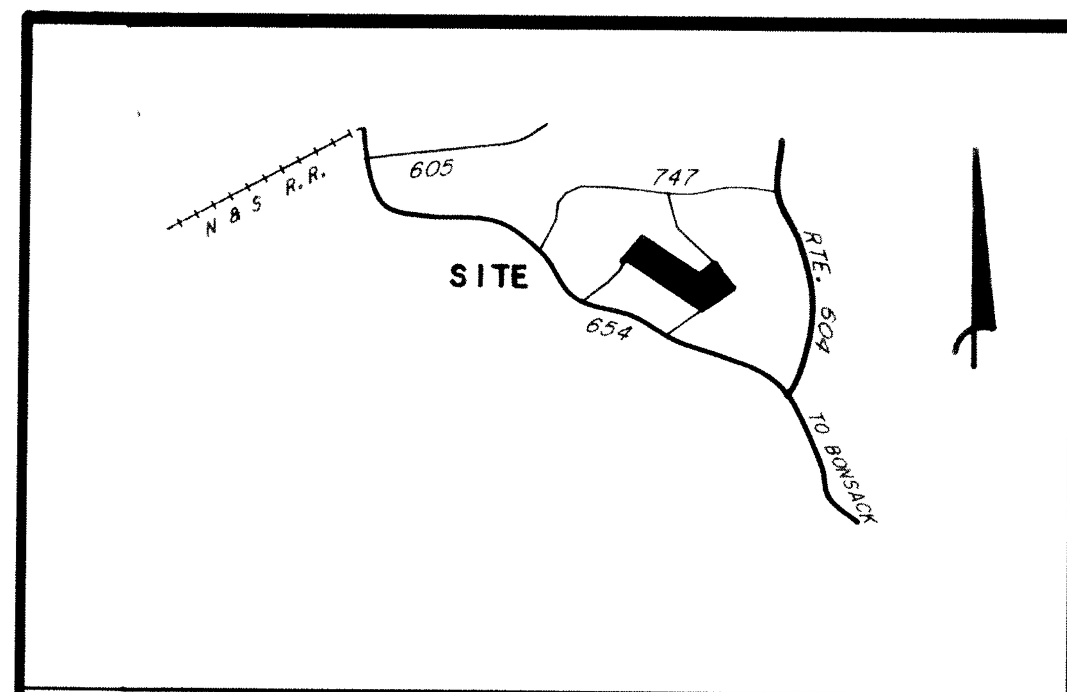
PROJECT NAME: Hunter's Green Sec. I
DATE:
TYPE: road utility plans
LOCATION:
TOTAL # SHEETS: 10
A/E FIRM: Shanks Assoc.
OF SETS: 1



VICINITY SKETCH
NOT TO SCALE

HUNTER'S GREEN

SECTION 1

ROAD and UTILITY PLANS

with Erosion and Sediment Control Measures

Blue Ridge Magisterial District
BOTETOURT COUNTY, VIRGINIA

Owner & Developer

R. & R. JOINT VENTURE, Inc.

P.O. BOX 386
BLUE RIDGE, VIRGINIA 24064

TEL: 977-6525

ROAD CONSTRUCTION NOTES

QUALITY CONTROL

Streets to be graded, paved and all structural components erected in accordance with the Virginia Department of Transportation Road and Bridge Specifications and Road Design Standards dated January 1987. All materials used shall be tested in accordance with standard policies. The developer must contact the office of the Resident Engineer, prior to beginning any construction at which time an Inspection and Testing Procedure Policy will be drawn. The developer will produce test reports from approved independent laboratories at the developer's expense.

The pavement designs shown are based on a subgrade rating of CBR10 or greater. The subgrade soil is to be tested by an independent laboratory and the results submitted to the Virginia Department of Transportation prior to pavement construction. Should the subgrade CBR values be less than CBR10, then additional base material will be required in accordance with departmental specifications.

The subgrade must be approved by Virginia Department of Transportation prior to placement of the base. Base must be approved by Virginia Department of Transportation for depth, template and compaction before surface is applied.

UTILITIES

All necessary utility laterals will be placed prior to pavement base and conduit provisions made for the same (i.e. water, sewer, gas, and telephone).

Gas or petroleum transmission lines will not be permitted within the pavement or shoulder element (back of curb to back of curb) of this development. Service laterals crossing and pipe lines located outside the pavement but inside the right of way will be in conformity with ASA B 31.8 Specifications and Safety Regulations. Distribution lines with pressures less than 120 lbs. are unaffected by the above.

Permits will be required for all utilities within street right of way prior to acceptance into the secondary highway system.

Any easements granted to a utility company for placement of power, telephone, etc. must be released prior to acceptance.

PRIVATE ENTRANCES

Standard CG-8 gutter will be provided at all entrances to private lots where standard CG-6 curb gutter is approved for use.

Permits will be required for all private entrances constructed on street rights of way prior to acceptance into the secondary highway system.

EROSION CONTROL AND LANDSCAPING

Care must be taken during construction to prevent erosion, dust and mud from damaging adjacent property, clogging ditches, tracking public streets and otherwise creating a public or private nuisance to surrounding areas.

The entire construction area back of curbs and or pavement to be backfilled and seeded together with ditches and channels, at the earliest possible time after final grading.

Drainage easements must be defined by excavated ditches or channels for their full length to well defined existing natural watercourses.

This road will be reviewed during construction for the need of paved gutters. If erosion is encountered in any drainage easement, it will be the responsibility of the developer to sod, rip rap, grout, pave, or to do whatever is necessary to correct the problem.

All vegetation and overburden to be removed from shoulder to shoulder prior to the conditioning (cutting and /or preparation) of the subgrade.

GENERAL

Minimum pavement radius of 25 feet required at all street intersections.

While these plans have been approved, such approval does not exempt connections with existing state-maintained roads from critical review at the time permit applications are made. This is necessary in order that the prevailing conditions be taken into consideration regarding safety accompaniments such as turning lanes.

Standard guardrail with safety end sections may be required on fills as deemed necessary by the VDOT engineer. After completion of rough grading operations, the office of the Resident Engineer, Virginia Department of Transportation, shall be notified so that a field review may be made of the proposed locations.

Field review will be made during construction to determine the need and limits of paved gutter and/or ditch stabilization treatments, to determine the need and limits of additional drainage easements. All drainage easements must be cut and made to function to a natural watercourse. Any erosion problems encountered in an easement must be corrected by whatever means necessary prior to subdivision acceptance.

Contractor shall obtain entrance permit to the existing Virginia Department of Transportation right of way from Resident Engineer prior to road construction.

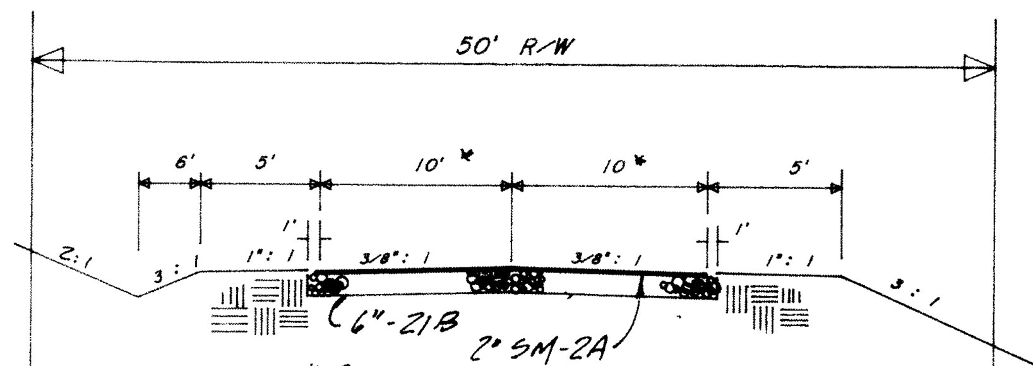
An inspector will not be furnished except for periodic progress inspection, the above mentioned field reviews and checking or required stone depths. The developer will be required to post a surety to guarantee the road free of defects for one year after acceptance by the Department of Transportation.

The streets must be properly maintained until acceptance. As such time as all requirements have been met for acceptance, another inspection will be made to determine the street has been properly maintained.

In order to meet public service requirements, all streets must serve a minimum of three occupied dwellings prior to acceptance.

Contractor shall verify location and elevation of all underground utilities shown on the plans in areas of construction prior to starting work. Contact Engineer immediately if location or elevation is different from that shown on the plan. If there appears to be a conflict, and upon discovery of any utility not shown on this plan, call "Miss Utility" of Central Virginia at 1-800-552-7001.

Approval of these plans will be based on specifications and standards in effect at the time of approval and will be subject, until completion of the roadway and acceptance by the Department, to future revisions, of the Specifications and Standards.

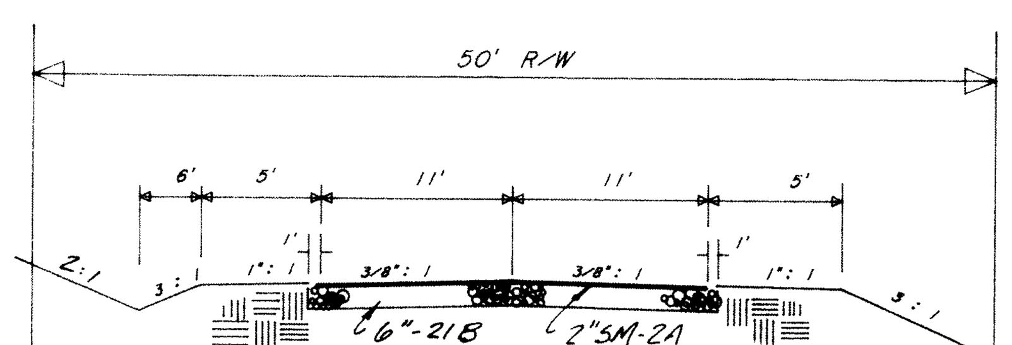


* BASED ON SUBGRADE SOILS - SSV = 10

CLASS I - PAVEMENT SECTION

HUNTER'S GREEN LANE - STA. 17+95 TO STA. 21+25 (18' PAVEMENT)*
SECOND ROAD - STA. 14+06 TO STA. 25+14.54

NOT TO SCALE



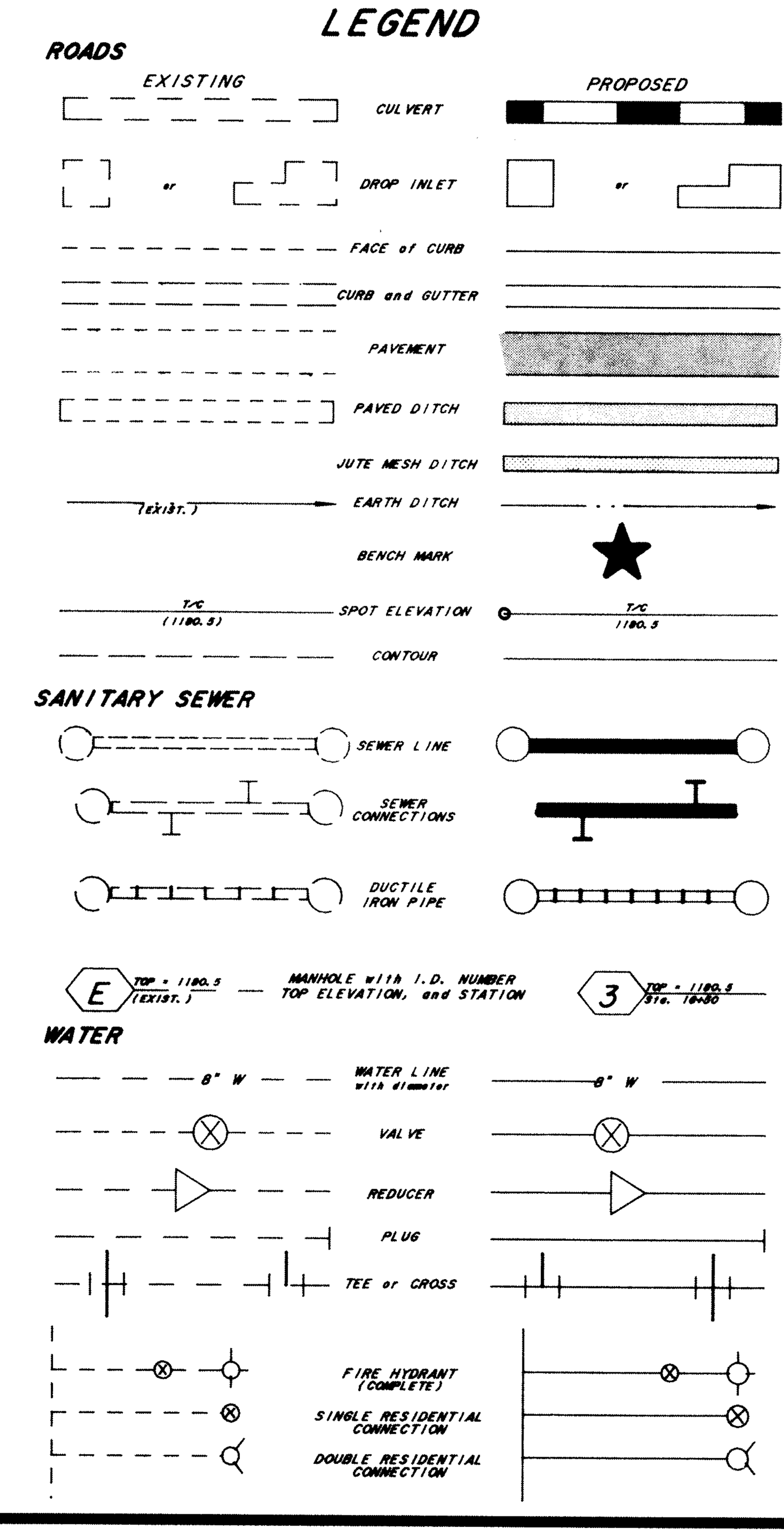
* BASED ON SUBGRADE SOILS - SSV = 10

CLASS II - PAVEMENT SECTION

HUNTER'S GREEN LANE - STA. 10+00 TO STA. 17+95
SECOND ROAD - STA. 10+00 TO STA. 14+06
FUTURE ROAD - STA. 14+75 TO STA. 16+75

