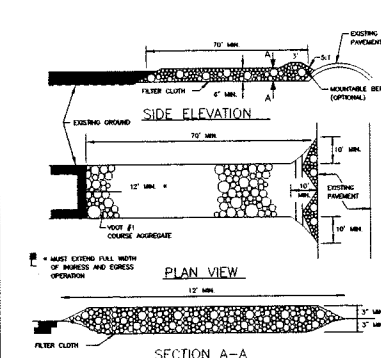
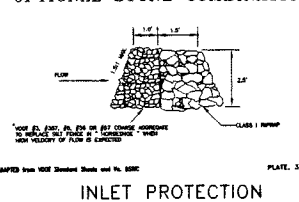
ROCK CHECK DAM



SILT FENCE CULVERT INLET PROTECTION



*OPTIONAL STONE COMBINATION



STONE CONSTRUCTION ENTRANCE

CE

CE

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CE

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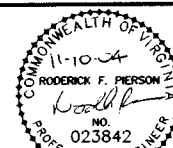
CE

CE

Roderick F. Pierson, P.E., L.L.S.
P.O. Box 311
1332 Roanoke Road, 220 North
Daleville, VA 24083

REV	DATE	DESCRIPTION	BY	APP
1	11/05/04	PER COUNTY COMMENTS		

E & S DETAIL SHEET
POPLAR TREE VILLAGE
BOTETOURT COUNTY, VIRGINIA



SCALE: -
COMM. NO. R2004115
DATE: 09/27/04

DATE: 09/27/04

11/05/04

