



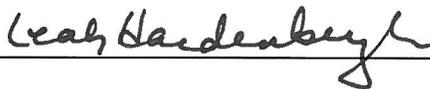
CERTIFICATE OF AUTHENTICITY

THIS IS TO CERTIFY THAT THE FOLLOWING ELECTRONIC RECORDS ARE TRUE AND ACCURATE REPRODUCTIONS OF THE ORIGINAL RECORDS OF JAMES CITY COUNTY GENERAL SERVICES DEPARTMENT- STORMWATER DIVISION; WERE SCANNED IN THE REGULAR COURSE OF BUSINESS PURSUANT TO GUIDELINES ESTABLISHED BY THE LIBRARY OF VIRGINIA AND ARCHIVES; AND HAVE BEEN VERIFIED IN THE CUSTODY OF THE INDIVIDUAL LISTED BELOW.

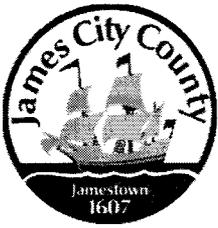
BMP NUMBER: PC081

DATE VERIFIED: May 31, 2012

QUALITY ASSURANCE TECHNICIAN: Leah Hardenbergh



LOCATION: WILLIAMSBURG, VIRGINIA



Stormwater Division

MEMORANDUM

DATE: February 24, 2010
TO: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services
FROM: Jo Anna Ripley, Stormwater
PO: 270712
RE: Files Approved for Scanning

BMP ID or General File ID PC081

PIN: 3140200002

Subdivision, Tract, Business or Owner

Name (if known):

Fords Colony

Property Description:

Marsh Hawk Course Holes 1-18

Site Address:

4157 Longhill Road

(For internal use only)

Box: FC001

Drawer: 1

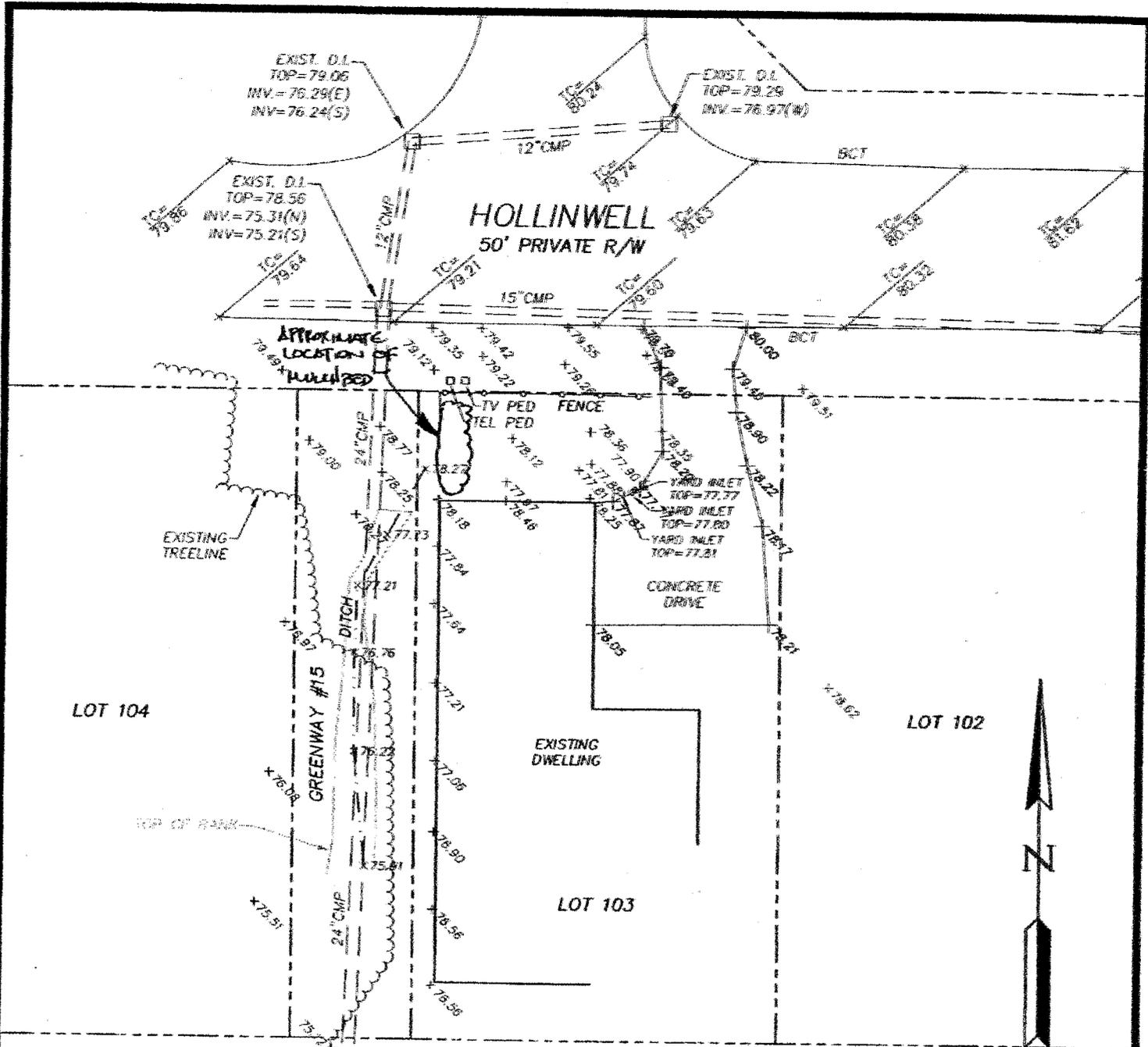
Agreements: (in file as of scan date)

N Book or Doc#:

Page:

Comments:

In error PC081 was in two separate folders. All data is now located in one folder.



CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND

5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040 Fax (757) 220-8994

**AS-BUILT SURVEY A PORTION OF HOLLINWELL AND LOT 103, SECTION X
FORD'S COLONY @ WILLIAMSBURG**

POWHATAN DISTRICT

JAMES CITY COUNTY

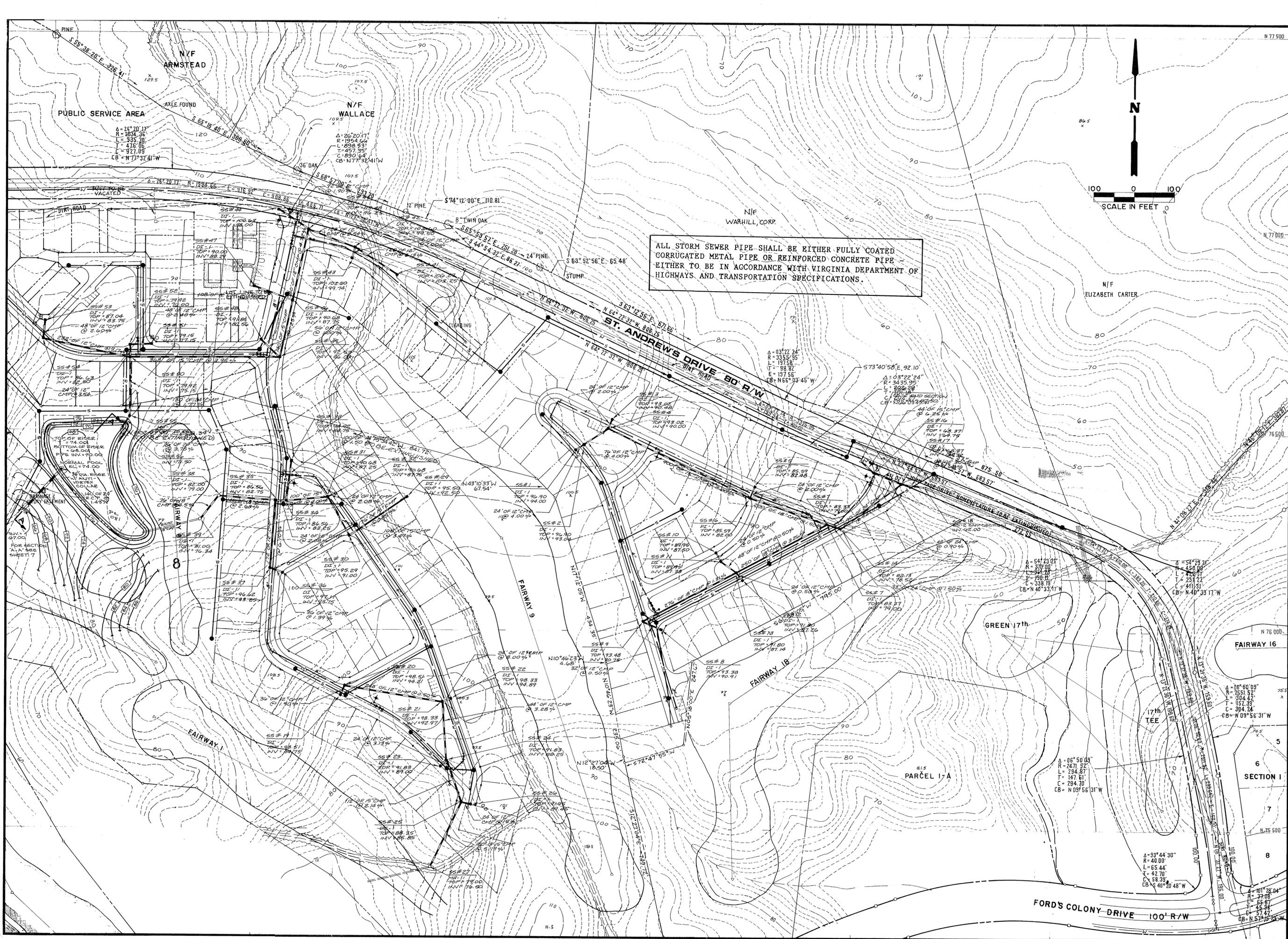
VIRGINIA

Drawn By: DLD

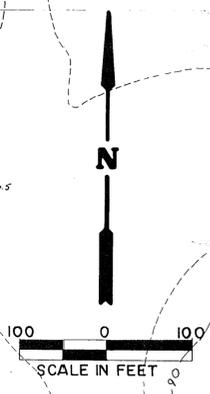
Scale: 1"=25'

Date: 8/27/04

Job No: 5652-43



ALL STORM SEWER PIPE SHALL BE EITHER FULLY COATED CORRUGATED METAL PIPE OR REINFORCED CONCRETE PIPE EITHER TO BE IN ACCORDANCE WITH VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION SPECIFICATIONS.



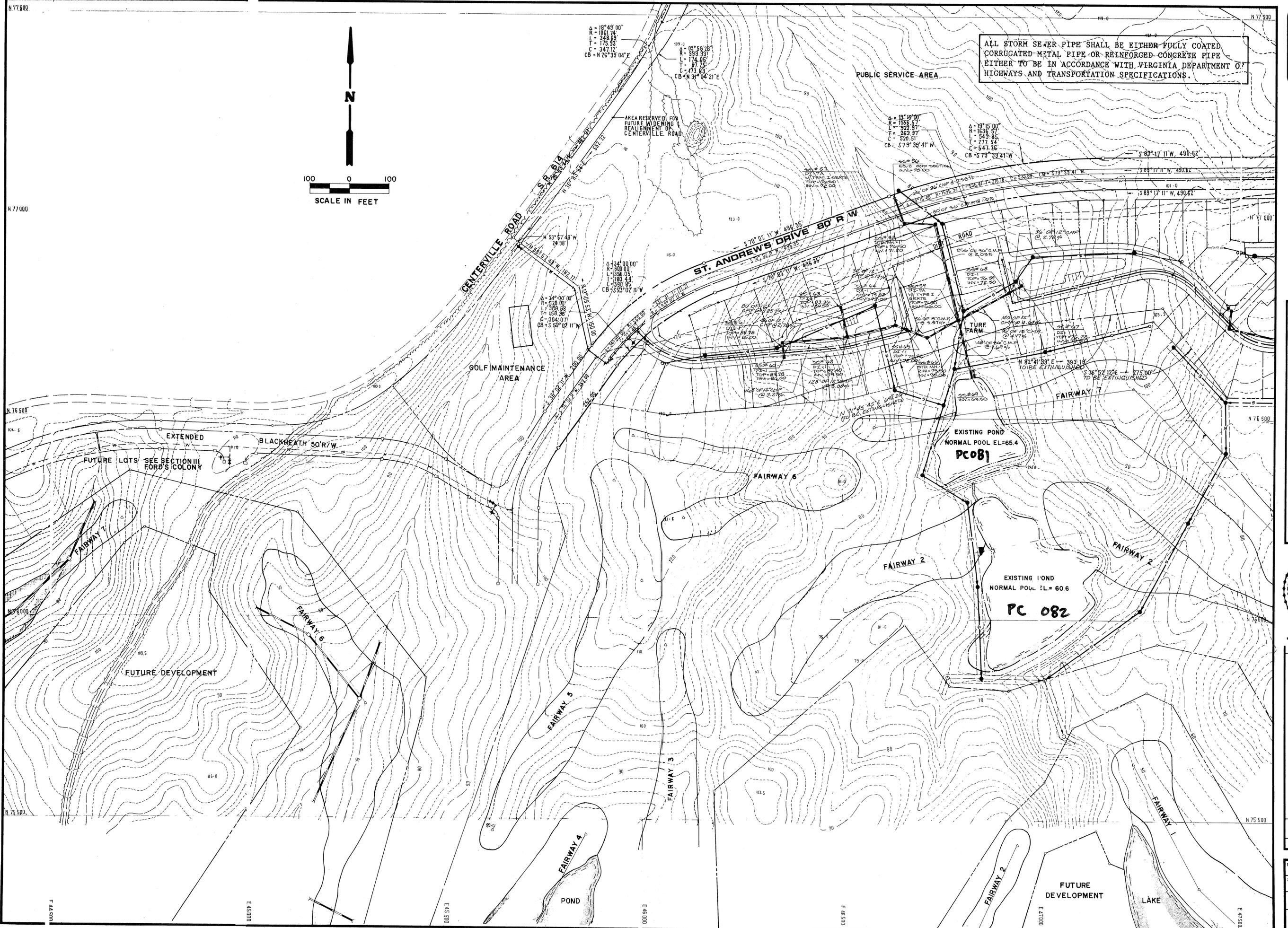
AES, a professional corporation
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 Architecture, Engineering, Surveying, Planning

STORM SEWER PLAN
 SECTION X
FORDS COLONY @ WILLIAMSBURG
 OWNER/DEVELOPER: FORDS COLONY @ WILLIAMSBURG VIRGINIA
 JAMES CITY COUNTY

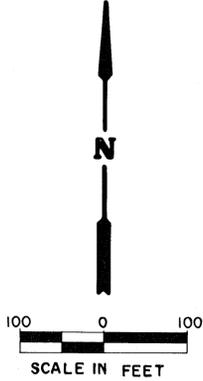


NO.	DATE	REVISION / COMMENT / NOTE	BY
1	11/26/86	REVISED PER LCA COMMENTS	JHS
2	3/30/87	REVISED PER LCA AND DESIGNER COMMENTS	JHS

Designed	Drawn
Scale	Date
1"=100'	NOV.1988
Project No.	5652
Drawing No.	10



ALL STORM SEWER PIPE SHALL BE EITHER FULLY COATED CORRUGATED METAL PIPE OR REINFORCED CONCRETE PIPE EITHER TO BE IN ACCORDANCE WITH VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION SPECIFICATIONS.



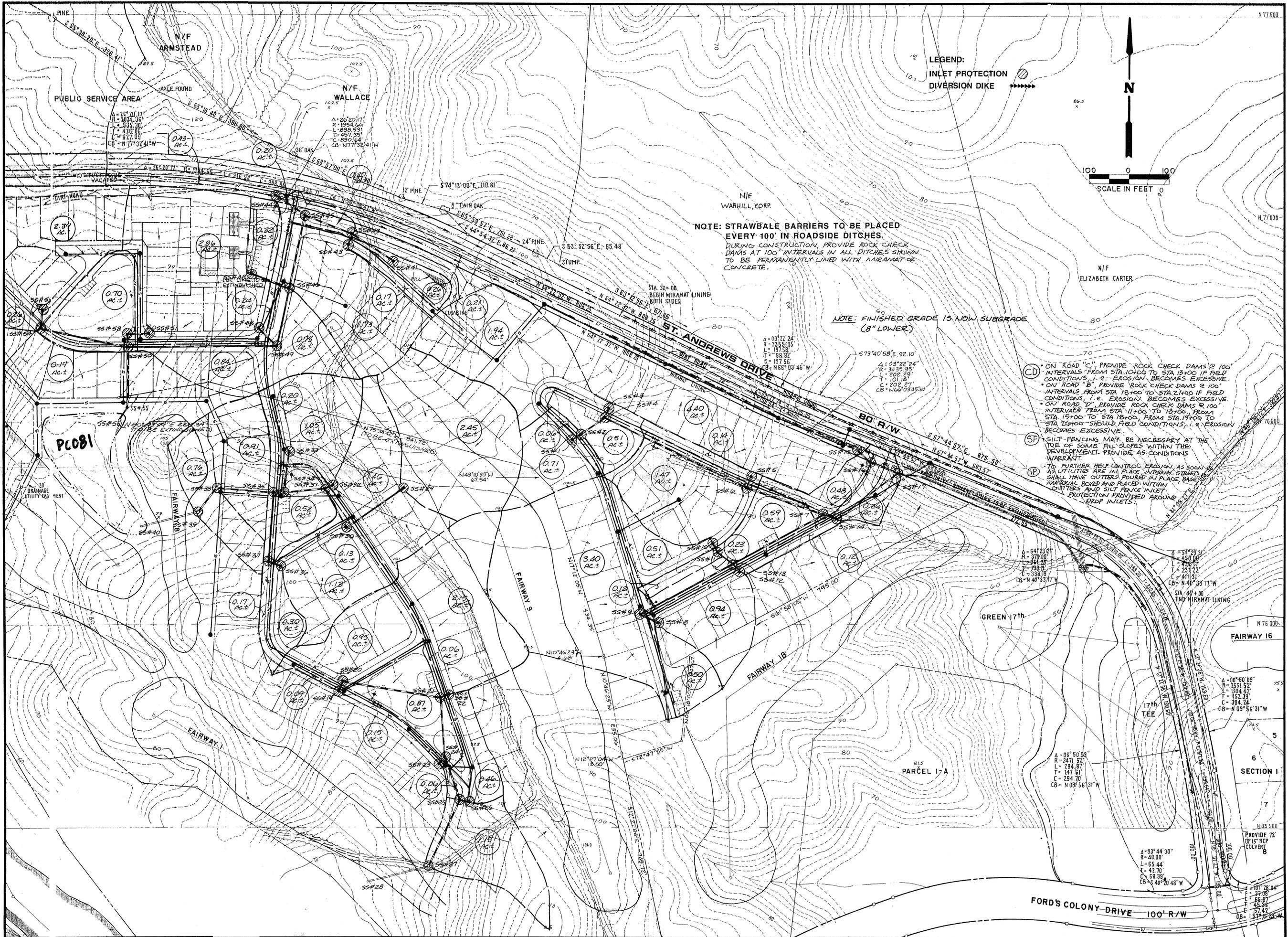
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STORM SEWER PLAN
 SECTION X
FORD'S COLONY
 @ **WILLIAMSBURG**
 OWNER/DEVELOPER: FORD'S COLONY @ WILLIAMSBURG
 JAMES CITY COUNTY, VIRGINIA



DESIGNED	BY
DRAWN	JHB
SCALE	DATE
1"=100'	NOV. 1986
PROJECT NO.	5652
DRAWING NO.	11

DESIGNED	DRAWN
SCALE	DATE
1"=100'	NOV. 1986
PROJECT NO.	5652
DRAWING NO.	11



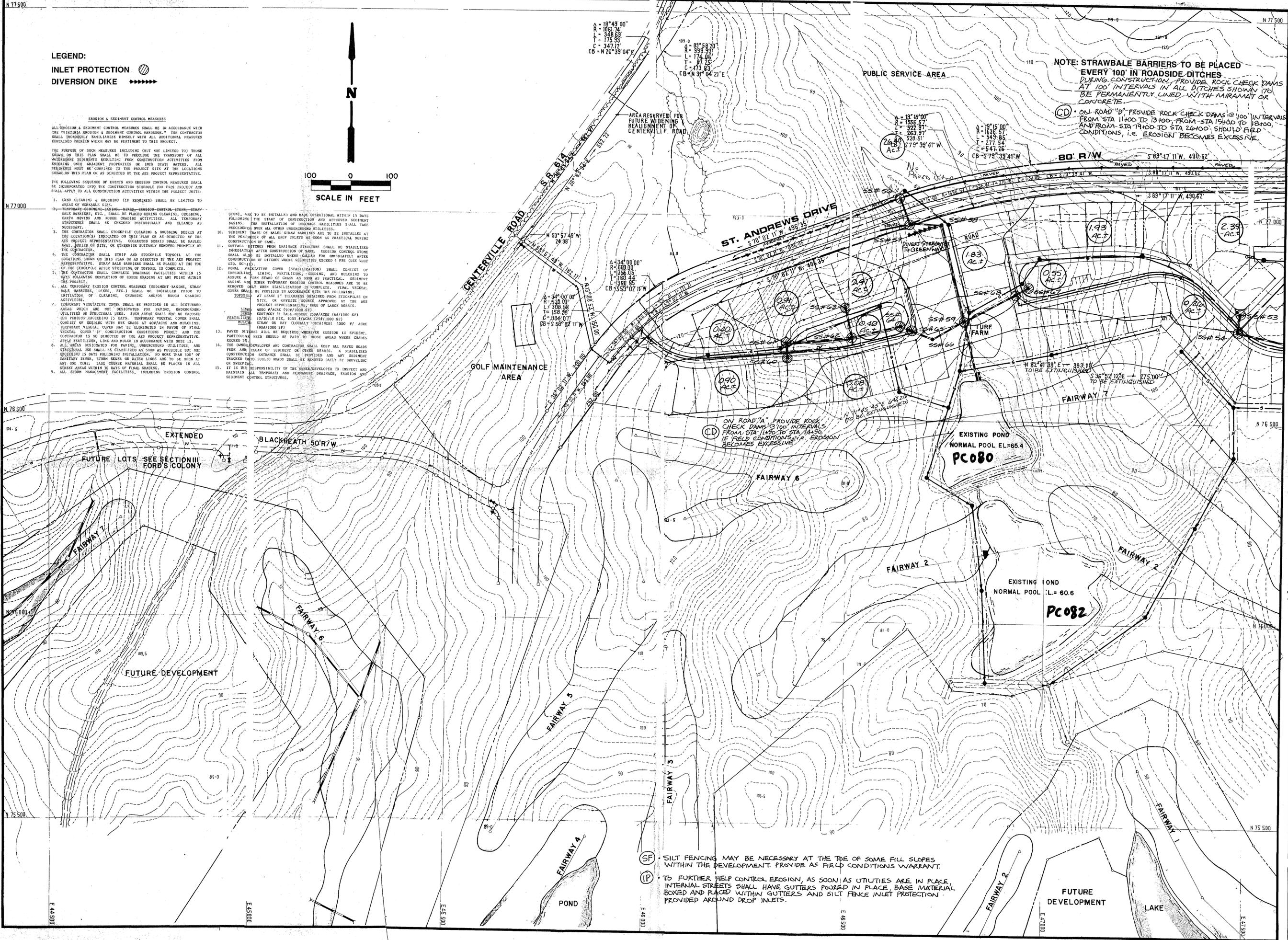
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DRAINAGE, EROSION AND SEDIMENT CONTROL PLAN
 SECTION X
FORD'S COLONY
 @ **WILLIAMSBURG**
 OWNER/DEVELOPER: FORD'S COLONY @ WILLIAMSBURG VIRGINIA
 JAMES CITY COUNTY



No.	DATE	REVISION / COMMENT / NOTE	BY
1	12/19/88	REVISED PER I.C. AND DEVELOPER COMMENTS	JCS
2	12/19/88	REVISED PER LCA COMMENTS	JCS

Designed AES	Drawn AES
Scale 1"=100'	Date NOV. 1988
Project No. 5652	Drawing No. 12



LEGEND:
INLET PROTECTION
DIVERSION DIKE

EROSION & SEDIMENT CONTROL MEASURES
 ALL EROSION & SEDIMENT CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE "VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK." THE CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH ALL ADDITIONAL MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.
 THE PURPOSE OF SUCH MEASURES INCLUDING (BUT NOT LIMITED TO) THOSE SHOWN ON THIS PLAN SHALL BE TO PREVENT THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ADJACENT PROPERTIES OR INTO STATE WATERS. ALL MEASURES MUST BE CONFORMED TO THE PROJECT SITE AT THE LOCATION SHOWN ON THIS PLAN OR AS DIRECTED BY THE A&S PROJECT REPRESENTATIVE.
 THE FOLLOWING SEQUENCE OF EVENTS AND EROSION CONTROL MEASURES SHALL BE INCORPORATED INTO THE CONSTRUCTION SCHEDULE FOR THIS PROJECT AND SHALL APPLY TO ALL CONSTRUCTION ACTIVITIES WITHIN THE PROJECT LIMITS:

1. LAND CLEARING & GRUBBING (IF REQUIRED) SHALL BE LIMITED TO AREAS OF NEARER SIZE.
2. TEMPORARY EROSION CONTROL MEASURES—DROPS, EROSION CONTROL STONES, STRAW BALE BARRIERS, ETC. SHALL BE PLACED BEFORE CLEARING, GRUBBING, GRASS MOVING AND ROUGH GRADING ACTIVITIES. ALL TEMPORARY STRUCTURES SHALL BE CHECKED PERSONALLY AND CLEARED AS NECESSARY.
3. THE CONTRACTOR SHALL STOCKPILE CLEARING & GRUBBING DEBRIS AT THE LOCATION(S) INDICATED ON THIS PLAN OR AS DIRECTED BY THE A&S PROJECT REPRESENTATIVE. COLLECTED DEBRIS SHALL BE HAULLED AWAY, BULGED ON SITE, OR OTHERWISE SUITABLY REMOVED PROMPTLY BY THE CONTRACTOR.
4. THE CONTRACTOR SHALL STRIP AND STOCKPILE TOPSOIL AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE A&S PROJECT REPRESENTATIVE. STRAW BALE BARRIERS SHALL BE PLACED AT THE TOE OF THE STOCKPILE AFTER STRIPPING OF TOPSOIL IS COMPLETE.
5. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 15 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT.
6. ALL TEMPORARY EROSION CONTROL MEASURES (SEDIMENT BASINS, STRAW BALE BARRIERS, DROPS, ETC.) SHALL BE UNINSTALLED PRIOR TO INITIATION OF CLEARING, GRUBBING AND/OR ROUGH GRADING ACTIVITIES.
7. TEMPORARY VEGETATIVE COVER SHALL BE PROVIDED IN ALL DISTURBED AREAS WHICH ARE NOT DESIGNATED FOR PAVING, UNDERGROUND UTILITIES OR STRUCTURAL USES. SUCH AREAS SHALL NOT BE EXPOSED FOR PERIODS EXCEEDING 15 DAYS. TEMPORARY VEGETATIVE COVER SHALL CONSIST OF SEEDING WITH SIF GRASS AT 100#/1000 SF AND MULCHING. TEMPORARY VEGETATIVE COVER MAY BE ELIMINATED IN FAVOR OF FINAL VEGETATIVE COVER IF CONSTRUCTION CONDITIONS PERMIT AND THE CONTRACTOR IS SO DIRECTED BY THE A&S PROJECT REPRESENTATIVE. APPLY FERTILIZER, LIME AND MULCH IN ACCORDANCE WITH NOTE 12.
8. ALL AREAS DESIGNATED FOR PAVING, UNDERGROUND UTILITIES, AND STRUCTURAL USES SHALL BE STABILIZED AS SOON AS POSSIBLE BUT NOT EXCEEDING 15 DAYS FOLLOWING INSTALLATION TO MORE THAN 200% OF SANITARY SEWER, STORM SEWER OR WATER LINES ARE TO BE OPEN AT ANY ONE TIME. BASE COURSE MATERIAL SHALL BE PLACED IN ALL STREET AREAS WITHIN 30 DAYS OF FINAL GRADING.
9. ALL STORM MANAGEMENT FACILITIES, INCLUDING EROSION CONTROL

10. STONES ARE TO BE INSTALLED AND MADE OPERATIONAL WITHIN 15 DAYS FOLLOWING THE START OF CONSTRUCTION AND APPROVED SEDIMENT BASINS. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL OTHER UNDERGROUND UTILITIES.
11. SEDIMENT TRAPS OR MAILED STRAW BARRIERS ARE TO BE INSTALLED AT THE PERIPHERY OF ALL DROP INLETS AS SOON AS PRACTICAL DURING CONSTRUCTION OF SAME.
12. OUTFALL STRUCTURES FROM WATERSHED STRUCTURE SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. EROSION CONTROL STONES SHALL ALSO BE INSTALLED WHERE CALLED FOR IMMEDIATELY AFTER CONSTRUCTION OF DITCHES WHERE VELOCITIES EXCEED 6 FPS (USE NOTE 10). EC-11).
13. FENAL VEGETATIVE COVER (STABILIZATION) SHALL CONSIST OF TOPSOILING, LIMING, FERTILIZING, SEEDING, AND MULCHING TO ASSURE A FIRM STAND OF GRASS AS SOON AS PRACTICAL. SEDIMENT CONTROL MEASURES SHALL BE PROVIDED IN ACCORDANCE WITH THE FOLLOWING: AT LEAST 2" THICKNESS OBTAINED FROM STOCKPILES ON SITE, OR OVERSEED SOURCE APPROVED BY THE A&S PROJECT REPRESENTATIVE, SEEDS OF LARGE SEEDS, 4000 #/ACRE (90#/1000 SF) KENTUCKY 31 TALL FESCUE (50#/ACRE (44#/1000 SF) FERTILIZER 10/20/10 MIX, 1000 #/ACRE (25#/1000 SF) STRAW OR HAY (LOCALLY OBTAINED) 4000 #/ ACRE (90#/1000 SF)
14. PAVED DITCHES WILL BE REQUIRED, HOWEVER EROSION IS EVIDENT, WHEN SHOULD BE PAID TO THOSE AREAS WHERE GRADES PARTICULAR EXCEED 3%.
15. THE OWNER, DEVELOPER AND CONTRACTOR SHALL KEEP ALL PAVED ROADS FREE AND CLEAR OF SEDIMENT OR OTHER DEBRIS. A STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROVIDED AND ANY SEDIMENT TRACKED ONTO PUBLIC ROADS SHALL BE REMOVED DAILY BY SHOVELING OR WAXING.
16. IT IS THE RESPONSIBILITY OF THE OWNER/DEVELOPER TO INSPECT AND MAINTAIN ALL TEMPORARY AND PERMANENT DRAINAGE, EROSION AND SEDIMENT CONTROL STRUCTURES.