SHEET INDEX

LEGEND



CONSTRUCTION NOTES

1. Contractor must secure all permits prior to commencing work.
2. County Engineer must be notified by contractor 48 hours prior to commencing.
3. Locations of all underground utilities are approximate and shall be verified prior to any construction.
4. Contractor is responsible for locating and uncovering all manholes and valve boxes after surface treatment of roads and to adjust them to final road grades.
5. Minimum cover above water line shall be 42 inches.
6. PVC plastic sewer pipe shall be ASTM D-3034 SDR 35 (minimum).
7. Ductile iron sewer pipe shall be ANSI/AWWA C-151, Class 52 minimum.
8. PVC plastic water line shall be AWWA C-900, Table 2, Class 150 (minimum).
9. Ductile iron water line shall be ANSI/AWWA C-151, Class 52 up to 12" and Class 51 for larger pipe.
10. An Erosion and Sediment Control Plan has been approved and is hereby made part of these plans. The contractor is responsible for obtaining and adhering to the provisions therein, which shall include inspection and repairs, if necessary, periodically and after every erodible rainfall.
11. An approved Erosion and Sediment Control Plan may be amended by the plan approving authority if on-site inspection indicates that the approved control measures are not effective in controlling erosion and sedimentation, or if, because of changed circumstances, the approved plan cannot be carried out.
12. All erosion and sediment control practices shall be in accordance with the "Virginia Erosion and Sediment Control Handbook, Second Edition, 1980." (VESCH).

EROSION and SEDIMENT CONTROL DEVICES
LEGEND

KEY	DEVICE TITLE
CE	Construction Entrance
CRS	Construction Road Stabilization
SF	Silt Fence
IP	Inlet Protection
FD	Fill Diversion
ST	Sediment Trap
SB	Sediment Basin
SCC	Stormwater Conveyance Channel
OP	Outlet Protection
RR	Riprap
CD	Check Dams
SR	Surface Roughening
TS	Temporary Seeding
PS	Permanent Seeding
MU	Mulching

VIRGINIA
Erosion and Sediment Control Law

MINIMUM STANDARDS FOR CONTROLLING EROSION AND SEDIMENTATION

MS-1. Stabilization of Denuded Areas

Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant (undisturbed) for longer than 30 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

Soil stabilization refers to measures which protect soil from the erosive forces of raindrop impact and flowing water. Applicable practices include vegetative establishment, mulching, and the early application of gravel base on areas to be paved.

MS-2. Stabilization of Soil Stockpiles

During construction of the project, soil stock piles shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary the temporary protection and permanent stabilization of all stockpiles on site as well as soil intentionally transported from the project site.

MS-3. Permanent Vegetation

A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that, in the opinion of the local program administrator or his designated agent, is uniform, mature enough to survive and will inhibit erosion.

MS-4. Timing and Stabilization of Sediment Trapping Measures

Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.

MS-5. Stabilization of Earthen Structures

Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.

MS-6. Sediment Basins

Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The sediment basin shall be constructed to accommodate the anticipated sediment loading from the land-disturbing activity.

MS-7. Cut and Fill Slopes

Cut and fill slopes shall be constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.

A. Roughened soil surfaces are generally preferred to smooth surfaces on slopes (see SURFACE ROUGHENING, E & S Handbook).

B. DIVERSIONS should be constructed at the top of long steep slopes which have significant drainage areas above the slopes. Diversions or terraces may also be used to reduce slope lengths.

MS-8. Concentrated Runoff Flow Down Cut or Fill Slopes

Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.

MS-9. Water Seeps From a Slope Face

Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.

MS-10. Storm Sewer Inlet Protection

All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

MS-11. Stabilization of Outlets

Before newly constructed stormwater conveyance channels are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.

MS-12. Work in Live Watercourses

When work in live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.

MS-13. Crossing a Live Watercourse

When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary stream crossing constructed of nonerodible material shall be provided.

MS-14. Applicable Regulations

All applicable federal, state and local regulations pertaining to working in or crossing live watercourses shall be met.

MS-15. Stabilization of Bed and Banks

The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.

MS-16. Underground Utility Construction

Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:

a. No more than 500 linear feet of trench may be opened at one time.

b. Excavated material shall be placed on the uphill side of trenches.

c. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property.

MS-17. Construction Access Routes

Where construction vehicle access routes intersect paved public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto a public road surface, the road shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual subdivision lots as well as to larger land-disturbing activities.

MS-18. Temporary Erosion & Sediment Control Measure Removal

All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after temporary measures are no longer needed, unless otherwise authorized by the local program administrator.

MS-19. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff. Contractor shall be responsible for obtaining copy of approved Erosion and Sediment Control Plan and adhere to same. The Virginia Erosion and Sediment Control Handbook shall be used in addition to the approved narrative and plan.

DATE	REVISION DESCRIPTION
4/13/92	REVISE SEWER, EROSION CONTROL
5/1/92	ADD NOTE, ELEV. FOR PONDS
5/8/92	OFF-SITE SANITARY SEWER
6/2/92	VDOT COMMENTS

SHANKS ASSOCIATES, P.C. - ENGINEERS - SURVEYORS - PLANNERS
313 LUCK AVENUE ROANOKE, VIRGINIA 24016 (703) 343-6685

HUNTER'S GREEN SECTION - 1
COVER SHEET

DATE: 03/31/92
DRAWN BY: CEG
DESIGNED BY: FOS
CHECKED BY:
SCALE: As Noted
SHEET NUMBER: 1 OF 10
JOB NUMBER: 692008

KNOW ALL MEN BY THESE PRESENTS TO WIT:

R & R Joint Venture, Inc. is the fee simple owner and proprietor of the land shown hereon to be subdivided, known as Section I, Hunter's Green, bounded as shown hereon in detail by Corners I through 31 to I, inclusive, which comprises the land conveyed to said owner by deeds from Read Mountain Associates and F & B Developers, Inc. recorded in the Clerk's Office of the Circuit Court of Botetourt County in Deed Book 403, Page 565, and Deed Book 403, Page 561, respectively, which land is subject to one Deed of Trust to The Bank of Fincastle, recorded in Deed Book 403, Page 569.

The said owner certifies that it has subdivided this land, as shown hereon, entirely with its own free will and consent and pursuant to and in compliance with Section 15.1 - 465 through 15.1 - 485 of the Virginia Code of 1950, as amended to date, and further pursuant to and in compliance with the County of Botetourt "Land Subdivision Ordinances". The said owner does by virtue of recordation of this plat, dedicate in fee simple to the County of Botetourt all the land embraced within the streets of this subdivision and all the easements are hereby dedicated for public use.

The said owner does as a condition precedent to the approval of this plat and subdivision and the acceptance of the dedication of the streets shown hereon by the Board of Supervisors of Botetourt County, and the Virginia Department of Transportation from any and all claims for damages which such owner, their heirs, successors, devises and assigns, may have against the County and the Virginia Department of Transportation by reason of establishing proper grade lines and along such streets as shown on this plat of the land subdivided (or such changes in street lines as may be agreed upon in the future) and by reason as may, from time to time, be established by said County or Virginia Department of Transportation, and said County or Virginia Department of Transportation shall not be required to construct any retaining walls along the streets and property lines thereof.

In Witness whereof are hereby placed the following signatures and seas this________________ day of________________, 1992.

BY: R & R Joint Venture, Inc.

A. R. Overbay ________________ Ron Geiger ________________

TRUSTEE: The Bank of Fincastle

John F. Kilby ________________ Paul A. Tucker ________________

(Either of Whom May Sign)

STATE OF VIRGINIA AT LARGE

________________ OF ________________

I,________________, A NOTARY PUBLIC IN AND FOR THE

AFORESAID________________ AND STATE, DO HEREBY CERTIFY THAT

____

HAVE PERSONALLY APPEARED BEFORE ME IN MY JURISDICTION AND ACKNOWLEDGED THE

SAME ON________________, 199 .

MY COMMISSION EXPIRES ON________________.

____
NOTARY PUBLIC

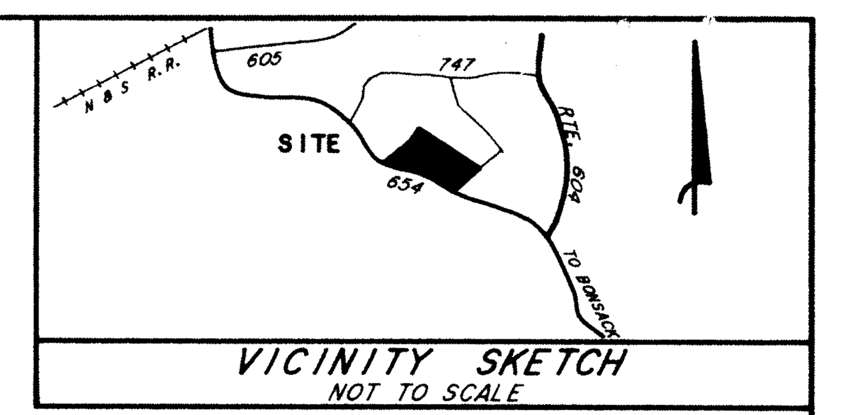
APPROVED:

____
J. WAYNE UTT
BOTETOURT COUNTY SUBDIVISION AGENT

IN THE CLERK'S OFFICE OF THE CIRCUIT COURT OF BOTETOURT COUNTY, VIRGINIA, THIS PLAT, WITH THE CERTIFICATE OF ACKNOWLEDGEMENT THERETO ANNEXED IS ADMITTED TO RECORD ON________________, 199__, AT________ O'CLOCK ____.M.

TESTEE:________________, CLERK

____
DEPUTY CLERK



VICINITY SKETCH
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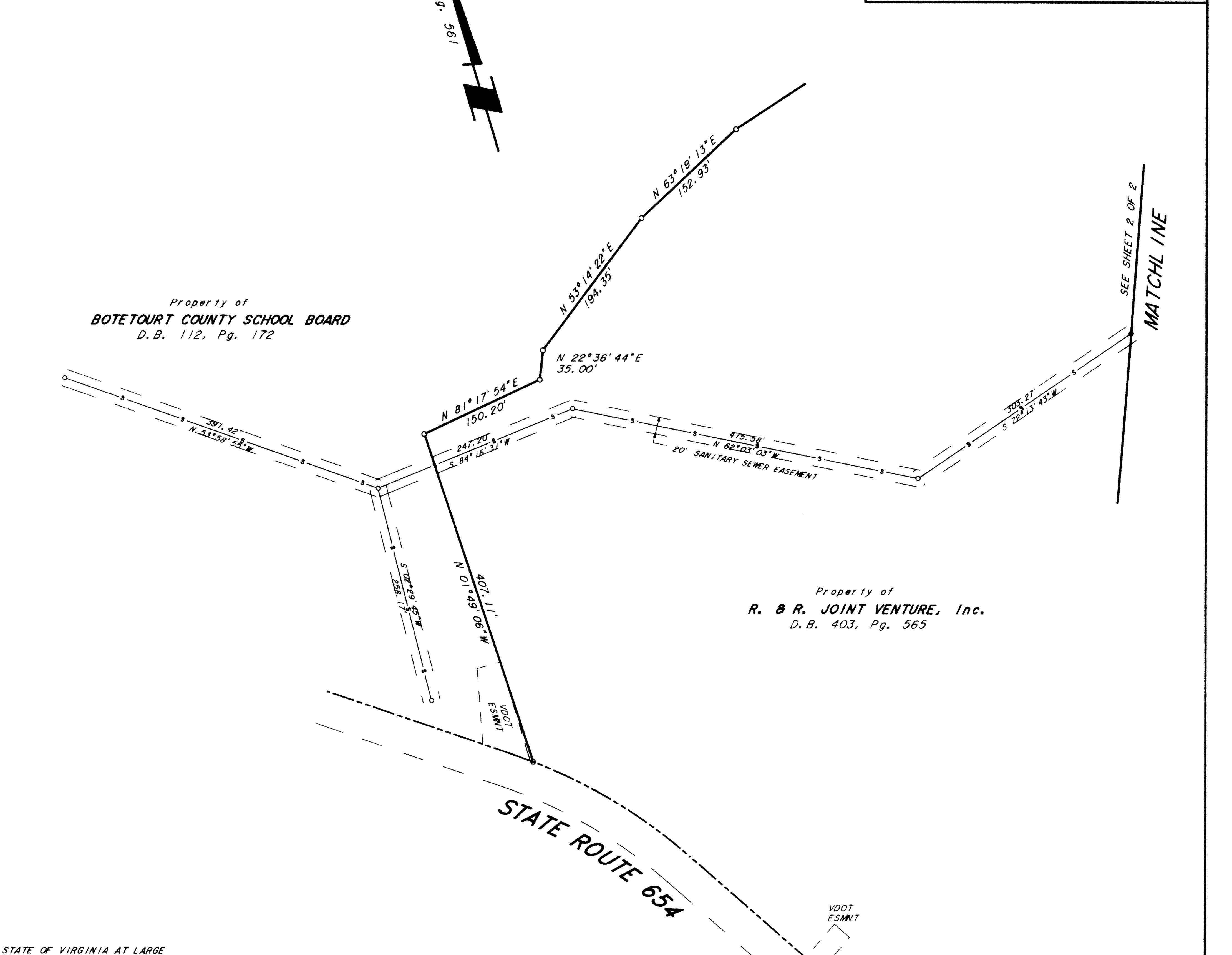


STATE OF VIRGINIA AT LARGE

________________ OF ________________

I,________________, A NOTARY PUBLIC IN AND FOR THE

AFORESAID________________ AND STATE, DO HEREBY CERTIFY THAT

____

HAVE PERSONALLY APPEARED BEFORE ME IN MY JURISDICTION AND ACKNOWLEDGED THE

SAME ON________________, 199 .