REVISIONS

PIERSON
ENGINEERING
&
SURVEYING

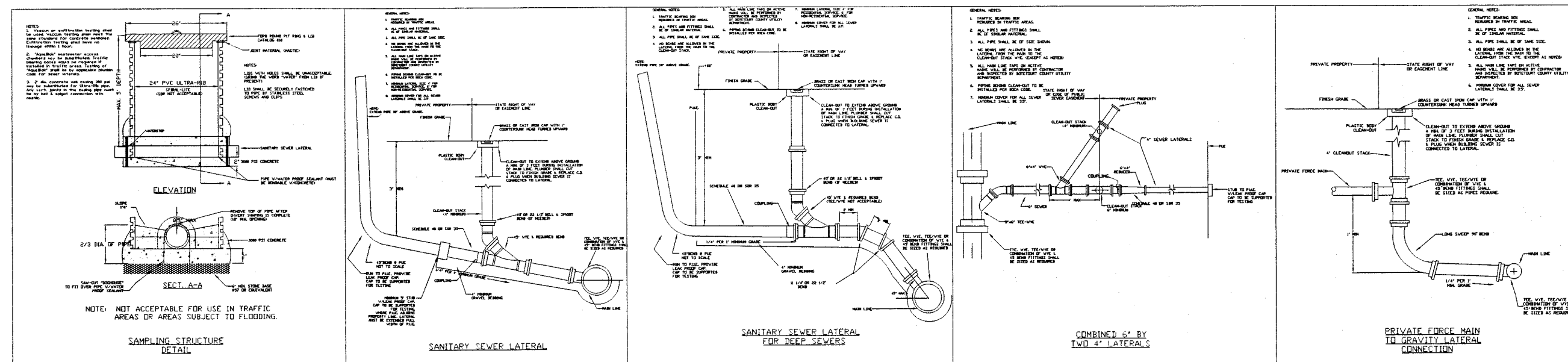
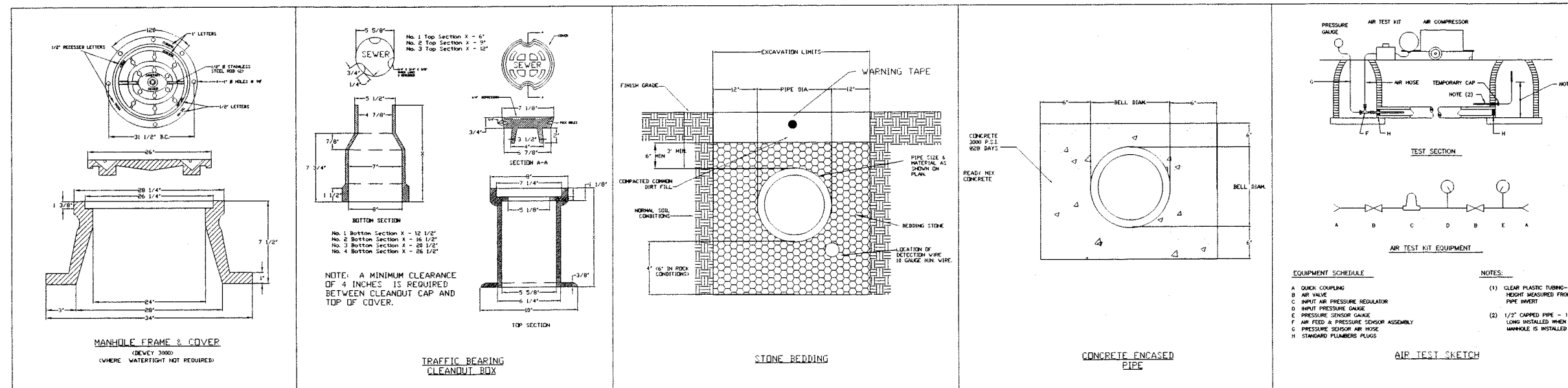
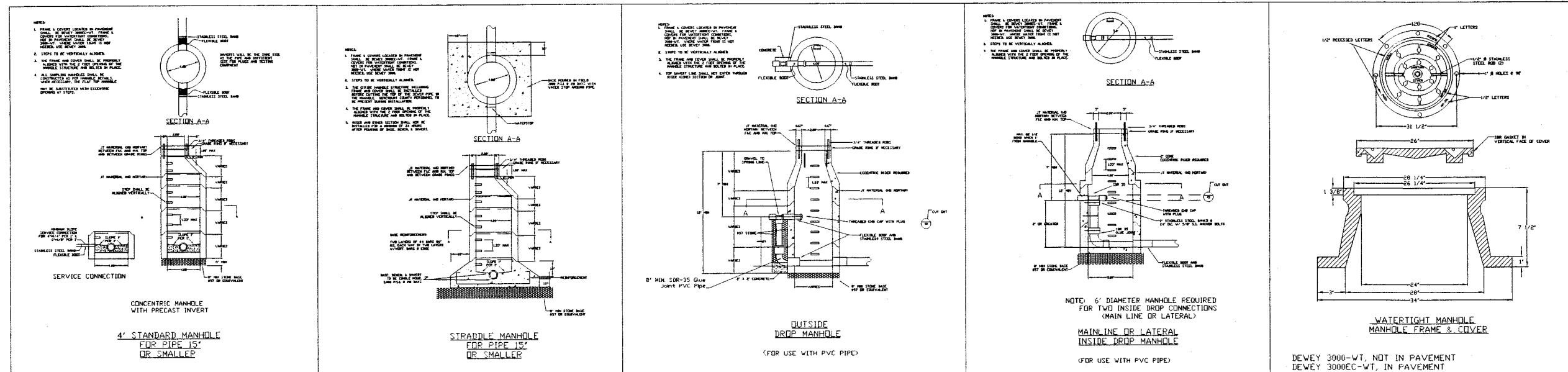
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DEVELOPMENT PLAN
FOR
POPLAR TREE VILLAGE
BOTETOURT COUNTY, VIRGINIA

SEWER DETAILS

COMMONWEALTH OF VIRGINIA
11-10-04
RODERICK E. PIERSON
No. 023842
PROFESSIONAL ENGINEER
COMMISSION
R2004115
SHEET
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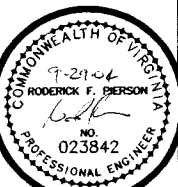
**PIERSON
 ENGINEERING
 &
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**DEVELOPMENT PLAN
 FOR
 POPLAR TREE VILLAGE
 BOTETOURT COUNTY, VIRGINIA**