SCALE IN FEET
 100 0 100

NOTE: STRAWBALE BARRIERS TO BE PLACED EVERY 100' IN ROADSIDE DITCHES DURING CONSTRUCTION. PROVIDE ROCK CHECK DAMS AT 100' INTERVALS IN ALL DITCHES SHOWN TO BE PERMANENTLY LINED WITH MARRAMAT OR CONCRETE.
 (CD) ON ROAD "B" PROVIDE ROCK CHECK DAMS @ 100' INTERVALS FROM STA 11400 TO 13400, FROM STA 15400 TO 18400, AND FROM STA 19400 TO STA 20400. SHOULD FIELD CONDITIONS, I.E. EROSION BECOMES EXCESSIVE.

(CD) ON ROAD "A" PROVIDE ROCK CHECK DAMS @ 100' INTERVALS FROM STA 11490 TO STA 14490 IF FIELD CONDITIONS I.E. EROSION BECOMES EXCESSIVE.

(SF) SILT FENCING MAY BE NECESSARY AT THE TOE OF SOME FILL SLOPES WITHIN THE DEVELOPMENT. PROVIDE AS FIELD CONDITIONS WARRANT.
 (P) TO FURTHER HELP CONTROL EROSION, AS SOON AS UTILITIES ARE IN PLACE, INTERNAL STREETS SHALL HAVE GUTTERS POURED IN PLACE. BASE MATERIAL BOXED AND PLACED WITHIN GUTTERS AND SILT FENCE INLET PROTECTION PROVIDED AROUND DROP INLETS.



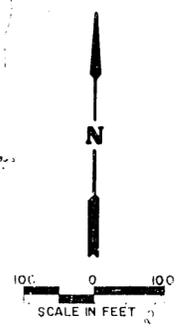
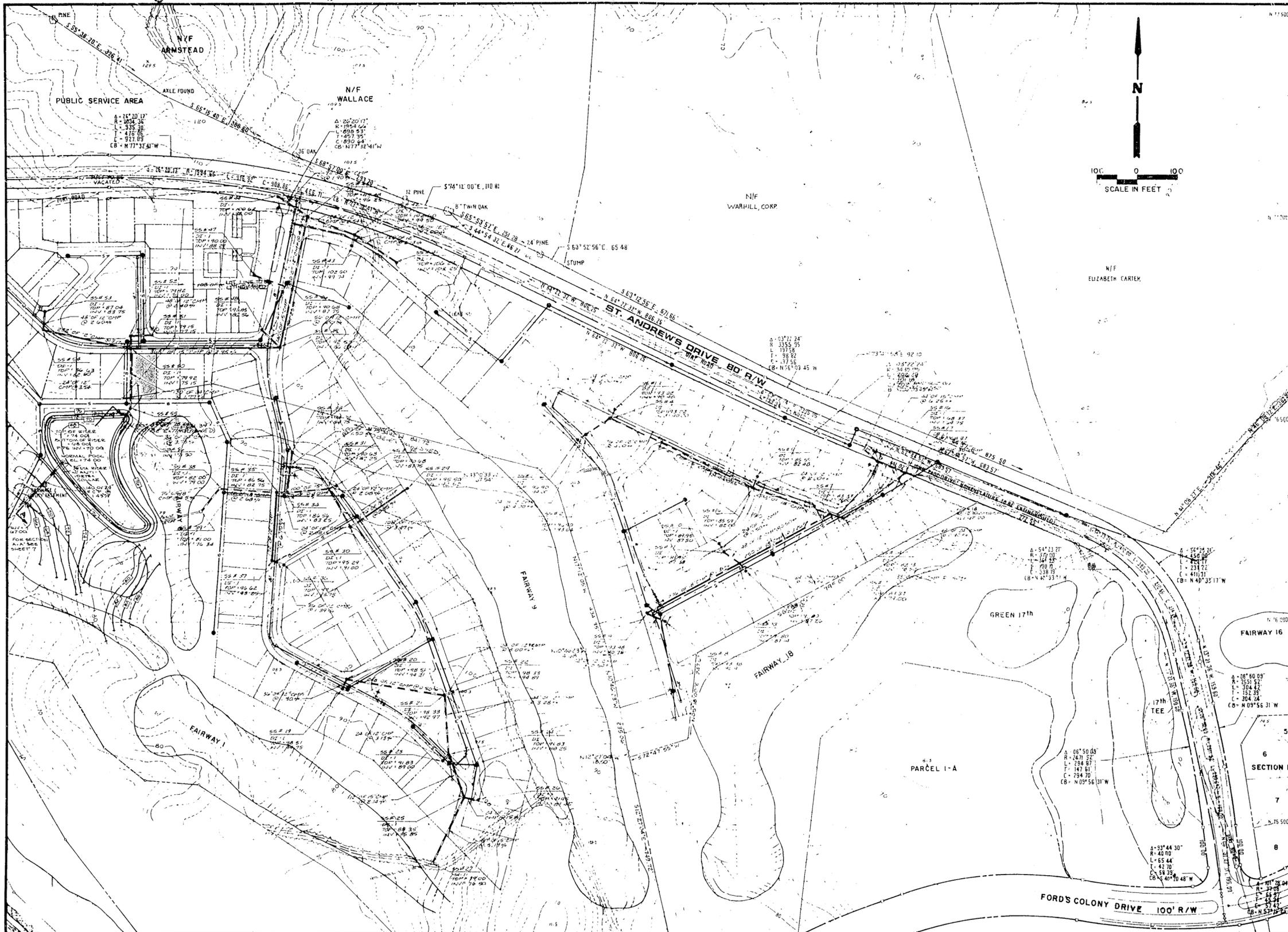
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DRAINAGE, EROSION AND SEDIMENT CONTROL PLAN
 SECTION X
FORD'S COLONY
 @ **WILLIAMSBURG**
 OWNER/DEVELOPER: FORD'S COLONY @ WILLIAMSBURG
 JAMES CITY COUNTY, VIRGINIA



NO.	DATE	REVISION / COMMENT / NOTE	BY

Designed by AES
 Drawn by AES
 Scale 1"=100'
 Date NOV. 1986
 Project No. 5652
 Drawing No. 13



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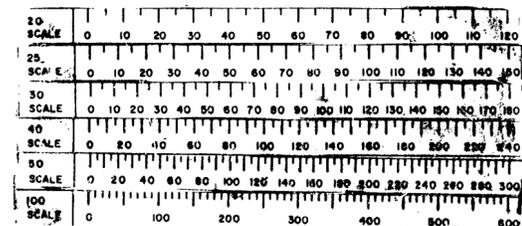
STORM SEWER PLAN
 SECTION X
**FORDS COLONY
 @ WILLIAMSBURG**
 OWNER/DEVELOPER: FORDS COLONY @ WILLIAMSBURG
 WAREHIRE COUNTY, VIRGINIA

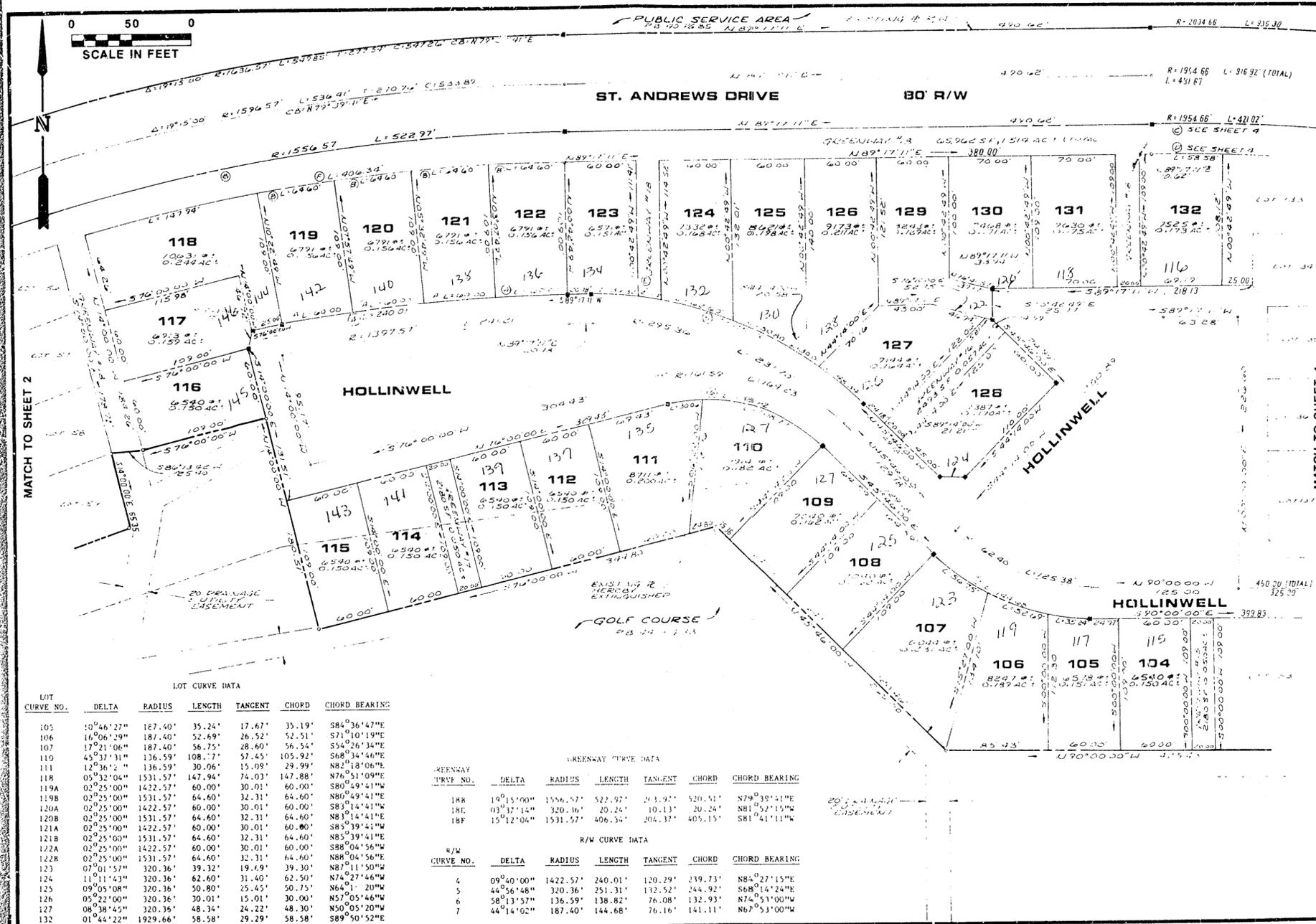


NO.	DATE	REVISION / COMMENT / NOTE
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Designed	Drawn
Scale	Date
1"=100'	NOV. 1998
Project No.	5652
Drawing No.	10

S-23-05 sec 10A
 lot 1
 S-40-04 sec 10
 lots 50-57
 BUA
 S-10-04 sec 10
 lot 118 BUA
 S-11-03 sec 10A
 lot 1
 S-58-03 sec 10
 111-172





LOT CURVE DATA

LOT CURVE NO.	DELTA	RADIUS	LENGTH	TANGENT	CHORD	CHORD BEARING
105	10°46'27"	187.40'	35.24'	17.67'	35.19'	S84°36'47"E
106	16°06'39"	187.40'	52.69'	26.52'	52.51'	S71°10'19"E
107	17°21'06"	187.40'	56.75'	28.60'	56.54'	S54°26'34"E
110	45°37'31"	136.59'	108.77'	57.45'	105.92'	S68°34'46"E
111	12°36'12"	136.59'	30.06'	15.09'	29.99'	N82°18'06"E
118	05°32'04"	1531.57'	147.94'	74.03'	147.88'	N76°51'09"E
119A	02°25'00"	1422.57'	60.00'	30.01'	60.00'	S80°49'41"W
119B	02°25'00"	1531.57'	64.60'	32.31'	64.60'	N80°49'41"E
120A	02°25'00"	1422.57'	60.00'	30.01'	60.00'	S83°14'41"W
120B	02°25'00"	1531.57'	64.60'	32.31'	64.60'	N83°14'41"E
121A	02°25'00"	1422.57'	60.00'	30.01'	60.00'	S85°39'41"W
121B	02°25'00"	1531.57'	64.60'	32.31'	64.60'	N85°39'41"E
122A	02°25'00"	1422.57'	60.00'	30.01'	60.00'	S88°04'56"W
122B	02°25'00"	1531.57'	64.60'	32.31'	64.60'	N88°04'56"E
123	07°01'57"	320.36'	39.32'	19.69'	39.30'	N87°11'50"W
124	11°11'43"	320.36'	62.60'	31.40'	62.50'	N76°27'46"W
125	09°05'08"	320.36'	50.80'	25.45'	50.75'	N64°11'20"W
126	05°22'00"	320.36'	30.01'	15.01'	30.00'	N57°05'46"W
127	08°38'45"	320.36'	48.34'	24.22'	48.30'	N50°05'20"W
132	01°44'22"	1929.66'	58.58'	29.29'	58.58'	S89°50'52"E

GREENWAY CURVE DATA

TRVE NO.	DELTA	RADIUS	LENGTH	TANGENT	CHORD	CHORD BEARING
188	19°15'00"	1531.57'	522.97'	241.92'	520.51'	N79°38'41"E
18E	03°37'14"	320.36'	20.24'	10.13'	20.24'	N81°52'15"W
18F	15°12'04"	1531.57'	406.34'	204.32'	405.15'	S81°41'11"W

R/W CURVE DATA

CURVE NO.	DELTA	RADIUS	LENGTH	TANGENT	CHORD	CHORD BEARING
4	09°40'00"	1422.57'	240.01'	120.29'	239.73'	N84°27'15"E
5	44°56'48"	320.36'	251.31'	132.52'	244.92'	S68°14'24"E
6	58°13'57"	136.59'	138.82'	76.08'	132.93'	N74°53'00"W
7	44°14'02"	187.40'	144.68'	76.16'	141.11'	N67°53'00"W



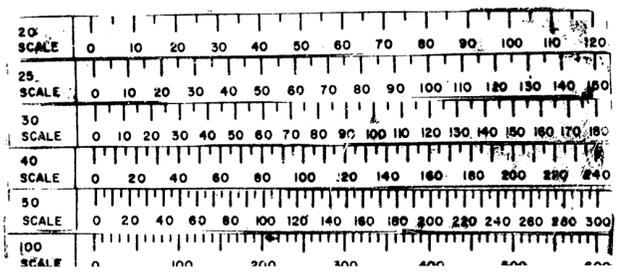
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PLAT OF FORD'S COLONY WILLIAMSBURG SECTION X LOT 104 TO LOT 132
 POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

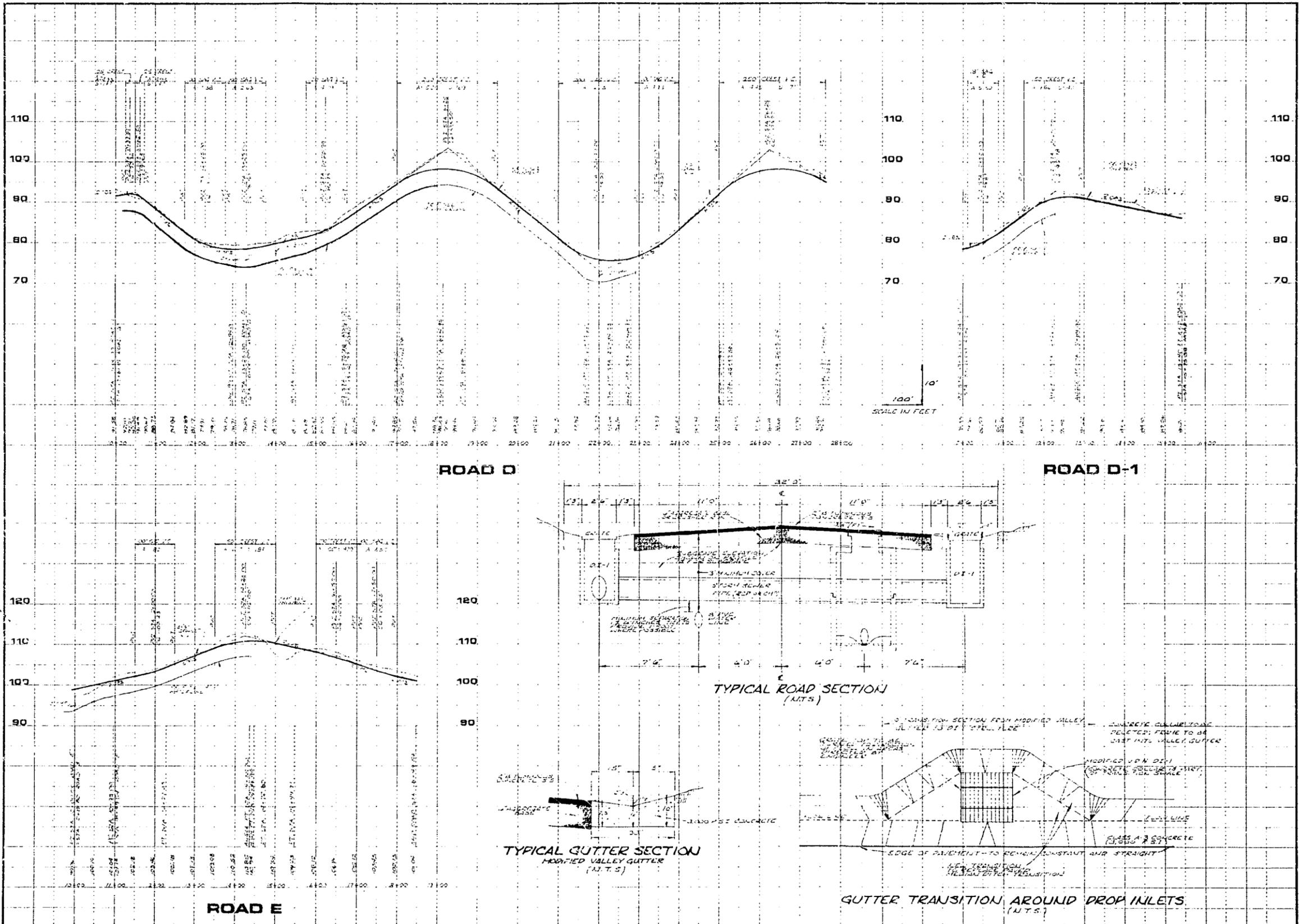


NO.	DATE	REVISION / COMMENT / NOTE	BY

Designed **JHB** Drawn **C.A.N.**
 Scale **1" = 50'** Date **JAN 13, 1987**
 Project No. **5652**
 Drawing No. **3 of 8**



COPY



DESIGNED BY	DATE
DRAWN BY	DATE
CHECKED BY	DATE
NOTED BY	DATE
PROJECT NO.	5652
ISSUED BY	1/30/9

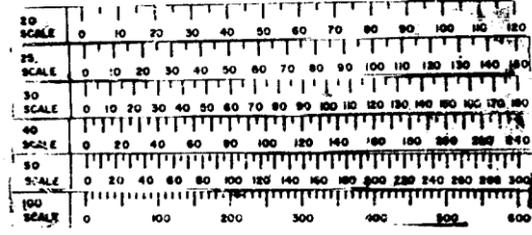


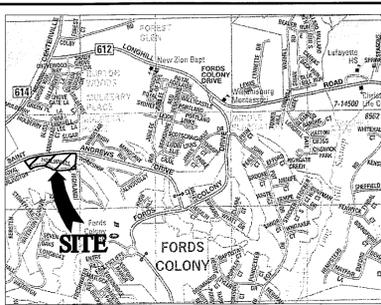
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 Williamsburg, Virginia 23186
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ROAD PROFILE
FORD'S COLONY
@ WILLIAMSBURG
 SECTION 1
 OWNER: DEVELOPER ADRIAN COUNTY & WILLIAMSBURG, VA
 PROJECT: 8TH HOLE POND
 JAMES CITY COUNTY, VIRGINIA

DESIGNED BY	DATE
DRAWN BY	DATE
CHECKED BY	DATE
NOTED BY	DATE
PROJECT NO.	5652
ISSUED BY	1/30/9





1. OWNER: EADIE, BRENDA D.
2. PARCEL ID: 3130700103.
3. LEGAL DESCRIPTION: L-103-S-10 FORD'S COLONY.
4. ZONING: R-4
5. APPROXIMATE AREA OF DISTURBANCE = 2000 SF.

Miss Utility of Virginia
1829 BLUE HILL CIRCLE
NE ROANOKE, VIRGINIA 24012



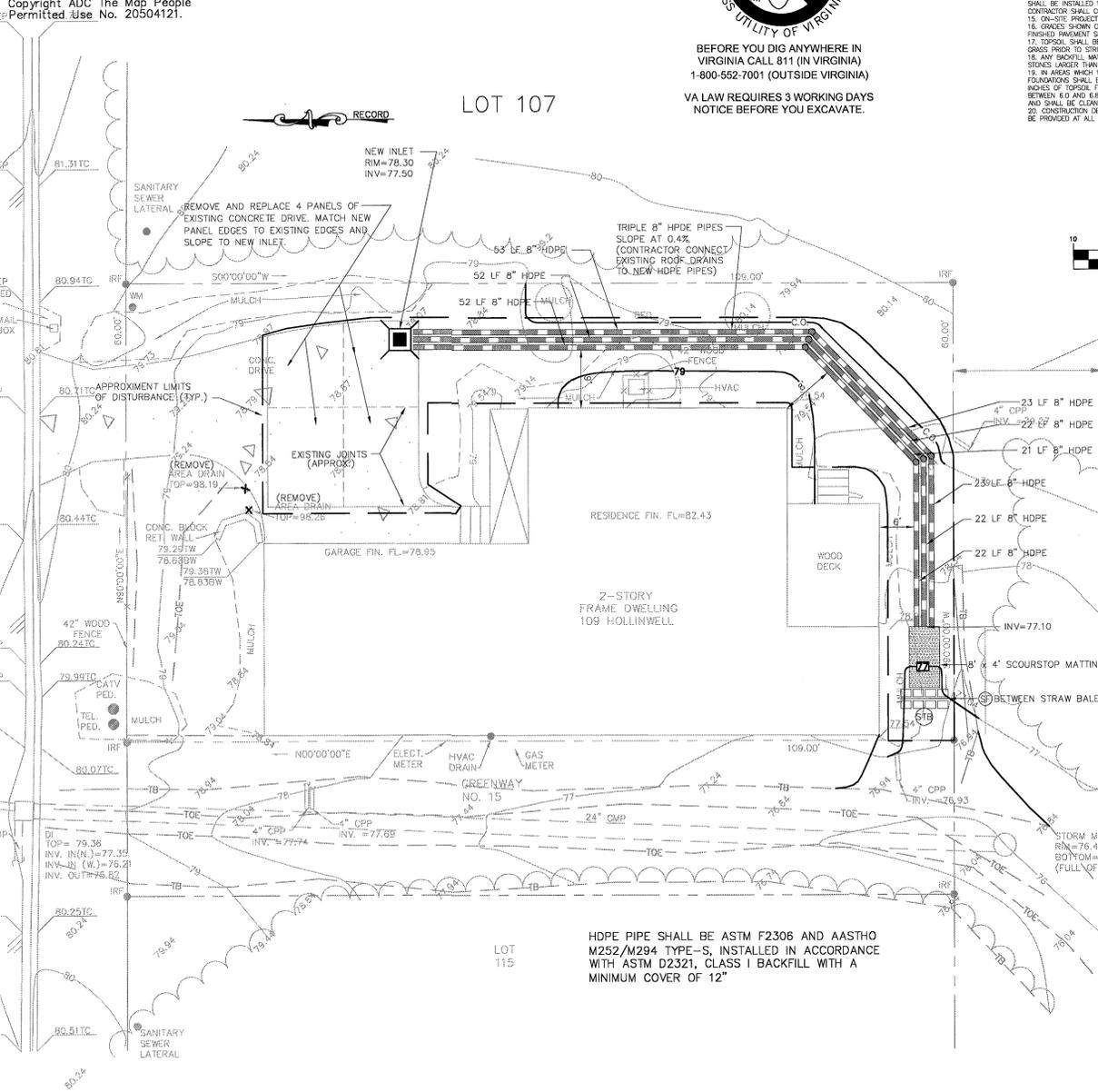
BEFORE YOU DIG ANYWHERE IN VIRGINIA CALL 811 (IN VIRGINIA)
1-800-552-7001 (OUTSIDE VIRGINIA)
VA LAW REQUIRES 3 WORKING DAYS NOTICE BEFORE YOU EXCAVATE.