MY COMMISSION EXPIRES ON________________.

____
NOTARY PUBLIC

THE SUBJECT PROPERTY IS NOT WITHIN A F.E.M.A. DEFINED FLOOD HAZARD ZONE AS OF JUNE 15, 1978 F.E.M.A. STUDIES. RESULTS OF ANY FURTHER STUDIES TO DATE ARE NOT PUBLISHED.

THE PROPERTY LIES INSIDE ZONE C AS SHOWN ON COMMUNITY PANEL NUMBER 510018 0150 A.

THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT.

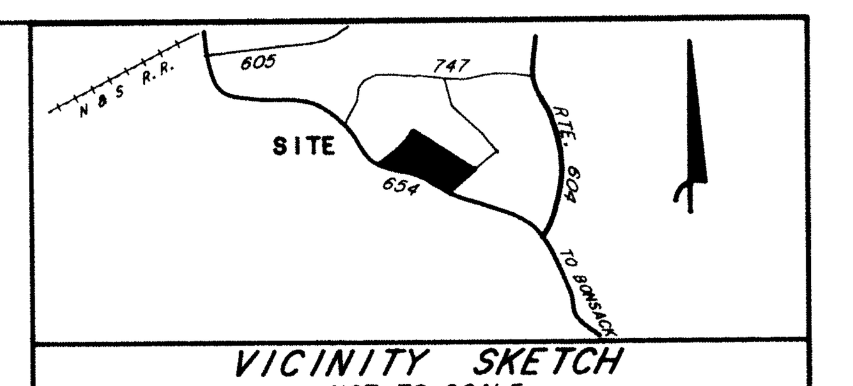
SHEET 1 OF 2

Plat of Section 1
HUNTER'S GREEN
21.785 Acres
belonging to
R. & R. JOINT VENTURE, Inc.

Blue Ridge Magisterial District
BOTETOURT COUNTY, VIRGINIA

SHANKS ASSOCIATES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
313 Luck Avenue
Roanoke, Virginia 24016
(703) 343-6685

DATE: 05/15/92 SCALE : 1" = 100'
JOB NO.: 692008
CALC. BY: JRA F.B.:
DRWN. BY: CEG CHECKED BY:



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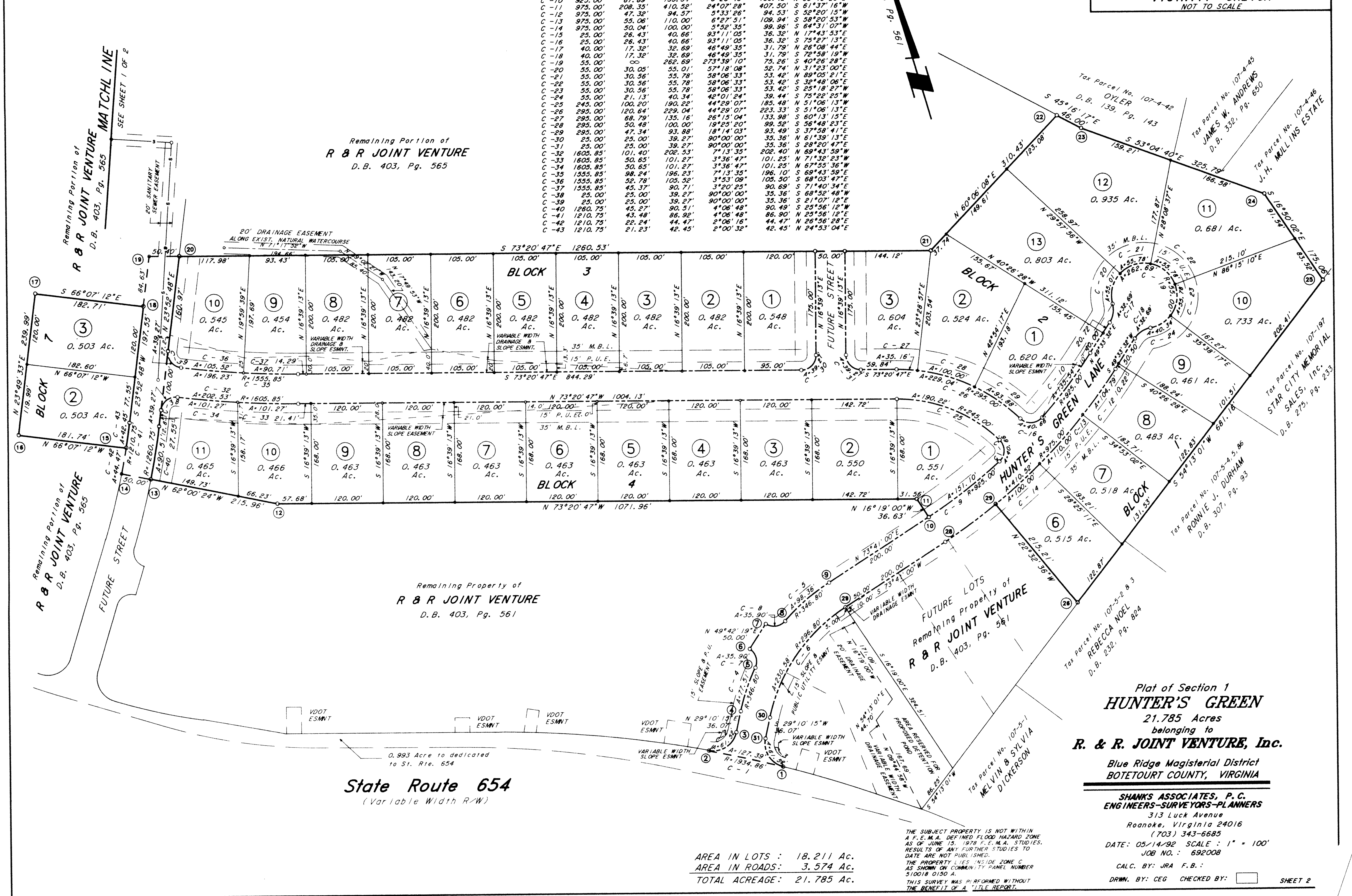


CURVE	RADIUS	TANGENT	LENGTH	DELTA	CHORD	CH. BEARING
C - 1	1934.86'	63.72'	127.39'	3°46'20"	127.37'	N 60°49'45"W
C - 2	40.00'	38.70'	61.52'	88°06'50"	55.63'	N 73°13'40"E
C - 3	40.00'	38.70'	61.52'	88°06'50"	55.63'	S 14°53'10"E
C - 4	346.80'	38.92'	77.51'	12°48'21"	77.35'	N 35°34'25"E
C - 5	346.80'	49.51'	98.36'	16°14'58"	98.03'	N 65°33'31"E
C - 6	296.80'	121.46'	230.58'	44°30'45"	224.83'	S 51°25'37"W
C - 7	25.00'	21.84'	35.90'	82°16'17"	32.89'	N 00°50'27"E
C - 8	25.00'	21.84'	35.90'	82°16'17"	32.89'	S 81°25'50"E
C - 9	925.00'	75.72'	151.10'	9°21'35"	150.94'	N 69°00'12"E
C -10	925.00'	67.89'	135.54'	8°23'43"	135.42'	N 53°45'23"E
C -11	975.00'	208.35'	410.52'	24°07'28"	407.50'	S 61°37'16"W
C -12	975.00'	47.32'	94.57'	5°33'26"	94.53'	S 52°20'15"W
C -13	975.00'	55.06'	110.00'	6°27'51"	109.94'	S 58°20'53"W
C -14	975.00'	50.04'	100.00'	5°52'35"	99.96'	S 64°31'07"W
C -15	25.00'	26.43'	40.66'	93°11'05"	36.32'	N 17°43'53"E
C -16	25.00'	26.43'	40.66'	93°11'05"	36.32'	S 75°27'13"E
C -17	40.00'	17.32'	32.69'	46°49'35"	31.79'	N 26°08'44"E
C -18	40.00'	17.32'	32.69'	46°49'35"	31.79'	S 72°58'19"W
C -19	55.00'	∞	262.69'	273°39'10"	75.26'	S 40°26'28"E
C -20	55.00'	30.05'	55.01'	57°18'08"	52.74'	N 31°23'00"E
C -21	55.00'	30.56'	55.78'	58°06'33"	53.42'	N 89°05'21"E
C -22	55.00'	30.56'	55.78'	58°06'33"	53.42'	S 32°48'06"E
C -23	55.00'	30.56'	55.78'	58°06'33"	53.42'	S 25°18'27"W
C -24	55.00'	21.13'	40.34'	42°01'24"	39.44'	S 75°22'25"W
C -25	245.00'	100.20'	190.22'	44°29'07"	185.48'	N 51°06'13"W
C -26	295.00'	120.64'	229.04'	44°29'07"	223.33'	S 51°06'13"E
C -27	295.00'	68.79'	135.16'	26°15'04"	133.98'	S 60°13'15"E
C -28	295.00'	50.48'	100.00'	19°25'20"	99.52'	S 56°48'23"E
C -29	295.00'	47.34'	93.88'	18°14'03"	93.49'	S 37°58'41"E
C -30	25.00'	25.00'	39.27'	90°00'00"	35.36'	N 61°39'13"E
C -31	25.00'	25.00'	39.27'	90°00'00"	35.36'	S 28°20'47"E
C -32	1605.85'	101.40'	202.53'	7°13'35"	202.40'	N 69°43'59"W
C -33	1605.85'	50.65'	101.27'	3°36'47"	101.25'	N 71°32'23"W
C -34	1605.85'	50.65'	101.27'	3°36'47"	101.25'	N 67°55'36"W
C -35	1555.85'	98.24'	196.23'	7°13'35"	196.10'	S 69°43'59"E
C -36	1555.85'	52.78'	105.52'	3°53'09"	105.50'	S 68°03'47"E
C -37	1555.85'	45.37'	90.71'	3°20'25"	90.69'	S 71°40'34"E
C -38	25.00'	25.00'	39.27'	90°00'00"	35.36'	S 68°52'48"W
C -39	25.00'	25.00'	39.27'	90°00'00"	35.36'	S 21°07'12"E
C -40	1260.75'	45.27'	90.51'	4°06'48"	90.49'	S 25°56'12"W
C -41	1210.75'	43.48'	86.92'	4°06'48"	86.90'	N 25°56'12"E
C -42	1210.75'	22.24'	44.47'	2°06'16"	44.47'	N 26°56'28"E
C -43	1210.75'	21.23'	42.45'	2°00'32"	42.45'	N 24°53'04"E

AREA IN LOTS : 18.211 Ac.
AREA IN ROADS: 3.574 Ac.
TOTAL ACREAGE: 21.785 Ac.

THE SUBJECT PROPERTY IS NOT WITHIN A F.E.M.A. DEFINED FLOOD HAZARD ZONE AS OF JUNE 15, 1978 F.E.M.A. STUDIES. RESULTS OF ANY FURTHER STUDIES TO DATE ARE NOT PUBLISHED.

THE PROPERTY LIES INSIDE ZONE C AS SHOWN ON COMMUNITY PANEL NUMBER 510018 0150 A.

THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT.

Plat of Section 1
HUNTER'S GREEN
21.785 Acres
belonging to
R. & R. JOINT VENTURE, Inc.