SEWER DETAILS



COMMISSION
 R2004115

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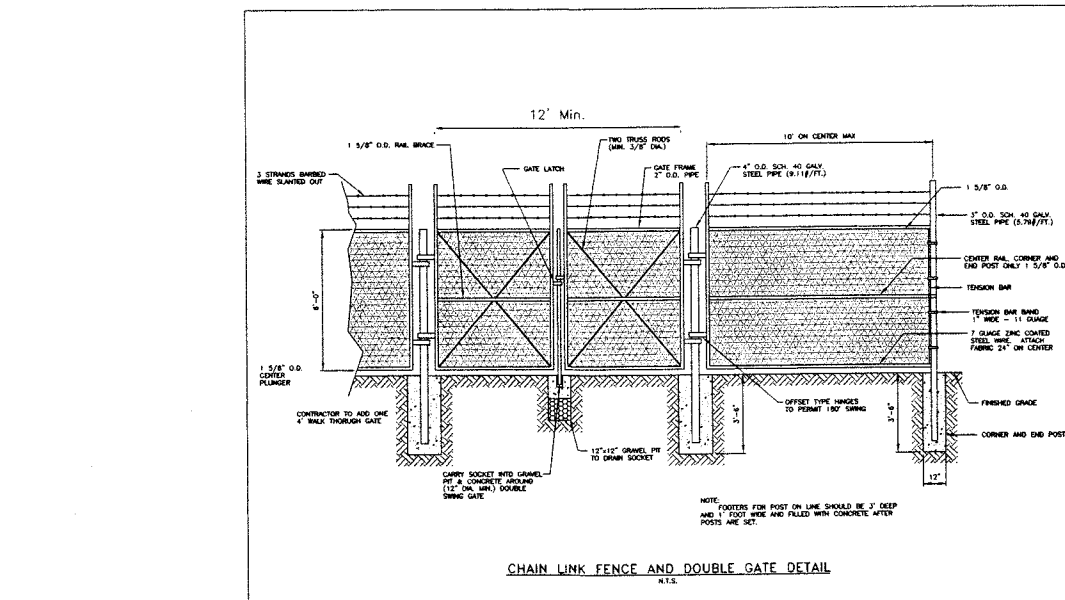
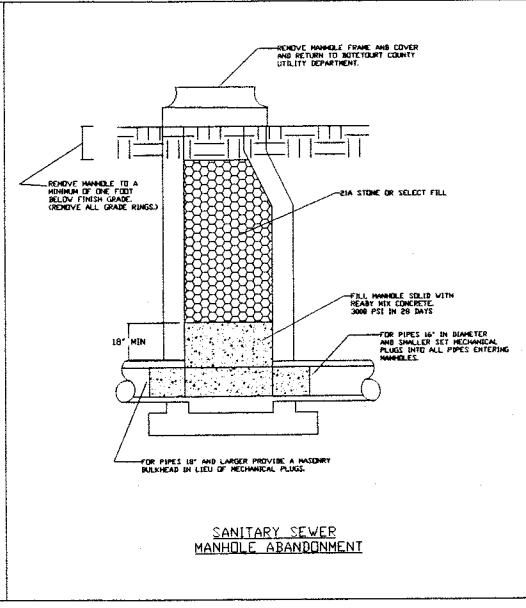