CONSTRUCTION NOTES

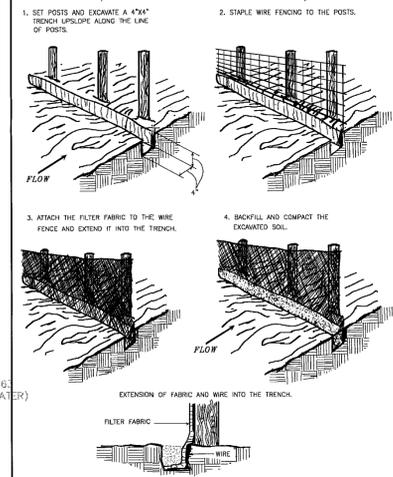
1. THE CONTRACTOR SHALL NOTIFY THE LOCAL PUBLIC WORKS AND UTILITY DEPARTMENTS AND VOOT A MINIMUM OF 36 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION AND/OR CONSTRUCTION ON SITE OR IN THE ROOT-OF-WAY.
2. THE CONTRACTOR SHALL VERIFY CRITICAL DIMENSIONS, ELEVATIONS AND INVERTS IN THE FIELD PRIOR TO BEGINNING WORK AND SHALL NOTIFY ARCHITECT/ENGINEER AND OWNER OF ANY DISCREPANCIES.
3. DIMENSIONS SHOWN ARE TO FACE OF CURBS, FACE OF BUILDINGS, CENTERLINE OF STORM AND UTILITY STRUCTURES, AND CENTERLINE OF PIPES, UNLESS OTHERWISE NOTED. DIMENSIONS DENOTED AS (L) SHALL BE FIELD VERIFIED PRIOR TO COMMENCING CONSTRUCTION AND THE ENGINEER SHALL BE PROMPTED WITH ACTUAL FIELD DIMENSIONS AT 1-800-552-7001.
4. THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING WORK. BEFORE YOU DIG, TO MISS THE UTILITIES, CALL "MISS UTILITY OF VIRGINIA" AT 1-800-552-7001.
5. SHOULD CONFLICTS WITH ANY EXISTING UTILITY OR STORM SYSTEM BECOME EVIDENT THE CONTRACTOR SHALL CONTACT THE ENGINEER AND OWNER BEFORE MAKING ANY ADJUSTMENTS WHICH MAY DIFFER FROM THIS PLAN.
6. ALL CONSTRUCTION METHODS AND MATERIALS SHALL CONFORM WITH CURRENT VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) ROAD AND BRIDGE STANDARDS, AS SPECIFIED THEREIN, OR LOCAL STANDARDS AS APPROPRIATE, UNLESS OTHERWISE NOTED.
7. EROSION CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED TO COMPLY WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (V.E.S.C.H.). ALL EROSION CONTROL DEVICES SHALL BE INSTALLED WITH THE FIRST PHASE OF DEMOLITION/CONSTRUCTION AND SHALL REMAIN IN PLACE AND MAINTAINED UNTIL THE COMPLETION OF CONSTRUCTION. SEE PLANS AND EROSION CONTROL NOTES FOR ADDITIONAL REQUIREMENTS.
8. CONTRACTOR SHALL PROTECT ALL TREES FROM DAMAGE SUCH AS CUTS, COMPACTION OF SOIL IN AREAS OF ROOTS, ETC. UNLESS INDICATED TO BE REMOVED, SHOULD TREES BECOME DAMAGED, THE CONTRACTOR WILL BE REQUIRED TO PROVIDE NEW TO MATCH EXISTING SPECIES AND SIZE. SEE TREE PROTECTION NOTES FOR ADDITIONAL REQUIREMENTS.
9. SLOPES STEEPER THAN 3 TO 1 (3:1 TO 1) TO 1 (3:1 TO 1) TO 1 (3:1 TO 1) SHALL BE BENCHED OR STIPPED PRIOR TO THE PLACEMENT OF FILL.
10. FILL MATERIALS CONTAINING ROCKS, BROCK, CONCRETE LARGER THAN SIX (6) INCHES SHALL NOT BE USED. THE UPPER MOST TWO (2) FEET SHALL NOT HAVE ANY ROCKS, BROCK, CONCRETE LARGER THAN TWO (2) INCHES IN DIAMETER. THE TOP SIX (6) INCHES SHALL NOT HAVE ANY ROCKS, BROCK, CONCRETE LARGER THAN ONE-HALF (1/2) INCH IN DIAMETER AND SHALL COMPLY WITH TOPSOIL REQUIREMENTS.
11. FILL AREAS SHALL BE PLACED IN LIFTS NOT EXCEEDING EIGHT (8) INCHES AND SHALL BE COMPACTED TO A MINIMUM 90% DENSITY IN ACCORDANCE WITH THE LATEST EDITION VDOT ROAD AND BRIDGE SPECIFICATIONS.
12. FOR WORK WITHIN CITY OR VDOT ROAD RIGHTS, THE CONTRACTOR SHALL MAINTAIN TWO-WAY TRAFFIC AT ALL TIMES. TRAFFIC CONTROL PLAN AND DEVICES SHALL COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS. LANE CLOSURES ARE NOT PERMITTED WITHOUT WRITTEN AUTHORIZATION FROM THE CITY/COUNTY AND/OR VDOT.
13. RE-SET EXISTING MANHOLE RINGS, CLEAN OUT AND WAVE BOXES, ETC. AS REQUIRED TO MEET NEW FINISHED GRADES.
14. THE CONTRACTOR SHALL INSTALL STORM DRAINAGE FROM THE LOW (DOWN-SLOPE) END OF THE SYSTEM TO THE HIGH (HEAD) OF THE SYSTEM. ALL PIPES SHALL BE INSTALLED WITH THE JOINTS FACING THE CORRECT DIRECTION (AS RECOMMENDED BY THE MANUFACTURER) FOR THE GRAVITY FLOW IN THE PIPES. THE CONTRACTOR SHALL OBTAIN CONNECTION ELEVATIONS PRIOR TO COMMENCING CONSTRUCTION.
15. ON-SITE PROJECT LIMITS TO BE PROPERLY LINES UNLESS OTHERWISE NOTED ON THE PLAN.
16. GRADES SHOWN ON SITE PLAN ARE FINISHED GRADES AND IDENTIFY THE LOCATION OF FINE GRADING SLOPING OR TOP OF MULCH IN NON-PAVED AREAS. FINISHED PAVEMENT SURFACE ON TOP OF CURB AS APPLICABLE IN PAVED AREAS.
17. TOPSOIL SHALL BE STORED WITHOUT CONTAMINATION WITH LEGIBLE AND STIPPLED FINE GRADING UNDESIRABLE MATERIALS. REMOVE HEAVY GROWTH OR GRASS PRIOR TO STORAGE.
18. ANY BACKFILL MATERIAL PLACED UNDER GRASS AND PLANTED AREAS SHALL BE FREE OF DEBRIS, WHITE, FROZEN MATERIALS, TOXIC MATERIALS, VEGETATION, STONES LARGER THAN ONE HALF INCH, OR OTHER DELICIOUS MATTER.
19. IN AREAS WHICH WILL NOT BE PAVED OR COVERED WITH A SEALING OR STRUCTURE ALL LANGUAGE COLLS SUCH AS CRUSHED STONE, RUBBLE, SLABS, FOUNDATIONS SHALL BE REMOVED. THE AREAS SHALL THEN BE BACKFILLED WITH TOPSOIL. PLANTED AND GRASS AREAS SHALL CONTAIN A MINIMUM OF SIX INCHES OF TOPSOIL FROM FINISHED GRADE TO THE BOTTOM OF THE TRENCH. TOPSOIL SHALL BE A NATURAL, FERTILE, FRABLE SOIL. IT SHALL HAVE A PH BETWEEN 6.0 AND 6.8 AND BE FREE OF TOXIC SUBSTANCES WHICH MAY BE HARMFUL TO PLANT GROWTH. TOPSOIL SHALL BE WITHOUT ADVERTISEMENTS OF SUBSOIL AND SHALL BE CLEAN AND FREE OF CLAY LUMPS, STONES, STUMPS, ROOTS AND SIMILAR MATERIALS OVER ONE HALF INCH IN DIAMETER.
20. CONSTRUCTION DEBRIS SHALL BE CONTRASTED IN ACCORDANCE WITH THE VIRGINIA LITTER CONTROL ACT. NO LESS THAN ONE LITER RECYCLEABLE SHALL BE PROVIDED AT ALL TIMES.

**JAMES CITY COUNTY ENVIRONMENTAL DIVISION
EROSION AND SEDIMENT CONTROL NOTES
REVISED 7/16/01**

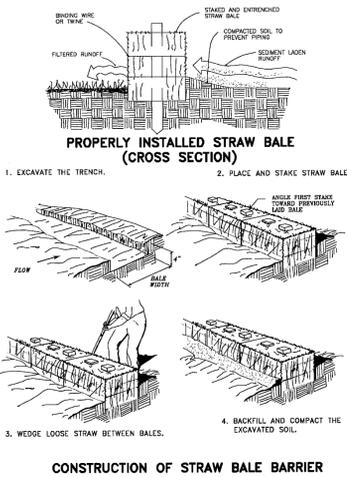
1. THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM EXTERIOR ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE PRESENCE OF SEDIMENT TO THE PROJECT SITE, ALL APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES. IN ADDITION TO THESE NOTES, ALL PROVISIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS SHALL APPLY TO THIS PROJECT.
1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, 3RD EDITION, 1992. THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE REGULATIONS CONTAINED THEREIN THAT MAY BE PERTINENT TO THIS PROJECT, INCLUDING MINIMUM STANDARDS 1 THROUGH 19. IF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS FOUND TO BE INADEQUATE IN THE FIELD, THE MINIMUM STANDARDS WILL APPLY IN ADDITION TO THE PROVISIONS OF THE APPROVED PLAN.
2. AS A PREREQUISITE TO APPROVAL OF AN EROSION AND SEDIMENT CONTROL PLAN FOR LAND-DISTURBING ACTIVITIES, THE NAME OF A RESPONSIBLE LAND-DISTURBER SHALL BE PROVIDED. THE RESPONSIBLE LAND-DISTURBER SHALL BE AN INDIVIDUAL WHO HOLDS A VALID CERTIFICATE OF COMPETENCY ISSUED BY THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION. THE PERSON DESIGNATED AS RESPONSIBLE LAND-DISTURBER SHALL BE SEEDED AND MULCHED IMMEDIATELY AFTER INSTALLATION. PERIODIC INSPECTIONS OF THE EROSION CONTROL MEASURES BY THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE MADE TO ASSESS THEIR CONDITION. ANY NECESSARY MAINTENANCE OF THE MEASURES SHALL BE ACCOMPLISHED IMMEDIATELY AND SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES.
3. A RECONSTRUCTION MEETING SHALL BE HELD ON-SITE BETWEEN THE COUNTY, THE DEVELOPER, THE PROJECT ENGINEER, THE RESPONSIBLE LAND-DISTURBER AND THE CONTRACTOR PRIOR TO ISSUANCE OF THE LAND DISTURBING PERMIT. THE CONTRACTOR SHALL SUBMIT A SCHEDULE OF CONSTRUCTION TO THE COUNTY FOR APPROVAL PRIOR TO THE RECONSTRUCTION MEETING. THE DESIGNATED RESPONSIBLE LAND-DISTURBER IS REQUIRED TO ATTEND THE RECONSTRUCTION MEETING FOR THE PROJECT.
4. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM VDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE THOROUGHLY CLEANED AT THE END OF EACH DAY (STD. & SPEC. 3.02).
5. SEDIMENT BARRIERS AND TRAPS (STD. & SPEC. 3.13 AND 3.14), PERIMETER DICES (STD. & SPEC. 3.09 AND 3.12), SEDIMENT FILTER BUFFERS (STD. & SPEC. 3.05) AND OTHER MEASURES INTENDED TO TRAP SEDIMENT ON-SITE MUST BE CONSTRUCTED AS A FIRST STEP IN GRADING AND MUST BE MADE FUNCTIONAL PRIOR TO ANY UP-SLOPE LAND DISTURBANCE TAKING PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DICES AND OVERSILLS MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER INSTALLATION. PERIODIC INSPECTIONS OF THE EROSION CONTROL MEASURES BY THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE MADE TO ASSESS THEIR CONDITION. ANY NECESSARY MAINTENANCE OF THE MEASURES SHALL BE ACCOMPLISHED IMMEDIATELY AND SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES.
6. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY OTHER REDIRECTING FLOWS FROM TRANSMISSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SLOWLY LOWER WATER DOWN-SLOPE WITHOUT CAUSING DAMAGE. A TEMPORARY FILL DIVERSION (STD. & SPEC. 3.10) AND SLOPE DRAIN (STD. & SPEC. 3.15) SHALL BE INSTALLED PRIOR TO THE END OF EACH WORKING DAY.
7. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FILL ADJUSTMENTS AT TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. ENVIRONMENTAL DIVISION APPROVAL WILL BE REQUIRED FOR OTHER DEVIATIONS FROM THE APPROVED PLAN.
8. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THE PLAN. SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE ENVIRONMENTAL DIVISION PRIOR TO THE IMPORT OF ANY BORROW OR TOP OF ANY WASTE TO OR FROM THE PROJECT SITE.
9. THE CONTRACTOR SHALL COMPLETE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUTLET DITCHES FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF THE SAME (STD. & SPEC. 3.16). THIS INCLUDES INSTALLATION OF EROSION CONTROL, STONE OR PAVED DITCHES WHERE REQUIRED. ANY DRAINAGE OUTLETS REQUIRED FOR A STREET MUST BE COMPLETED BEFORE STREET GRADING OR UTILITY INSTALLATION BEGINS.
10. 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 BE AT FINAL GRADE BUT WILL REMAIN DENUDED FOR LONGER THAN 30 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DENUDED FOR MORE THAN ONE YEAR.
11. NO MORE THAN 300 FEET OF SANITARY SEWER, STORM DRAIN, WATER OR UNDERGROUND UTILITY LINES ARE TO BE OPEN AT ONE TIME. FOLLOWING INSTALLATION OF ANY PORTION OF THESE ITEMS, ALL DISTURBED AREAS ARE TO BE IMMEDIATELY STABILIZED (I.E. THE SAME DAY).
12. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING (STD. & SPEC. 3.35). SEEDING WILL THEN TAKE PLACE AS SOON AS THE SPECIFIED PERIOD PERMITS.
13. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDING CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME AND FERTILIZER (STD. & SPEC. 3.32). IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE ESTABLISHMENT OF GRASS COVER.
14. ALL SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL, BLANKETS AND MATINGS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH STD. & SPEC. 3.35. MULCHING, STD. & SPEC. 3.36, SOIL STABILIZATION BLANKETS AND MATINGS AND MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 3:1.
15. INLET PROTECTION (STD. & SPEC. 3.07 AND 3.08) SHALL BE PROVIDED FOR ALL STORM DRAIN AND CULVERT INLETS FOLLOWING CONSTRUCTION OF THE SAME.
16. TEMPORARY LINERS, SUCH AS POLYETHYLENE SHEETS, SHALL BE PROVIDED FOR ALL PAVED DITCHES UNTIL THE PERMANENT CONCRETE LINER IS INSTALLED.
17. PAVED DITCHES SHALL BE REQUIRED WHEREVER ACCELERATED EROSION IS EVIDENT. PARTICULAR ATTENTION SHALL BE PAID TO THOSE AREAS WHERE GRASSES EXCEED 3 PERCENT.
18. TEMPORARY EROSION CONTROL MEASURES SUCH AS SILT FENCE ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. TRAPPED SEDIMENT SHALL BE SPREAD, SEEDING AND MULCHED. AFTER THE PROJECT AND MAINTENANCE, STD. & SPEC. 3.36, SOIL STABILIZATION BLANKETS AND MATINGS AND MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 3:1.
19. NO SEDIMENT TRAP OR SEDIMENT BASIN SHALL BE REMOVED UNTIL AT LEAST 75 PERCENT OF THE LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN HAVE BEEN SOLD TO A THIRD PARTY (UNRELATED TO THE DEVELOPER FOR THE CONSTRUCTION OF HOUSES AND/OR 80 PERCENT OF THE SINGLE FAMILY LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN HAVE BEEN COMPLETED AND THE SOIL STABILIZED). A BULK SALE OF THE LOTS TO ANOTHER BUILDER DOES NOT SATISFY THIS PROVISION. SEDIMENT TRAPS AND SEDIMENT BASINS SHALL NOT BE REMOVED WITHOUT THE EXPRESS AUTHORIZATION OF THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION.
20. RECORD DRAWINGS (AS-BUILTS) AND CONSTRUCTION CERTIFICATIONS ARE BOTH REQUIRED FOR NEWLY CONSTRUCTED OR MODIFIED STORMWATER MANAGEMENT/RMP FACILITIES. CERTIFICATION ACTIVITIES SHALL BE ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH THE CURRENT VERSION OF THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION, STORMWATER MANAGEMENT/RMP FACILITIES, RECORD DRAWINGS AND CONSTRUCTION CERTIFICATION STANDARD FORMS & INSTRUCTIONS.
21. DESIGN AND CONSTRUCTION OF PRIVATE-TYPE SITE DRAINAGE SYSTEMS OUTSIDE VDOT RIGHTS-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT VERSION OF THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION, STORMWATER DRAINAGE CONFORMANCE SYSTEMS (NON-SUB RELATED), GENERAL DESIGN AND CONSTRUCTION GUIDELINES.



CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT)



STRAW BALE BARRIER



RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
4"	21"
6"	23"
8"	26"
10"	28"
12"	30"
14"	34"
16"	36"
18"	40"
20"	42"
24"	48"
30"	54"
36"	64"
42"	72"
48"	80"
54"	88"
60"	96"

MINIMUM RECOMMENDED COVER BASED ON VEHICLE LOADING CONDITIONS

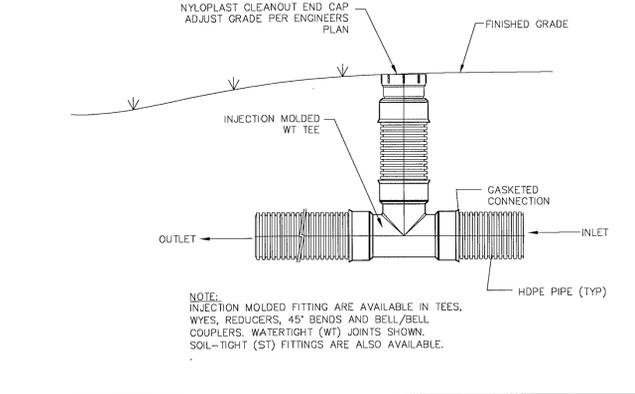
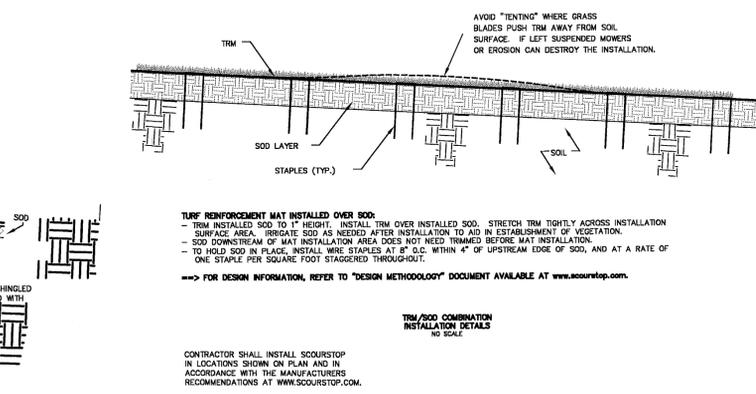
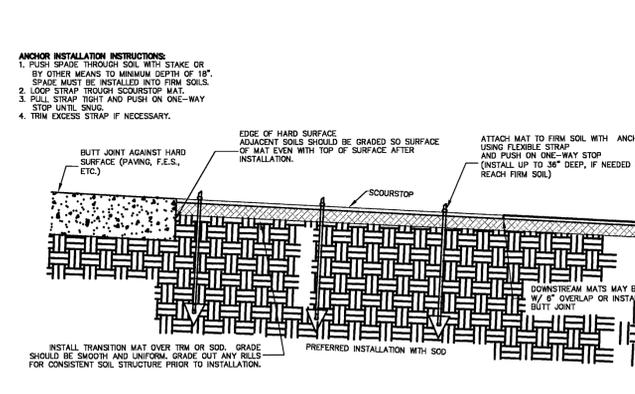
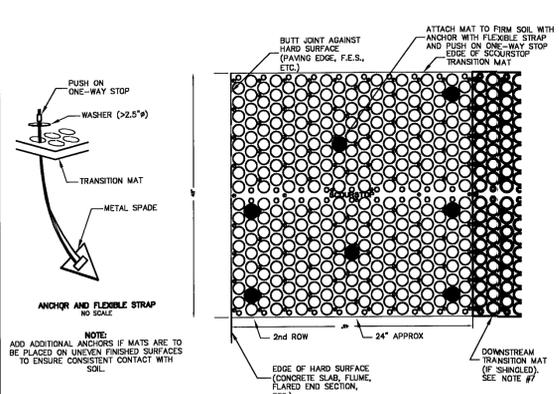
PIPE DIAM.	H-20	HEAVY CONSTRUCTION (FIRST AXLE LOAD)**
12" - 48"	12"	48"
54" - 60"	24"	60"

MINIMUM RECOMMENDED COVER BASED ON MALTING, LOADING CONDITIONS

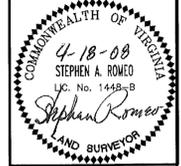
PIPE DIAM.	COVER
UP TO 24"	E-60*
30" - 36"	30"
42" - 60"	48"

NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS LATEST EDITION.
2. MEASURES SHOULD BE TAKEN TO PREVENT MOTION OF NATIVE FINES INTO BACKFILL MATERIAL WHEN REQUIRED.
3. FOUNDATION, WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A STABILIZATION IS COMPLETE. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I OR II. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER, UNLESS OTHERWISE NOTED BY THE ENGINEER. MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4" - 24" (100mm-600mm), 6" (150mm) FOR 30" (750mm-900mm).
5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I OR II IN THE PIPE ZONE EXTENDING NOT LESS THAN 8" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS TO BE MEASURED FROM THE TOP OF THE PIPE TO THE FINISHED GRADE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" COVER FOR 54" OR 60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.
7. SEE A&E, INC.



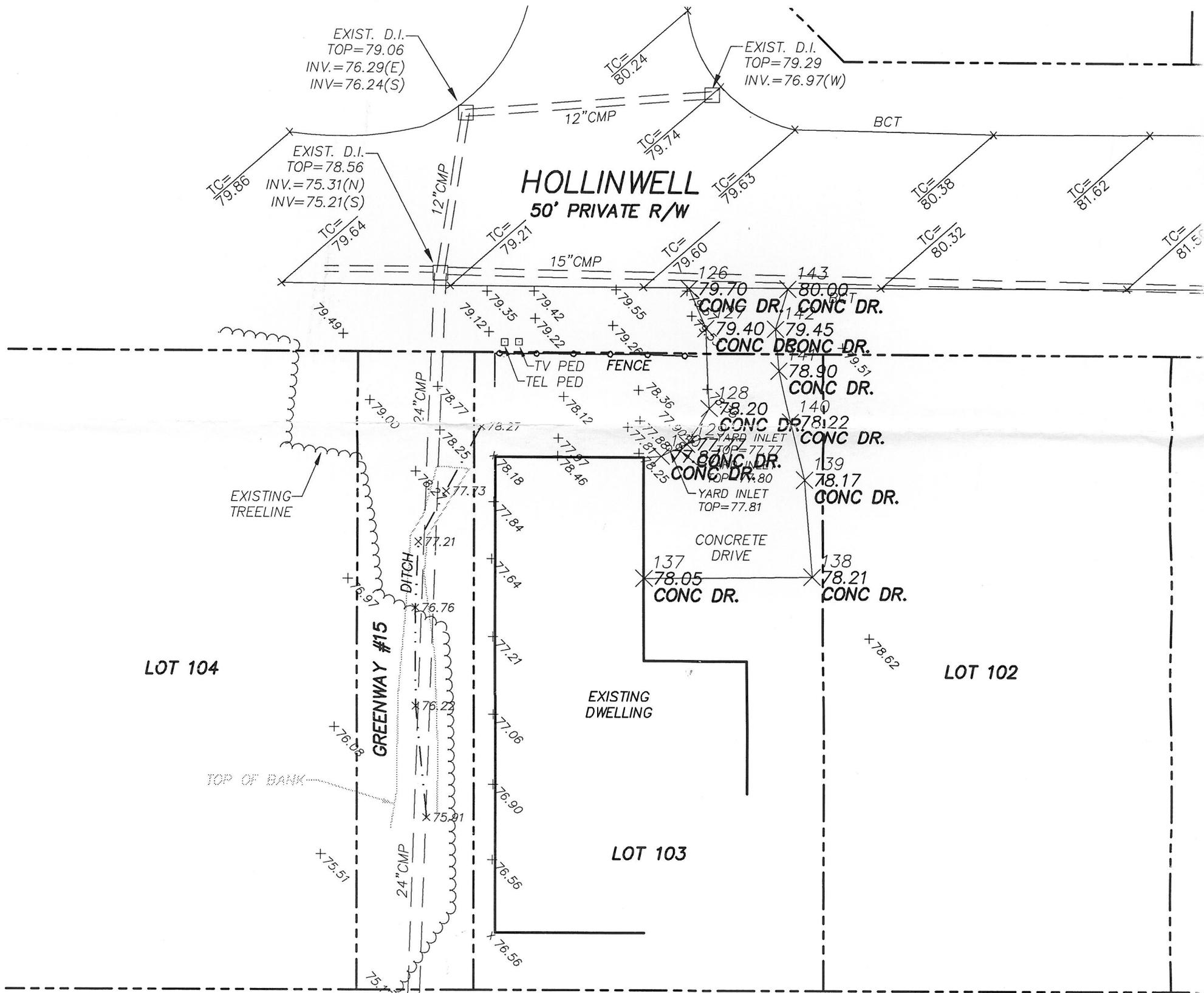
APPROVED
James City County
Environmental Division
By: [Signature]
Date: 05/16/05



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Fax: (757) 475-2000
E-mail: info@landmarkdesigngroup.com

LANDMARK DESIGN GROUP
Engineers • Planners • Surveyors
Landscape Architects • Environmental Scientists

DESIGNED: N/A DATE: 08/12/05
CHECKED: SAR SCALE: 1"=10'
FILE MGR./DRAWN: JCZ CADD FILE NAME: LOT-103
PROJECT NUMBER: 2005096-000.00 DWG. FILE NO.: 16319AW
DRAWING NUMBER: C-1



EXIST. D.I.
TOP=79.06
INV.=76.29(E)
INV.=76.24(S)

EXIST. D.I.
TOP=79.29
INV.=76.97(W)

EXIST. D.I.
TOP=78.56
INV.=75.31(N)
INV.=75.21(S)

HOLLINWELL
50' PRIVATE R/W

LOT 104

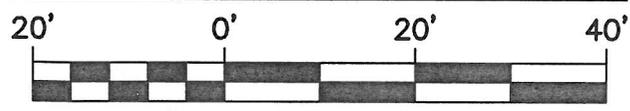
LOT 102

LOT 103

EXIST. D.I.
TOP=74.37
INV.=70.87
(FLOODED)

S:\Jobs\5652\43-Recreation Area (Section 10)\dwg\Topo\5652

GRAPHIC SCALE



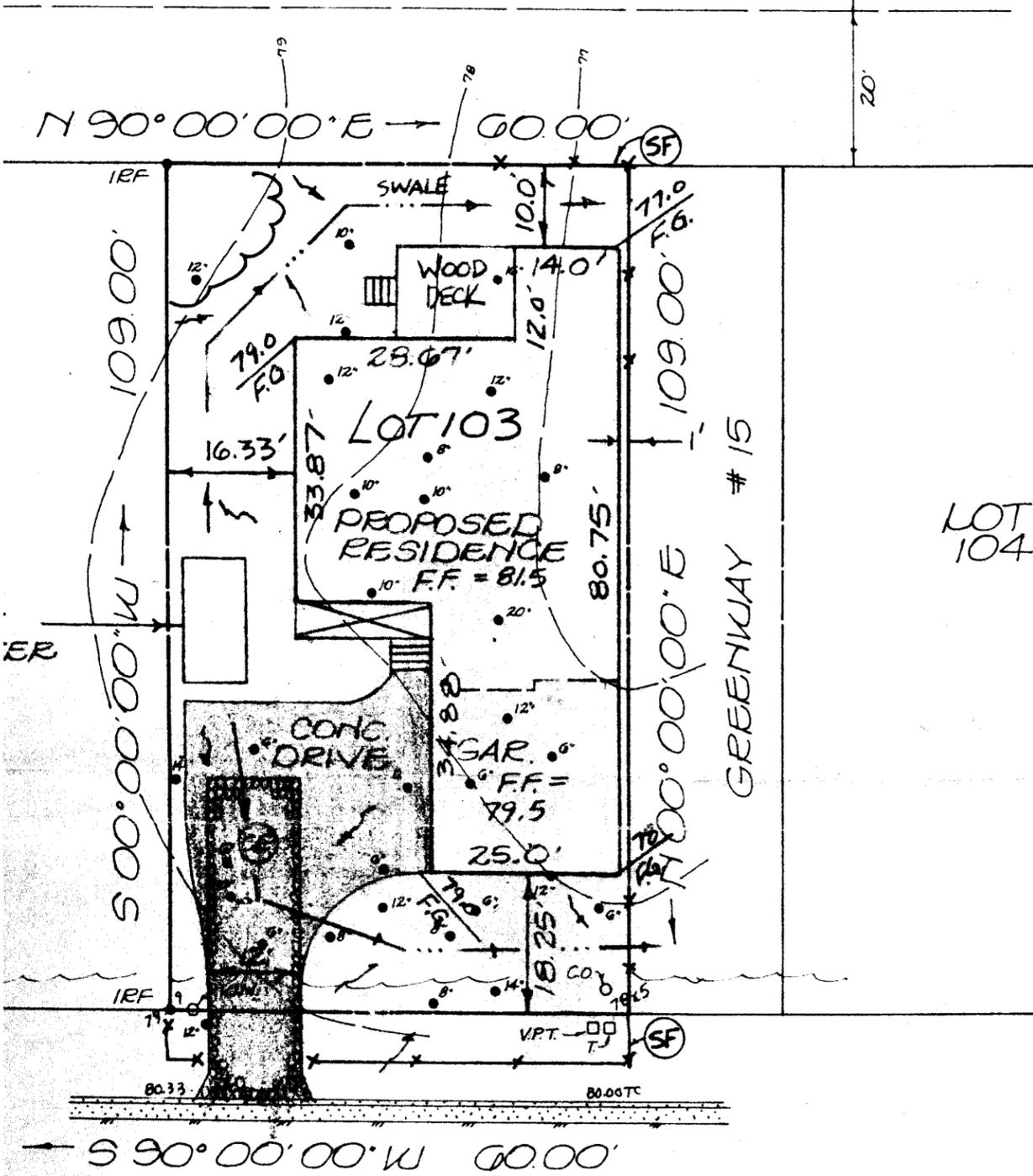
SCALE: 1" = 20'



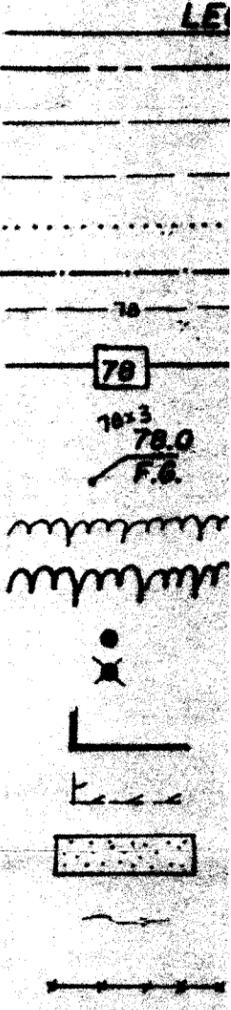
SURFACE
3.74

~ GOLF COURSE ~

DRAINAGE
UTILITY
EASEMENT



N



EROSION & SEDIMENT CONTROL

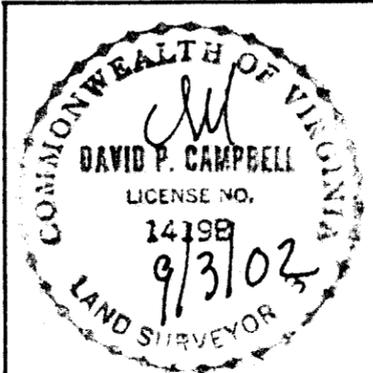
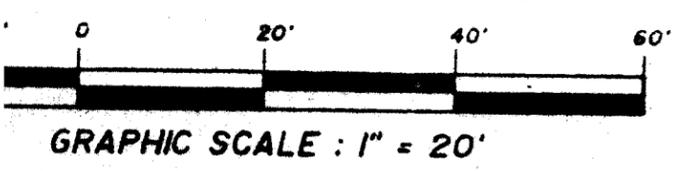
- (SF) - SILT FENCE
- (CE) - STONE CONSTRUCTION

HOLLINWELL
(PRIVATE)

E&S APPROVED AS NOTED
BY: CEO 10-8-02
wind
Exposure
A/B

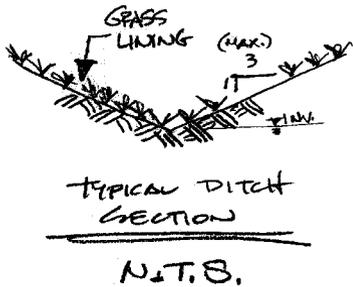
CE-CONSTRUCTION
10ft x 70ft x 6in of #1
FILTER FABRIC

SF-SILT FENCE
4in, STAKED EV

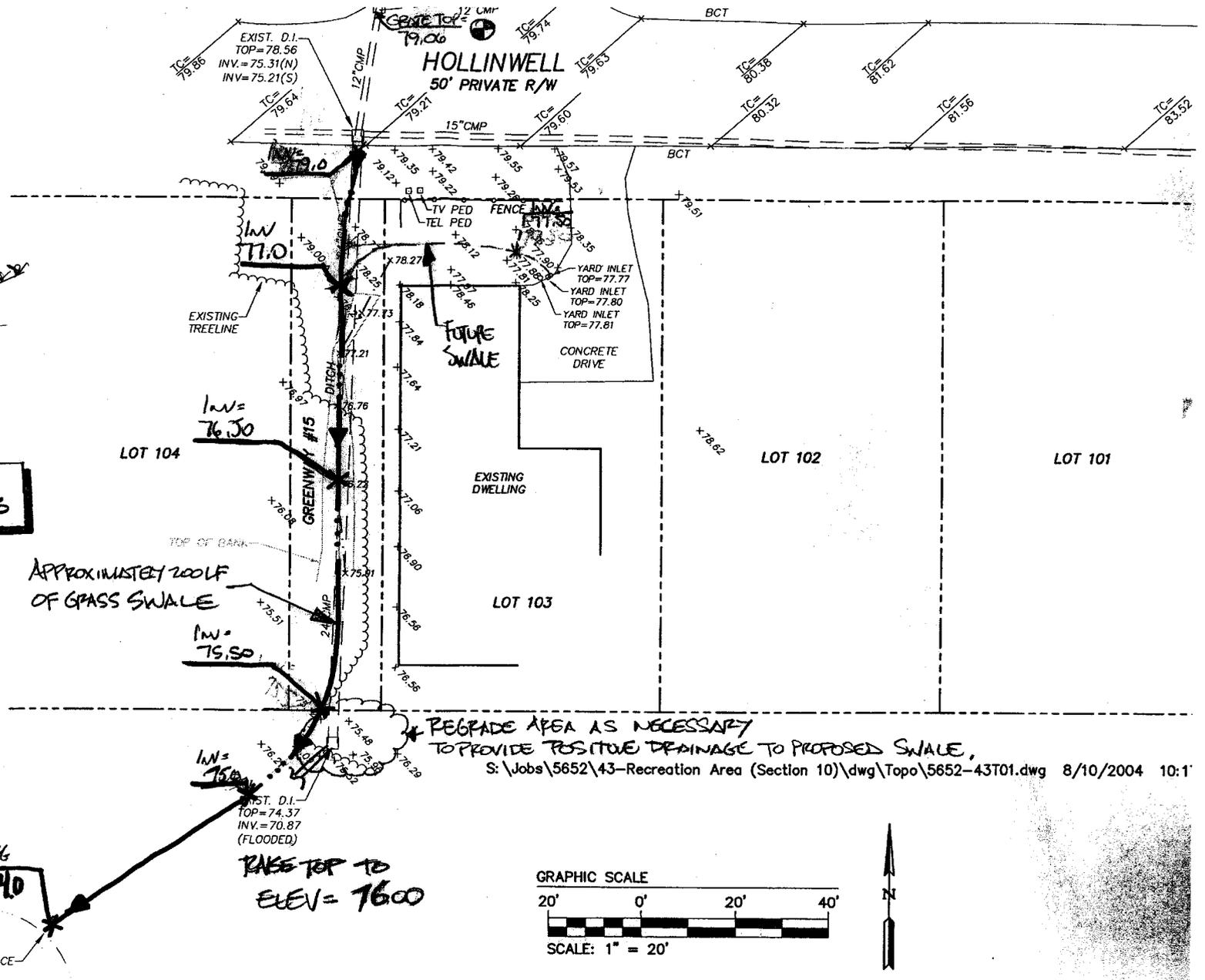


LOT DEVELOPER		
LOT 103 FORD'S COLONY AT WILLIAMSBURG SECTION 1 JAMES CITY COUNTY		
CAMPBELL LAND SURVEYING P. O. BOX 855, YORKTOWN, VA. 23091 (757)890-0837		
DESIGN BY	DRAWN BY	CHECKED BY
D.P.C.	K.L.B.	D.P.C.