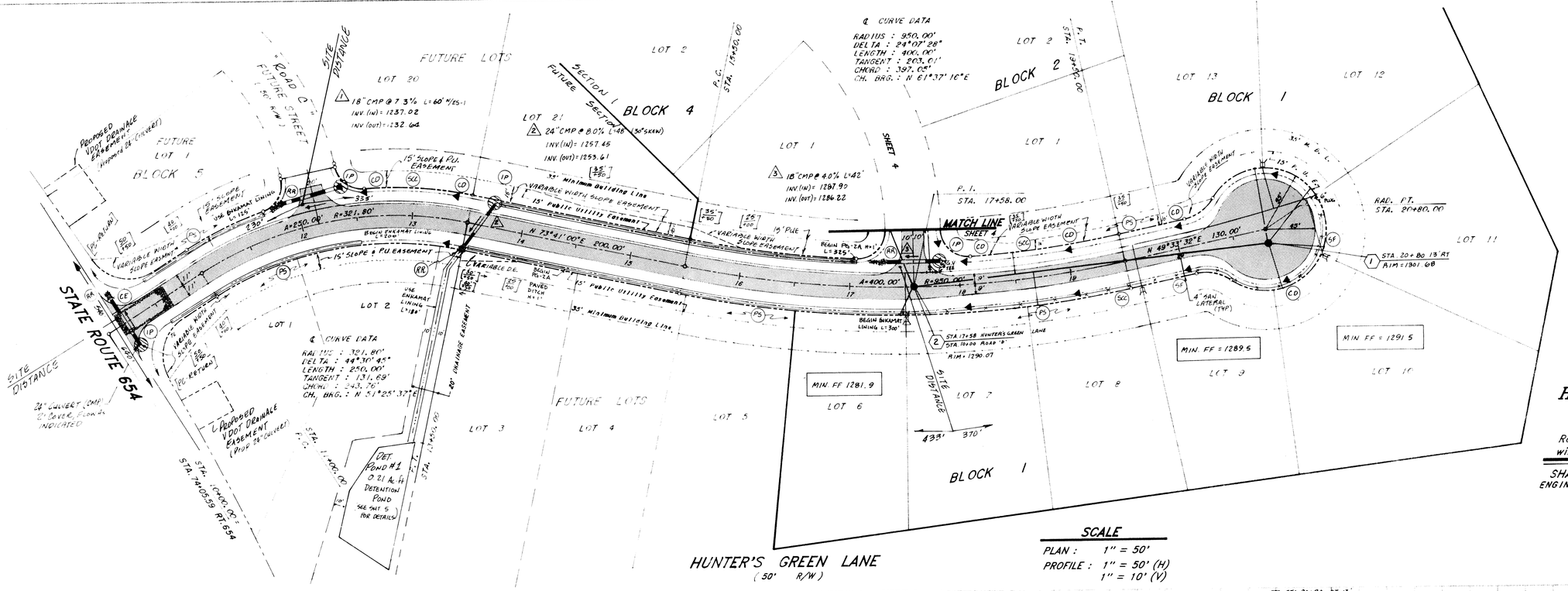
Blue Ridge Magisterial District
BOTETOURT COUNTY, VIRGINIA

SHANKS ASSOCIATES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
313 Luck Avenue
Roanoke, Virginia 24016
(703) 343-6685

DATE: 05/14/92 SCALE : 1" = 100'
JOB NO.: 692008
CALC. BY: JRA F.B.:
DRWN. BY: CEG CHECKED BY:

SHEET 2

SHEET 2 OF 10



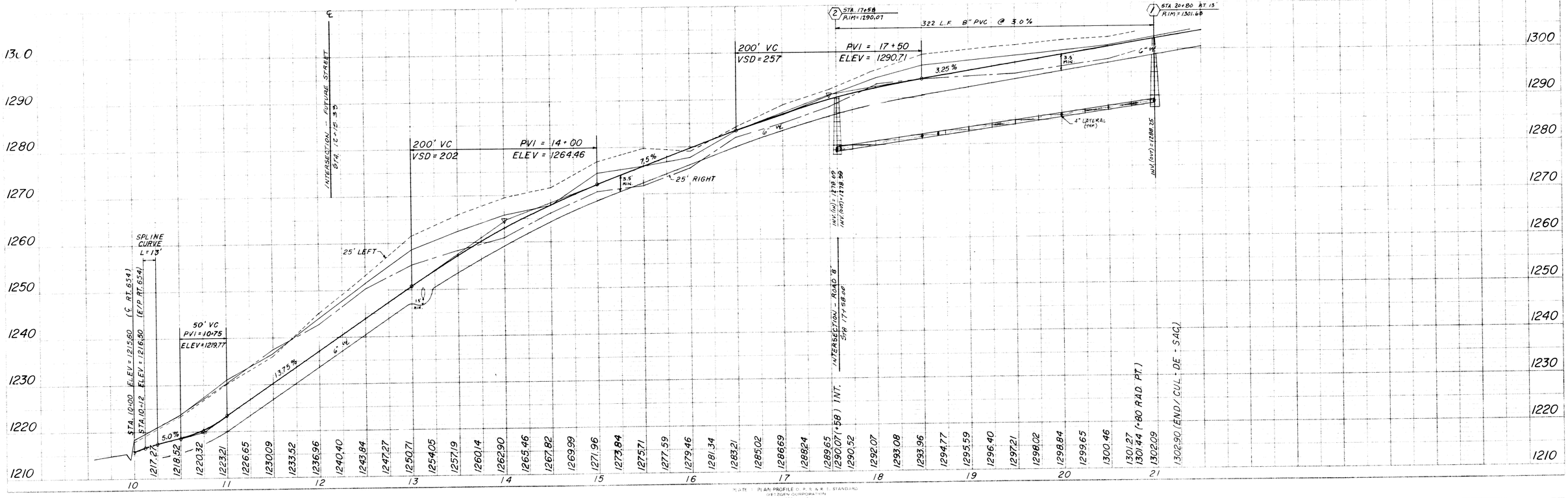
HUNTER'S GREEN
SECTION 1
Plan and Profile for Road and Utility Construction with Erosion Control Measures

SHANKS ASSOCIATES, P.C.
ENGINEERS - SURVEYORS - PLANNERS
313 LUCK AVENUE
ROANOKE, VIRGINIA 24016
(703) 343-6685

JOB NUMBER: 692008
DATE: 03/31/92 REVISED: 04/13/92
5/8/92
6/3/92

SHEET 3 of 10 4/24/92

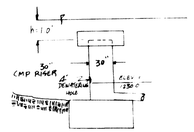
SCALE
PLAN : 1" = 50'
PROFILE : 1" = 50' (H)
1" = 10' (V)



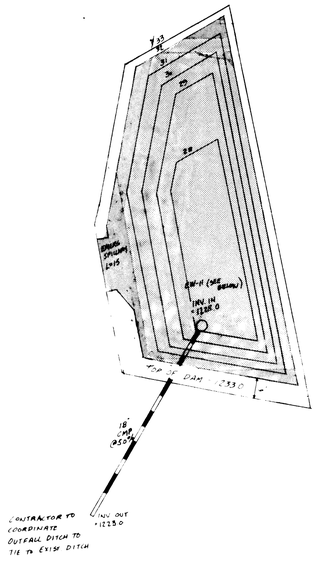
NOTE: PLAN-PROFILE C.P.S.A.K.I. STANDARD
BREZGEN CORPORATION
PANTEGO, N.C.S.


HUNTER'S GREEN LANE
MATCH LINE
SHEET 3
℄ CURVE DATA
RADIUS : 270.00'
DELTA : 44°29'07"
LENGTH : 209.63'
TANGENT : 110.42'
CHORD : 204.41'
CH. BRG. : N 51°06' 13"W
FUTURE LOTS
BLOCK 4
BLOCK 3
BLOCK 2
FUTURE STREET
(50' R/W)
FUTURE ROAD
(50' R/W)
P.I. STA. 13+70.86
= STA. 10+00
SITE DISTANCE
33' Minimum Building Line
VARIABLE WIDTH SLOPE EASEMENT
VARIABLE WIDTH DRAINAGE & SLOPE EASEMENT
MIN. FF = 1263.4
MIN. FF = 1258.7
MIN. FF = 1252.4
MIN. FF = 1246.1
20' DRAINAGE EASEMENT ALONG EXIST. NATURAL WATERCOURSE
℄ CURVE DATA
RADIUS : 1580.85'
DELTA : 7°13'35"
LENGTH : 199.38'
TANGENT : 99.82'
CHORD : 199.25'
CH. BRG. : N 69°43'59"W
MATCH LINE
SHEET 10
END 20' PAVEMENT SECTION AT STA. 16+75
HUNTER'S GREEN
SECTION 1
Plan and Profile for
Road and Utility Construction
with Erosion Control Measures
SHANKS ASSOCIATES, P. C.
ENGINEERS - SURVEYORS - PLANNERS
313 LUCK AVENUE
ROANOKE, VIRGINIA 24016
(703) 343-6685
JOB NUMBER: 692008
DATE: 03/31/92 REVISED: 04/13/92
5/8/92
6/3/92
6/24/92
SHEET 4 of 10
SCALE
PLAN: 1" = 50'
PROFILE: 1" = 50' (H)
1" = 10' (V)
STA 10+00
RIM = 1290.07
STA 13+00
RIM = 1300.17
STA 17+00
RIM = 1286.07
STA 21+00
RIM = 1268.07
STA 25+00
RIM = 1242.07
300 L.F. 8" PVC @ 0.63%
400 L.F. 8" PVC @ 0.5%
400 L.F. 8" PVC @ 4.64%
400 L.F. 8" PVC @ 6.26%
300' VC
VSD = 205'
PVI = 14+00
ELEV. = 1304.07
200' VC
PVI = 18+00
ELEV. = 1280.07
200' VC
VSD = 240'
PVI = 22+50
ELEV. = 1262.07
100' VC
PVI = 24+50
ELEV = 1244.57
INTERSECTION
FUTURE STREET
MATCH LINE
SHEET 10
PLATE 1 PLAN-PROFILE

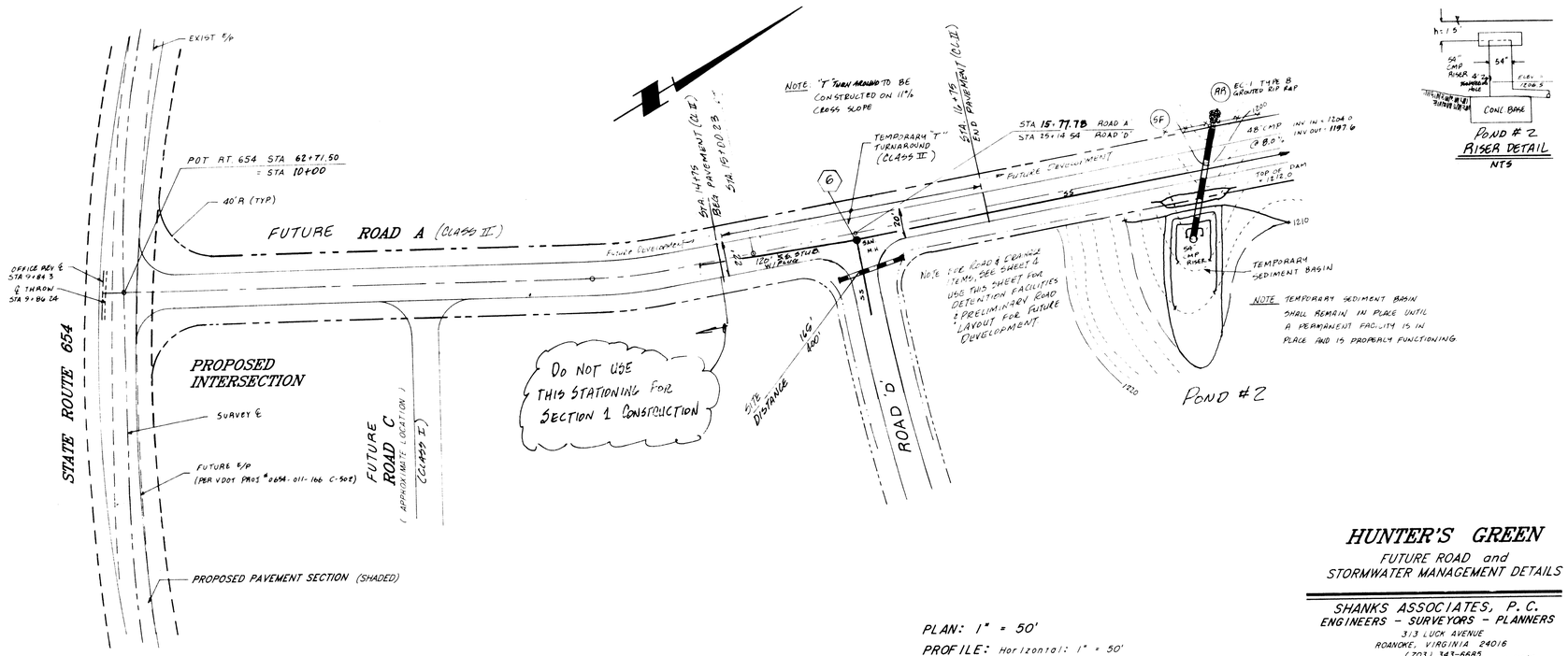
NOTE: 30" CMP RISER TO BE REMOVED UPON COMPLETION OF DEVELOPMENT AND PERMANENT VEGETATION ESTABLISHED