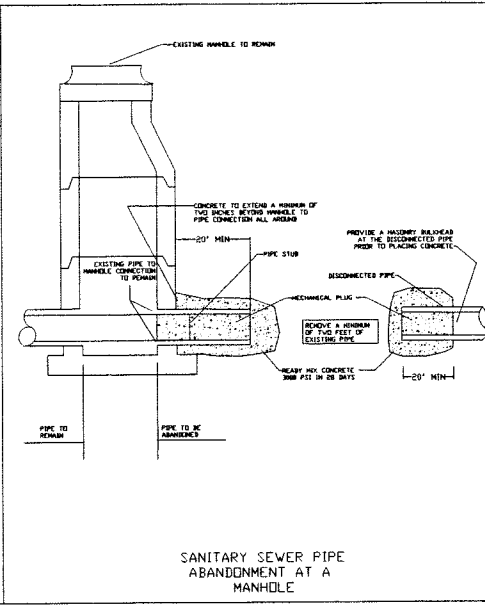
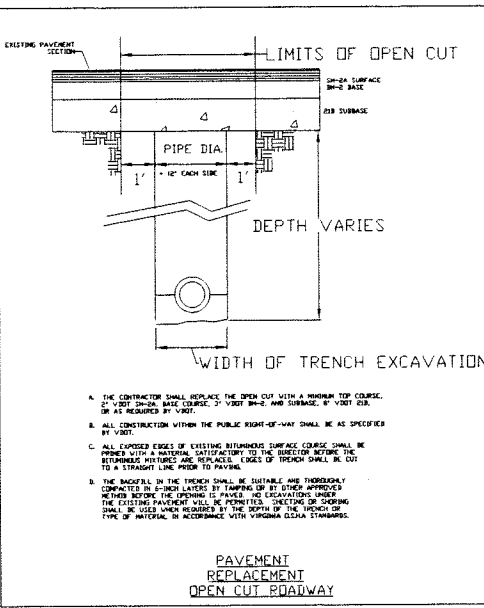
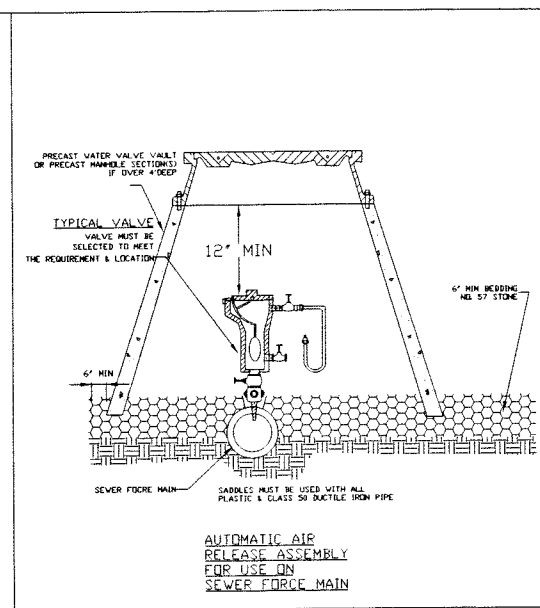
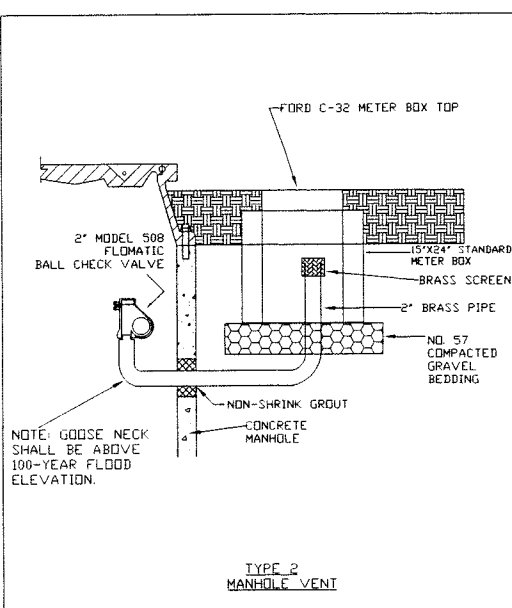
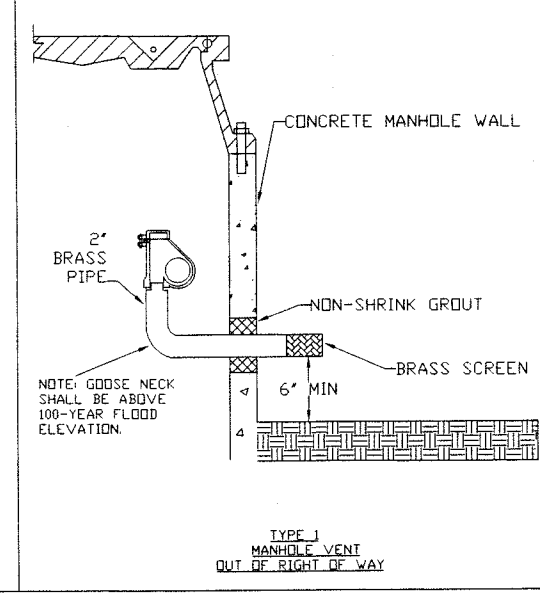