REV.: 9/27/02



FORDS COLONY
SECTION X, LOT 103



EXIST. D.I.
TOP=78.56
INV.=75.31(N)
INV.=75.21(S)

HOLLINWELL
50' PRIVATE R/W

INW
76.50

INW
79.50

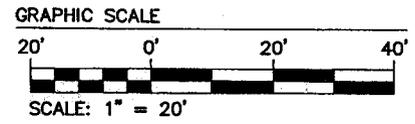
INW
75.00

RAISE TOP TO
ELEV = 76.00

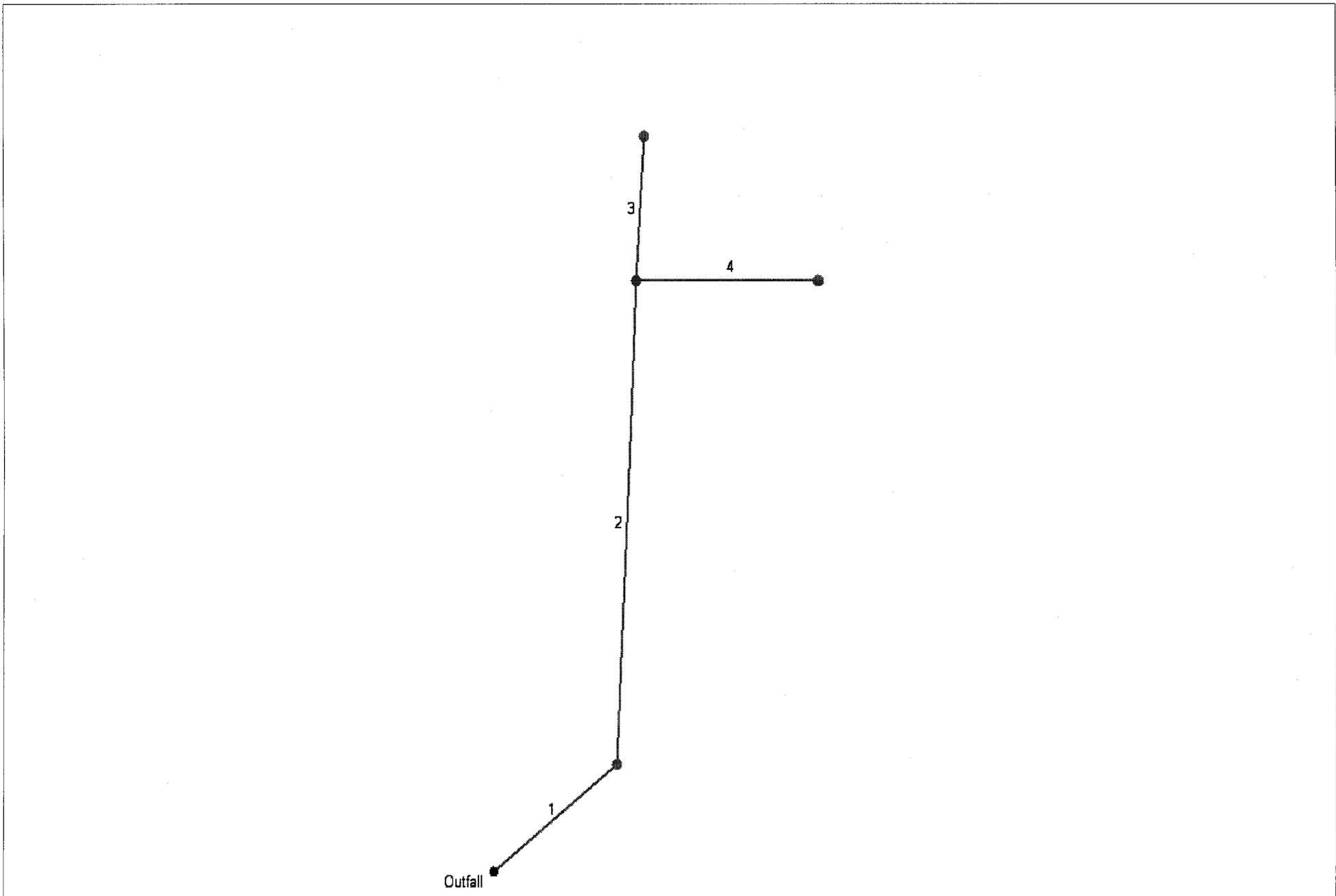
REGRADE AREA AS NECESSARY
TO PROVIDE POSITIVE DRAINAGE TO PROPOSED SWALE,

S:\Jobs\5652\43-Recreation Area (Section 10)\dwg\Topo\5652-43T01.dwg 8/10/2004 10:1'

WATER SURFACE
ELEV=73.74



Hydraflow Plan View



Project File: roughoutfall@103+houseline.stm	No. Lines: 4	05-24-2005
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Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	36.0	-38.2	MH	0.00	0.00	0.00	0.0	69.00	5.19	70.87	24	Cir	0.013	0.80	74.37	
2	1	100.0	-49.3	MH	0.00	0.00	0.00	0.0	70.87	3.34	74.21	24	Cir	0.013	1.00	78.56	
3	2	30.0	1.1	MH	21.73	0.00	0.00	0.0	74.21	3.33	75.21	24	Cir	0.013	1.00	78.25	
4	2	42.0	87.4	MH	0.00	0.08	0.80	5.0	74.21	6.17	76.80	12	Cir	0.013	1.00	77.80	
Project File: roughoutfall@103+houseline.stm											Number of lines: 4				Date: 05-24-2005		

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	36.0	0.00	0.08	0.00	0.00	0.06	0.0	6.5	6.6	22.15	51.55	7.05	24	5.19	70.87	69.00	75.41	75.06	74.37	43.00	
2	1	100.0	0.00	0.08	0.00	0.00	0.06	0.0	6.2	6.7	22.16	41.34	7.05	24	3.34	74.21	70.87	76.98	76.02	78.56	74.37	
3	2	30.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	21.73	41.29	6.92	24	3.33	75.21	74.21	78.06	77.79	78.25	78.56	
4	2	42.0	0.08	0.08	0.80	0.06	0.06	5.0	5.0	7.0	0.45	8.84	0.57	12	6.17	76.80	74.21	78.53	78.53	77.80	78.56	

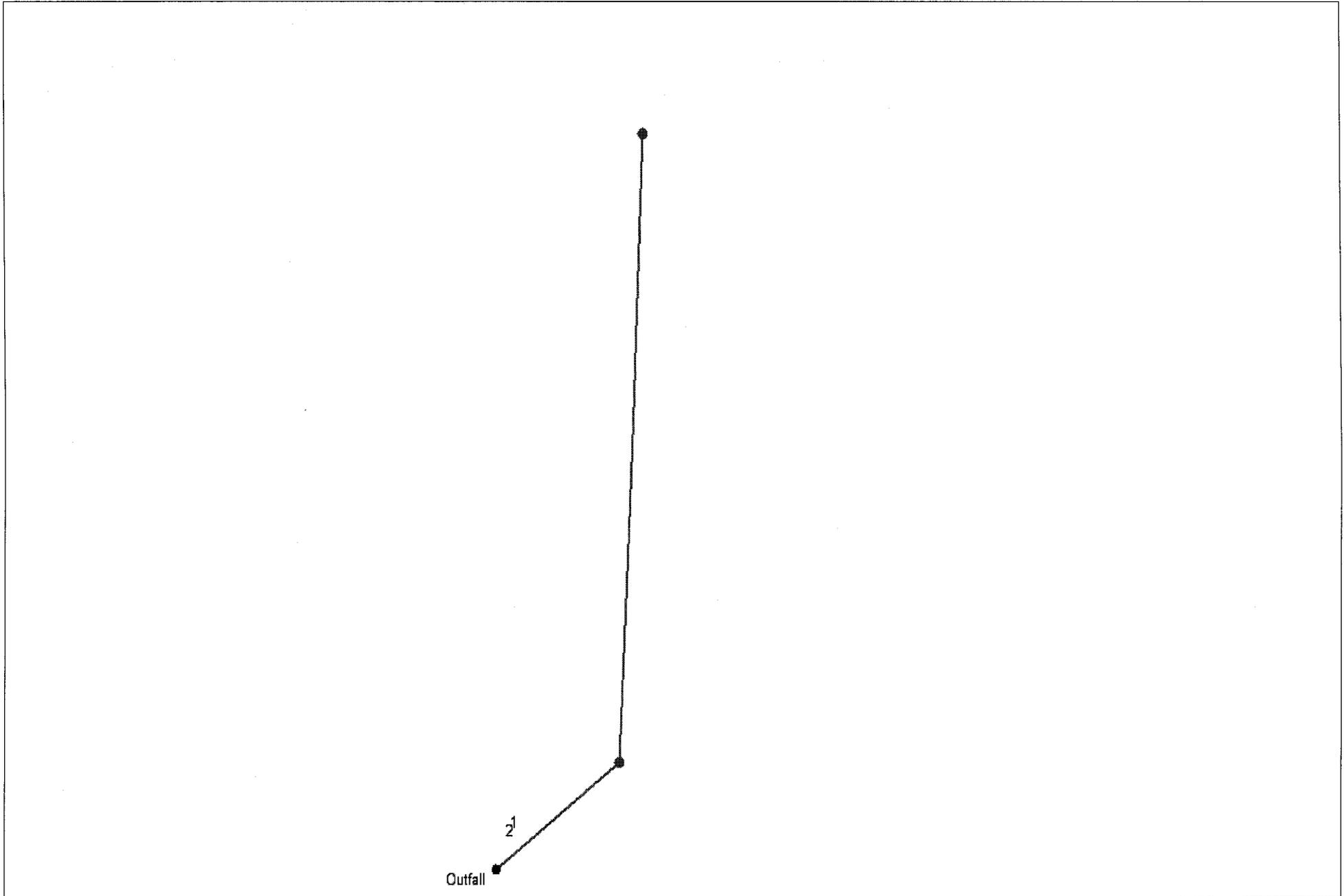
Project File: roughoutfall@103+houseline.stm

Number of lines: 4

Run Date: 05-24-2005

NOTES: Intensity = 80.56 / (Inlet time + 14.90) ^ 0.82; Return period = 10 Yrs.

Hydraflow Plan View



Project File: roughoutfall@103.stm

No. Lines: 2

05-24-2005

Hydraflow Storm Sewers 2005

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data							Line ID	
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)		Inlet/ Rim El (ft)
1	End	36.0	-38.2	MH	0.00	0.00	0.00	0.0	69.00	5.19	70.87	24	Cir	0.013	0.80	74.37	
2	1	130.0	-49.3	MH	21.73	0.00	0.00	0.0	70.87	3.34	75.21	24	Cir	0.013	1.00	78.56	
Project File: roughoutfall@103.stm											Number of lines: 2				Date: 05-24-2005		

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	36.0	0.00	0.00	0.00	0.00	0.00	0.0	0.3	0.0	21.73	51.55	6.92	24	5.19	70.87	69.00	75.39	75.06	74.37	43.00	
2	1	130.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	21.73	41.33	7.05	24	3.34	75.21	70.87	77.05	75.99	78.56	74.37	

Project File: roughoutfall@103.stm

Number of lines: 2

Run Date: 05-24-2005

NOTES: Intensity = 80.56 / (Inlet time + 14.90) ^ 0.82; Return period = 10 Yrs.

Scott Thomas

From: Romeo, Stephen [SRomeo@landmarkdg.com]
Sent: Friday, May 02, 2008 4:40 PM
To: Scott Thomas
Subject: Eadie - 109 Hollinwell - Ford's Colony
Attachments: 1953_001.pdf

Scott,

Attached are calculations for capacity of 8" hdpe pipe @ 0.4%. Using 10 year Q (SCS) @ 1.65 cfs, two 8" pipes would suffice. The third is "cheap insurance".

Stephen Romeo, LS
Vice President
LandMark Design Group, Inc.
4029 Ironbound Rd., Ste. 100
Williamsburg, VA 23188
757-253-2975

**Worksheet
Worksheet for Circular Channel**

Project Description	
Worksheet	Circular Channel
Flow Element	Circular Channel
Method	Manning's Formu
Solve For	Discharge

Input Data	
Mannings Coeff	0.012
Slope	004000 ft/ft
Depth	0.66 ft
Diameter	8 in

Results	
Discharge	0.86 cfs
Flow Area	0.3 ft ²
Wetted Perime	1.96 ft
Top Width	0.13 ft
Critical Depth	0.44 ft
Percent Full	99.0 %
Critical Slope	0.007266 ft/ft
Velocity	2.48 ft/s
Velocity Head	0.10 ft
Specific Energ	0.76 ft
Froude Numbe	0.27
Maximum Disc	0.89 cfs
Discharge Full	0.83 cfs
Slope Full	0.004343 ft/ft
Flow Type	Subcritical

Comps for ONE PIPE

$$\begin{array}{r} 0.86 \\ \times 3 \\ \hline 2.58 \text{ cfs} \end{array} = \text{OK FOR 100-YEAR}$$

0.4%

CAPACITY

⇒ Comps basic Mannings n only, not storm sewer model.

⇒ TAILWATER EFFECTS?
This area has some history
Re: storm pipe, comps.

CAPACITY ONE (1) - 8" = 0.86 cfs

LANDMARK DESIGN GROUP TRANSMITTAL

To: Scott Thomas
 Company: JCC Environmental Division
 From: Steve Romeo
 Date: April 25, 2008
 Subject: Ford's Colony Section X Lot 103
 LMDG Job No.: 2005096-000.00



E+S-08-08

Attached please find:

- Prints
- Plans
- Specifications
- Drawings
- Report
- Letter
- Original Plat

Transmitted as checked below:

- For your use
- As requested
- For review and comment
- For approval
- Approved
-

Copies	Date	Drawing No.	Description
12	04/18/08	16319AW	Drainage Improvement Plan
2	08/12/05	16319W	Drainage Area Map
2	N/A	N/A	Drainage Calculations

Notes:

Copies

1. File: 2005096-000.00 _____
2. _____
3. _____
4. _____
5. _____

Enclosures

-
-
-
-
-

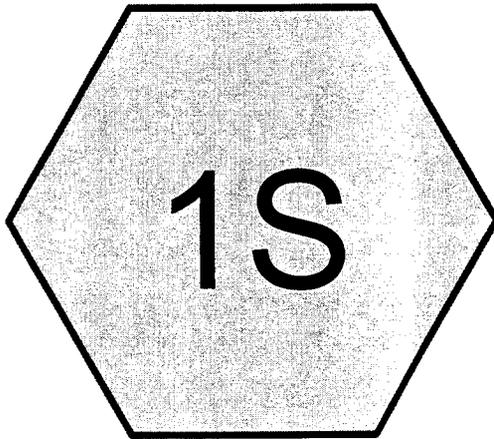
LandMark Design Group, Inc.

By: bya

Engineers ♦ Planners ♦ Surveyors ♦ Landscape Architects ♦ Environmental Scientists

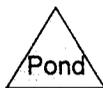
4029 Ironbound Road, Suite 100, Williamsburg, VA 23188 (757) 253-2975 FAX: (757) 229-0049 lmdg@landmarkdg.com

	1yr	2yr	10yr	25yr	100yr
SCS	0.47 cfs	0.72 cfs	1.65 cfs	1.90 cfs	2.58 cfs
RAT		0.71 cfs	0.92 cfs	1.04 cfs	1.22 cfs



da-1

E4S-08-08
HYDROLOGY



Drainage Diagram for da-scs
 Prepared by LandMark Design Group, Printed 3/31/2008
 HydroCAD® 8.50 s/n 001765 © 2007 HydroCAD Software Solutions LLC

da-scs

Prepared by LandMark Design Group

HydroCAD® 8.50 s/n 001765 © 2007 HydroCAD Software Solutions LLC

Type II 24-hr 1 YEAR Rainfall=2.80"

Printed 3/31/2008

Summary for Subcatchment 1S: da-1

Runoff = 0.47 cfs @ 11.96 hrs, Volume= 0.020 af, Depth> 0.84"

DA
0.28 ac.

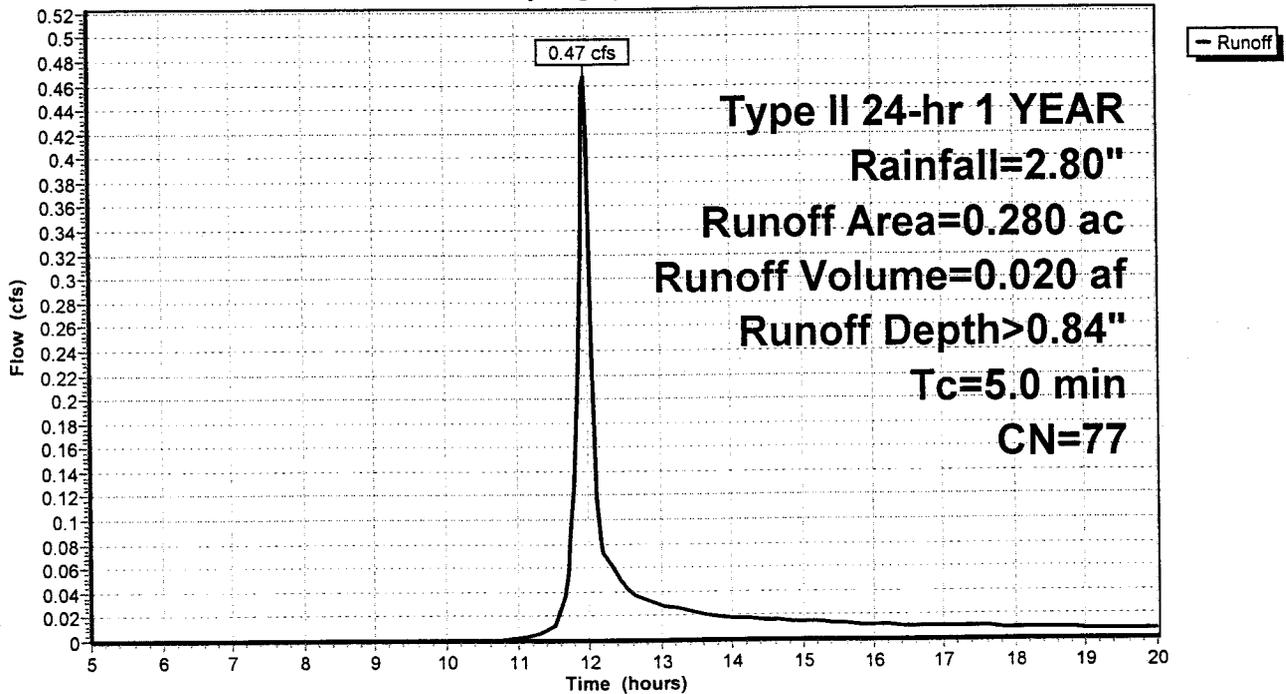
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YEAR Rainfall=2.80"

Area (ac)	CN	Description
0.050	98	Paved parking & roofs
0.060	74	>75% Grass cover, Good, HSG C
0.170	72	Woods/grass comb., Good, HSG C
0.280	77	Weighted Average
0.230		Pervious Area
0.050		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Direct entry

Subcatchment 1S: da-1

Hydrograph



Summary for Subcatchment 1S: da-1

Runoff = 0.72 cfs @ 11.96 hrs, Volume= 0.030 af, Depth> 1.31"

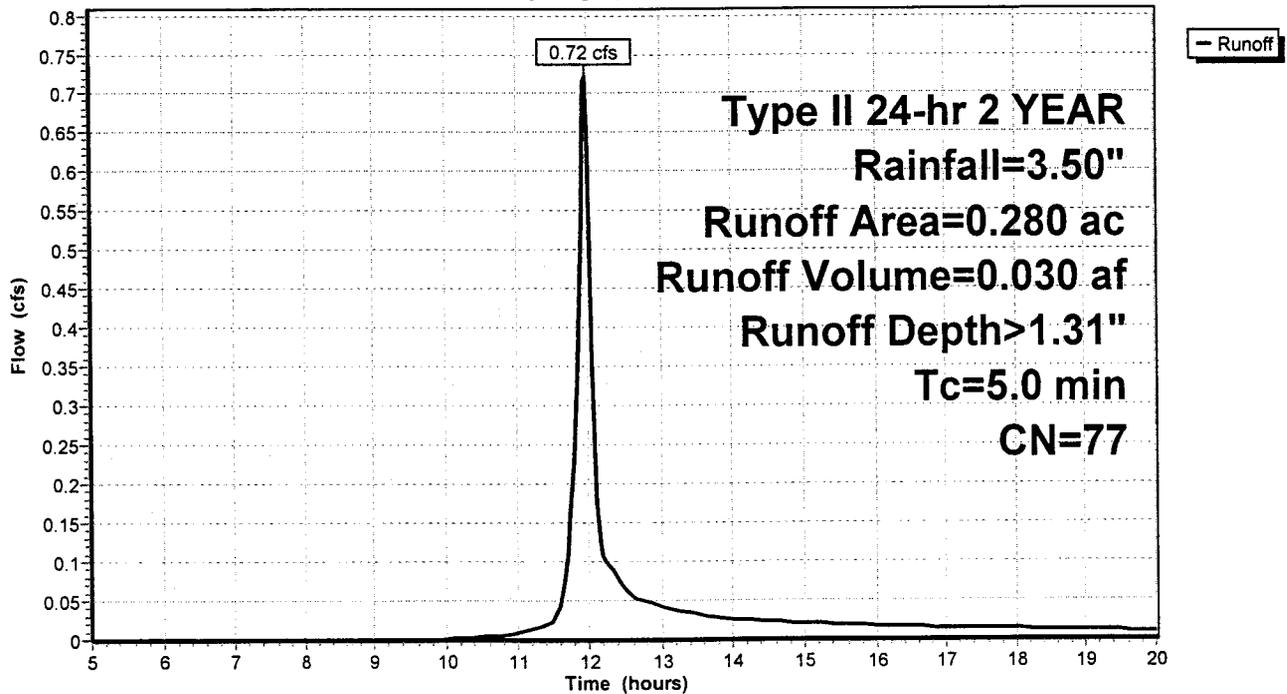
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2 YEAR Rainfall=3.50"

Area (ac)	CN	Description
0.050	98	Paved parking & roofs
0.060	74	>75% Grass cover, Good, HSG C
0.170	72	Woods/grass comb., Good, HSG C
0.280	77	Weighted Average
0.230		Pervious Area
0.050		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Direct entry

Subcatchment 1S: da-1

Hydrograph



da-scs

Prepared by LandMark Design Group
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Type II 24-hr 10 YEAR Rainfall=5.80"
Printed 3/31/2008

Summary for Subcatchment 1S: da-1

Runoff = 1.65 cfs @ 11.96 hrs, Volume= 0.071 af, Depth> 3.06"

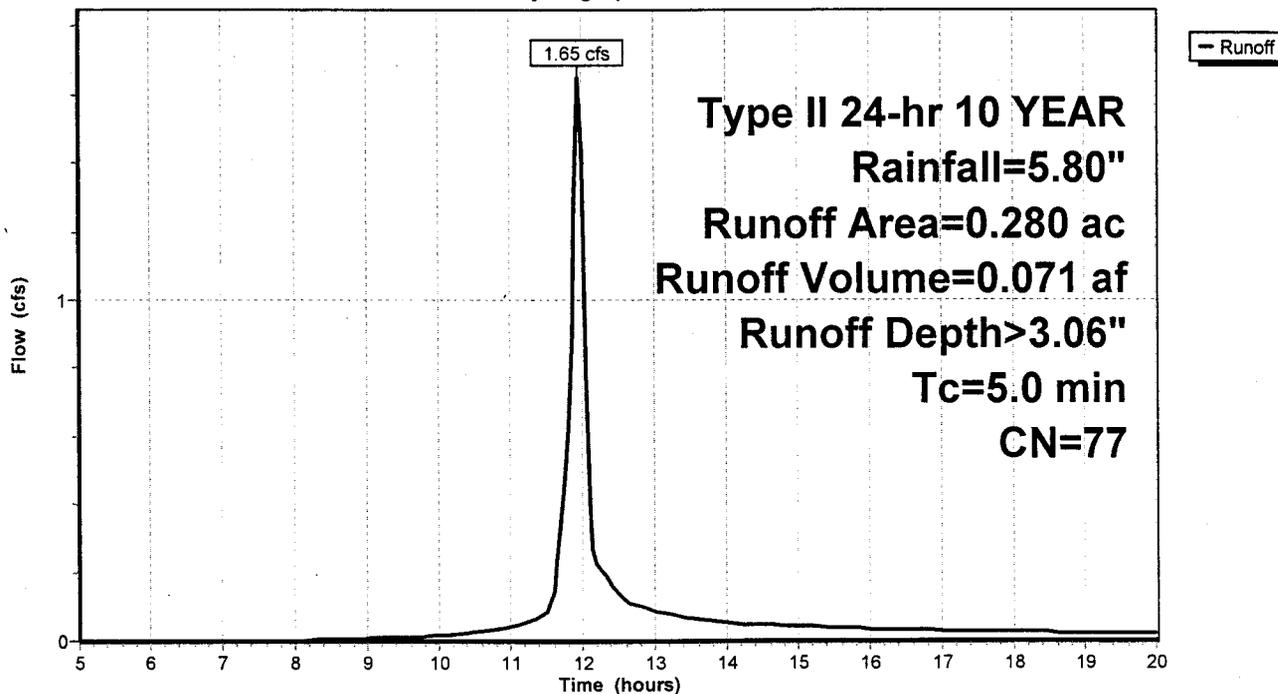
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YEAR Rainfall=5.80"