POND #1
RISER DETAIL
NTS



POND #1
POND DETAIL
SCALE 1" = 20'



NOTE: 54" CMP RISER TO BE REMOVED UPON COMPLETION OF DEVELOPMENT AND PERMANENT VEGETATION ESTABLISHED

POND #2
RISER DETAIL
NTS

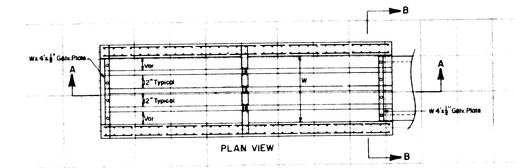
HUNTER'S GREEN

FUTURE ROAD and STORMWATER MANAGEMENT DETAILS

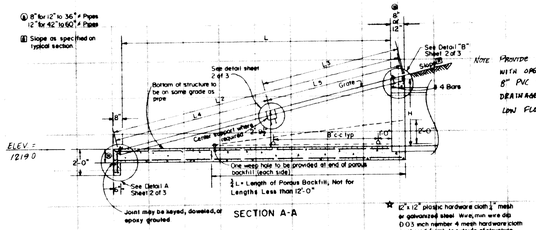
PLAN: 1" = 50'
PROFILE: Horizontal: 1" = 50'
Vertical: 1" = 10'

SHANKS ASSOCIATES, P.C.
ENGINEERS - SURVEYORS - PLANNERS
313 LUCK AVENUE
ROANOKE, VIRGINIA 24016
(703) 343-6685

JOB NUMBER: 692008 05/8/92
DATE: 04/01/92 REVISED: 04/13/92



PLAN VIEW



SECTION A-A

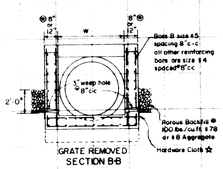
NOTE: PROVIDE HEADWALL WITH OPENING FOR 8" PVC TO INSURE DRAINAGE DURING LOW FLOW

★ 12"x 12" plastic hardware cloth 1" mesh or galvanized steel Wire, min wire dia 0.03 inch number 4 mesh hardware cloth anchored firmly to outside of structure

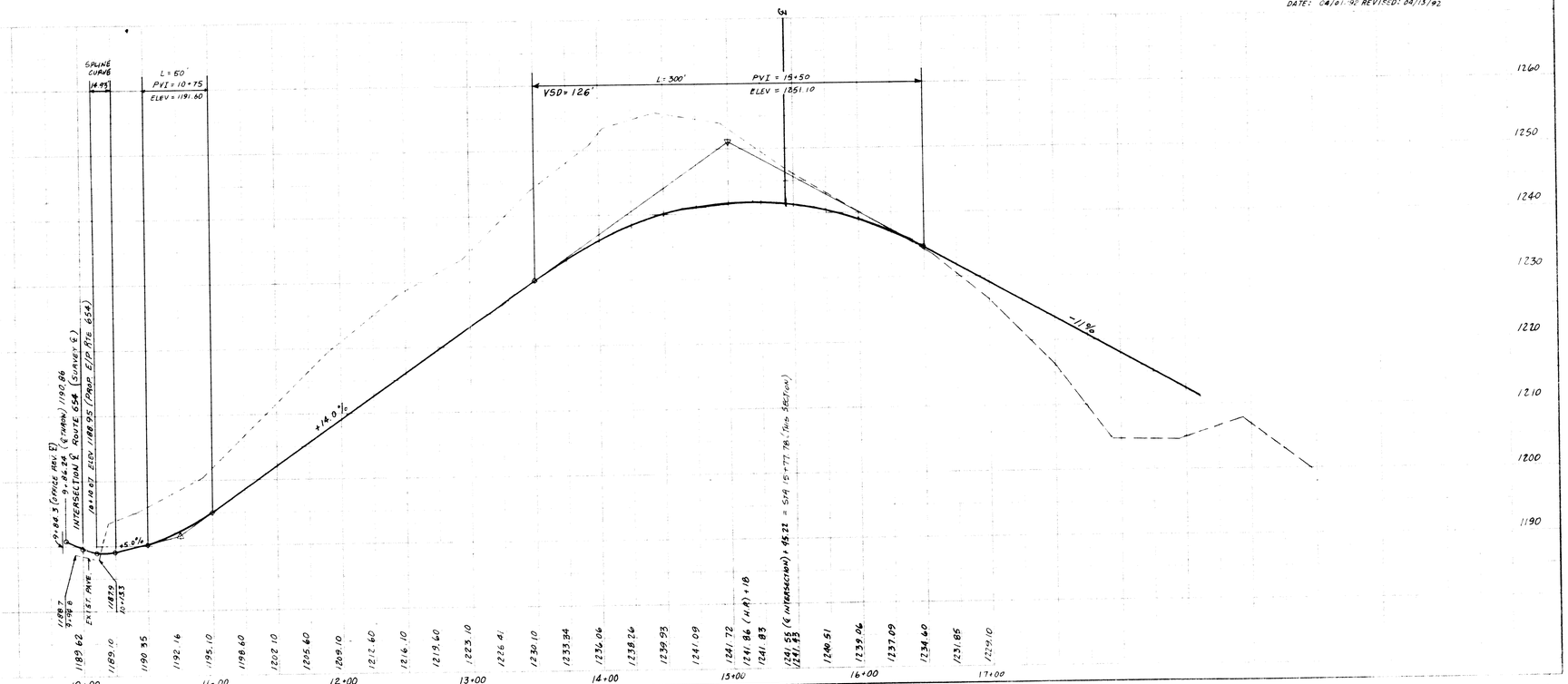
NOTES

All cast in place concrete to be Class A3. For precast use 4,000 PSI min.
Reinforcing steel to have a minimum 1½" cover.
For tabulation of dimensions and quantities see Sheet 3 of 3.
This item may be precast or cast in place
All pipe for grate, structural tubing, and related hardware to be galvanized
For tabulation of dimensions and quantities see Sheet 3 of 3.

MODIFIED EW-11 w/ 18" CMP



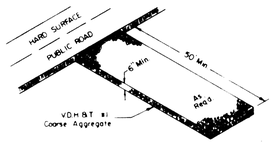
GRATE REMOVED
SECTION B-B

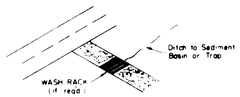


PROFILE

KEUFFEL & ESSER | PLATE 1. PLAN-PROFILE
48 7008 Made in U.S.A.

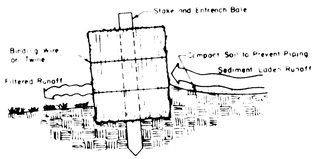
SHEET 10



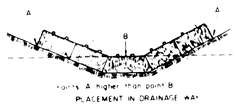


WASH RACK DETAIL

(CE) TEMPORARY GRAVEL CONSTRUCTION ENTRANCE

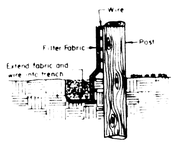


CROSS - SECTION



Points A higher than point B
PLACEMENT IN DRAINAGE WAY

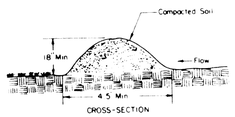
(STB) STRAW BALE BARRIER



CROSS - SECTION

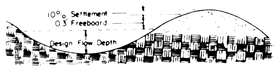
Points A higher than point B
PLACEMENT IN DRAINAGE WAY

(SF) SILT FENCE

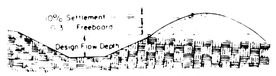


CROSS-SECTION

(DD) TEMPORARY DIVERSION DIKE



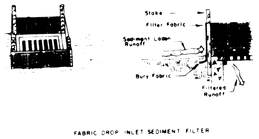
TYPICAL PARABOLIC DIVERSION



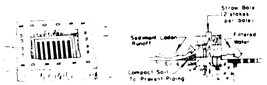
TYPICAL TRAPEZOIDAL DIVERSION

TYPICAL VEE DIVERSION

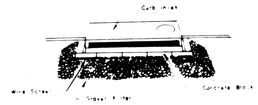
(DV) DIVERSION



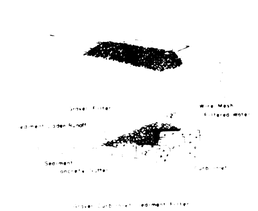
FABRIC DROP INLET SEDIMENT FILTER



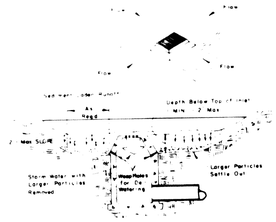
STRAW BALE DROP INLET SEDIMENT FILTER



BLOCK AND GRAVEL DROP INLET SEDIMENT FILTER

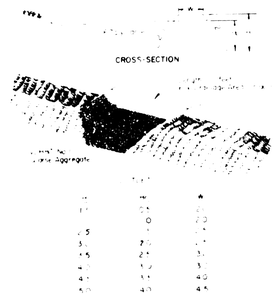


CURB INLET SEDIMENT FILTER

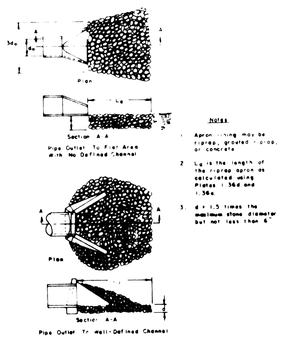


EXCAVATED DROP INLET SEDIMENT TRAP

(IP) STORM DRAIN INLET PROTECTION



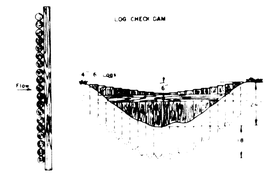
(ST) SEDIMENT TRAP



Notes
1. Apron lining may be riprap, grouted riprap, or concrete
2. L_a is the length of the riprap apron as calculated using Plates 1:36a and 1:36b
3. d = 1.5 times the maximum stone diameter but not less than 6"

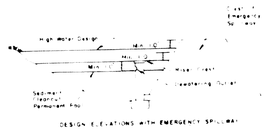
PIPE OUTLET CONDITIONS

(OP) OUTLET PROTECTION

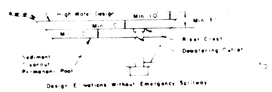


SPACING BETWEEN THE DAMS

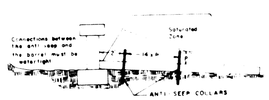
(CD) CHECK DAM

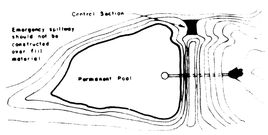


DESIGN ELEVATIONS WITH EMERGENCY SPILLWAY



Design Elevations Without Emergency Spillway





(SB) TEMPORARY SEDIMENT BASIN

EROSION-SILTATION CONTROL COST ESTIMATE

ALL COSTS GIVEN ARE COMPLETE IN PLACE

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
DIVERSION DIKE	L.F.			
STRAW BALE BARRIER	L.F.			
CRUSHED STONE	TON			
SOD	S.Y.			
SEEDING OPERATION	000 S.F.			
TEMP. SEDIMENT BASIN	JOB			
TOTAL PROJECT COST				

GENERAL NOTES

1. ALL EROSION & SEDIMENT CONTROL PRACTICES & PROCEEDURES SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK.
2. OWNER/DEVELOPER GRANTS RIGHT OF ENTRY TO COUNTY PERSONNEL FOR THE PURPOSE OF MONITORING COMPLIANCE WITH THE CODE OF VIRGINIA, EROSION & SEDIMENT CONTROL LAW (TITLE 21, CHAPTER 1, ARTICLE 4).
3. BUILDING PERMITS WILL NOT BE ISSUED UNTIL THE INITIAL EROSION & SEDIMENT CONTROL MEASURES AS DEPICTED IN THE APPROVED PLAN HAVE BEEN PROPERLY INSTALLED.
4. EROSION & SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AFTER EACH RAINFALL AND DAILY DURING PROLONGED RAINFALL. MAINTENANCE IS THE RESPONSIBILITY OF THE DEVELOPER DURING THE ENTIRE CONSTRUCTION PERIOD.
5. ALL VEGETATIVE CONTROLS SHALL BE IN PLACE PRIOR TO CLEARING, STRIPPING OF TOPSOIL OR GRADING.
6. ALL STANDARDS ARE FROM THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK. THE HANDBOOK SHALL SUPERCEDE THIS SHEET. SHOULD A DISCREPANCY EXIST.

TEMPORARY SEDIMENT TRAP DATA

STRUCTURE	DRAINAGE AREA (ACRES)	STORAGE (C.Y.) REQUIRED	STORAGE (C.Y.) DESIGN	WEIR LENGTH (FEET)	WEIR HEIGHT (FEET)	BERM HEIGHT (FEET)

SHANKS ASSOCIATES, P.C.
ENGINEERS SURVEYORS PLANNERS
313 LUCK AVENUE, ROANOKE, VIRGINIA, 24011
(703) 343-6685

EROSION & SILTATION CONTROL DETAILS

PLAN NAME:
OWNER:
DEVELOPER:
ENGINEER:
MAGISTERIAL DISTRICT:
TAX MAP NO.: SECTION NO.: PARCEL NO.:
TOTAL AREA: PRESENT ZONING:
DATE: SHEET 6 OF 10

GENERAL CONDITIONS

The Contractor shall be responsible for notifying Botetourt County at least 48 hours prior to starting any work on this project. All work shall be subject to inspection by County inspectors and design engineer. The Contractor shall obtain all necessary permits.