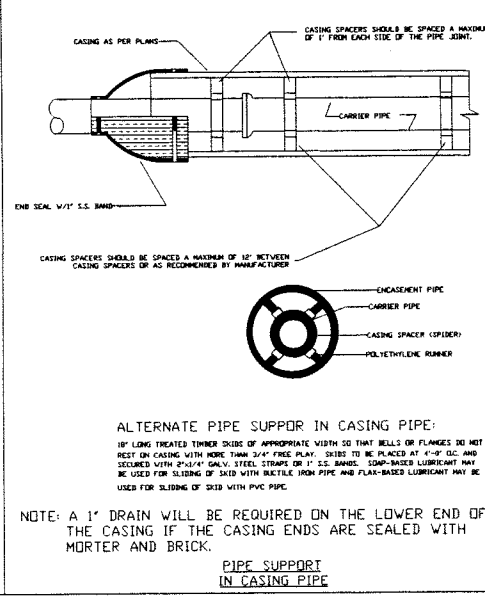
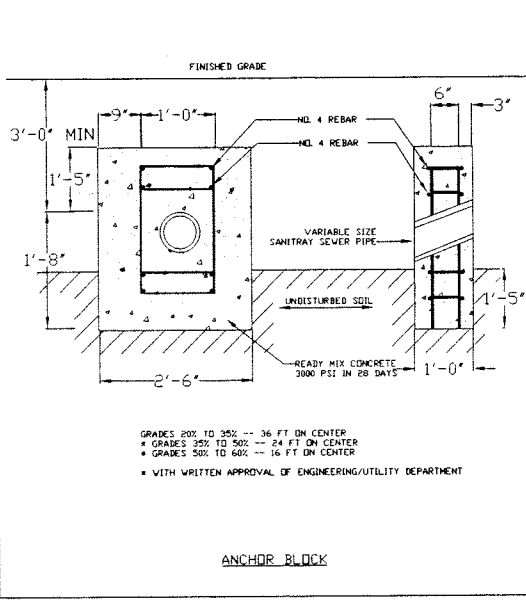
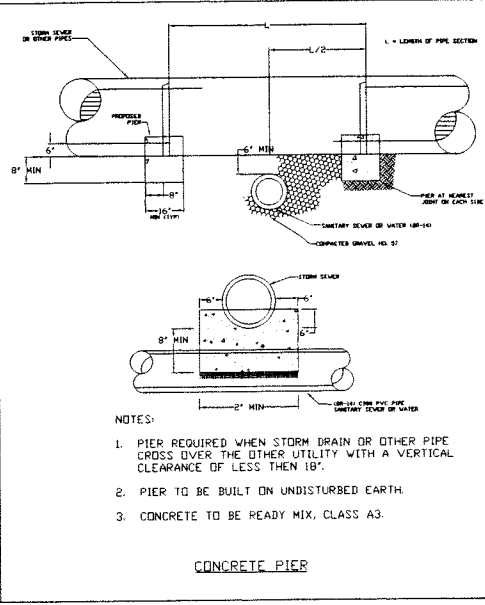
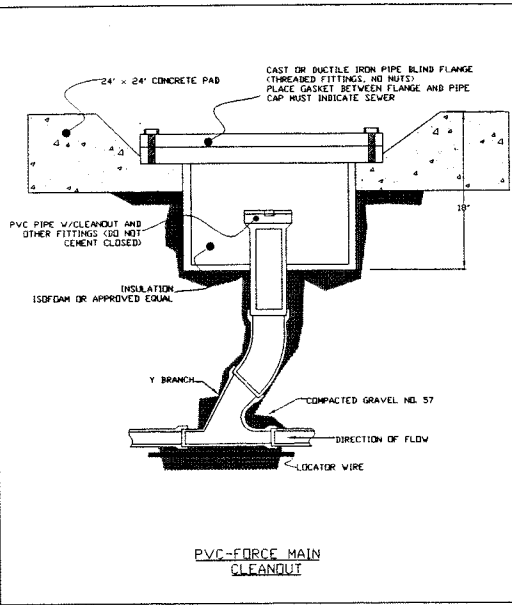