Area (ac)	CN	Description
0.050	98	Paved parking & roofs
0.060	74	>75% Grass cover, Good, HSG C
0.170	72	Woods/grass comb., Good, HSG C
0.280	77	Weighted Average
0.230		Pervious Area
0.050		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Direct entry

Subcatchment 1S: da-1

Hydrograph



Summary for Subcatchment 1S: da-1

Runoff = 1.90 cfs @ 11.96 hrs, Volume= 0.083 af, Depth> 3.56"

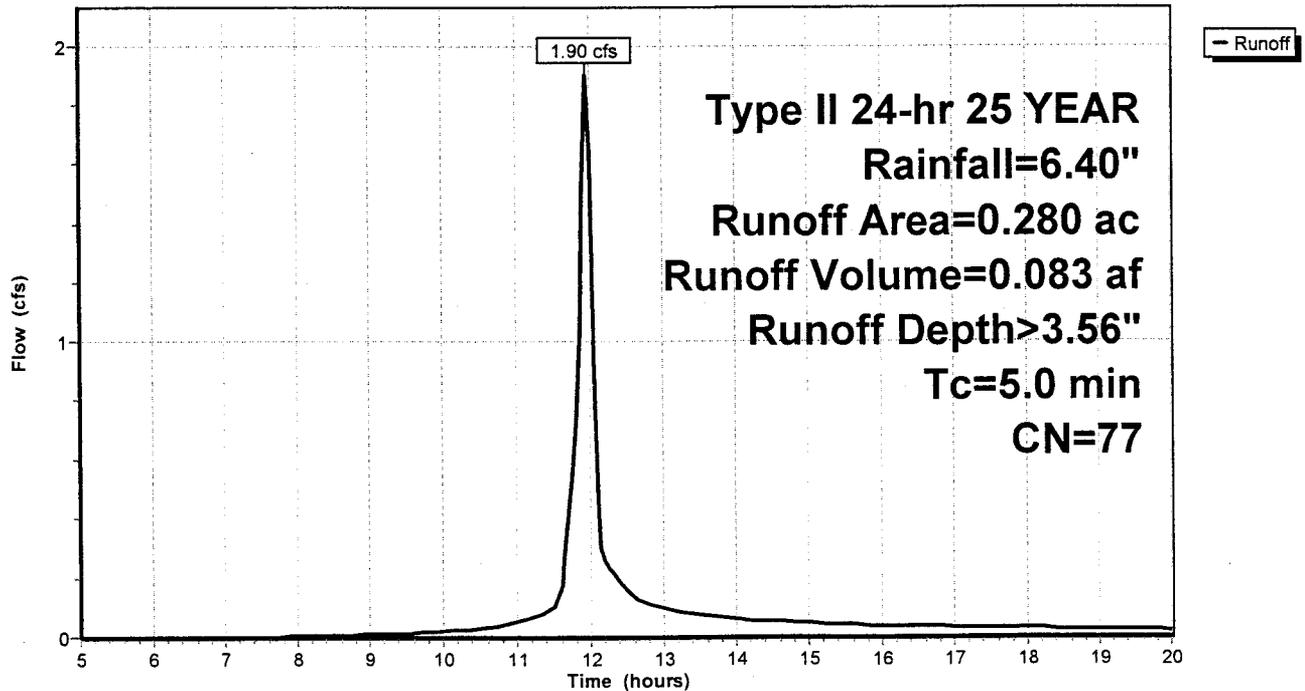
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 25 YEAR Rainfall=6.40"

Area (ac)	CN	Description
0.050	98	Paved parking & roofs
0.060	74	>75% Grass cover, Good, HSG C
0.170	72	Woods/grass comb., Good, HSG C
0.280	77	Weighted Average
0.230		Pervious Area
0.050		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Direct entry

Subcatchment 1S: da-1

Hydrograph



da-scs

Prepared by LandMark Design Group

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Type II 24-hr 100 YEAR Rainfall=8.00"

Printed 3/31/2008

Summary for Subcatchment 1S: da-1

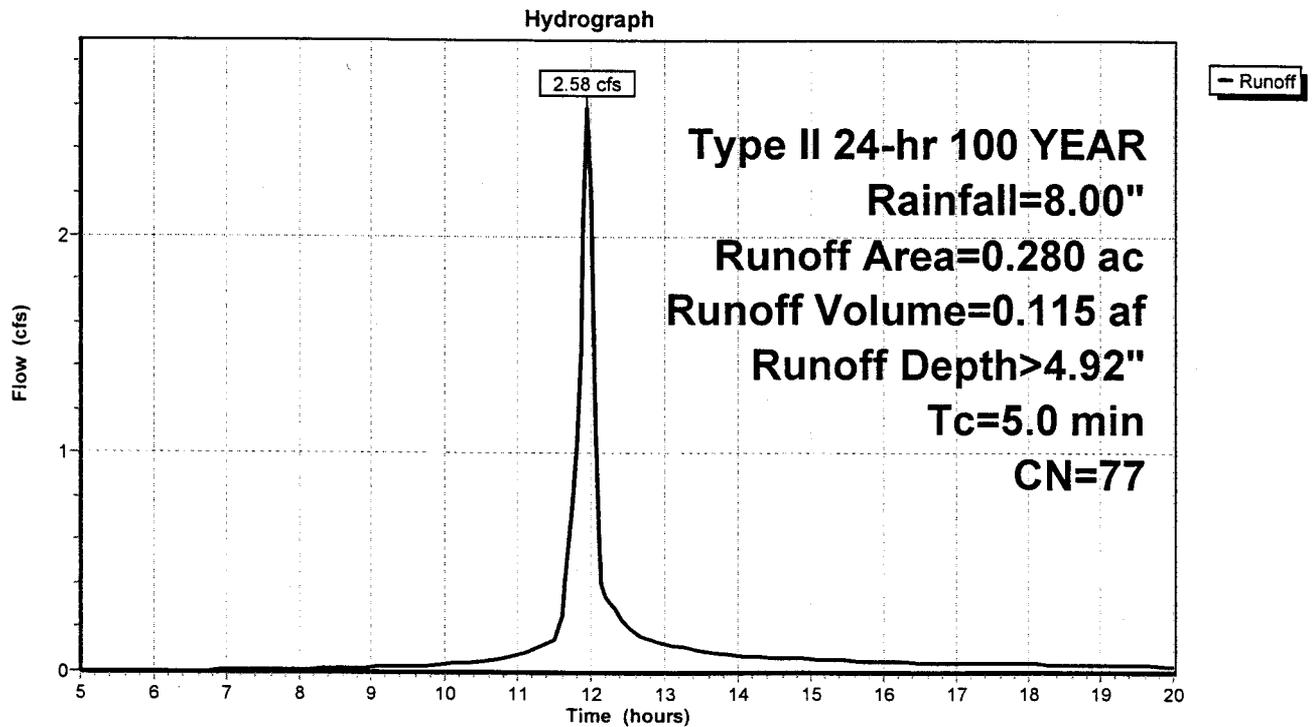
Runoff = 2.58 cfs @ 11.95 hrs, Volume= 0.115 af, Depth> 4.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YEAR Rainfall=8.00"

Area (ac)	CN	Description
0.050	98	Paved parking & roofs
0.060	74	>75% Grass cover, Good, HSG C
0.170	72	Woods/grass comb., Good, HSG C
0.280	77	Weighted Average
0.230		Pervious Area
0.050		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Direct entry

Subcatchment 1S: da-1



da-rat

VA-James City County 2-Year Duration=5 min, Inten=5.78 in/hr

Prepared by LandMark Design Group

Printed 3/31/2008

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Summary for Subcatchment 1S: da-1

Runoff = 0.71 cfs @ 0.08 hrs, Volume= 0.005 af, Depth= 0.22"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-8.00 hrs, dt= 0.01 hrs

VA-James City County 2-Year Duration=5 min, Inten=5.78 in/hr

Area (ac)	C	Description
0.050	0.90	Paved parking & roofs
0.060	0.35	>75% Grass cover, Good, HSG C
0.170	0.35	Woods/grass comb., Good, HSG C
0.280	0.45	Weighted Average
0.280		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Direct entry

da-rat

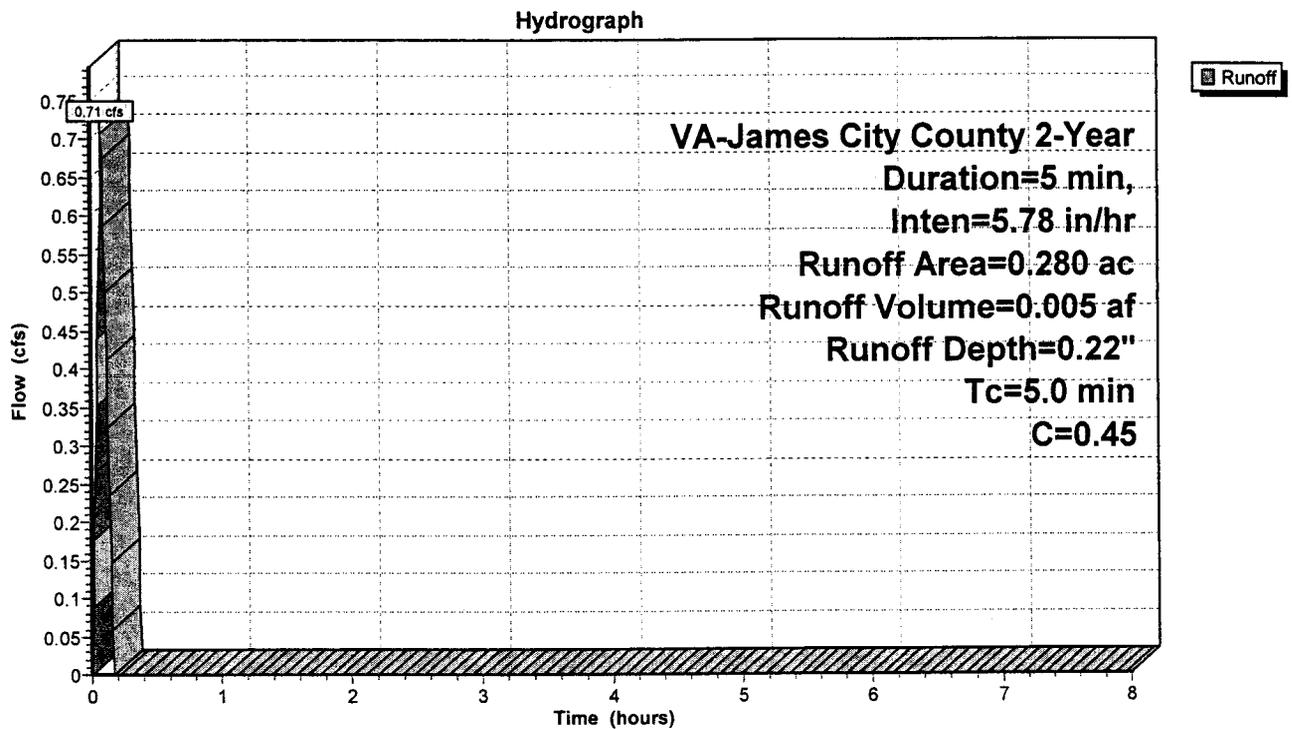
VA-James City County 2-Year Duration=5 min, Inten=5.78 in/hr

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Subcatchment 1S: da-1



da-rat

VA-James City County 10-Year Duration=5 min, Inten=7.50 in/hr

Prepared by LandMark Design Group

Printed 3/31/2008

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Summary for Subcatchment 1S: da-1

Runoff = 0.92 cfs @ 0.08 hrs, Volume= 0.007 af, Depth= 0.28"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-8.00 hrs, dt= 0.01 hrs

VA-James City County 10-Year Duration=5 min, Inten=7.50 in/hr

Area (ac)	C	Description
0.050	0.90	Paved parking & roofs
0.060	0.35	>75% Grass cover, Good, HSG C
0.170	0.35	Woods/grass comb., Good, HSG C
0.280	0.45	Weighted Average
0.280		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Direct entry

da-rat

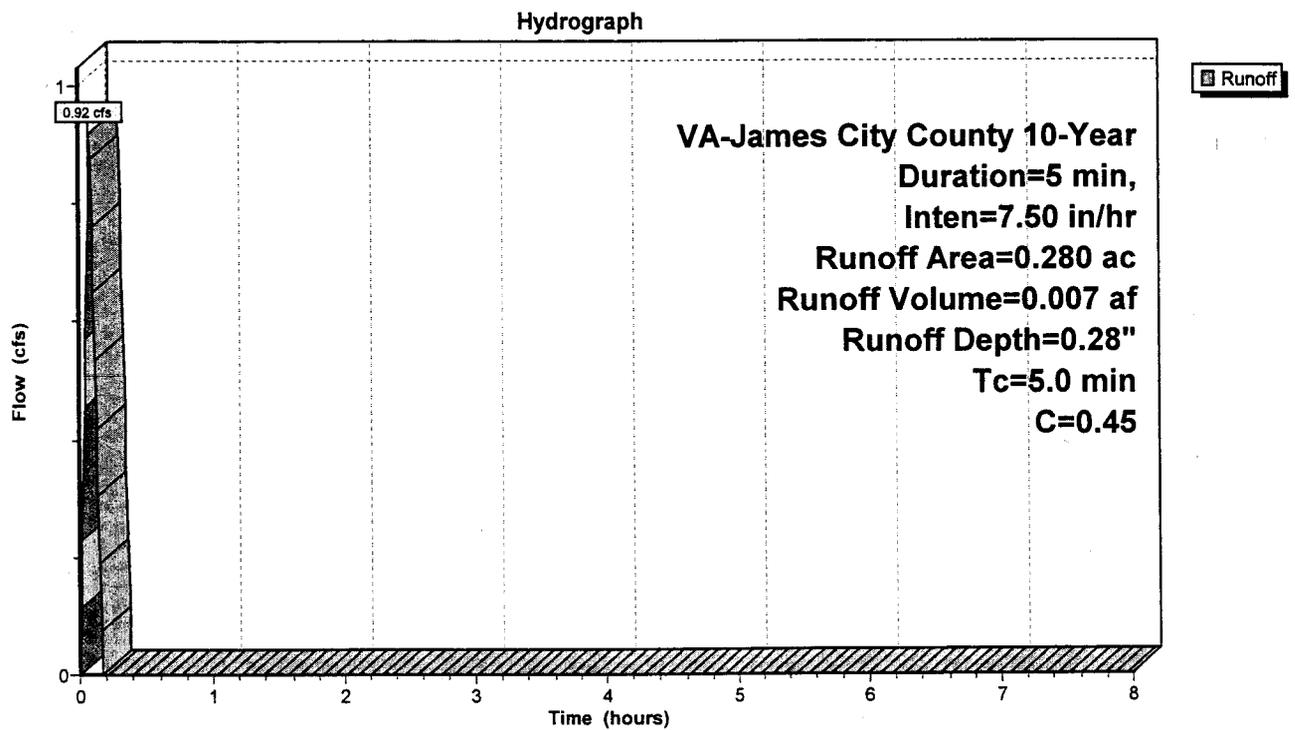
VA-James City County 10-Year Duration=5 min, Inten=7.50 in/hr

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Subcatchment 1S: da-1



da-rat

VA-James City County 25-Year Duration=5 min, Inten=8.49 in/hr

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Summary for Subcatchment 1S: da-1

Runoff = 1.04 cfs @ 0.08 hrs, Volume= 0.007 af, Depth= 0.32"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-8.00 hrs, dt= 0.01 hrs

VA-James City County 25-Year Duration=5 min, Inten=8.49 in/hr

Area (ac)	C	Description
0.050	0.90	Paved parking & roofs
0.060	0.35	>75% Grass cover, Good, HSG C
0.170	0.35	Woods/grass comb., Good, HSG C
0.280	0.45	Weighted Average
0.280		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Direct entry

da-rat

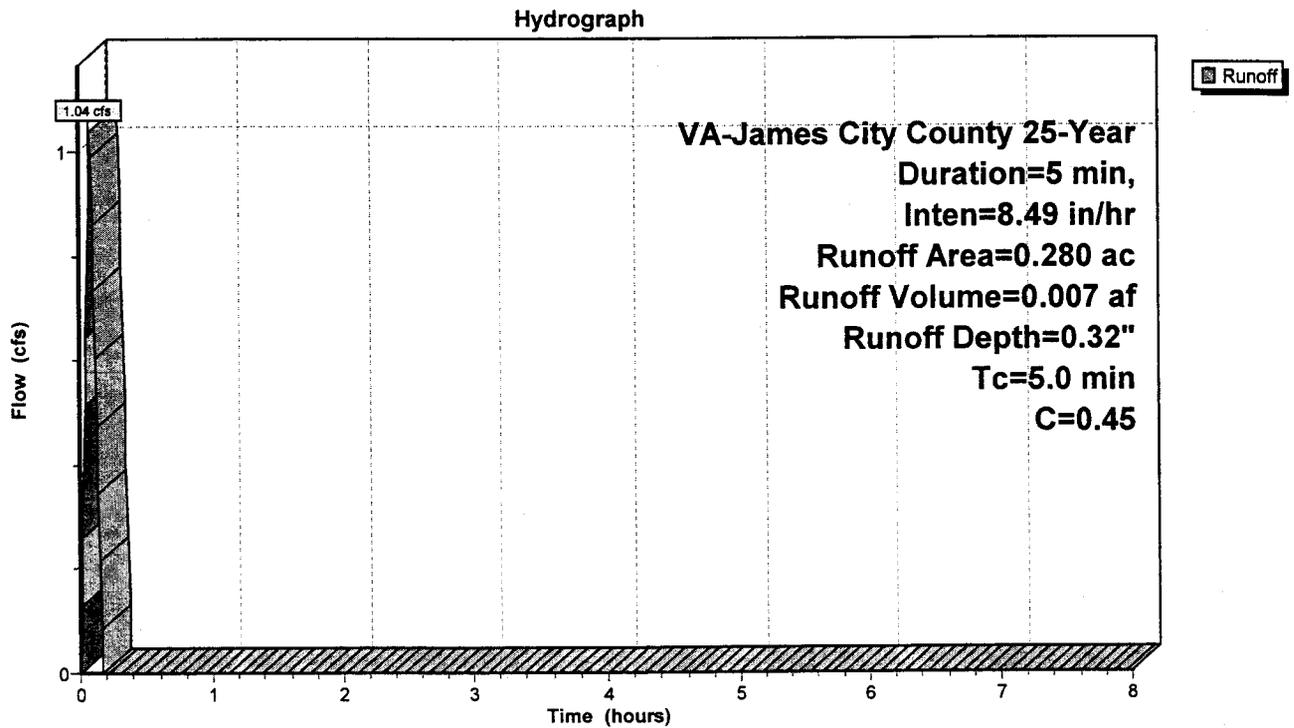
VA-James City County 25-Year Duration=5 min, Inten=8.49 in/hr

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Subcatchment 1S: da-1



da-rat

VA-James City County 100-Year Duration=5 min, Inten=9.99 in/hr

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Summary for Subcatchment 1S: da-1

Runoff = 1.22 cfs @ 0.08 hrs, Volume= 0.009 af, Depth= 0.37"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-8.00 hrs, dt= 0.01 hrs
VA-James City County 100-Year Duration=5 min, Inten=9.99 in/hr

Area (ac)	C	Description
0.050	0.90	Paved parking & roofs
0.060	0.35	>75% Grass cover, Good, HSG C
0.170	0.35	Woods/grass comb., Good, HSG C
0.280	0.45	Weighted Average
0.280		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Direct entry

da-rat

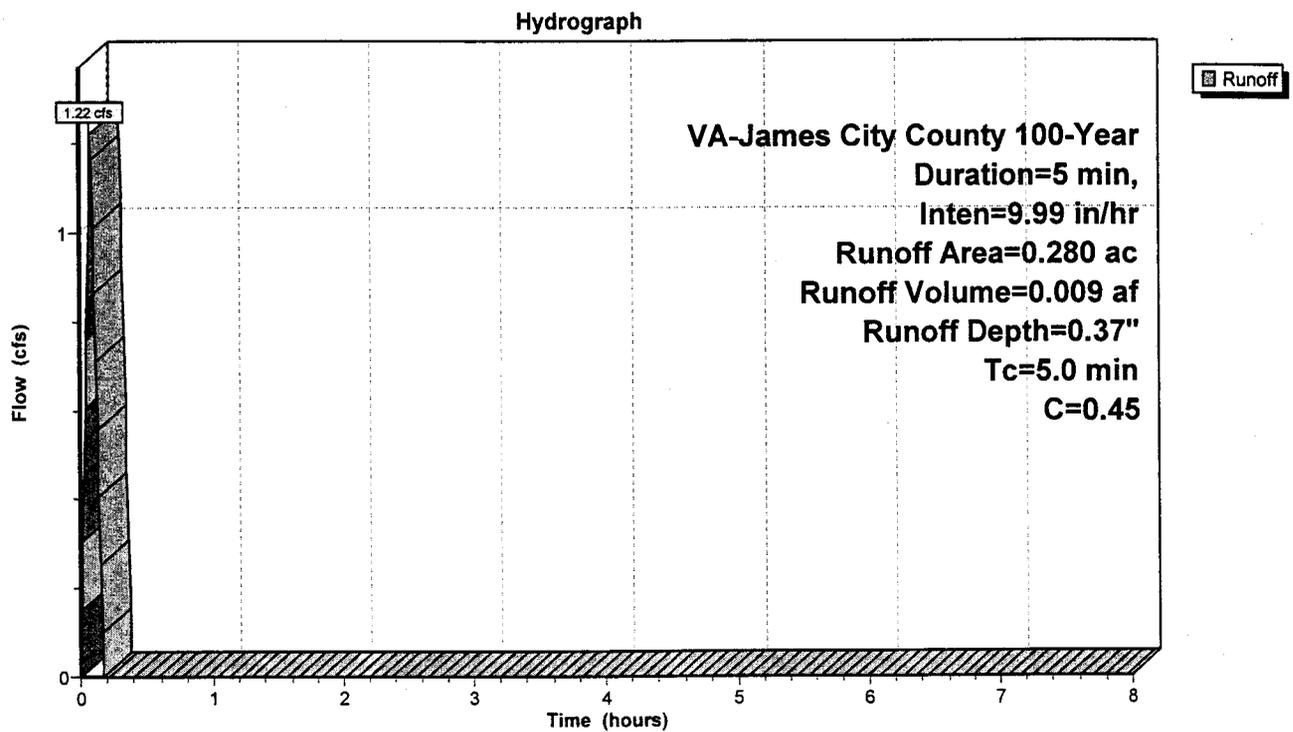
VA-James City County 100-Year Duration=5 min, Inten=9.99 in/hr

Prepared by LandMark Design Group

Printed 3/31/2008

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Subcatchment 1S: da-1



POND BETWEEN 7TH AND 8TH HOLE

DRAINAGE AREA = 26.60 Ac $T_c = 25.0$ min $I_{10} = 4.0$ in/hr.
 $C = 0.40$ FULLY DEVELOPED
 $Q_{10} = 0.40 (4.0) 26.60 = 42.56$ cfs

ELEVATION OF SPILLWAY STRUCTURE = 74.00
 ELEVATION OF EMERGENCY SPILLWAY = 76.00
 STORAGE VOLUME AVAILABLE = 73,000 ft³

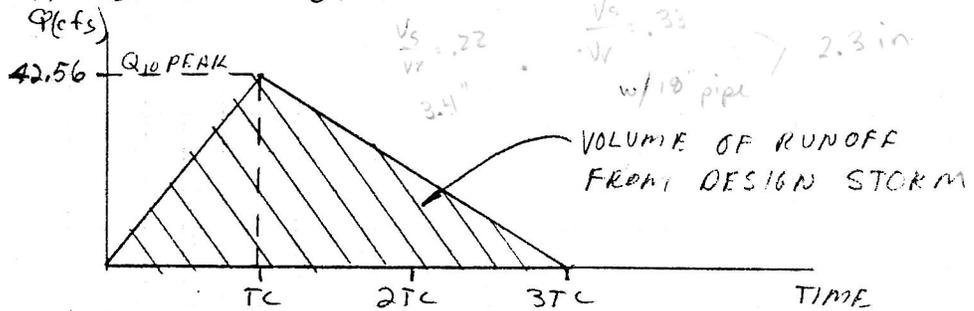
$Q_1 = 42.5$ cfs
 $Q_0 = 11$ cfs

- ASSUME POND IS DESIGNED TO PASS 10 YEAR DESIGN STORM WITHOUT TOPPING BANKS

$\frac{V_s}{V_r} = .44$

RUNOFF VOLUME

LENGTH OF DESIGN STORM = $3T_c$



$$\begin{aligned} \text{Volume}_{10} &= \frac{1}{2} (Q_{10})(T_c) + \frac{1}{2} (Q_{10})(2T_c) \\ &= \frac{1}{2} (42.56)(25)(60) + \frac{1}{2} (42.56)(25)(60) 2 \\ &= 95,760 \text{ ft}^3 \end{aligned}$$

RUNOFF VOLUME - STORAGE VOLUME = VOLUME TO PASS THROUGH SPILLWAY STRUCTURE DURING DESIGN STORM ($3T_c$)
 $95,760 \text{ ft}^3 - 73,000 \text{ ft}^3 = 22,760 \text{ ft}^3$

$$\begin{aligned} Q_{\text{THROUGH STRUCTURE}} &= \frac{22,760 \text{ ft}^3}{3T_c} = \frac{22,760 \text{ ft}^3}{(3)(25)(60) \text{ SEC.}} \\ &= 5.06 \text{ cfs} \end{aligned}$$

SPILLWAY STRUCTURE DESIGN

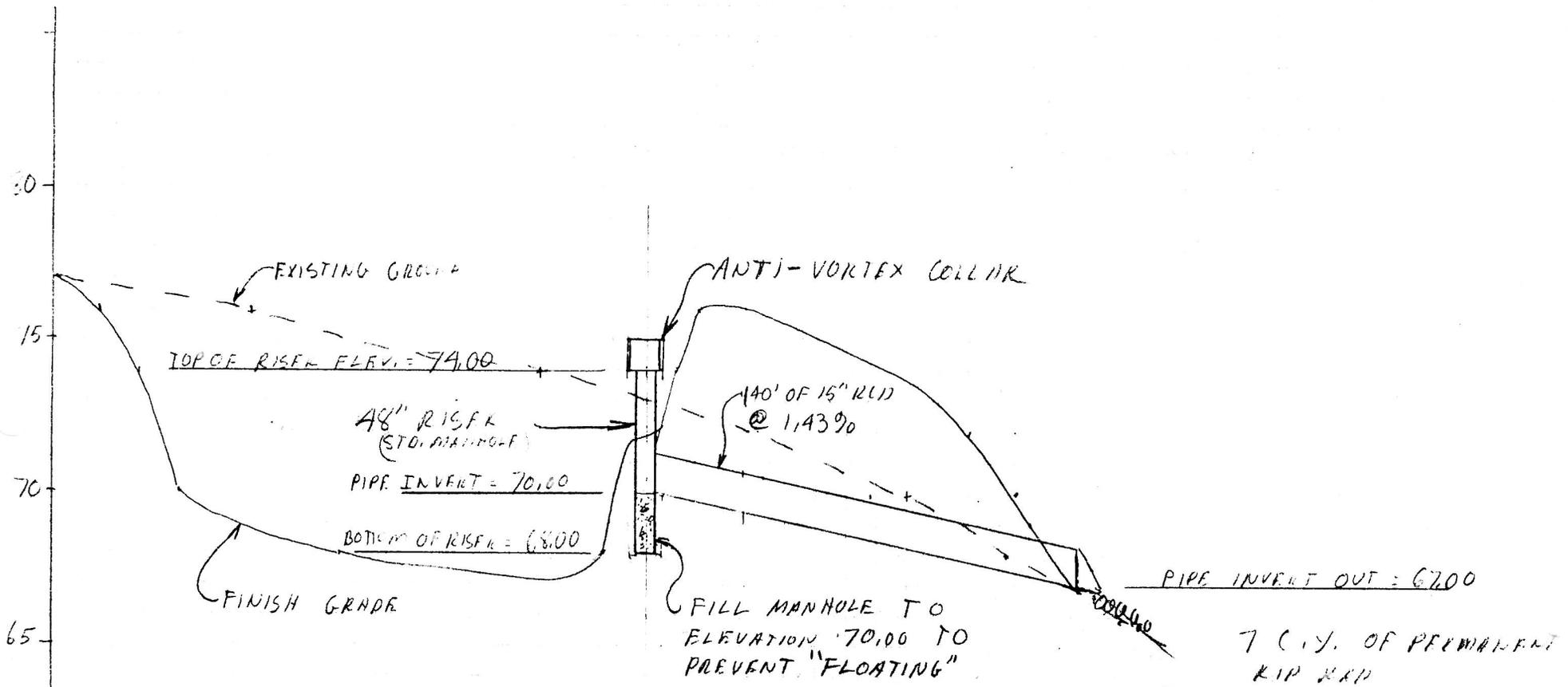
use 36" riser
 21" panel

USE STANDARD 48" MANHOLE FOR RISER 1
 TOP ELEVATION = 74.00
 BOTTOM FLEV = 68.00
 $D = 6'$

OUTLET PIPE - USE 15" RCP $Q = 11.81 \text{ cfs} \geq 5.06 \text{ cfs}$

$V = 9.62$ f.p.s.