The Contractor shall include in applicable bid price the cost of locating and uncovering all sewer manholes and all valve boxes after surface treatment of roads and adjusting them to final road grades, if necessary. The Contractor shall be responsible for cleaning out sewer mains for final inspection, if necessary.

The location of existing utilities across or along the line of proposed work is not necessarily shown in the plans and where shown, is approximate. The Contractor shall, on his own initiative and at no extra cost, locate all underground lines and structures as necessary. The Contractor shall be responsible for any damage to underground lines and structures. The Contractor shall comply with the State Water Works Regulations, Section 12.05.03 where lines cross.

Contractor shall call "Miss Utility" at 1-800-552-7001 prior to construction.

Power lines and poles, telephone lines and poles, and gas lines shall be protected from damage in accordance with the utility owners's instructions. The Contractor is responsible for contacting the utility owners, obtaining the proper protective measures for each individual construction location and for protecting utilities from damage. Any damage caused by the Contractor or the Contractor's construction operations shall be corrected by the Contractor at his expense.

Existing roads, shoulders, and ditches shall be protected from damage. Damage resulting from operations under this contract shall be repaired or replaced by the Contractor at his own expense.

All trenches within existing or future Virginia Department of Transportation right-of-way shall be compacted in six inch layers.

Minimum cover over top of pipe shall be three (3) feet.

The Contractor shall notify the County of any field revisions or corrections to the approved plans prior to such construction.

All lines to be staked prior to construction.

Contractor to coordinate with engineer to provide As-Built Plans.

All construction shall be in accordance with approved construction practices of the applicable trades.

Unless otherwise specified herein, all construction shall be in accordance with the latest edition of AWWA standards.

EROSION CONTROL

Utility construction is subject to all provisions setforth in the approved Erosion and Sediment Control Plan. The Contractor is responsible for obtaining a copy of the Plan, including the Narrative Report prior to construction.

Throughout construction, temporary measures shall control erosion and minimize siltration of adjacent properties, streets, and drainage ways.

Construction and personal vehicles shall be cleaned of mud and debris prior to leaving the site.

Failure of the Contractor to control erosion and siltation may cause the owner to take actions necessary to accomodate the requirements of the County. The cost of such action, including engineering fees, will be deducted from monies due the Contractor for other work.

EXCAVATION, STABILIZATION & BEDDING

TRENCHING

The Contractor shall comply with the latest revisions of the Virginia Occupational Safety and Health Standards for the Construction Industry as adopted by the Safety and Health Codes Commission of Virginia.

The materials and methods of construction required for trench stabilization and pipe bedding shall be in accordance with the latest revisions of the applicable Virginia Department of Transportation and American Society for Testing Materials standards.

The Contractor shall excavate all materials encountered to the lines and grades indicated and the trenches and ditches detailed on the drawings along the alignments shown.

Excavation, unless otherwise specified, shall be open cut. The Contractor shall open no more than two hundred (200) feet of trench in advance of the laying of pipe unless approved by the Engineer. Any water that accumulates in the trenches shall be removed promptly.

Trenches shall be excavated in straight lines and shall be accurately graded in order to establish a true elevation for the invert of the pipe.

The width of trenches, from existing grade to one (1) foot above the top of the pipe shall be of sufficient width to permit the proper installation of bracing, shoring or sheeting.

The sides of the trenches shall be excavated as vertical as practical.

Excavation for structures hall be sufficient to leave at least twelve (12) inches clearance between the structure and the sides of the trench or any required bracing, shoring, or sheeting.

The trench bottom shall be excavated to provide a firm, stable, and uniform support for the full length of pipe. Any part of the trench bottom excavated below the required grade shall be backfilled to grade and compacted to provide firm pipe support. Ledge rock, boulders, and large stones shall be removed to provide six (6) inches of soil cushion or improved bedding on all sides of the pipe, including the bottom, and on all sides of accessories. When an unacceptable subgrade material is encountered which will provide inadequate pipe support, additional trench depth shall be excavated and refilled with trench stabilization material.

The bottom of trenches for gravity pipelines shall be excavated to a minimum overdepth of four (4) inches below the bottom of the pipe to provide for improved pipe bedding material for the entire length of the pipeline, including service connections, except in rock, where bedding shall be six inches deep. The bedding shall be shaped so that the bottom quadrant of the pipe lies on the bed.

Excavated materials suitable for backfill shall be stockpiled in an orderly manner at a sufficient distance from the sides of the trench in order to avoid overloading the banks of the trench and to prevent slides or cave-ins.

Unless otherwise directed by the owner or engineer, surplus excavated material shall be removed from the site and disposed of by the Contractor, at his own expense.

TRENCH STABILIZATION

Trench stabilization material shall be #2 coarse aggregate as specified in Section 203 of the 1987 Virginia Department of Transportation (VDOT) Road and Bridge Specifications.

Wherever excessively wet or unsuitable material is encountered in the trench bottom, such material shall be removed and backfilled with trench stabilization material, which shall be graded to allow for the compacted bedding material.

COMPACTED BEDDING MATERIAL

Bedding material shall be #57 coarse aggregate, or #25 or #26 crusher run aggregate, each as specified in Section 203 of the 1987 VDOT Road and Bridge Specifications.

PIPE, JOINTS, FITTINGS AND APPURTENANCES

GENERAL

All materials and appurtenances for this work new, top quality, and shall be furnished, delivered, assembled, connected, and finished in every detail as specified or indicated. All materials found defective, regardless of the circumstances, shall be replaced with new material at the expense of the Contractor.

The materials specified shall comply with the latest revisions of the applicable American Society of Testing Materials (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), and/or the Virginia Department of Transportation (VDOT).

OPTIONAL PIPE SELECTIONS

The Contractor shall install only one (1) type of pipe between structures. Where existing pipe is to be replaced or extended, the same type of pipe is to be installed. All pipe is to be installed in strict accordance with the recommendations of the manufacturer.

Water lines shall be either PVC AWWA C-900 DR 18 (min.) or ductile iron ANSI/AWWA C151 Class 52 for 12" diameter or smaller and Class 51 for 16" diameter and larger, at the Contractor's option, unless specified or indicated otherwise.

Sanitary sewer lines shall be either PVC ASTM D-3034 PSM SDR 35 Concrete ASTM C-14, Class 2, or Ductile Iron ANSI/AWWA C151, Class 52 (min.), at the Contractor's option, unless specified or indicated otherwise.

JOINTS, COUPLINGS, AND APPURTENANCES

PVC pipes and fittings shall be bell and spigot type joints. The bell and spigot joint shall be sealed with elastomeric gaskets conforming to ASTM D 3212. The joints shall be in strict accordance with the recommendation of the pipe manufacturer.

Ductile iron pipe and fittings shall be either mechanical or bell and spigot type joints as specified or indicated. Fittings shall conform with AWWA C 110/ANSI A21.10. Joints shall be made with a single watertight rubber gasket manufactured in accordance with AWWA C 111/ANSI A21.11. The joints shall be in strict accordance with the recommendation of the pipe manufacturer. Pipe and fittings shall be bituminous coated and cement lined in accordance with AWWA C 104/ANSI A21.40.

Gate valves shall be iron-body, bronze-mounted, double-disc, parallel seat, O-ring sealed, inside-screw, non-rising stem, with 2 inch square operating nut for valve vault service, all in accordance with AWWA Standard C500 (latest revision). Connections shall be suitable for the pipe with which it is used. The valve shall be suitable for 200 p.s.i. water working pressure and shall be hydrostatically tested at twice the rated pressure. All gate valves shall be installed in valve vaults and equipped with a two inch square operating nut, marked with the word "OPEN" and an arrow and shall open by turning clockwise.

Sanitary sewer service connections shall include all four (4) inch diameter pipe as specified or indicated.

All other materials and appurtenances are to be in accordance with the details shown on the plans and in strict accordance with the recommendation of the manufacturer.

Any materials, equipment, tool, or accessory found to be defective or not in first condition to accomplish the task continuously and expeditiously shall be promptly replaced.

The Contractor shall include expense of procuring the field services of experienced and qualified manufacturer representatives for approved materials. The representative shall instruct the Contractor's representatives or employees as to proper installation procedure for the particular material.

The Contractor shall not lay pipe or place manholes until all water has been removed from the trench or if the weather conditions are unsuitable for work.

Pipe that may require field cutting shall be done so in a neat and workmanlike manner, so as to leave a smooth end at right angles to the pipe axis. Care shall be taken to avoid damaging the pipe, including linings and coatings.

The materials shall be visually inspected for defects prior to lowering the pipe or placing the manholes into the trench.

During pipe installation, no tools, clothing, or other material shall be placed in the pipe or manholes. All pipe shall be free of debris prior to and during installation.

The pipe and manholes shall be lowered carefully into the trench by suitable means and handled with care at all times to avoid damage. Materials shall not be dropped or dumped into the trenches.

When work is not in progress, the Contractor shall plug the open ends of the pipe to prevent water or other material from entering the pipe. The plug shall be watertight and shall remain in place until any required dewatering has been completed.

Before joints are made the pipe shall be well bedded on a firm foundation and no pipe shall be brought into position until the preceding length has been thoroughly embedded and secured in place. Any defects due to settlement shall be made good by the Contractor at his expense. Bell holes shall be dug sufficiently large to insure proper jointing.

Pipe shall be jointed in strict accordance with the manufacturer's recommendations.

SEPARATION OF POTABLE WATER AND SANITARY SEWER LINES

PARALLEL INSTALLATION

Water lines shall be laid at least ten (10) feet horizontally from a sewer or sewer manhole whenever possible. Horizontal separation shall be measured outside to outside. Where ten (10) feet of horizontal separation is not practical, the water line may be laid closer provided that: (1) The bottom of the water line shall be at least eighteen (18) inches above the outermost crown of the sewer or: (2) the sewer shall be constructed of AWWA approved ductile iron water pipe pressure rated at 50 p.s.i. without leakage prior to backfilling or: (3) the sewer manhole shall be of watertight construction and tested in place.

CROSSING

Water lines crossing sewers shall have a vertical separation of at least eighteen (18) inches, measured outside to outside, between the bottom of the water line and the top of the sewer line. Where eighteen (18) inches of vertical separation is not practical, (1) Sewers passing over or under water lines shall be constructed of ductile iron AWWA water pipe and (2) water lines passing under sewers shall be protected by providing: (a) an eighteen (18) vertical separation, measured outside to outside, between the bottom of the sewer pipe and the top of the water line and: (b) adequate structural support for the sewer to prevent excessive deflection of the joints and the settling and breaking of the water line and: (c) the joints for the water line be located as far as equal distance from the crossing as sewer.

The contractor shall comply with State Water Works Regulations, Section 12.05.03 where lines cross.

WATER MAIN INSTALLATION

The water mains shall be laid and maintained at the required lines and grades and fittings and valves at the required locations.

Deflection of the line of pipe, either in the vertical or horizontal plane, shall not exceed either AWWA standards or the recommendations of the manufacturer.

All plugs, except mechanical joint plugs used at connection points for future lines, all tees, all bends, and all fire hydrant assemblies shall be supported by thrust blocking as indicated. Valves for connection of future lines shall be anchored to the water main with rods.

DISINFECTION OF WATER MAINS

All pipe shall be disinfected, tested, and flushed in accordance with AWWA Standard C601 (latest revision).

Contractor shall provide all materials, equipment, and necessary taps and shall perform all work required for the sterilization, testing, and flushing of the water main.

No tested section of water line shall be approved to deliver water service until a favorable laboratory report has been achieved. Any tested section failing to meet the specified requirements shall be repaired and disinfected and retested until the results are within accepted limits. The repairs and retesting shall be at the Contractor's expense.

The water main or valved section that has been completed shall be filled slowly and flushed.

After testing and before final inspection of the completed systems, water mains and service laterals shall be flushing and disinfected in accordance with AWWA Specification latest revision. Flushing shall be accomplished at a flow velocity in excess of 2.5 feet per second.

Disinfection as described in AWWA C651 shall be used. Five (5) gram calcium hypochlorite tablets with 3.25 g available chlorine per tablet shall be attached at the inside top of the pipe by an adhesive such as Permatex No. 1, or equal. The following number of tablets for the given pipe size shall be used for an initial dose of 25 mg/l (ppm) chlorine:

Pipe diameter	Tablets per 18-20 ft. pipe section
6"	1
8"	2
10"	3
12"	4
16"	7

Use of the continuous feed or slug method of disinfecting may only be used to rechlorinate a water pipe after the initial disinfection. When filling the pipeline for disinfection, the rate of filling must result in a velocity less than 1 ft./sec.