TABLE II-1

FINE AGGREGATE

AMOUNTS FINER THAN EACH LABORATORY SIEVE (SQUARE OPENINGS #), PERCENTAGE BY WEIGHT												
GRADING	3/8"	NO. 4	NO. 8	NO. 16	NO. 30	NO. 50	NO. 100					
A	MIN 100	97+/-3	90+/-10	67+/-18	42+/-17	17+/-	MAX 10					
B	MIN 100	97+/-3					MAX 10					
C		MIN 100	97+/-				MAX 25					

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

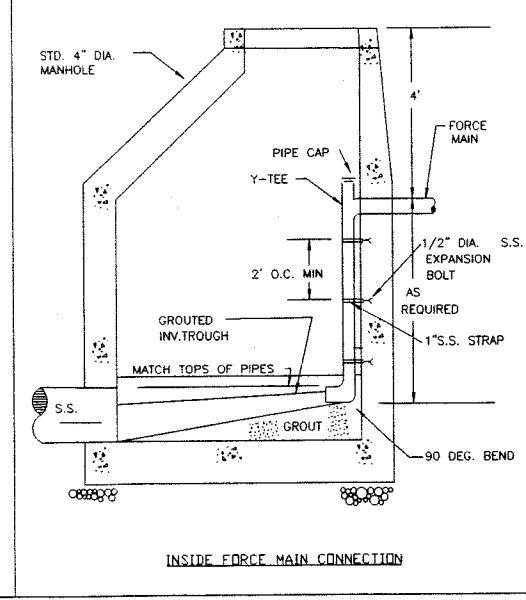
FINE AGGREGATE

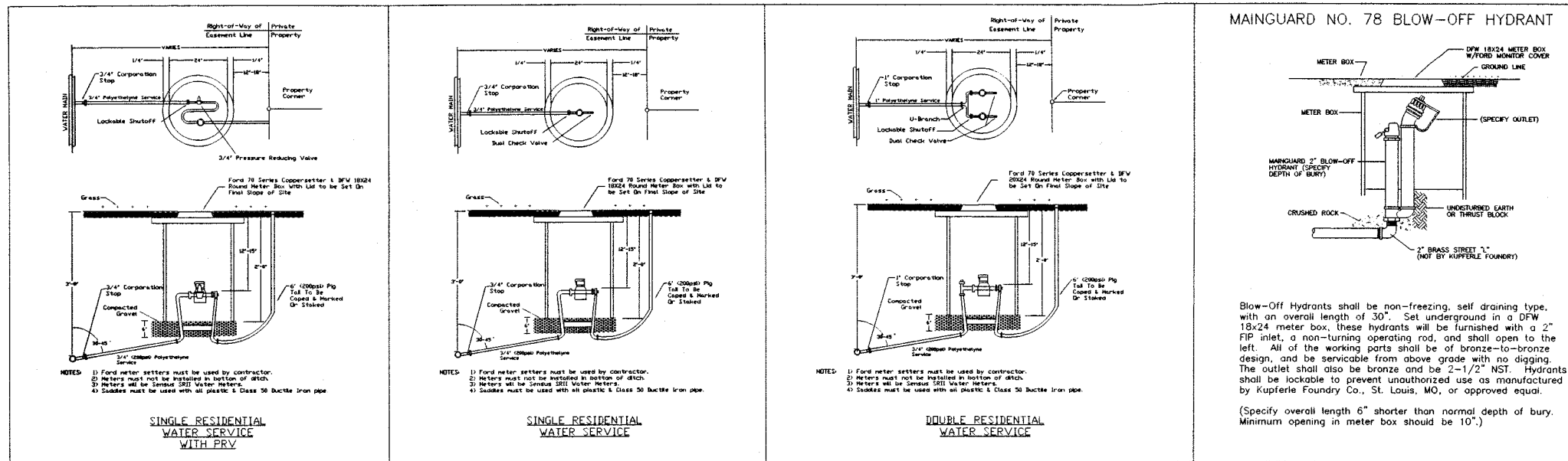
EQUIVALENT PSI

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.