PROVIDE T.C.Y. OR RIP RAP AT OUTLET



SECTION A-A
POND CROSS SECTION

SCALE: 1" = 5' VERT.
1" = 50' HORIZ.

$$V = Q_0 T + \frac{Q_0 t_c}{4} = \frac{q_0 T}{2} - \frac{3 q_0 t_c}{4} \quad \left. \begin{array}{l} a = 189.2 \\ b = 22.1 \end{array} \right\} 6.0$$

$$T_c = \sqrt{\frac{2 C A_0 (b - \frac{t_c}{4})}{q_0}} - b$$

$$I = \frac{q}{b + t_c} = \frac{189.2}{22.1 + 25} = 4.0"$$

$$q_0 = CIA = .4 \times 4 \times 26.6 = 42.56$$

$$T_c = \sqrt{\frac{2 \times 1.6 \times 189.2 (22.1 - \frac{25}{4})}{42.6}} - 22.1 = .7$$

7 C.Y. OF PERMANENT RIP RAP

use base + check for flotation

STORM SEWER DESIGN COMPUTATIONS

ROUTE _____ PROJ. FORDS COLONY SECTION A-10
 COUNTY JAMES CITY DISTRICT _____
 DESCRIPTION PATIO HOMES ROAD "C" SECTION
A.M. 11/86

L & D 229

SHEET 1 OF 3

FROM POINT	TO POINT	AREA DRAIN. "A"	RUN-OFF COEF.	CA		INLET TIME	RAIN FALL J_{10}	RUNOFF Q_{10}	INVERT ELEVATIONS		LENGTH	SLOPE	DIA.	CAPACITY	VEL.	FLOW TIME	REMARKS
		ACRES	C	INCREMENT	ACCUMULATED	MINUTES	IN./HR.	C.F.S.	UPPER END	LOWER END	FT.	FT./FT.	IN.	C.F.S.	F.P.S.	SEC.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
SS#1	SS# 2	0.77	0.40	0.31	0.31	15	5.1	1.57	99.00	90.00	100	0.040	12	7.72			
2	3	2.113	0.40	0.45	0.76	15	5.1	3.89	90.00	88.95	210	0.005	15	4.95			
3	4	0.63	0.40	0.25	1.01	15	5.1	5.16	88.95	81.33	210	0.0363	15	12.31			
4	5	1.41	0.40	0.56	1.57	15	5.1	8.03	81.33	77.33	200	0.020	15	9.14			
6	7	3.95	0.40	1.58	1.58	15	5.1	8.05	89.25	86.61	264	0.010	18	9.75			
8	7	0.59	0.40	0.22	0.22	15	5.1	1.10	87.00	86.61	76	0.0051	12	2.76			
7	5	1.15	0.40	0.46	2.26	15	5.1	11.53	86.61	77.33	264	0.0352	18	18.30			
5	9	0.77	0.40	0.31	4.14	15	5.1	21.10	77.33	63.40	180	0.0152	18	26.75			
10	9	4.40	0.40	1.76	1.76	15	5.1	8.98	67.50	63.80	76	0.0487	24	17.00			INVERT CORRECT
9	11	0.65	0.40	0.26	6.16	15	5.1	31.41	63.80	62.00	90	0.0311	30	58.77			

STORM SEWER DESIGN COMPUTATIONS

ROUTE _____ PROJ. FORDS COLONY SECTION A-10
 COUNTY JCC DISTRICT _____
 DESCRIPTION PATIO HOMES ROAD "B", "D", "E" SECTIONS
A.M. 11/86

L & D 229

SHEET 2 OF 3

FROM POINT	TO POINT	AREA DRAIN. "A"	RUN-OFF COEF.	CA		INLET TIME	RAIN FALL	RUNOFF Q	INVERT ELEVATIONS		LENGTH	SLOPE	DIA.	CAPACITY	VEL.	FLOW TIME	REMARKS
		ACRES	C	INCRE-MENT	ACCUM-ULATED	MIN-UTES	IN./HR.	C.F.S.	UPPER END	LOWER END	FT.	FT./FT.	IN.	C.F.S.	F.P.S.	SEC.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
12	13	1.03	0.40	0.41	0.41	20	4.5	1.84	99.24	93.06	236	0.005	12	2.72			
13	14	2.29	0.40	0.92	1.33	20	4.5	5.97	93.06	87.91	158	0.0326	12"	6.93			
14	15	0.87	0.40	0.35	1.68	20	4.5	7.55	87.91	86.41	100	0.015	15	7.91			
15	16	0.51	0.40	0.20	1.88	20	4.5	8.48	86.41	84.00	108	0.0223	15	9.65			
16	17	0.23	0.40	0.09	1.97	20	4.5	8.87	84.00	76.50	94	0.0798	15	17.25			
17	18	1.01	0.40	0.40	2.37	20	4.5	10.68	76.50	71.00	160	0.0344	15	11.98			
19	20	3.42	0.40	1.37	1.37	20	4.5	6.16	92.50	90.37	154	0.0138	15	7.59			
20	21	2.38	0.40	0.95	2.32	20	4.5	10.45	90.37	86.76	86	0.0420	15	13.24			
21	22	0.29	0.40	0.12	2.44	20	4.5	10.96	86.76	82.64	134	0.0307	15	11.32			
26	22	0.47	0.40	0.19	0.19	20	4.5	0.85	92.95	82.64	172	0.0599	12	9.45			
22	23	1.84	0.40	0.74	3.37	20	4.5	15.15	82.64	79.00	152	0.0305	18"	16.24			
23	24	0.89	0.40	0.36	3.73	20	4.5	16.77	79.00	76.34	76	0.035	18"	18.25			
25	26	0.43	0.40	0.17	0.17	15	5.1	0.88	98.00	96.00	80	0.0250	12"	6.10			
34	26	0.59	0.40	0.24	0.24	15	5.1	1.20	99.50	96.00	175	0.0200	12"	5.46			
26	27	0.11	0.40	0.04	0.45	15	5.1	2.32	96.00	87.00	162	0.0556	12"	9.16			
35	27	0.29	0.40	0.12	0.12	15	5.1	0.59	87.50	87.00	76	0.0066	12"	3.14			
27	28	1.83	0.40	0.73	1.30	15	5.1	6.64	87.00	85.64	136	0.0100	18"	9.75			
28	29	0.71	0.40	0.28	1.58	15	5.1	8.08	85.64	76.16	224	0.0423	18"	20.06			
36	29	1.47	0.40	0.59	0.59	15	5.1	3.00	77.50	76.16	27	0.0496	12"	8.60			
29	30	0.62	0.40	0.25	2.42	15	5.1	12.33	76.16	75.20	100	0.0096	24"	18.01			
30	31	2.02	0.40	0.51	3.23	15	5.1	16.46	75.20	74.80	40	0.010	24"	18.38			
37	31	2.65	0.40	1.06	1.06	15	5.1	5.41	83.21	76.00	226	0.0319	12"	6.89			
31	32	-	0.40	-	4.29	15	5.1	21.88	74.80	72.85	130	0.0150	24"	22.51			
32	33	-	0.40	-	4.29	15	5.1	21.88	72.85	71.50	36	0.0375	24"	35.60			

STORM SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. FORDS COLONY SECTION A-10
 COUNTY JCC DISTRICT _____
 DESCRIPTION PATIO HOMES ROAD "A" + "D" SECTIONS
A.M. 11/86

SHEET 3 OF 3

FROM POINT	TO POINT	AREA DRAIN. "A"	RUN-OFF COEF.	CA		INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS		LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
		ACRES	C	INCRE-MENT	ACCUM-ULATED				UPPER END	LOWER END				C.F.S.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
38	39	26.40	0.40	10.56	10.56	25	4.0	42.24	78.00	72.00	66	0.0759	36	48.00			INLET CONTROLS
39	40	1.92	0.40	0.77	11.33	25	4.0	45.31	72.00	71.20	80	0.0100	36	48.17			
40	41	-	0.40	-	11.33	25	4.0	45.31	71.20	66.00	256	0.0203	36	66.64			
43	44	1.10	0.40	0.44	0.44	15	5.1	2.24	84.89	79.00	150	0.0393	12"	7.65			
47	44	1.34	0.40	0.54	0.54	15	5.1	2.73	80.00	79.00	76	0.0132	12"	4.43			
44	45	0.33	0.40	0.13	1.11	15	5.1	5.67	79.00	72.00	137	0.0365	12"	7.37			
45	46	0.81	0.40	0.32	1.43	15	5.1	7.31	72.00	70.00	66	0.0303	15"	11.25			
46	41	-	0.40	-	1.43	15	5.1	7.31	70.00	66.00	97	0.0412	15"	13.11			
48	41	2.48	0.40	0.99	0.99	15	5.1	5.06	72.10	66.00	168	0.0363	12"	7.35			
41	42	1.83	0.40	0.73	14.96	25	4.0	57.92	66.00	63.50	140	0.0179	36	64.45			

ST. ANDREWS DRIVE ROADSIDE DITCH CALCULATIONS SECTION A-10
 Tc = 20 MIN I₂ = 3.4 in/hr F₁₀ = 4.5 in/hr. A.M. 11/86

ANDREWS DR.
AT
STATION

ANDREWS DR. AT STATION	DRAINAGE AREA	INCREMENTAL CA		CUMULATIVE CA	Q ₂ (CFS)	SLOPE FT/FT	VEL. 2 FPS	LINING	Q ₁₀ (CFS)	DEPTH (IN.)	COMMENTS
		C	CA								
5+00 K	0.70	0.40	0.28	0.28	0.95	1.0756	2.90	GRASS	1.26	4.5	V-DITCH W/3:1 SS
5+00 L	0.60	0.40	0.24	0.24	0.82	1.0756	2.85	GRASS	1.08	4.5	" "
8+00 R	0.52	0.40	0.21	0.44	1.67	1.0756	3.40	GRASS	2.21	5.5	" "
8+00 L	0.52	0.40	0.21	0.45	1.53	1.0756	3.20	GRASS	2.02	5.3	" "
10+00 L	12.68	0.40	5.07	5.07	17.25	1.0367	4.60	PAVE MIRAMAT	22.82	16.0	END MIRAMAT STA 15+00
10+00 R	1.72	0.40	0.69	0.69	2.34	1.0367	2.90	GRASS	3.11	7.0	" "
20+00 K	0.26	0.40	0.10	0.10	0.34	1.0054	0.85	GRASS	0.45	5.0	" "
20+00 L	1.03	0.40	0.41	0.41	1.39	1.0054	1.20	GRASS	1.85	8.5	" "
30+00 R	1.72	0.40	0.69	0.79	2.69	1.0054	1.40	GRASS	3.56	10.8	" "
30+00 L	2.80	0.40	1.12	1.53	5.20	1.0054	1.70	GRASS	6.89	14.0	" "
35+00 R	1.67	0.40	0.67	1.46	4.96	1.0442	3.70	MIRAMAT	6.57	9.0	END MIRAMAT STA 38+00
33+00 L	0.51	0.40	0.21	1.74	5.90	1.0442	3.80	MIRAMAT	7.83	9.5	" "
39+00 R	1.65	0.40	0.66	2.12	7.20	0.0133	2.80	GRASS	9.54	13	V-DITCH W/3:1 SS
41+00 R	From storm sewer			6.16	20.44	0.0560	15.00	PAVED	31.91	10	V-DITCH W/3:1 SS 15' DE
41+00 L	0.90	0.40	0.36	2.10	7.14	0.0560	4.4	MIRAMAT	9.45	10	END MIRAMAT @ CURB, 15'
44+00 K	1.15	0.40	0.46	6.62	22.50	0.010	7.5	PAVED	33.46	14	V-DITCH W/3:1 SS 15' DE END PAVED DITCH & CURB

FROM STATION 44+75 (CURB) TO INTERSECTION OF FORDS COLONY BLVD
 BOTH RIGHT AND LEFT HAND SIDE DITCHES ARE GRASS V-DITCHES.

FORDS COLONY
SECTION A-10
POND BETWEEN 7TH AND 8TH HOLE

11/86

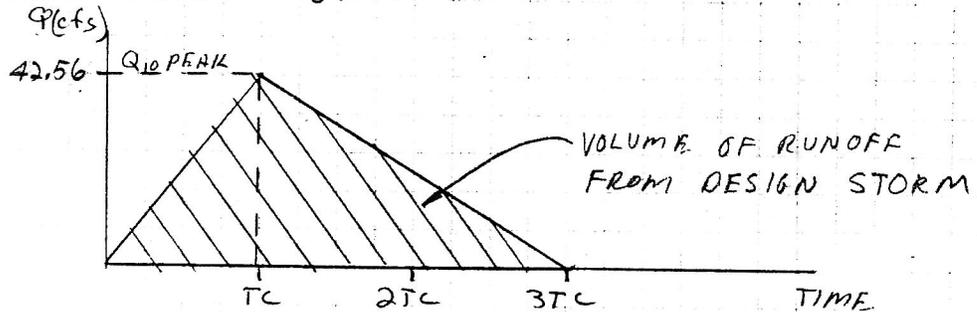
DRAINAGE AREA = 26.60 Ac $T_c = 25.0$ min $I_{10} = 4.0$ in/hr
 $C = 0.40$ FULLY DEVELOPED
 $Q_{10} = 0.40 (4.0) 26.60 = 42.56$ cfs

ELEVATION OF SPILLWAY STRUCTURE = 74.00
 ELEVATION OF EMERGENCY SPILLWAY = 76.00
 STORAGE VOLUME AVAILABLE = 73,000 ft³

- ASSUME POND IS DESIGNED TO PASS 10 YEAR DESIGN STORM WITHOUT TOPPING BANKS.

RUNOFF VOLUME

LENGTH OF DESIGN STORM = $3T_c$



$$\begin{aligned} \text{Volume}_{10} &= \frac{1}{2} (Q_{10})(T_c) + \frac{1}{2} (Q_{10})(2T_c) \\ &= \frac{1}{2} (42.56)(25)(60) + \frac{1}{2} (42.56)(25)(60) 2 \\ &= 95,760 \text{ ft}^3 \end{aligned}$$

RUNOFF VOLUME - STORAGE VOLUME = VOLUME TO PASS THROUGH SPILLWAY STRUCTURE DURING DESIGN STORM ($3T_c$)
 $95,760 \text{ ft}^3 - 73,000 \text{ ft}^3 = 22,760 \text{ ft}^3$

$$\begin{aligned} Q_{\text{THROUGH STRUCTURE}} &= \frac{22,760 \text{ ft}^3}{3T_c} = \frac{22,760 \text{ ft}^3}{(3)(25)(60) \text{ SEC.}} \\ &= 5.06 \text{ cfs} \end{aligned}$$

SPILLWAY STRUCTURE DESIGN

USE 36" DIA RISER W/ ANTI-VORTEX COLLAR
 TOP ELEVATION = 74.00
 BOTTOM ELEV = 68.00
 $D = 6'$

$Q_{\text{riser}} = 36 \text{ cfs w } \rightarrow \text{ orif } \rightarrow \text{ OK}$
 $4-7 \text{ } Q_0 = 36 \text{ cfs}$

OUTLET PIPE - USE 24" RCP $Q = 36.12 \text{ cfs} \geq 5.06 \text{ cfs}$

$V = 8.61 \text{ f.p.s.}$

PROVIDE 75 Y. OF RIP RAP AT OUTLET

80
75
70
65

EXISTING GROUND

TOP OF RISER ELEV. = 79.00

36" DIA RISER

PIPE INVERT = 70.00

BOTTOM OF RISER = 68.00

FINISH GRADE

ANTI-VORTEX COLLAR

PROVIDE 2 4'x4' ANTI-SEEP COLLARS 14' AND 28' DOWN SLOPE OF RISER STRUCTURE

140' OF 24" RCP @ 1.43%

FILL MANHOLE AND 1' AROUND MANHOLE TO ELEVATION TO TO PREVENT "FLOATING"

PIPE INVERT OUT = 67.00

7 C.Y. OF PERMANENT RIP RAP

SECTION A-A
POND CROSS SECTION

SCALE: 1" = 5' VERT.
1" = 50' HORIZ.

AES, A PROFESSIONAL CORPORATION
 Engineering And Surveying
 1761 Jamestown Road
 WILLIAMSBURG, VIRGINIA 23185

NET WEIGHT TRANSMITTAL

(804) 253-0040

11/17/86 5652
 ALLEN MURPHY
 FORDS COLONY
 SECTION 6
 SECTION 10

TO JCC PLANNING DEPT
 P.O. BOX JC
 WILLIAMSBURG, VA 23187

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10	11/86	SECTION 10
2	11/86	DRAINAGE CALCULATIONS SECTION 6
2	11/86	DRAINAGE CALCULATIONS SECTION 10
1	11/17/86	SUBDIVISION APPLICATIONS SECTIONS 6 AND 10
1	11/17/86	(CHECKS FOR SUBDIVISION APPLICATION FEE FOR SECTIONS 6 & 10 AND EROSION CONTROL FEE FOR SECTION 6 & 10)
		(SECTION 6 - SUB. FEE \$4000.00, EROSION FEE \$700.00)
		(SECTION 10 - SUB. FEE \$2575.00, EROSION FEE \$300.00)

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SIGNED *James H. Bennett*

MANHOLE TIME SECTION A TO ROAD CORNER

11/1/66

ROAD Z MAX SLOPE 5.1%
MIN SLOPE 2.1% OUTSIDE 2.5%

NORTH SIDE - 1.2' H
SOUTH SIDE - 2' H
CHANNEL C LWD CUL DE SAC - 1.52 A C=0.35

To to 56" channel $T_c = 15$ $I_p = 57$ $I_m = 5.2$

7y $Q = 1.37(3.7)(1.52) = 2.1$ CFS @ 8.5% = 5.2 FPS USE MENTH
 $Q = 1.37(3.7)(1.25) = 1.7$ CFS @ 5.1% = 4.5 FPS USE MENTH
 $Q = 1.37(3.7)(.7) = 0.4$ CFS @ 5.4% = 3.0 FPS OK

RY $Q = 2.8$ cfs 5.5" DEEP OK
 $Q = 2.3$ cfs 6.0" DEEP OK
 $Q = 0.5$ cfs 3.0 DEEP OK

USE 18' DITCH W/ MENTH

AREA BETWEEN RD Z & RD Y

DO TO CULV UNDER ROAD P

AREA = 3.1 A $T_c = 16$ min

10y $Q = 1.37(5.2)(3.31) = 6.02$ CFS

USE 15 CMP @ 2% $Q = 10$ CFS CULVERT #1

NE SIDE RD 13 A @ 3.4%
NW SIDE 10 20 A @ 2.9%

2y $Q = 1.37(3.9)(1.3) = 1.8$ CFS @ 3.4% = 13.4 FPS OK
 $Q = 1.37(3.9)(2.0) = 2.7$ CFS @ 2.9% = 12.4 FPS OK

10y $Q = 2.4$ cfs 8" DEEP OK
 $Q = 3.6$ cfs 10" DEEP OK

CHANNEL TIME 550' / 36 = 65% CHIN = 10
 VEL ON GRASS 3.1 FPS

USE $T_c = 16$ FOR ROLLER BANK

2yr $Q = .35(3.4)(5.1) = 7.6 @ 9\% = 8.4\text{ fps}$ USE HIRAKATI

10yr $Q = .35(4.7)(5.1) = 12.9$ 8.5" DITCH OK

USE DITCHES 18" DEEP

ROAD Y @ END OF SAC

OUTFALL DITCH MOST CRITICAL
 $T_c = 15$

2yr $Q = .35(3.9)(13) = 1.8 \text{ cfs}$

OUTFALL DITCH 18%

USE 12' CON V DITCH 1.5:1 S.S.

10yr $Q = .35(5.2)(13) = 2.4 \text{ cfs}$ 7" DEEP $U = 5.0 \text{ fps}$

NW SIDE DITCH

2yr $Q = .35(3.9)(1.0) = 1.4 \text{ cfs} @ 3.3\% = 3.3 \text{ fps}$ OK
USE DITCHES 18" DEEP

UPPER ROAD Y

$T_c = 15 @ 6\%$

2yr $Q = .35(3.9)(13) = 1.8 \text{ cfs} @ 4.4\% = 4.3 \text{ fps}$ HIRAKATI

USE 18" DITCH W/ HIRAKATI

CULVERT ROAD Y / ROAD X

10yr $Q = .35(5.2)(13) = 2.4 \text{ cfs}$

USE 15' CM @ 1% $Q = 7.5 \text{ cfs}$ CULVERT

- ROAD X 10' CULVERT @ 8% MAX

$$\begin{aligned} \text{E SIDE } Q &= 35(3.4)(1.0) = 1.4 \text{ cfs} = 3.8 \text{ cfs @ } 8\% = 20 \text{ fps} \\ \text{W SIDE } Q &= 35(3.4)(2.0) = 2.8 \text{ cfs} = 5.6 \text{ cfs @ } 8\% = 30 \text{ fps} \end{aligned}$$

USE MIRRIMAT BOTH SIDES IN 18" DITCH

- CULVERT END ROAD Y

$$2\% Q = 6.6 \text{ cfs @ } 6\% = 6.5 \text{ fps}$$

$$10\% Q = 7.9 \text{ cfs @ } 6\% = 7.5" \text{ DEEP}$$

USE MIRRIMAT IN 18" DITCH

- ROAD P CULVERT # 3

CULVERT CALC

SLOPE 3.5% $T_c = 20$

$$2\% Q = 35(3.4)(4.8) = 5.7$$

$$10\% Q = 35(4.7)(4.8) = 7.5 \text{ cfs}$$

SOLE IS CMP @ 2% CULVERT # 3

- ROAD P BETWEEN ROAD W AND V
OUTFALL DITCH @ TOP

$$5.7 \text{ cfs @ } 5\% = 5.8 \text{ fps USE MIRRIMAT}$$

OUTFALL DITCH @ BOTTOM $T_c = 20$

$$Q_2 = 35(3.4)(4.14 + 4.7) = 10.6 \text{ cfs @ } 5.0\% = 6.8 \text{ fps}$$

USE MIRRIMAT ENTIRE LENGTH

$$Q_D = 14.0 \text{ cfs } 9.5" \text{ DEEP}$$

USE 18" DITCH WITH MIRRIMAT

ROAD V
CR N SIDE DITCH @ ROAD W

$$Q_1 = .35(3.7)(1.0) = 1.35 \text{ cfs @ } 5.6\% = 3.8 \text{ fps}$$

USE MIRCINAT TO PIPE

PIPE ON ROAD V

$$Q_2 = .35(3.7)(2.1) = 3.7 \text{ cfs}$$
$$Q_{10} = .35(5.1)(2.7) = 4.9 \text{ cfs}$$

USE 40' 15" CMP @ 1.0% COLLECT #4

OUTFALL DITCH OFF ROAD V
AT TOP

$$Q_2 = 3.7 \text{ cfs @ } 3.3\% = 11.7 \text{ fps @ } 7' \text{ DEEP}$$

18" DITCH W/
PERMANENT GR

OUTFALL DITCH OFF ROAD V
AT BOTTOM

$$Q_2 = 5.7 \text{ cfs @ } 3.4\% = 8.1 \text{ fps @ } 7' \text{ DEEP}$$

18" DITCH W/
PERMANENT GR

ROAD P DITCH @ STA 47 USING
T=20 FUTURE

$$Q_2 = .35(3.4)(7.2) = 8.65 @ 2\% = 16.5 \text{ fps USE PERMANENT}$$

ROAD P DITCH @ STA 41 N SIDE

$$Q_2 = .35(4.6)(1.34) = .5 \text{ cfs @ } 7.33\% = 4.0 \text{ fps}$$

CULVERT UNDER RD P

T=20

$$Q_{10} = .35(4.5)(10.5) = 16.5 \text{ cfs}$$

SEE PAGE 8

USE 21" CMP @ 2% Q=21 cfs CULVERT #5

OUTFALL OF ROAD V

T=20 AT PIPE W SIDE

$$Q_2 = .35(3.4)(10.5) = 12.5 \text{ cfs @ } 2.5\% = 5.7 \text{ fps USE PERMANENT}$$

AT BOTTOM W SIDE

$$Q_2 = .35(3.4)(13.93) = 16.6 \text{ cfs @ } 2.5\% = 5.8 \text{ fps USE PERMANENT}$$

$Q_1 = 1.3(3.9)(7) = 3.5 \text{ cfs}$ @ 3" DEEP
12" DITCH WITH MIRANAT OK

ROAD E
DO SHARPER TURN

$Q_2 = .3(3.9)(17) = 1.9 \text{ cfs}$
 $Q_1 + Q_2 = 3.5 + 1.9 = 5.4 \text{ cfs}$

USE 5" DIA. 17' @ 7' CULVERT 6

REVERSE DITCH FLOW TO CULVERT INSIDE
 $Q_2 = .3(3.9)(7) = 2.4 \text{ cfs}$ @ 4% 3.2 fps OK

REVERSE DITCH FLOW TO CULVERT S. SOUTH
LESS FLOW THAN ABOVE OK

OUT FALL 4 FOOT CULVERT ROAD E

$Q_2 = 2.4 \text{ cfs}$ @ 8.6% = 4.3 fps USE MIRANAT

OUTFALL FROM ROAD @

$Q = .35(3.9)(2.6) = .8$

DRAINAGE FROM ABOVE ROAD @

$L = 5$

$Q_2 = .35(3.9)(4.24) = 5.8 \text{ cfs}$

TOTAL $Q_2 = 5.8 + .8 + 2.4 = 9.0 \text{ cfs}$

DITCH FLOW

9.0 cfs @ 3.5% = 5.8 cfs @ 8" DEEP

18" DITCH WITH MIRANAT OK

ROAD S

Q₁ = .35(3.4)(1.3) = 1.5 cfs @ 2% = 5 fps @ 4" DITCH

[USE 4" DITCH @ 2% TO 10' FROM CURB @ 10' C]

OUTFALL

5' x 1.5' + 1.5' x 1.5' = 6.75 cfs @ 10% = 1.5 fps
[10" DITCH WITH MIRAMAT OK.]

ROAD S

CHECK OUTFALL 1ST T.E. = 15'

Q₁ = .35(3.4)(1.3) = 1.5 cfs @ 8% = 5 fps @ 4" DITCH
[10" OUTFALL DITCH WITH MIRAMAT OK.]

CHECK DITCH

Q₂ = 4.0 @ 3% = 3 fps OK

ROAD T

CHECK N SIDE @ MIDDLE

Q₁ = .5(3.7)(3.3) = 1.6 cfs @ 10% = 4.2 fps @ 2 1/2" DEEP

[USE MIRAMAT STA 11+50 → 13+50]

USE ON S SIDE TO CUL D. @ 10'

[USE MIRAMAT STA 11+50 → 15+25]

OUTFALL

Q₂ = .35(3.7)(2.0) = 2.7 cfs @ 19%

[USE 12" DEEP CORR. DITCH WITH 15' S.S.]