The disinfection solution shall remain in the pipe line for twenty-four (24) hours, after which time a chlorine residual of 10 ppm at all parts of the line shall be required.

Following chlorination, the piping shall be thoroughly flushed and tested in accordance with the Virginia Waterworks Regulations, Section 7.17.03 and 12.11.04-12.11.04.05.

SANITARY SEWER INSTALLATION

The installation of the sanitary sewer system shall begin at the downstream manhole and proceed upstream. The downstream sections shall be completed, tested, and approved prior to allowing sanitary sewage into the system.

The pipe shall be installed in accordance with the pipe manufacturer's recommendations and as directed by the Engineer. The pipe shall be laid in true straight lines with the bell ends upstream and with the invert of the pipe being the true elevation and grade of the system.

The Contractor shall be responsible for establishing and maintaining the horizontal and vertical alignment of the system in accordance with the survey information indicated on the plans.

The horizontal alignment of the pipe shall be maintained by a transit or theodolite plumbed over the center of the downstream manhole. The vertical alignment shall be maintained by an adjustable laser level mounted at the invert of the downstream manhole with target(s) placed at the bell end of the pipe being laid.

DETECTION TAPE SHALL BE PLACED 18"-24" ABOVE ALL SEWER MAINS & LATERALS

JOINTING

The sanitary sewer system shall be laid and joined complete-in-place in order that each length and section of pipe between the manholes have a smooth and uniform invert.

The previous joint shall have been completed and the entire length of pipe shall be well bedded and firmly backfilled before jointing another length of pipe. Bell holes shall be dug of sufficient size to insure proper jointing.

The Contractor shall not use excavation equipment to push the pipe into the home position, unless approved by the Engineer, and then only for short length of pipe at a time.

Joints for pipes of different materials shall either be made at manholes or with standard adapter fittings.

The Contractor shall join the pipe as recommended by the pipe manufacturer in order to obtain the degree of watertightness required. The use of lubricants, primers, adhesives, and similar materials shall be as recommended by the manufacturer.

The pipe shall be connected to manholes through precast openings and joined with either a flexible boot adapter or pipe seal gasket.

BACKFILLING

GENERAL

All material for the compaction of backfill shall be in accordance with the latest revisions of the applicable American Society of Testing Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO), and Virginia Department of Transportation (VDOT) standards.

The expense of obtaining and compacting earth backfill material shall be included in the Contractor's bid.

The Contractor shall comply with all Local and State erosion and sediment control ordinances and requirements and all approved Erosion and Sediment Control Plans and Reports pertaining to this project. It is the Contractor's responsibility to obtain copies of the approved plans.

Backfilling shall not be done in freezing weather and shall not be accomplished with frozen material. No fill shall be made where the material in the trench is already frozen.

The Contractor shall at all times during the construction, and at its completion for final inspection, keep the trench, excavation, or other parts of the work free from accumulated water.

JOB CONDITIONS

Prior to placing backfill, all organic material rubbish, debris, or other unsuitable material within the trench shall be removed. All concrete forms shall be removed. All shoring and sheeting shall be removed or cut off at the elevation stipulated by the Engineer.

Prior to placing backfill, the trench, the installed pipe, inlets, and manholes shall be visually inspected by the Engineer.

Backfill material shall be placed in uniform horizontal layers and thoroughly compacted with proper mechanical or hand operated tampers.

Backfill material shall be placed and compacted so as to not unevenly support, damage, or displace the alignment of the pipe, inlets, or manholes. Backfill material shall be placed under the sides of the pipe to provide satisfactory haunching.

Backfill shall not be placed or compacted against cast-in-place concrete until it has obtained sufficient strength to withstand the backfill pressure placed upon it.

Upon completion of backfilling, all excess soil, stones, and debris shall be disposed on site as directed by the Owner and at no additional expense.

BACKFILL MATERIAL

Materials for backfill shall be approved excavated material or approved suitable material obtained from other sources. All material shall be approved by a Soils Engineer.

Material shall consist of durable natural granular material or granular aggregates free of organic material, loam, debris, ashes, cinders, pavement, boulders, or other objectionable material which cannot be properly compacted. Backfilling shall be done in such a way to prevent dropping of material directly on top of the pipe through any vertical distance greater than three (3) feet and shall be deposited in horizontal layers. No particles with a diameter greater than twelve (12) inches shall be placed within the initial backfill from the top of the improved bedding to a point two (2) feet over the top of the pipe. No rock particles with a diameter or dimension greater than six (6) inches shall be placed in the remainder of the backfill. Excavated rock particles with a diameter or dimension greater than six (6) inches are considered unsuitable material.

Excessively wet excavated material shall not be used as backfill material. Frozen material shall not be placed in the trench, nor shall approved backfill be placed upon frozen material.

Aggregate backfill material, where indicated for trenches below paved or surface treated streets or parking areas shall be VDOT standard size 25 or size 26 crusher run as specified in Section 206 of the VDOT Road and Bridge Specifications (latest revision). Aggregate backfill in such situation shall be placed in eight (8) inch lifts.

BACKFILL BELOW UNPAVED AREAS

Backfill from the top of the pipe bedding or bottom of the pipe trench to one (1) foot above the top of the pipe shall be free of stones larger than two (2) inches in diameter and shall be placed in layers not to exceed six (6) inches and compacted with hand operated tampers.

Backfill from one (1) foot above the top of pipe to the topsoil subgrade shall be free of stones larger than four (4) inches in diameter and shall be placed in layers not to exceed twelve (12) inches and compacted with mechanical tampers.

Final backfill in grassed areas shall be mounded three (3) inches above surrounding ground to allow for settlement.

BACKFILL BELOW PAVED AREAS

Backfill from the top of the pipe bedding or bottom of the pipe trench to one (1) foot above the top of the pipe shall be free of stones larger than two (2) inches in diameter and shall be placed in layers not to exceed six (6) inches and compacted with hand operated tampers.

Backfill from one (1) foot above the top of pipe to the topsoil subgrade shall be free of stones larger than four (4) inches in diameter and shall be placed in layers not to exceed eight (8) inches and compacted with mechanical tampers.

Final backfill in paved areas shall be mounded two inches and allowed to settle for thirty (30) days prior to pavement placement or replacement. The trench in paved areas shall be maintained daily, as required, to provide a smooth crossing for vehicles until such time as pavement is placed.

COMPACTION TESTS

Backfill shall be moistened or aerated as required to provide the proper moisture content necessary to achieve the compaction specified herein.

Compaction by water, either natural or mechanical, shall not be permitted. Each layer shall be thoroughly tamped and compacted by hand or pneumatic tamper in place. Special care shall be taken in using mechanical tamper directly over the pipe.

Backfill material shall be placed and compacted to the following minimum percentages of maximum dry density as determined by ASTM D689:

Fill from the top of pipe bedding or the bottom of pipe trench to one (1) foot above the top of the pipe, each layer shall be compacted 95 percent.

Fill below unpaved areas from one (1) foot above the top pipe to the topsoil subgrade and in drainage channels to the topsoil subgrade, each layer shall be compacted 90 percent.

Fill below paved areas or walks, each layer shall be compacted 95 percent.

Backfill shall be tested in accordance with ASTM D698 or ASTM D2487 and D2216.

Backfill that fails to meet the minimum percentages specified shall be reworked or replaced and retested all at the Contractor's expense.

RESTORATION

The Contractor shall at his own expense, clean all refuse, rubbish, scrap materials, and debris caused by his operations such that at all times the site shall not be a source of litter and shall present a neat, orderly, and workmanlike appearance. Immediately following the backfilling of the trench, the Contractor shall "broom" or otherwise clean the surfaces of paved streets. All surplus material shall be removed and disposed of.

Finish grading shall be done as required to establish the slopes indicated and to prevent low spots and pockets that do not drain.

Developed property, such as walks, steps, mailboxes, driveways, culverts and the like, disturbed by the work, shall be restored or replaced to their original condition. Ditches shall be restored to their original shape and slope. All disturbed areas not covered by pavement or structures and all areas disturbed by construction activity shall be fertilized, limed, and seeded in accordance with the rates specified in the Erosion and Sediment Control Plan and Report.

Restoration of pavement shall be in accordance with the pavement details indicated.

Restoration of underground utilities shall be in accordance with the standards of the utility owner, with respect to labor, equipment, and materials.

INSPECTION AND TESTS

TESTING OF SANITARY SEWER

The Contractor shall repair or replace, at his expense, any length of pipe, manhole, structure, or any material that is found to be defective or deficient during the work or within one (1) year after the work has been completed.

The Contractor shall prove watertightness of the sewer system or portions thereof by low pressure air testing. Test shall be made only in the presence of the County Engineer and the Engineer.

The Contractor shall furnish all labor and equipment required for the test and shall make repairs necessary until test results are satisfactory. The testing equipment, procedure, and results will be subject to compliance with ASTM designation C-828, current revision. The air test is to be conducted between two (2) consecutive manholes. The test equipment shall consist of two (2) plugs, one tapped and equipped for air inlet connection), a shut-off valve, a pressure regulating valve, a pressure relief valve, a monitoring pressure gauge having a pressure range from 0 to 5 psi, graduated in 0.1 psi with an accuracy of +- .04 psi. The test equipment shall be set up outside the manhole for easy access and reading. Air shall be supplied to the test slowly and shall be regulated to prevent the pressure inside the pipe from exceeding 5.0 psig. The pipeline shall be filled until a constant internal pressure shall be maintained at 3.5 psig or slightly above for a five minute stabilization period. At such time the internal pressure will be adjusted to 3.5 psig, the air supply shut off and the test begun. For safety purposes, no person shall remain in the manhole while the pipe is being pressurized or throughout the test.

Should the pressure drop 1.0 psi in less time than that specified below, the sewer segment shall have failed. If the time required for the pressure to drop 1.0 psi is greater than shown, the sewer segment shall have passed. For a more detailed description of the air test method, refer to ASTM designation C-828, current revision. An air pressure correction shall be required when the prevailing groundwater is above the sewer line being tested and shall be calculated as follows:

(Groundwater Depth (ft)/2.31) + 3.5 = starting test pressure

Ending test pressure = starting test pressure - 1.0 psi

AIR TEST TABLE

LENGTH OF TEST SEGMENT	PIPE DIAMETER 6"	PIPE DIAMETER 8"
25	0.10	0.18
50	0.20	0.35
75	0.30	0.53
100	0.40	1.10
125	0.50	1.28
150	0.59	1.46
175	1.09	2.03
200	1.19	2.21
225	1.29	2.38
250	1.39	2.56
275	1.49	3.14
300	1.59	3.31
350	2.19	3.47
400	2.38	

TEST FOR DISPLACEMENTS OF BURIED SANITARY SEWERS: AFTER THE TRENCH HAS BEEN BACKFILLED AND COMPACTED AND COVER OVER THE PIPELINE HAS BEEN BROUGHT TO FINISHED GRADE, PIPELINES WILL BE TESTED AS FOLLOWS: LIGHT WILL BE FLASHED BETWEEN MANHOLES, OR, IF MANHOLES HAVE NOT YET BEEN CONSTRUCTED, BETWEEN THE LOCATIONS OF THE MANHOLES, BY MEANS OF A FLASHLIGHT OR BY REFLECTING SUNLIGHT WITH A MIRROR. POOR ALIGNMENT, DISPLACED PIPE, OR OTHER DEFECTS SHALL BE REMEDIED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

Manholes shall be tested by exfiltration by plugging lines with inflatable stoppers and filling the manhole with water for a twelve hour soak period. Leakage shall not exceed one-half gallon per hour in the one hour test period following the soak period. An approved air test for manholes will also be considered.

TESTS FOR DEFLECTION SHALL BE MADE WITH A DEFLECTOMETER THAT PRODUCES A CONTINOUS RECORD OF PIPE DEFLECTION, OR BY PULLING A MANDREL, SPHERE, OR PIN-TYPE GO/NO-GO DEVICE THROUGH THE PIPELINE.