**AIR TESTING
 BACK PRESSURE
 EQUIVALENCY
 TABLE**



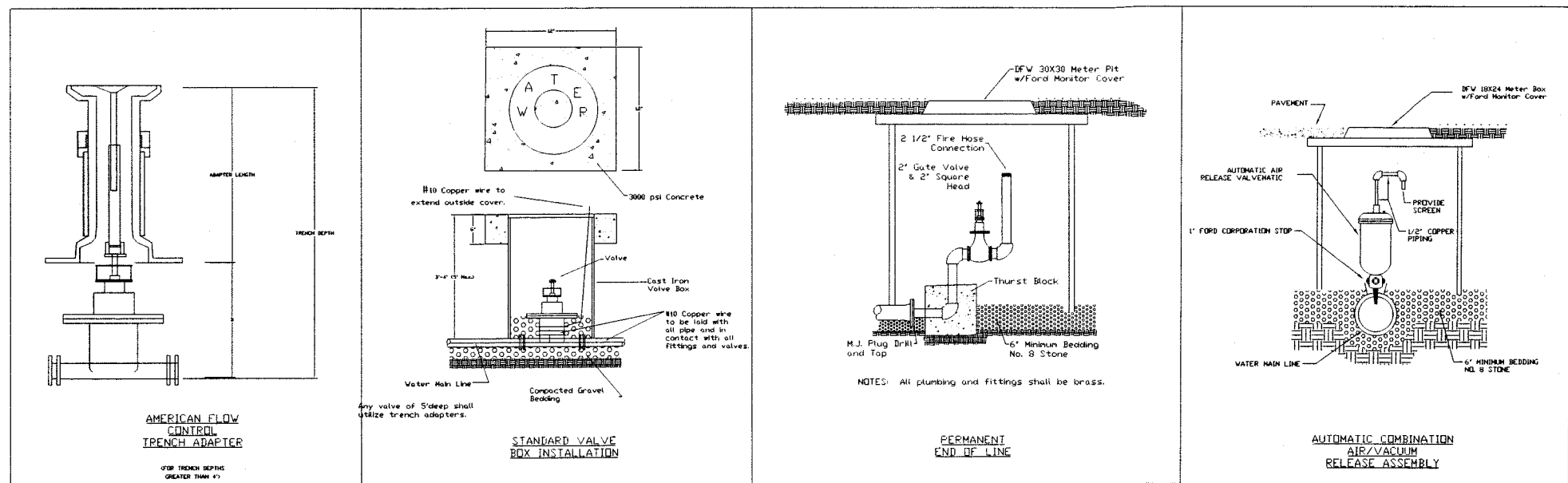


DATE: 09/27/04
11/05/04

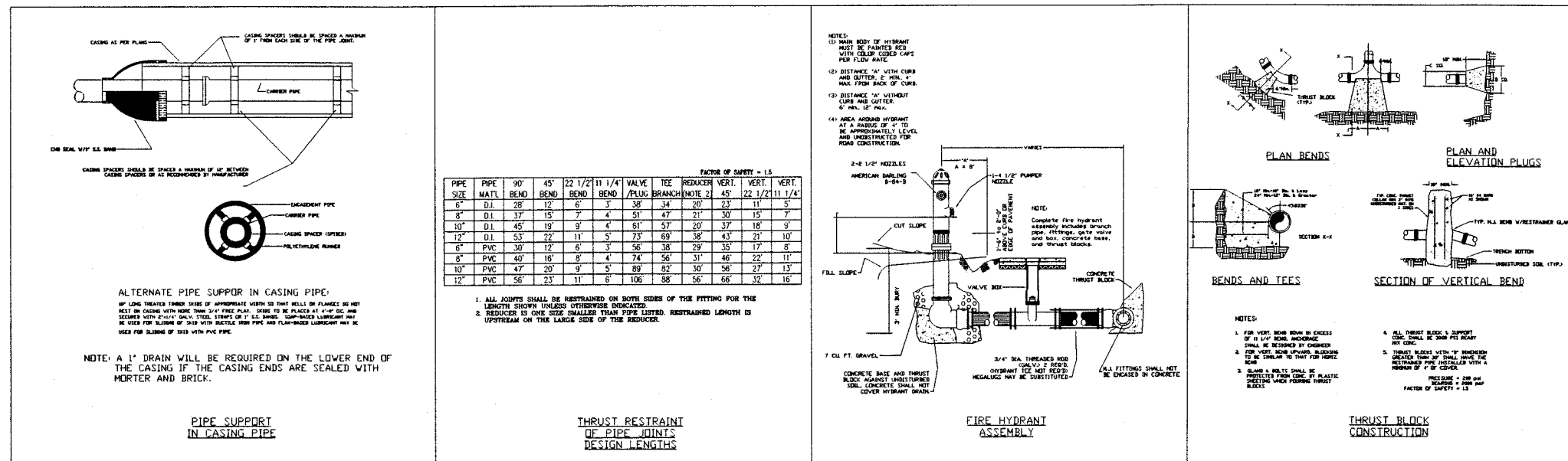
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e-mail: rpierson@bnet.com



DEVELOPMENT PLAN
FOR
POPLAR TREE VILLAGE
BOTETOURT COUNTY, VIRGINIA



WATER DETAILS

COMMONWEALTH OF VIRGINIA
RODGERICK F. PIERSON
11-10-04
023842
PROFESSIONAL ENGINEER
COMMISSION
R2004115
SHEET
8

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 Supervisors.

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 therein.)

As built plan submittals - Botetourt 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 / record 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.
- Deed of conveyance from the owner to Botetourt County.
- Plot 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:
 - Main line sewer line air pressure testing up to and against the first clean-out on service lines.
 - Main line sewer deflection mandrel testing.
 - Sewer manhole vacuum testing up to and including the manhole frame.
 - Main line water line pressure testing.
 - 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.
- Schedule a pre-final inspection of the system.
- Address any inspection / punch list items.
- 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:

$$L = \frac{SDP^{1/2}}{135,200}$$

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 properly 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 values 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)

- Contractor shall thoroughly clean and remove all debris, silt, earth or other materials from the sewer prior to acceptance testing.
- 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.
- 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.
- 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.
- As a safety precaution, no one shall be allowed in manhole after air pressure is increased in the sewer line. 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.
- 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.
- 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.
- 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 "rebound" 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 Mandrel D Dimension			
Nom. Dia.	(MIN)	ASTM D3034 SDR 35	ASTM D2751 (6" only)* ASTM D2680
6"	6"	5.65"	5.65" (SDR 35) 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 (1-800-843-7534).