[12" FTII 4" D]

ROAD P from Pond T to E/W
Check 12' deep road $T_c = 10$

$$Q_2 = .35(4.6)(1.5) = .8 \text{ cfs @ } 2.4\% = 2.2 \text{ fps}$$

ON LINED 18" DITCH OR

CHUCK CUTFALL

$$Q = .35(3.1)(1.5) = 2 \text{ cfs @ } 4\%$$

USE 12" DEEP CONC V DITCH WITH 1.5:1 SS

DEPTH = 4.5'

ROAD K DO CULVERT

$T_c = 15$

$$Q_2 = .35(3.9)(1.9) = 2.6$$

$$Q_{10} = .2(5.2)(1.9) = 3.5 \text{ cfs}$$

USE 40'-15" CMD @ 1% $Q = 7.5$ CULVERT 7

CK DITCHES @ 6% PORTION

$$Q_2 = .35(3.9)(1.9) = 1.4 \text{ cfs @ } 6\% = 4.3 \text{ fps}$$

USE MIRAMAT IN STIFF DITCH STA 16 → 18 WEST SIDE

DO OUTFALL AREA

$T_c = 15$

$$Q_2 = .35(3.9)(9.9) = 13.5 \text{ cfs} + 4.3 \text{ cfs} = 17.8$$

DO OUTFALL DITCH

$$17.8 \text{ cfs @ } 2.5\% = 5.8 \text{ fps @ } 12" \text{ DEPTH}$$

@ Q_{10} DEPTH = 15" W/ CONC

USE 2' FLAT BOTTOM DITCH W/ 2:1 SS

$$V = 5.3 \text{ fps DEPTH} = 0.9'$$

USE 2' FLAT BOTTOM DITCH W/ 2:1 SS 18" DEEP
W MIRAMAT

ROAD CULVERT # 5

$$T_c = 20$$

$$Q_{10} = .35(4.5)(10.1 + 18) = 22.4 \text{ cfs}$$

USE 50' 21" CMP @ 2% $Q = 4.1 \text{ cfs}$

21" 0.35(4.5) UNDER CULVERT 21" 0.35(4.5) 1.00

$$Q_1 = 26.5 @ 2.5\% = 5.1 \text{ cfs} = 11' \text{ DIA}$$

$$Q_2 = 1.3' \text{ DIA}$$

USE 18' DIA 2' FLAT BOTTOM DITCH W/ 2% SLOPE WITH HIRACANT

ROAD O @ ROAD Y

DO CULVERT

$$Q_{10} = .35(6.2)(16) = 2.9 \text{ cfs}$$

USE 50' 15" CMP @ 1% CULVERT # 8

SIDE DITCH < .5% OK

ROAD O EAST OF ROAD K

$$Q_1 = .35(3.4)(16 + 1) = 3.6 \text{ cfs} @ 6.4\% = 5.1 \text{ cfs}$$

$$Q_2 = .35(3.9)(16 + 3.6) = 7.1 \text{ cfs} @ 7.9\% = 5.1 \text{ cfs}$$

LINE DITCH W HIRACANT STA 10+15

INT ROAD P & O CULVERT - CULV CROSS C

$$Q_{10} = .35(5.2)(36) = 6.5 + 2.9 = 9.4 \text{ cfs}$$

USE 60-15" CMP @ 2% $Q = 10' \text{ DIA} = 7.1 \text{ cfs}$

CULV CROSS D

$$Q_{10} = .35(5.2)(5.9) = 10.6 + 9.4 = 20 \text{ cfs}$$

USE 50' 21" CMP @ 2% $Q = 21' \text{ DIA} = 10.6 \text{ cfs}$

AT OUTFALL FROM ROAD P
 $Q_1 = .35(3.9)(32) = 4.1 \text{ cfs @ } 3.7\% = 38 \text{ FPS @ } 7'$
HIRRANT FROM OUTFALL TO CULVERT = 10'
ADD DITCH FROM BRIDGE
 $.35(3.9)(32) = 4.1 \text{ cfs @ } 3.7\% = 38 \text{ FPS @ } 7'$

ROAD P CULVERT

$Q_1 = .35(4.1)(15) = 2.1 \text{ cfs @ } 3.7\% = 58 \text{ FPS @ } 4 1/2' \text{ DEPT}$
| 18" DEEP OUTFALL DITCH W/ HIRRANT |
ROAD IS AT 1% DITCHES OK

ROAD M CULVERT

$$Q_{10} = .35(6.0)(70) = 1.68 \text{ cfs}$$

| USE 50' - 15' CMP @ 1% $Q = 2'$ CULVERT = 11'

CK DITCH = 10'

$$Q_2 = .35(4.1)(6.4) = .6 \text{ cfs @ } 3.7\% = 28 \text{ FPS OK}$$

ROAD V 11' OUTFALL (CONTRIBUTOR)

$$Q_2 = .35(3.9)(.78 + .47) = 1.7 \text{ cfs @ } 1.7\% = 3.2 \text{ FPS OK}$$

OUTFALL FROM ROAD P CULVERT = 10'

$T_c = 15'$ USE FLAT BOTTOM DITCH TO 20' H OUTFALL

$$Q_2 = .35(3.9)(5.43 + 3.61 + 1.6) = 15.1 \text{ cfs @ } 4.4\% = 6.2 \text{ FPS @ } 7'$$

| USE 15' DEEP 2' FLAT BOTTOM DITCH W/ HIRRANT |

CHECK @ 20' H OUTFALL USE $T_c = 20'$

$$Q_2 = .35(3.4)(5.43 + 3.61 + 1.6 + .78 + .47 + 1.6 + 1.78 + 2) = 20.5 \text{ cfs}$$

$$20.5 \text{ cfs @ } 4.4\% = 7 \text{ FPS @ } 8' \text{ DEPT}$$

DITCH OK AS DEPT 4' + 8'

ROAD I
 $Q_{10} = .31(3.14)(17.23 + 6.5) = 28.3 @ 3.2\% = 6.4 \text{ fps}$
 $Q_{10} = 37.95 \text{ 1.4' DEPTH}$
 1.5' DEEP AVERAGE

ROAD J CULVERT I
 $Q_{10} = .35(5.2)(2.67) = 4.9 \text{ cfs}$
 USE 60" 15" CMP @ 2% $Q = 10.0$ CULVERT #11
 ON SIDE DITCH FOR ROAD J
 $Q = .35(3.14)(1.33) = 1.8 \text{ cfs @ 5.8\%} = 4.3 \text{ fps}$
 USE MIRAMANT STA 10-13 WEST SIDE
 ON OTHER SIDE
 $.35(3.5)(.3) = .4 \text{ cfs @ 5.9\%} = 3.2 \text{ fps} \quad \text{OK}$

ROAD P CULVERT EAST OF ROAD J
 $Q_{10} = .35(5.2)(2.67 + 1.32) = 7.3 \text{ cfs}$
 USE 60" 15" CMP @ 2% $Q = 10$ CULVERT #13
 CULVERT BETWEEN #13 & #15 $Q_{10} = 5.1$
 USE 120" 15" CMP @ 6.67% $Q_{10} = 15$ CULVERT #14

ROAD M CULVERT @ CUL-DE-SAC
 $Q_{10} = .13(5.2)2.31 = 4.2 + 7.3 = 10.5 \text{ cfs}$
 USE 60" 15" CMP @ 4% $Q = 13$ CULVERT #15

OUTFALL
 $Q_{10} = 10.5 \text{ cfs}$ INV IN 44.6 INV OUT 40.8
 USE 60" 15" CMP @ 7.67% CULVERT #16

DITCH CALC
 $Q_2 = 7.8 @ 3.3\% = 5.6 \text{ fps}$
 USE 18" DITCH WITH HOLES FOR ROAD M

ROAD D

OUTFALL @ CUL-DE-SAC

$$Q_1 = .35(4.4)(1) = 1.6 \text{ cfs @ } 9.1\% = 5.3 \text{ fps}$$

USE 18" DEEP DITCH W/ MIRAMAT

OUTFALL FROM ROAD H & I

$$Q_2 = .35(3.9)(2.1 + 2.3) = 2.9$$

$$Q_3 = .35(3.4)(1.32 + 2.67) = 4.8 \text{ / } 1.32 + 2.67 = 6\% = 7 \text{ fps @ } 6\%$$

USE 18" DEEP DITCH W/ MIRAMAT

ROAD F UPPER CULVERT

$$Q_{10} = .35(5.2)(2.6) = 4.7 \text{ cfs}$$

USE 40' OF 15" CMP @ 1% CULVERT #17

CHECK OUTFALL TO INTERSECTION OUTFALLS

$$Q_2 = .35(3.9)(2.6 + 3.3) = 5.3 \text{ cfs @ } 3\% = 4.7 \text{ fps}$$

USE 18" DITCH W/ MIRAMAT

ROAD G & ROAD H PWT. DESIGN CULVERT

$$Q_{10} = .35(5.2)4.24 = 7.7 \text{ cfs}$$

USE 60' OF 15" CMP @ 2% CULVERT #18

CK DITCHES ON G

$$Q_2 = .35(3.9)2.1 = 2.9 \text{ @ } 5.7\% = 4.8 \text{ fps}$$

USE MIRAMAT FROM #12 TO #10 TO PIDE

$$Q_2 = .35(4.6)(1.5) = .8 \text{ cfs @ } 5.7\% = 3.5 \text{ fps OK}$$

USE MIRAMAT FROM STATION 1+50

ROAD G - USE EWY COLLECTOR @ CUL-DE-SAC
 $Q_1 = .39(5.2)(1.7) = 2.8 \text{ cfs}$

USE 40'-15" CMP @ 1% COLLECTOR # 19

DESIGN OUTFALL DITCH

$Q_2 = .3(3.1)(1.7+1.7) = 3.1 \text{ cfs @ } 0.5\% = 3 \text{ fps @ } 5\frac{1}{2}"$

USE 18" DEEP DITCH w/ MIRAMAT

DO OUTFALL FROM ROAD G - CUL-DE-SAC
 $T_c = 5$

$Q_2 = .5(5.7)(1.34) = 1 \text{ cfs @ } 13\% = 5.6 \text{ fps @ } 3" \text{ DEPT}$

USE 18" DEEP DITCH w/ MIRAMAT

ROAD I DESIGN COLLECTOR @ CUL-DE-SAC
 $T_c = 5$

$Q_1 = .35(6.0)(6.3) = 1.32 \text{ cfs}$

USE 40'-15" CMP @ 2% COLLECTOR # 20

DESIGN OUTFALL
 $T_c = 10$

$Q_2 = .3(6.3+7.5) = 2.2 \text{ cfs @ } 8.9\% = 5.7 \text{ fps @ } 4\frac{1}{2}" \text{ DEPT}$

USE 18" DEEP DITCH w/ MIRAMAT

DESIGN OUTFALL @ EWY CUL-DE-SAC F # 6
 $T_c = 20$ $A = 20.1$ USE FLAT BOTTOM DITCH

$Q_2 = .35(2.4)(16.9) = 20.0 @ 3.5\% = 6.2 \text{ cfs @ } 1.9' \text{ DEPT}$

$Q_{10} = 26.5 \text{ cfs} = 1.6' \text{ DEPT}$

USE 18" FLAT BOTTOM DITCH w/ MIRAMAT

$Q_1 = 0.35(3.4)(1.2) = 1.47 \text{ cfs}$
 $Q_2 = 2.25(3.4)(1.3) = 10.1 \text{ cfs}$

160' 15" CNP @ 1% $Q = 17.16$ CULVERT #20
 PROVIDE MH @ END OF LINE 20

70' 15" CNP @ 8.6% $Q = 17.16$ CULVERT #21
 (CHECK ROAD PROFILE)

$Q_3 = 1.5(3.4)(1) = 5.1 \text{ cfs @ } 7.3\% = 7.4 \text{ fps}$

USE 18" DEEP DITCH W/ MURKIN STA 1950 → 1950

POND J
 OUTFALL

$Q_1 = 1.5(3.4)(1) = 5.1 \text{ cfs}$

$Q_2 = 14.1$

USE 220' 18" CNP @ 2.0% $Q = 14$ CFS CULVERT 22

DO CULVERT FROM 22 TO 21

USE 180' 18" CNP @ 8% $Q = 28$ CFS CULVERT 23

RE DO CULVERT 21

$Q_3 = 4.1 + 5.5 = 9.6 \text{ cfs}$

USE 18" CNP @ 8.6% $Q = 21$ CFS CULVERT 21

C/C S DITCH POND J

$Q_1 = 2.1(3.4) 5.67 = 7.7 \text{ cfs @ } 1.2\%$

$Q_2 = 3.1(3.4) 2.13 = 3.1 @ 2.28 = 3.7 \text{ fps}$

ROAD C @ GREEN HOLE TUNNEL

$$Q_2 = .35(5.2)(3.85) = 7.1 \text{ cfs}$$

USE 100'-15" CMP @ 2.5% $Q_{cap} = 7.5$ CULVERT # 24

ROAD D @ GREEN HOLE TUNNEL

$$Q_2 = .35(5.2)(4.7) = 7.6 \text{ cfs}$$

USE 120'-15" CMP @ 3% $Q_{cap} = 13$ CULVERT # 25

BASIN BETWEEN TUNNEL & GREEN

USE 160'-15" CMP @ 1% $Q_{cap} = 7.5$ CULVERT # 26

BASIN AT GREEN

USE 120'-15" CMP @ 9% $Q_{cap} = 23$ cfs CULVERT # 27

$$Q_{10} = .35(5.2)(3.86 + 5.39) = 16.8$$

USE 200'-18" CMP @ 4% $Q_{cap} = 19$ cfs CULVERT # 28

$$Q_{10} = .35(5.2)(3.86 + 5.39 + 1.04) = 18.7$$

USE 160'-18" CMP @ 4% $Q_{cap} = 19$ cfs CULVERT # 29

OUTFALL FROM ROAD D

$$Q_2 = .35(3.9)(1.4) = 1.9 \text{ cfs @ } 10.6\% = 3.8 \text{ fps}$$

USE 18" DEEP DITCH W/ MIREMAT

CK W DITCH ROAD

$$Q_2 = .35(3.9)(.8) = 1.1 \text{ cfs @ } 4\% = 2.5 \text{ fps}$$

CULVERT FOR ROAD D

$$Q_2 = .35(3.9)(1.04) = 1.4 \text{ cfs}$$

USE 40'-15" CMP @ 1% $Q = 7.5$ CULVERT # 30

INT ROAD C & RD A

DESIGN CULVERT

$$Q_{10} = 2.5(5.2)(1.6) = 2.9 \text{ cfs}$$

USE 60' - 15" CMP @ 1% $Q_{cap} = 7.5$ CULVERT 31

CR DITCH W/ SIDE

$$Q_2 = 1.5(4.6)(.9) = 2.11 @ 2.2\% = 2.1 \text{ fps OK}$$

ROAD B OUTFALL

$$Q_2 = 1.35(3.9)(1.3) = 1.8 \text{ cfs @ } 3\% = 3 \text{ fps}$$

12" DEEP DITCH OK

SIDE DITCHES LESS 60' OK

INT ROAD A & RD D DESIGN CULVERT

$$Q_{10}^{T_c=15} = 1.35(5.2)(1.85) = 3.4$$

USE 60' - 15" CMP @ 2% $Q_{cap} = 10$ CULVERT 32

INT ROAD A & ROAD C

$$Q_{10}^{T_c=20} = 1.35(4.5)(2.68 + 1.85) = 7.1$$

USE 60' - 15" CMP @ 1% $Q_{cap} = 7.5$ CULVERT 33

PIPE XING ROAD A @ OUTFALL

$$Q_{10} = 1.35(5.2)(1.62) = 2.9 \text{ cfs}$$

USE 40' - 15" CMP @ 1% $Q_{cap} = 7.5$ CULVERT 34

DESIGN OUTFALL POND # 1 @ COLLEGE

$T_c = 30$

$Q_2 = .35 (201) (1.185 + 2.46 + 1.67 + 1.8) = 6.6 cfs @ 10\%$

5 ft @ 8" DEEP

USE 18" DITCH

"Mirrored"

DESIGN CULVERT AFTER OUTFALL ACCESS
GOLF COURSE 6.6 cfs

USE 120' 15" CMP @ 10% SLOPE 75' CULVERT 36

SECTION 1-10
FOUR BETWEEN 7TH AND 8TH STS

DRAINAGE AREA = 26.60 AC TIME TO TRAVEL $T_c = 4.0$ MIN $I_p = 4.0$ IN/H

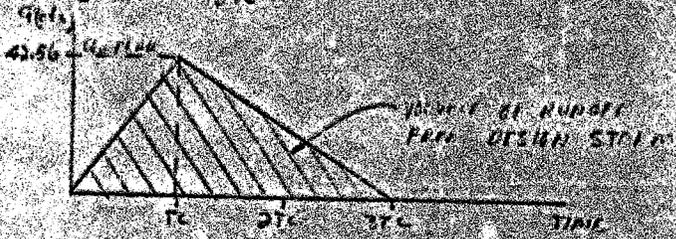
$Q_{10} = C_p A (I_p) 26.60 = 42.56$ cfs

FIGURE OF MERIT FOR DESIGN STORM = 1.0
 PERCENT OF RAINFALL EXCESS = 100
 STORAGE VOLUME AVAILABLE = 73,000 cu ft

- ASSUME POND IS DESIGNED TO PASS 1 YEAR OF DESIGN STORM WITHOUT TIPPING POINTS

KNOWLEDGE

LEAD IN OF DESIGN STORM = 3Tc



$$\begin{aligned} \text{Volume}_{10} &= \frac{1}{2} (Q_{10}) (T_c) + \frac{1}{2} (Q_{10}) (2T_c) \\ &= \frac{1}{2} (42.56) (25) (60) + \frac{1}{2} (42.56) (25) (60) \\ &= 95,760 \text{ ft}^3 \end{aligned}$$

RUNOFF VOLUME - STORAGE VOLUME = VOLUME TO PASS THROUGH CAPACITY STORAGE DURING DESIGN STORM (3Tc)

$95,760 \text{ ft}^3 - 73,000 \text{ ft}^3 = 22,760 \text{ ft}^3$

$$\begin{aligned} Q_{\text{required}} &= \frac{22,760 \text{ ft}^3}{3T_c} = \frac{22,760 \text{ ft}^3}{(3)(25)(60) \text{ sec}} \\ &= 5.06 \text{ cfs} \end{aligned}$$

SPILLWAY STRUCTURE DESIGN

USE STANDARD 41" APPROXIMATE SIZE SPA
 TOTAL SPAN = 74.00
 BENCH MARK = 62.00
 C = 6'

OUTLET PIPE - USE 15" DIA $Q = 5.06 \text{ cfs} \Rightarrow 5.00 \text{ cfs}$

$V = 9.62 \text{ FPS}$

PROVIDE 7' x 2' x 1' AT OUTLET

Scott Thomas

From: Scott Thomas
Sent: Friday, July 01, 2005 10:27 AM
To: Darryl Cook; Pat Menichino
Subject: FW: Lot 103 Sec 10 Ford's Colony

FYI – I guess we need to look at this and see if it is a real fix or just a band-aid solution.

Scott J. Thomas, P.E.
James City County
Environmental Division

-----Original Message-----

From: Charles Records [mailto:crecords@aesva.com]
Sent: Thursday, June 30, 2005 11:12 AM
To: Scott Thomas
Subject: RE: Lot 103 Sec 10 Ford's Colony

Scott,

The following plan was implemented and has been constructed. It is my understanding that Ms. Eadie recognizes that she is responsible for grading her front yard to tie into the new swale. Based on a conversation I had with Jimmy Minor, she was satisfied with the improvements that were made and also that she needs to have her front yard regraded to drain properly to the new overflow swale. As part of the attached plan, we ensured that the tie-in grade was low enough to drain her driveway. As part of this improvement, the submerged inlet at the rear corner of her lot was raised and changed to a manhole. There are no other improvements currently planned to take place by Realtec. Let me know if you need any additional information.

Charles B. Records, P.E.
Project Manager

AES Consulting Engineers
Williamsburg | Richmond
(757) 253-0040
www.aesva.com

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From: Scott Thomas [mailto:SCOTTT@james-city.va.us]
Sent: Tuesday, June 21, 2005 3:12 PM
To: Charles Records
Cc: Pat Menichino
Subject: Lot 103 Sec 10 Ford's Colony

Any update on the current status for the Eadie drainage complaint, 109 Holinwell, Lot 103 Sec 10 Ford's Colony? We would like to be able to respond to her with at least a progress report in a timely manner. When we last spoke at the site, you were going to talk with Drew and look at the feasibility of a combined approach – a surface swale which drains the front yard area and from the inlet down through the yard and second, looking at possibly lowering the BMP WSEL so that the storm system is not submerged.

Scott Thomas

From: Charles Records [crecords@aesva.com]
Sent: Thursday, June 30, 2005 11:12 AM
To: Scott Thomas
Subject: RE: Lot 103 Sec 10 Ford's Colony

Scott,

The following plan was implemented and has been constructed. It is my understanding that Ms. Eadie recognizes that she is responsible for grading her front yard to tie into the new swale. Based on a conversation I had with Jimmy Minor, she was satisfied with the improvements that were made and also that she needs to have her front yard regraded to drain properly to the new overflow swale. As part of the attached plan, we ensured that the tie-in grade was low enough to drain her driveway. As part of this improvement, the submerged inlet at the rear corner of her lot was raised and changed to a manhole. There are no other improvements currently planned to take place by Realtec. Let me know if you need any additional information.

Charles B. Records, P.E.
Project Manager

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From: Scott Thomas [mailto:SCOTTT@james-city.va.us]
Sent: Tuesday, June 21, 2005 3:12 PM
To: Charles Records
Cc: Pat Menichino
Subject: Lot 103 Sec 10 Ford's Colony

Any update on the current status for the Eadie drainage complaint, 109 Holinwell, Lot 103 Sec 10 Ford's Colony? We would like to be able to respond to her with at least a progress report in a timely manner. When we last spoke at the site, you were going to talk with Drew and look at the feasibility of a combined approach – a surface swale which drains the front yard area and from the inlet down through the yard and second, looking at possibly lowering the BMP WSEL so that the storm system is not submerged.

Scott J. Thomas, P.E.
James City County
Environmental Division

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

Scott Thomas

From: Scott Thomas
Sent: Tuesday, June 21, 2005 3:12 PM
To: 'Charles Records'
Cc: Pat Menichino
Subject: Lot 103 Sec 10 Ford's Colony

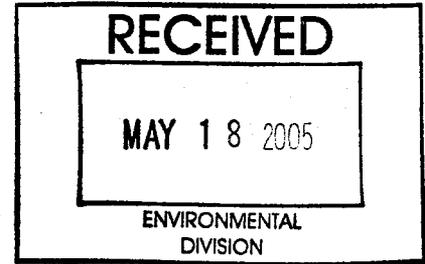
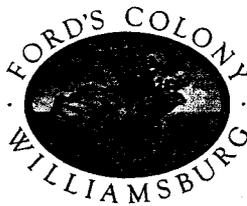
Any update on the current status for the Eadie drainage complaint, 109 Holinwell, Lot 103 Sec 10 Ford's Colony? We would like to be able to respond to her with at least a progress report in a timely manner. When we last spoke at the site, you were going to talk with Drew and look at the feasibility of a combined approach – a surface swale which drains the front yard area and from the inlet down through the yard and second, looking at possibly lowering the BMP WSEL so that the storm system is not submerged.

Scott J. Thomas, P.E.
James City County
Environmental Division

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

FIELD VISIT
PTM
SJT
Charles Records
Ms. Eadie

MAY 31/ST



May 12, 2005

Ms. Brenda D. Eadie
109 Hollinwell
Williamsburg, VA 23188

Re: Your ltr dtd May 9, 2005
Lot 103, Section X
Ford's Colony at Williamsburg

Dear Ms. Eadie:

I forwarded a copy of the subject letter to Mr. Charles Records, P.E., AES Consulting Engineers. I asked him to inspect the drainage easement and piping system again, with the benefit of the comments in your letter. I have also instructed a contractor to inspect the pipe, drainage inlet, and manholes from the drainage inlet adjacent to your address to the golf course.

Please note that the engineer's report indicated that the drainage pipes in the front yard, installed by your contractor, were not correctly connected to the main drainage pipe. As observed on the ground, the connection area has sink spots that may have resulted from soil passing into the pipe system. You were instructed to remove the pipe connection and have your yard re-graded to pass drainage from the front yard to the rear of the drainage easement.

I will inform you of the results of the two inspections when they are completed. I asked that the inspections be completed as soon as practical in their scheduling.

Sincerely,

Drew R. Mulhare
VP Operations

Cc: Steve Hein, Manager
President, FCHOA Board of Directors
Charles Records, P.E., w/attachment
James Minor, Longhill Excavating, w/attachment
Patrick Menichino, JCC Environmental

M:Drew/Eadie drainage 5.12.05.doc

100 Manchester Drive ~ Williamsburg, Virginia 23188
757-258-4230 ~ Fax 757-258-4065
1-800-334-6033 ~ www.fordscolony.com

Brenda D. Eadie
109 Hollinwell Drive
Williamsburg, VA 23188
(H) 757-565-2909 ♦ (Cell) 757-329-8039
Email: Brenead@aol.com

May 9, 2005

Drew Mulhare
Vice President of Operations
Ford's Colony Community Services
100 Manchester Drive
Williamsburg, VA 23188

Re: Drainage/Flooding on Hollinwell Drive

Dear Mr. Mulhare,

The purpose of this letter is to address the problem of the drainage next to my lot at 103 St. Andrews Village, and your letter dated September 30, 2004. I hope you have received a copy of my letter to Mr. Edgerton dated April 15, 2005.

I realize that you hired Mr. Records from AES Consulting Engineers and numerous times I have read his findings. However, I don't believe Mr. Records has ever been present to see what occurs during a heavy downpour. Also, I was not in the area and unable to meet with him concerning the drainage problem on my property and the drainage holes next to my property. I do not have the expertise to agree/disagree with his findings concerning my garage foundation being built 1.5 feet lower than the design elevation and the problem with the grading on my property. I cannot agree or disagree with your claim that the front yard was not graded per the site plan. However, I have contacted James City County Environmental Division and they will be meeting with me this week. I will discuss my drainage/flooding problems with one of their engineers, and ask for their evaluation and assistance. If necessary, I am prepared to hire an independent engineer to access the drainage/flooding problems on my property and what occurs at the drainage hole cover on Hollinwell next to my property. In addition, I am waiting for Mr. Edgerton's reply as to how and when he plans on correcting any deficiencies/problems as outlined in Mr. Record's report.

I do NOT agree with Mr. Record's findings or your letter regarding the flooding situation from the storm water management facility located along the golf course in the rear of lots 104-106 and along Hollinwell in front of the golf course easement next to my lot. I have witnessed on MANY occasions during a heavy downpour the drainage hole on the street next to my property completely flooding and backing up with water about 3+feet. I have also witnessed the drainage hole located on the rear of the golf course easement (southwest corner of my house) flooding up in excess of 3 or 4 feet on several occasions. Although I will admit that debris covering the drainage hole will

impede the flow on the drain cover on the street, it is NOT the sole problem. I have ran out in the rain (heavy downpours and during lightning) and checked on the debris covering that drain hole. I have found the drain hole to be free of debris. I have also on numerous occasions gone out and cleaned that drain myself to ensure it was free of debris when a thunderstorm or heavy rain was expected. I will admit that there is a serious drainage problem on my property; however, too many times that drain has flooded up and jumped over the curb during a downpour until the rain eases up or stops. I have also called Ford's Colony security on a few occasions and asked them to come and clear the drain. During heavy rains, that system is INADEQUATE. All points on Hollinwell from the north, east, and west, ALL of the rain runs DOWNHILL when it is raining heavily and converges on that drain and in front of my property. I have a prime spot of watching this from my front porch or dining room window, which faces north.

Also, I would like to discuss the drainage hole cover on the golf course easement that is located to the rear of the golf course easement and my house. This drainage cover is a significant problem as well. During heavy downpours over the past two years, I have seen it back up with water. Also, during Hurricane Isabel, I witnessed water rising over 4+ feet. I was so worried that my house/sunroom was going to be flooded because water was rising SO high. Vegetation has just about completely grown over the cover, and the earth surrounding the hole is not stabilized. If someone was to walk out there and not know that cover was there, he/she could become injured. What about keeping that drain cover free of debris? This drainage cover/grate has been a source of frustration for me ever since I purchased my lot. I had to call your office a couple of times prior to construction commencing and ask that something be done to that drain because it was a safety issue and it was marked only by yellow "do not cross" or "keep out" tape.

As you know, I am a resident here in Ford's Colony and I pay my homeowner's association dues promptly. I kindly ask for your prompt attention to resolving this problem. I would suggest some type of culvert ditch to ease the flow of water towards the pond during times of heavy downpours when the drain hole on Hollinwell fills up and cannot flow fast enough. Also, I ask for your prompt attention into fixing the drainage hole next to my house on the southwest corner. You stated in your letter, "Prior to the arrival of any significant rainfall, the maintenance staff visits your area to ensure that debris is cleared from the gutter and grate". I do appreciate the maintenance staff keeping it clear of debris; however, debris covering the grate is not the only problem with the existing drainage system. Furthermore, even if debris covering the grate was the sole problem, one cannot always predict the weather and heavy downpours can occur when it isn't necessarily expected. Even if my property is regraded as per Mr. Record's suggestions, I have seen (and have pictures and a Ford's Colony security police report) the rising water from that drain when it was reasonably free of debris, rise above the curb and water flowing onto my lawn and down the greenway. Once the rain eases up and water subsides, the evidence of the rainwater has been left on my lawn and the golf course easement.

I humbly request your immediate attention in addressing and resolving the drainage issue that exists next to my property. I cannot ignore this situation any longer and

thunderstorm and hurricane season is fast approaching. (Last year, on May 27, 2004, I met with you and Mr. Edgerton and begged you all to find out what the problems were and correct it as soon as possible. I didn't get a response from you until after September 30, 2004; that is over 4 months.) Your response is requested within 30 days from the receipt of this letter.

Sincerely,

Brenda D. Eadie

Cc: Ricky Edgerton, Edgerton Contracting Inc.

Chris Henderson, President of Ford's Colony Homeowner's Association

Ford's Colony Homeowner's Association Board of Directors

✓ Patrick Menichino, Environmental Inspections Supervisor, JCC Environmental Div.

Bob & MJ Carboni, residents on Hollinwell Drive

Brenda D. Eadie

109 Hollinwell Drive
Williamsburg, VA 23188
(H) 757-565-2909 ♦ (Cell) 757-329-8039
Email: Brethead@aol.com

April 23, 2005

Patrick Menichino, Environmental Insp. Supervisor
James City County Environmental Division
101-E Mounts Bay Road, P. O. Box 8784
Williamsburg, VA 23187

Dear Mr. Menichino,

I am requesting your assistance to look into the serious drainage and flooding problems that I am having (and have had for 2 years) in my driveway and garage. I desperately need your help. Ford's Colony Community Services and Mr. Mulhare will not do what is necessary to fix or solve the problem with the drainage problem (2 drain holes) next to my lot and on the street. They have blamed the entire problem on my builder. In addition, my builder (apparently) did not slope my yard correctly and there is a problem with the drainage and my garage floods in a heavy rain. (And the water runs from all points on Hollinwell then fills up the drain on the street and then flows down my driveway flooding out my garage.) My builder blames the problem on Ford's Colony and Ford's Colony blames it on the builder. And neither...will do anything to fix the problem.

I am a single mother to an 11 year old named Kevin who suffers from a rare and fatal children's disease called Niemann-Pick Type C. I struggled to get together every single dollar that I could (even taking my retirement funds) to provide the house on Hollinwell for Kevin. I wanted to give him a wonderful home in a great neighborhood since he has this terrible disease. It is a very cruel disorder. Kevin was once a healthy little boy who played Little League baseball and now he struggles to walk. All my time is devoted to helping save his life by raising funds for research and awareness and most importantly, by providing the best quality of life that I can give him. His needs have increased and therefore, my time to devote to other things is very limited. And I haven't been getting any help or assistance in solving the flooding problem in my garage. I beg of you to do something to assist me and help me with getting this situation corrected. **I have far greater things to worry about with my son progressing in his illness;** however, I can't keep ignoring the flooding problem that exists at my house and lot.

Sincerely,

Brenda D. Eadie

Brenda D. Eadie

Brenda D. Eadie
109 Hollinwell Drive
Williamsburg, VA 23188
(H) 757-565-2909 ♦ (Cell) 757-329-8039
Email: Brenead@aol.com

April 15, 2005

Ricky Edgerton
Edgerton Contracting Inc.
P.O. Box 1189
Yorktown, VA 23692

Re: Drainage Problem on Lot 103, Ford's Colony

Dear Mr. Edgerton,

The purpose of this letter is to address the drainage problem on my lot and the continued flooding of my driveway/garage and the summary of the findings from AES Consulting Engineers as noted in the Ford's Colony letter dated September 30, 2004.