SHANKS ASSOCIATES, P.C.
ENGINEERS SURVEYORS PLANNERS
3/3 LUCK AVENUE ROANOKE, VIRGINIA 24015
(703) 343-6685

HUNTER'S GREEN SECTION 1

UTILITY SPECIFICATIONS

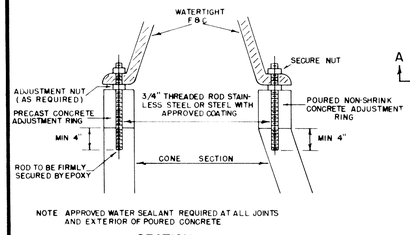
DATE: 05/7/92 SCALE: N/A DESIGNED: DRAWN: FOS CHECKED: FOS	REVISIONS: 6/25/92	JOB NO: 692008 SHEET 7 OF 10

MH-RCR-3000 EC		MH-RCR-3000 W	
300 lbs.	FRAME	262 lbs.	FRAME
170 lbs.	COVER	170 lbs.	COVER
470 lbs.	TOTAL *	432 lbs.	TOTAL *

* MINIMUM AVERAGE WEIGHTS

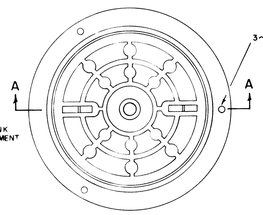
MANHOLE FRAME AND COVER

DEWEY BROTHERS, INC. MH-RCR-3000 EC OR EQUIVALENT
DEWEY BROTHERS, INC. MH-RCR-3000 W OR EQUIVALENT
(where watertight specified)

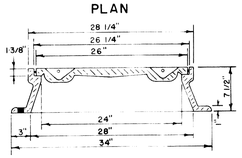


NOTE APPROVED WATER SEALANT REQUIRED AT ALL JOINTS AND EXTERIOR OF POURED CONCRETE

SECTION

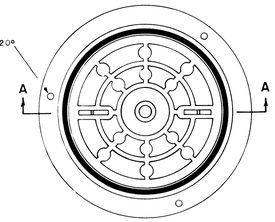


PLAN

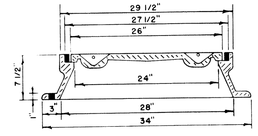


SECTION A-A

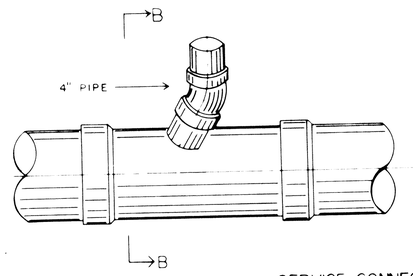
GASKET IN VERTICAL FACE OF COVER

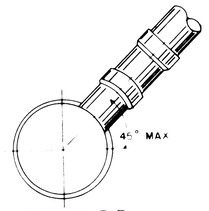


PLAN

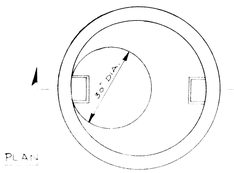


SECTION A-A

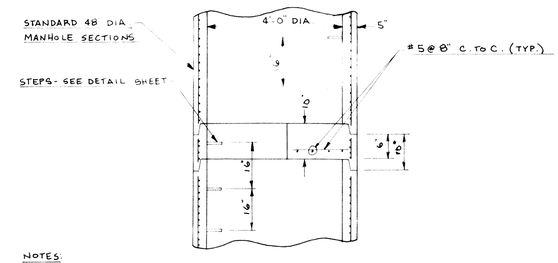




SECTION B-B

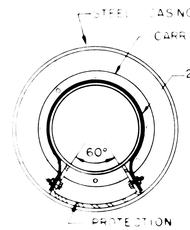


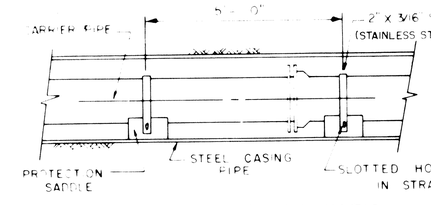
PLAN



NOTES:
1) 4000 PSI CONCRETE
2) GRADE 60 STEEL
3) SAFETY SLAB TO BE USED PER CONTRACT DOCUMENTS

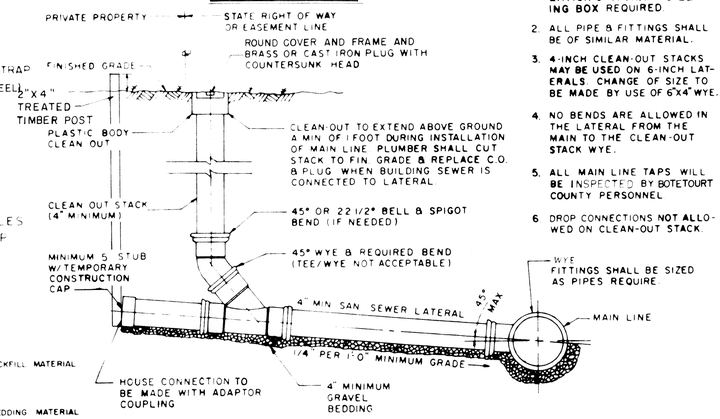
SERVICE CONNECTION "WYE"



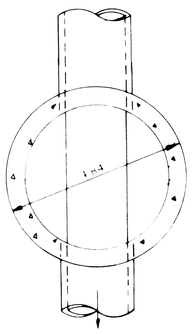


SADDLE MUST BE STEEL OR 4 x 4 x 2'-0" TREATED OAK

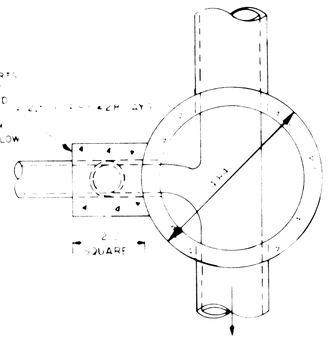
SAFETY SLAB



NOTES:
1. IN TRAFFIC AREAS INSTALLATION OF A TRAFFIC BEARING BOX REQUIRED
2. ALL PIPE & FITTINGS SHALL BE OF SIMILAR MATERIAL.
3. 4-INCH CLEAN-OUT STACKS MAY BE USED ON 6-INCH LATERALS. CHANGE OF SIZE TO BE MADE BY USE OF 6"X4" WYE.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEAN-OUT STACK WYE.
5. ALL MAIN LINE TAPS WILL BE INSPECTED BY BOTETOURT COUNTY PERSONNEL
6. DROP CONNECTIONS NOT ALLOWED ON CLEAN-OUT STACK.

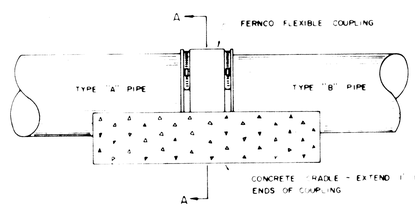


SECTION A-A
STANDARD MANHOLE

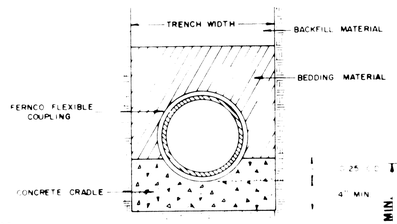


SECTION B-B
DROP MANHOLE

BORING AND CASING

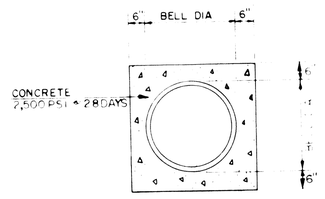


SIDE VIEW

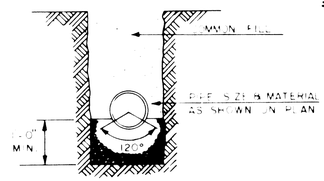


SECTION A-A

JOINING DISSIMILAR PIPE



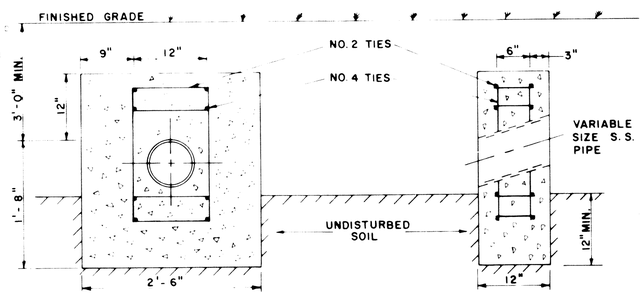
CONCRETE ENCASED PIPE



STONE CRADLE

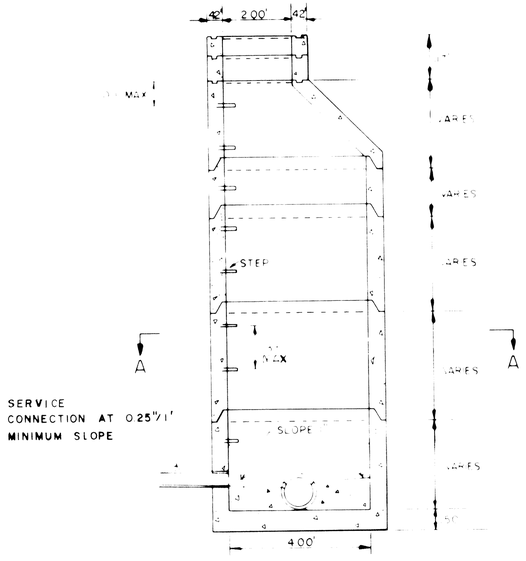
SANITARY SEWER LATERAL

SCALE 1" = 1'-0"

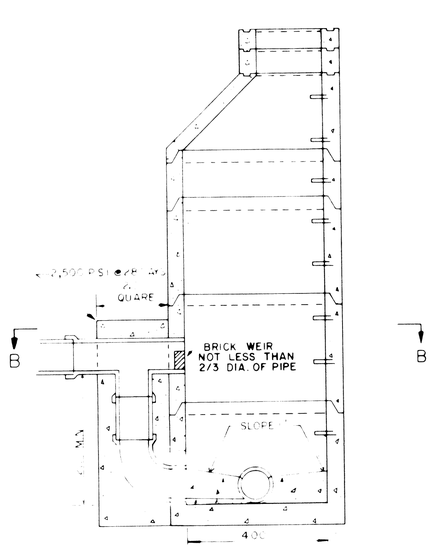


ANCHOR BLOCK

SCALE 1" = 1'-0"



STANDARD MANHOLE

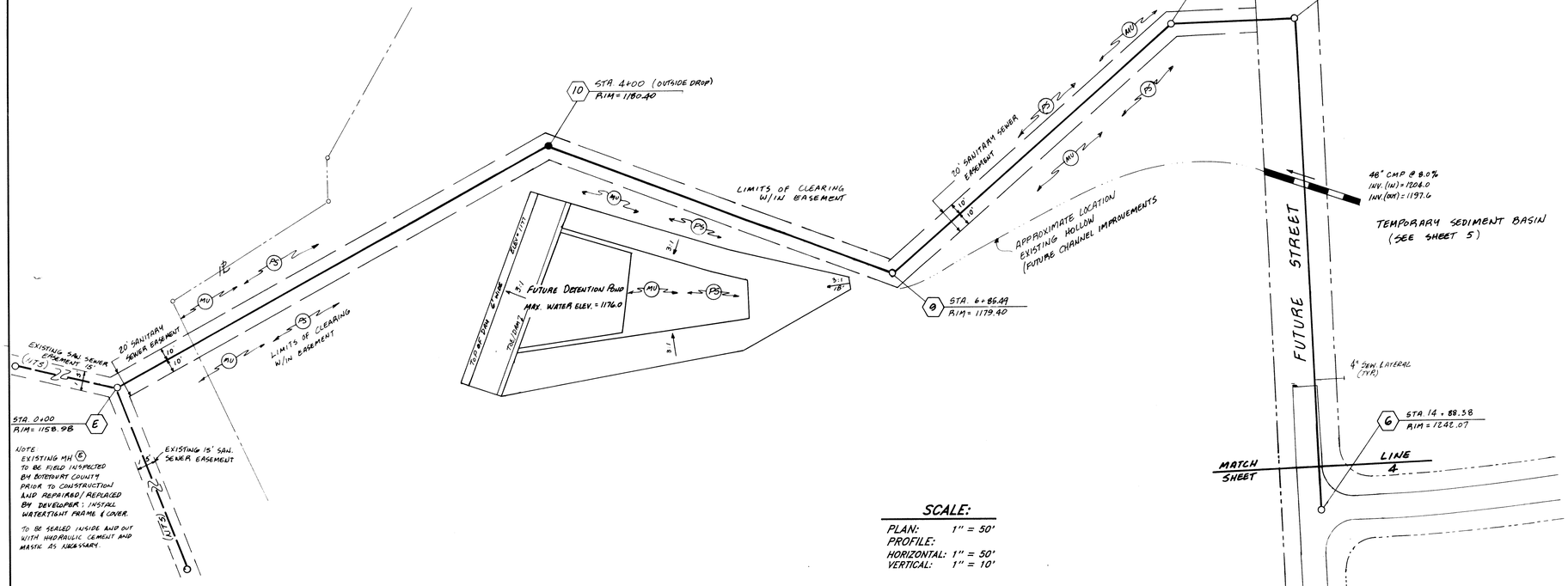


DROP MANHOLE

SANITARY SEWER DETAILS

SHANKS ASSOCIATES, P.C.
ENGINEERS · SURVEYORS · PLANNERS
313 LUCK AVENUE ROANOKE, VIRGINIA 24011
(703) 343-6685

PLAN
SURVEYED
DRAWN
NOTE BOOK
No.
ALIGNMENT CHECKED
PT OF WAY CHECKED
BY
DATE



SCALE:

PLAN: 1" = 50'
PROFILE:
HORIZONTAL: 1" = 50'
VERTICAL: 1" = 10'

HUNTER'S GREEN

Section 1

OFF-SITE SANITARY SEWER

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ROANOKE, VIRGINIA 24016
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JOB NUMBER: 692008
DATE: 05-08-92 REVISED: 6/26/92

SHEET 10 of 10

PROFILE
SURVEYED
DRAWN
NOTE BOOK
No.
GRADES CHECKED
R.M.'s NOTED
STRUCTURE ADDITIONS CHECKED
BY
DATE