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 warranty 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 material 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: 09/27/04

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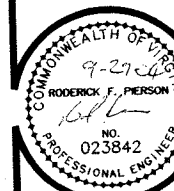
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&
SURVEYING**

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

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

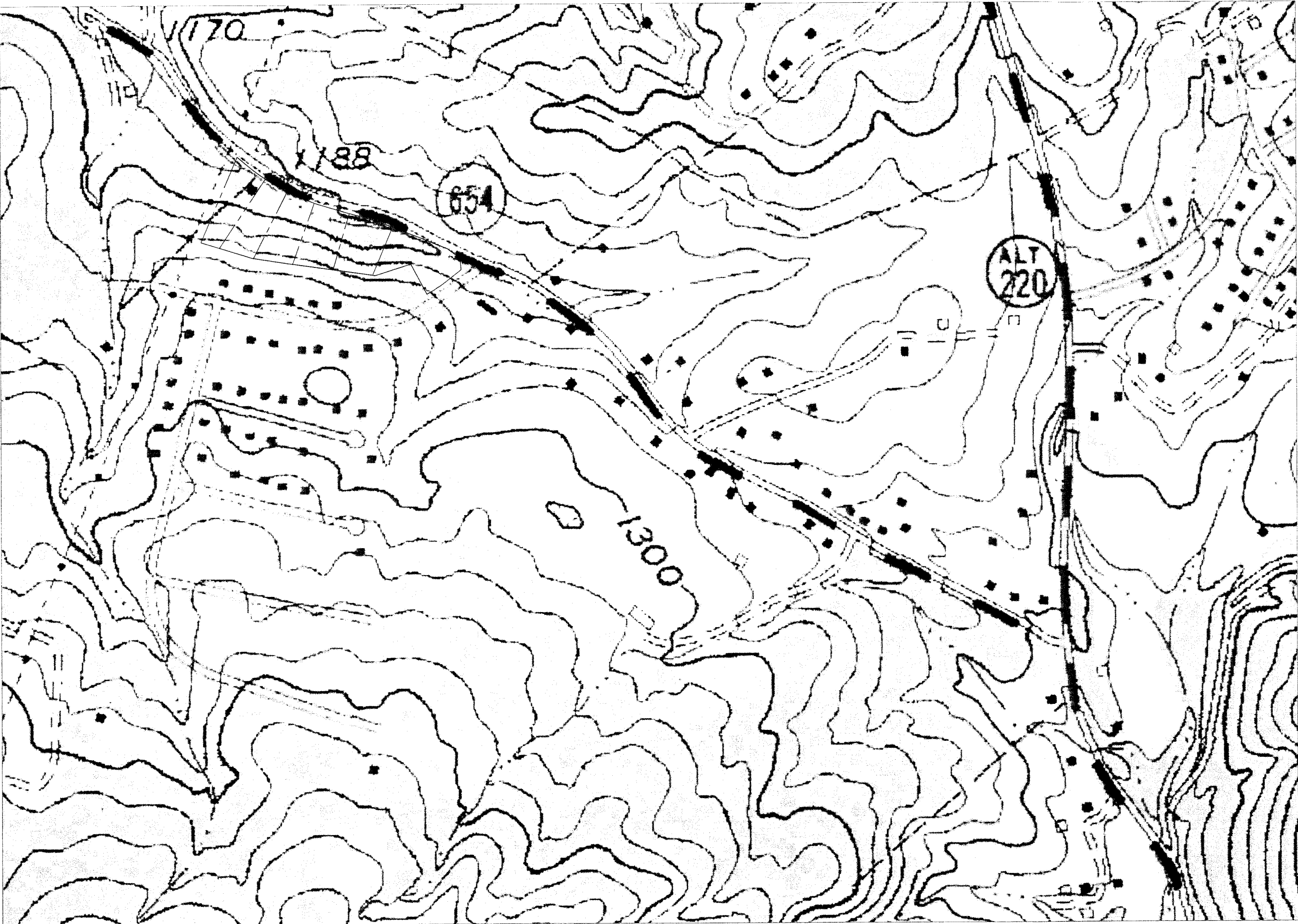
DEVELOPMENT PLAN
FOR
POPLAR TREE VILLAGE
BOTETOURT COUNTY, VIRGINIA

WATER DETAILS



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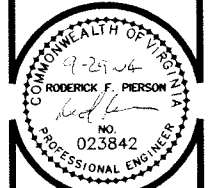
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DEVELOPMENT PLAN
FOR
POPLAR TREE VILLAGE
BOTETOURT COUNTY, VIRGINIA

USGS OVERLAY



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