Here is a detailed overview:

My lot by the front steps and driveway has been flooding since January 2003 (after the foundation was built) and throughout the building process. The water pool that collected at the front steps was during the entire construction phase (after foundation) until the landscaping was done and the concrete driveway was installed. This pool of water was SO significant that by Spring of 2003, mosquitoes and frogs were breeding, and remained there until the contractor came to frame for the driveway. Since it had been a very rainy Winter/Spring season, I didn't feel this was cause for concern. Furthermore, I had communicated to you on several occasions during the planning phase, as well as, during construction, that I was very concerned proper drainage so I wouldn't worry about moisture underneath my house. You assured me that I didn't need any type of additional drainage, and gutters were always a solution.

My garage has flooded continuously since the week prior to James City County's occupancy permit on or around June 11, 2003. At that time and several times after my garage flooded during the summer of 2003, I expressed my concern about the "pooling" of water around the east side of my foundation, the area of the front porch, as well as, the collection of water on my driveway. Immediately upon occupying in June 2003, I had expensive gutters installed, which were the only type approved by Ford's Colony. This was to help alleviate the drainage situation. I also dug out landscaping beds with drainage gullies around the beds to help the flood problem on the front of the porch grassy area and the east side of the house near the a/c unit to direct the water flow towards the small drainage pipes you had installed after my garage flooded several times. On several occasions before digging out trenches and landscaping beds, I saw at least 6 inches of water standing near the area of the HVAC unit.

I have witnessed for more than approximately 25+ times, my driveway become flooded with water in excess of 12 inches during heavy rainfall and more than 8 inches flooding in my garage. Family members and friends have witnessed this flooding as well, and I have had them help me on numerous occasions in cleaning up the aftermath of the flooding in my garage. I've had my garage flooded in excess of approximately 15 times that I have had to deal with, and this does NOT include the flooding that occurred last summer when I rented my home. Since I was not staying at my residence and had to rely on information from other sources, I cannot say exactly how many times my garage flooded. However, I know it flooded several times. I've had to throw away many items stored in my garage because of damage from my garage flooding during a downpour. On many occasions (to include a hurricane) in the middle of an electrical thunderstorm, I have had to run with my bare feet onto my flooded driveway into approximately 6 to 8 inches (and rising) of water (hoping that I wouldn't get struck by lightning) to "unclog" the two small green drainage holes, clean out the holes, and uncover the debris on the black drainage hole after it was installed.

On several occasions throughout the summer of 2003 (as you are aware), I had to call you or your Office Assistant, Maryann Truno, and again, last spring 2004, to ask for help due to my driveway and garage flooding. I have also had to contact Ford's Colony Homeowner's Association and Ford's Colony Security in regards to the flooding of my driveway and garage. I requested a meeting with you and Ford's Colony in September 2003. In October 2004, I was finally able to meet you, Mr. Ayers and Mr. Steve Hein from Ford's Colony Community Services to discuss the situation of flooding in my driveway, garage, the Ford's Colony drain on the street next to my property, and the drainage easement within 15 feet from the southwest corner of my house. I begged all of you at that time to please correct the drainage/flooding problems that was continuing and the stress of it in my life. Furthermore, I was tiring of cleaning up the mess and fearful of a moisture problem and mold that was developing on the garage walls. I also kindly informed all of you of my own observations of the situation (noting that I wasn't an expert) and asked you all to work together to come to a resolution. At that time, the drywall in my garage had suffered from moisture and mold was growing from the constant flooding throughout the summer and fall of 2003. (This meeting occurred after a flooding situation in October and following the aftermath of Hurricane Isabel. During the hurricane, I witnessed floodwaters rising in the southwest corner near the drainage easement in excess of 4 to 5 feet and had to call Ford's Colony Security. They were "confined to quarters" for a while and could not come out. At one point, they did respond and cleaned out the drainage area on the street next to my property to help with drainage.) Thankfully, immediately prior to the hurricane's arrival, you dug a deep trench next to the foundation of my garage that faces the street to keep my garage from flooding. I also strategically placed tarp in front of the garage door and secured it with bricks. These countermeasures worked in keeping my garage from flooding during the hurricane.

If the drainage/flooding problem on my property had been an isolated incident during Hurricane Isabel, I would believe it was due to the hurricane and not a significant drainage/flooding problem on my lot.

On three separate occasions, you have come out to install drainage pipes to tie into Ford's Colony drainage easement next to my property. The first two drains (green) were completely inadequate and are still there. Furthermore, you installed the small drainage hoses to the downspouts of the gutters and one hose laid on top of my lawn for over a month and it killed the sod grass. (The sod was never replaced; only a small amount of clay dirt was thrown down and some seed. I had to pay a professional lawn service to sow grass that Fall of 2003.) After the drainage hoses from the downspouts and the two green drainpipes were installed and found to be inadequate (again) because my garage and driveway was still flooding, you placed a larger drainage pipe (black) next to the smaller green drains. However, after the last drain (larger black drain) was installed, water was still collecting on my driveway in excess of 3 to 4 inches before it would "overflow" into the black drainage hole. I then informed you and Ms. Truno that the drain was an improvement over the small green drains; however, the black drain was positioned incorrectly because it was not in the swell of the driveway and asked you to reposition the black drain hole for better drainage. When I addressed this issue with you ...after my garage flooded again on May 26, 2004, you informed me that you would not do anything until Ford's Colony did something about the drainage problem. When I called for an emergency meeting with you and Mr. Mulhare, you met with me on May 28, 2004. I once again reiterated what was happening and what I had been witnessing during the flooding of my driveway and garage. Furthermore, I went on to explain that I thought the problem was two-fold. I informed you and Mr. Mulhare that the flooding of my driveway and garage had become a major problem for me and that I felt it shouldn't be my problem because I had paid you for constructing a custom home with proper drainage, and I pay my homeowners association dues to live in a nice community. At that time, I also explained my situation regarding my son's terminal illness, his many medical concerns, and his upcoming participation in an experimental drug trial to help save his life. I begged you both to please come to some type of conclusion as to what the problem was on my property and to fix the problems. I also informed you both that I would be out of the area for approximately 3 months and I was renting my house for five months to attend to my son's continuously increasing medical needs and his participation in the drug trials. In June and July 2004, I called Mr. Mulhare to inquire about the progress towards fixing the drainage/flooding on my property. To put it bluntly, my calls were ignored. After notifying the Ford's Colony HOA President via email, I was notified by email that the situation was going to be looked into by AES Consulting Engineers. I received a letter from Ford's Colony in late October 2004, which was dated September 30, 2004. The letter had to be forwarded through US Mail since I was NOT occupying my residence on Hollinwell Drive. TO DATE, I have not heard anything from you responding to their findings, nor have I heard anything more from Ford's Colony. I have not heard anything from you since May 28, 2004. Although you were sent a copy of their letter, I am not aware of you responding to their letter or the findings of AES Consulting Engineers. And...so my garage continued to be flooded last summer while I had it rented.

I will admit that I am no expert in this field; however, I am a very intelligent person. I know what I have witnessed on numerous occasions. I cannot tell you how many times

exactly my garage flooded last summer but I know it flooded several times. I was not able to occupy my house until November 2004. Once again, I had to clean my garage from debris and dirt (through away rugs, etc.) from the flooding of my garage. On several occasions since November, I have witnessed the flooding of my driveway again. I've had to run out before & during the rain and clean out the two small green drains, and make sure the black drainage hole was clear of debris. The driveway has continues to flood with about 3 inches of rain. Thankfully, we have not had any significant downpours thus far this season; however, we are beginning the time and season of thunderstorms and downpours so I am concerned about my garage flooding again.

I believe the problem of my garage/driveway flooding is two-fold:

First, I definitely believe there is a site problem from not being properly prepared, graded, or following the site plan. According to the site plan (per Ford's Colony and AES), the yard was supposed to be graded and sloped towards the greenway and away from the garage and instead the slope runs towards the driveway and garage. Consequently, water drains following the slope of my yard from a southern and eastern direction onto my driveway and from the downward slope of the driveway (from the north).

Secondly, I have a vantage point from my dining room window looking out which faces north. I can see the slope of the street (on Hollinwell) from points north, east, and west. I have witnessed during many occasions of heavy rainfalls or downpours that the slope of the street of Hollinwell converges upon the drainage point on the main drain just to the west and in front of my house. All the water runs down the street and curbs towards that drain and whenever it is a significant downpour, the drain cannot handle the amount fast enough and as a result, the drain backs up temporarily. The water overflows, jumps the curb, and onto my property (and the greenway property) and consequently, due to the **existing drainage problem** that already exists on my lot, it starts flowing down my driveway and into my garage. Although the debris on that drain can make the situation worse, and cause the drain to back up, **it does not exclusively** cause the problem of the drain backing up. I have witnessed on several occasions flooding in that area of the street when the drain was NOT clogged with debris. **I will address this issue with Ford's Colony.**

I do appreciate you having my garage sheetrock repainted last May, and the previous attempts to alleviate the problem of adding drainage pipes which drain into Ford's Colony's drainage system next to my property. Unfortunately, the drainage pipes you installed are inadequate and have not corrected the problem of my driveway flooding during heavy rain and my garage flooding. Furthermore, these drain hole covers are an eyesore to the front of my property and do not look very professional for a custom home. Although Ford's Colony may have drainage issues for the greenway easement next to my property and the street drain, **this does not exempt you from your obligation to resolve the issue of the drainage problems on my lot (and/or the need to move the black drain hole to the optimum location for drainage and/or correct the eyesore).**

In conclusion, I will be hiring my own independent engineer to access the drainage problem on my lot, and to access the findings of AES (that my garage was built about 1.5 feet lower than the design called for on the site plan and if the slope was followed per the site plan). I will once again ask Ford's Colony for their assistance in resolving the drainage easement problem next to my property on the west side and the problem with the drains (at the rear of the easement and on the street) backing up as it drains underground into the pond and overflowing onto my property during periods of heavy rainfall. Furthermore, I will also ask for assistance from James City County's Environmental Division and Code Compliance.

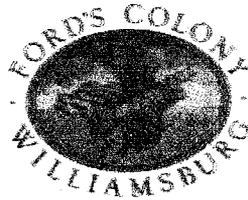
I kindly ask for your assistance in solving this problem and respectfully ask for your reply ~~within 30 days~~ from the receipt of this letter as to how and when you will correct the drainage problem on my property so my garage and driveway will not continue to be flooded during heavy rain.

Sincerely,

Brenda D. Eadie

Brenda D. Eadie

Cc: Drew Mulhare, V. President of Operations, Community Services at Ford's Colony
Chris Henderson, President of Ford's Colony Homeowner's Association
Ford's Colony Homeowner's Association Board of Directors
Douglas Murrow, Director of James City County Code Compliance
✓ Patrick Menichino, Environmental Inspections Supervisor, JCC Environmental Div.
David Blalock, Peninsula Housing & Builders Association



September 30, 2004

Ms. Brenda Eadie
109 Hollinwell
Williamsburg, VA 23188

Re: Drainage on Lot 103, Section 10

Dear Ms. Eadie,

The purpose of this letter is to provide a summary of the findings of an engineering firm retained to study the conditions on your lot and adjacent common area, and to offer recommendations to remedy the conditions noted. AES Consulting Engineers produced the attached report at the request of the Ford's Colony at Williamsburg Homeowners Association (FCHOA) to document whether the FCHOA's drainage system was flooding your lot.

The FCHOA drainage system is operating within design parameters. As noted in AES' report, any debris that would serve to clog the inlet or pipe system would increase the potential for flooding. For that reason, Project Maintenance has the inlet adjacent to your property on its list of critical areas to visit and maintain. Prior to the arrival of any significant rainfall, the maintenance staff visits your area to ensure that debris is cleared from the gutter and grate.

AES found that your garage is built about 1.5 feet lower than the design called for on the site plan, and that the majority of the driveway is sloped toward the garage. To help mitigate this condition, the builder installed three inlets to catch water and convey it to the drainage system that runs to the west of your lot. As is the case with the FCHOA inlet, these inlets will fail to operate properly if clogged, and AES found that two were clogged at the time of the inspection. The effectiveness of tie-in to the FCHOA's drainage system is also unknown, and could be compromising the ability of your drain system to function.

Perhaps the most significant problem is that the front yard is sloped toward the garage instead of toward the greenway as called for on the site plan. Any water that breaches the curb during a heavy rainfall will run toward your driveway and garage.

We recommend that the drain inlets and piping on your lot be removed. It is imperative that the connection point to the FCHOA's drain pipe be repaired as soon as possible. We also recommend that the front yard be regraded as shown on your site plan to provide positive drainage from the driveway to the greenway to the west of your lot. In order to ensure that your garage is not flooded, you may wish to raise the floor of the garage and the area of the driveway closest to the garage to improve the slope toward the front yard.

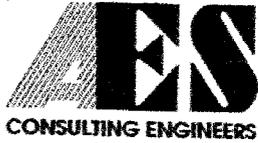
Sincerely,



Drew R. Mulhare
President, Realtec Community Services

Copy: Edgerton Contracting, Inc.

100 Manchester Drive ~ Williamsburg, Virginia 23188
757-258-4230 ~ Fax 757-258-4065
1-800-334-6033 ~ www.fordscolony.com



5248 Olde Towne Road • Suite 1 • Williamsburg, Virginia 23188
(757) 253-0040 • Fax (757) 220-8994 • E-mail aes@aesva.com

August 30, 2004

Mr. Drew R. Mulhare
Realtec Community Services
100 Manchester Drive
Williamsburg, Virginia 23188

**RE: Ford's Colony, Section X, Lot 103 – Drainage Study
AES Project #5652-43**

Dear Drew:

Per your request, this letter is to summarize our findings of the drainage study that was performed in the vicinity of Lot 103 and the ultimate low point of Hollinwell Road in Section X. AES Consulting Engineers completed an as-built survey and field inspection of the drainage system, the adjacent road and the homesite of Lot 103. The purpose of this study was to determine the adequacy of the outfall piping system which drains from Hollinwell to the existing stormwater management facility located along the golf course in the rear of Lots 104-106 in Section X. Additionally, the study was undertaken to determine if the system is flooding the improvements on Lot 103.

Upon reviewing the as-built information collected in the field, a few items are to be noted. The diameter of the piping system has been built in accordance with the construction plans. The elevations of the structure tops and inverts have deviated from the design elevations. Once this was recognized, hydraulic calculations were performed on the outfall of the system using the as-built elevations and original design flowrates. The hydraulic model indicates that the ten year design storm does not surcharge the system into the street, although there is minimal freeboard. It should be anticipated that larger storm events will cause the inlet at the street in front of Lot 103 to flood. It is important to note that this is under ideal conditions, which assumes there is no clogging of the inlets or pipe system. Any clogging would increase the flood potential. It was also noted that the inlet at the sump of Hollinwell adjacent to Lot 103 is in poor condition, specifically the pipe inlets into the structure.

The elevations of the existing improvements to Lot 103 are also of concern. The finish floor of the garage is approximately 2 feet below the elevation of the street at the driveway tie-in location. The majority of the driveway is graded towards to garage and there is minimal slope on the driveway to convey the drainage away from the building. Upon reviewing the approved development plan for Lot 103, it was noted that the garage was built approximately 1.5 feet lower than the design elevation. Three drainage inlets have been installed at the edge of the driveway to help convey the water off of the property. These three inlets drain to the main drainage system, described above, which is located to the west of Lot 103. Two of these three inlets were clogged during the field inspection which would render them useless during a storm event.

Mr. Drew Mulhare

August 30, 2004

Page 2 of 2

There are a few unknown variables that could also be affecting the performance of the storm drainage system, which in turn, would have the potential to flood Lot 103. It is unknown how the three inlets that drain the driveway area of Lot 103 were tied into the main roadway drainage system. The roadway drainage system pipe material is corrugated metal. The drains from Lot 103 appear to be high density polyethylene pipe. As there are no readily available, fabricated junctions to make this type of connection, it appears as though a substandard connection has been made which could have adverse hydraulic effects on the system. There is also a depression in the area where the connections appear to have been made which is indicative of silt entering the system.

Based on the as-built survey, the grading of the front yard of Lot 103 is further increasing the flood potential into the garage. The emergency water route is blocked by the existing mulch bed at the northwestern most corner of the house. Additionally, the grade of the front yard falls towards the inlets at the driveway. During a minimal storm event, it is anticipated that water would flow into the garage. This is a significant problem and the front yard should be regraded to provide positive drainage away from the driveway to the existing ditch in the greenway on the western side of the house. Based on the existing grading, if the inlet along Hollinwell becomes clogged during a storm event, the water would breach the curb and further increase the amount of runoff to the drains at the driveway.

It is our recommendation that the inlets at the driveway be removed in their entirety, from the driveway to the main pipe system, to include repairing the connection point. The front yard should be regraded to provide positive drainage from the driveway to the greenway on the west side of the homesite. This can be accomplished by grading a grass swale approximately 70 feet long from the driveway to the existing ditch. Reworking of the landscaping in the front yard is also necessary to prevent impeding the flow of water to the greenway. Routine maintenance of the roadway drainage system should also be performed to prevent clogging of the roadside drainage inlets.

Please see the attached as-built survey which was prepared as part of this study. Should you have any questions or need any additional information, please give me a call.

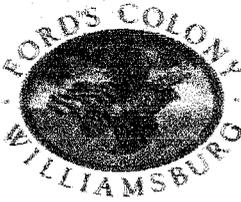
Sincerely,
AES Consulting Engineers



Charles B. Records, P.E.
Project Manager

Attachments

S:\Jobs\565243-Recreation Area (Section 10)\Wordproc\Document\565243104.cbr.doc



January 21, 2004

Ms. Brenda Eadie
109 Hollinwell Drive
Williamsburg, VA 23188

RE: **Homesite 103 /Section X**
Ford's Colony

Dear Ms. Eadie:

Representatives of the Environmental Control Committee inspected the above referenced homesite for consideration of refunding the surety deposit. Approval is pending for the following reason(s):

Site:

- 1) Restore the adjacent HOA easement that resulted from construction building at the above-mentioned homesite. (See attached letter dated July 31, 2003)
- 2) The side and rear yard will require additional stabilization.
- 3) The drainage pipe in the right rear yard needs to be buried.
- 4) The front yard (directly in front of the garage) has been back graded. As a result, water flows from the right to left instead of toward the greenway and eventually down to the golf course and pond. The water is now directed to the right side of the driveway and garage. The installed DI does not appear adequate to handle the volume of water in a significant rain fall.

House:

- 5) The HVAC fence needs to be painted or solid stained white or off-white.
- 6) Foundation vents will need to be installed on the front of the garage in accordance to the approved architectural drawings dated 10/08/02.
- 7) The ridge-mounted chimney that has been constructed is unacceptable. First, the chimney will require a traditional cap with corbeling. (See attachment) Second, please verify the chimney is the same brick as the foundation.
- 8) The pediments over the front elevation windows have been omitted without proper approval.

The Committee approved an extension of 90 days to comply with the above items. The ECC must receive any written request with photos for specific variances within 30 days. If the discrepancies cannot be accomplished within this schedule, then a written plan, including timing, for the remedy of the discrepancies within a reasonable time frame must be submitted to the ECC so further action will not be necessary, including the forfeit of the surety deposit.

Please contact this office for a reinspection when the above items have been resolved. Note, there will be a \$200.00 fee for a reinspection that will be deducted from the surety bond.

100 Manchester Drive ~ Williamsburg, Virginia 23188
757-258-4230 ~ Fax 757-258-4065
1-800-334-6033 ~ www.fordscolony.com

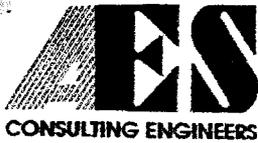
Your cooperation and prompt attention to the above issues will be greatly appreciated. If you have any questions regarding this letter, please do not hesitate to call me at 757-258-4230. Thank you for adhering to the guidelines of the Environmental Control Committee.

Sincerely,



Lynn D. Combs
Administrative Assistant
Environmental Control Committee

cc: ECC file 103 /Section X
Edgerton Contracting
Field Inspector/Mr. Ed Flook



5248 Olde Towne Road • Suite 1 • Williamsburg, Virginia 23188
(757) 253-0040 • Fax (757) 220-8994 • E-mail aes@aesva.com

August 30, 2004

Mr. Drew R. Mulhare
Realtec Community Services
100 Manchester Drive
Williamsburg, Virginia 23188

**RE: Ford's Colony, Section X, Lot 103 – Drainage Study
AES Project #5652-43**

Dear Drew:

Per your request, this letter is to summarize our findings of the drainage study that was performed in the vicinity of Lot 103 and the ultimate low point of Hollinwell Road in Section X. AES Consulting Engineers completed an as-built survey and field inspection of the drainage system, the adjacent road and the homesite of Lot 103. The purpose of this study was to determine the adequacy of the outfall piping system which drains from Hollinwell to the existing stormwater management facility located along the golf course in the rear of Lots 104-106 in Section X. Additionally, the study was undertaken to determine if the system is flooding the improvements on Lot 103.

Upon reviewing the as-built information collected in the field, a few items are to be noted. The diameter of the piping system has been built in accordance with the construction plans. The elevations of the structure tops and inverts have deviated from the design elevations. Once this was recognized, hydraulic calculations were performed on the outfall of the system using the as-built elevations and original design flowrates. The hydraulic model indicates that the ten year design storm does not surcharge the system into the street, although there is minimal freeboard. It should be anticipated that larger storm events will cause the inlet at the street in front of Lot 103 to flood. It is important to note that this is under ideal conditions, which assumes there is no clogging of the inlets or pipe system. Any clogging would increase the flood potential. It was also noted that the inlet at the sump of Hollinwell adjacent to Lot 103 is in poor condition, specifically the pipe inlets into the structure.

Need to see this!

The elevations of the existing improvements to Lot 103 are also of concern. The finish floor of the garage is approximately 2 feet below the elevation of the street at the driveway tie-in location. The majority of the driveway is graded towards to garage and there is minimal slope on the driveway to convey the drainage away from the building. Upon reviewing the approved development plan for Lot 103, it was noted that the garage was built approximately 1.5 feet lower than the design elevation. Three drainage inlets have been installed at the edge of the driveway to help convey the water off of the property. These three inlets drain to the main drainage system, described above, which is located to the west of Lot 103. Two of these three inlets were clogged during the field inspection which would render them useless during a storm event.

There are a few unknown variables that could also be affecting the performance of the storm drainage system, which in turn, would have the potential to flood Lot 103. It is unknown how the three inlets that drain the driveway area of Lot 103 were tied into the main roadway drainage system. The roadway drainage system pipe material is corrugated metal. The drains from Lot 103 appear to be high density polyethylene pipe. As there are no readily available, fabricated junctions to make this type of connection, it appears as though a substandard connection has been made which could have adverse hydraulic effects on the system. There is also a depression in the area where the connections appear to have been made which is indicative of silt entering the system.

Based on the as-built survey, the grading of the front yard of Lot 103 is further increasing the flood potential into the garage. The emergency water route is blocked by the existing mulch bed at the northwestern most corner of the house. Additionally, the grade of the front yard falls towards the inlets at the driveway. During a minimal storm event, it is anticipated that water would flow into the garage. This is a significant problem and the front yard should be regraded to provide positive drainage away from the driveway to the existing ditch in the greenway on the western side of the house. Based on the existing grading, if the inlet along Hollinwell becomes clogged during a storm event, the water would breach the curb and further increase the amount of runoff to the drains at the driveway.

It is our recommendation that the inlets at the driveway be removed in their entirety, from the driveway to the main pipe system, to include repairing the connection point. The front yard should be regraded to provide positive drainage from the driveway to the greenway on the west side of the homesite. This can be accomplished by grading a grass swale approximately 70 feet long from the driveway to the existing ditch. Reworking of the landscaping in the front yard is also necessary to prevent impeding the flow of water to the greenway. Routine maintenance of the roadway drainage system should also be performed to prevent clogging of the roadside drainage inlets.

Please see the attached as-built survey which was prepared as part of this study. Should you have any questions or need any additional information, please give me a call.

Sincerely,
AES Consulting Engineers



Charles B. Records, P.E.
Project Manager

Attachments

S:\Jobs\565243-Recreation Area (Section 10)\Wordproc\Document\565243104.cbr.doc

PAT-

5/9

She said she had sent you
a letter on her problem -
drng in Fords Col.

Darryl

WATERSHED PC
BMP ID NO 081
PLAN NO
TAX PARCEL (31-4)(2-2)
PIN NO 3140200002
CONSTRUCTION DATE 1/1/1988
PROJECT NAME Ford's Colony Sec 10
FACILITY LOCATION Behind (south) 117 Hollinwell
CITY-STATE Williamsburg, VA
CURRENT OWNER Fords Colony Country Club Inc.
OWNER ADDRESS 240 Fords Colony Drive
OWNER ADDRESS 2
CITY-STATE-ZIP CODE Williamsburg, VA 23188
OWNER PHONE
MAINT AGREEMENT Yes
EMERG ACTION PLAN No

MAINTENANCE PLAN No
SITE AREA acre 2400
LAND USE SF Residential
old BMP TYP Wet Pond
JCC BMP CODE
POINT VALUE 6
SVC DRAIN AREA acres 32
SERVICE AREA DESCR FORDS COLONY MASTER PLAN
IMPERV AREA acres
RECV STREAM UT of Powhatan Creek
EXT DET-WQ-CTRL No
WTR QUAL VOL acre-ft 5.7
CHAN PROT CTRL No
CHAN PROT VOL acre-ft 0
SW/FLOOD CONTROL No
GEOTECH REPORT No

CTRL STRUC DESC
CTRL STRUC SIZE inches
OTLT BARRL DESC RCP
OTLT BARRL SIZE inch 24
EMERG SPILLWAY No
DESIGN HW ELEV
PERM POOL ELE
2-YR OUTFLOW cfs
10-YR OUTFLOW cfs
REC DRAWING No
CONSTR CERTI No
LAST INSP DATE 9/11/2000
INTERNAL RATING 3
MISC/COMMENTS
 8th Hole Pond.

Get Last BMP No

Return to Menu

X	1. ORIGINAL	CERTIFICATE OF USE AND OCCUPANCY JAMES CITY COUNTY	4 TAX MAP NO (31-3)(07-0-0103-)
	2. CHANGE IN USE		5 BUILDING PERMIT NO. 23402
	3. TEMPORARY (See Special Conditions)		

This certificate is issued pursuant to the requirements of Section 117.0 of the Virginia Uniform Statewide Building Code and it (1) certifies that at the date of issuance this structure as identified below is deemed to be in compliance with the applicable provisions of the Virginia Uniform Statewide Building Code as they apply to the following use and occupancy and (2) authorizes the use and occupancy as described below:

(The expiration date of a Temporary Certificate appears beside Special Conditions.)

STRUCTURE	LOCATION	6 NUMBER AND STREET 109 HOLLINWELL		LOCATION CHARACTERISTIC		YES	NO	
		7 CITY AND ZIP CODE WILLIAMSBURG, VA		9 PRIMARY SERVICE AREA		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		8 PROJECT NAME FORDS COLONY		10 OVERLAY DISTRICT		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	USE	12 PURPOSE FOR WHICH STRUCTURE MAY BE USED SFD		11 FLOODPLAIN		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
		13 ZONING DISTRICT R-4						
		SPECIAL CONSIDERATION (PLACE CASE NUMBER IN BOXES)						
ACTION		YES	NO	ACTION		YES	NO	
14. SPECIAL USE PERMIT		<input type="checkbox"/>	<input checked="" type="checkbox"/>	15. SITE PLAN		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
16. CONDITIONAL USE PERMIT		<input type="checkbox"/>	<input checked="" type="checkbox"/>	17. VARIANCE		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
IMPROVEMENT DATA	18. USE GROUP CLASSIFICATION R-4			19. TYPE OF CONSTRUCTION 5B				
	20. TYPE OF IMPROVEMENT 01							
OWNER	21. NAME BRENDA EADIE							
	22. NUMBER AND STREET 105 TADWORTH							
	23. CITY AND STATE WILLIAMSBURG, VA				24. ZIP CODE 23188			
SPECIAL CONDITIONS	25. LIST DETAILS OF SPECIAL CONDITIONS CODE MODIFICATION APPROVED TO CABO 602.9 AND 302							
SIGNATURE	26. BUILDING OFFICIAL <i>Wynona H. Munnally</i>				27. DATE OF ISSUE 11-Jun-2003			

ENVIRONMENTAL DIVISION CITIZEN COMPLAINT RESPONSE FORM

Complainant's Name: Brenda Edie

Address: 109 Hollinwell Dr.

Telephone No.: 565-2909 / cell 329-8039

Date Received: 5/9/05

Date Assigned: _____

Location of Problem: _____

Type of Complaint

- Drainage
- Erosion
- Land Disturbing
- Tree Removal
- Sink Hole
- Street Sign
- Street Light
- Other:

Inspector Assigned: Pat or Jordan

Watershed Code: _____

Date Investigated: _____

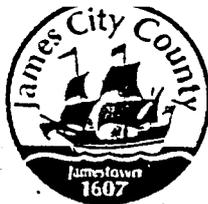
Complainant Contacted? Yes No

Field Investigation? Yes No

Follow up Required? Yes No

Results of Investigation:

LEFT Mes



JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670

Fax Number: 757-259-4032

DATE SENT: 5-21-05

Name: Charles Records
 Firm or Company: AES Consulting Engineers
 Facsimile Number: 220-8994
 Number of pages including this transmittal: 4
 From: Scott J. Thomas

James City County
 P O Box 8784
 Williamsburg VA 23187-8784

Comments: Drainage complaint 109 Holinwell, Lot 103 section
10 Ford's Colony.
 1) I need to see information as underlined on attached letter.
 2) I believe there is also a problem with the p/s BMP.

If you do not receive all pages, call 757-253-6670 as soon as possible

I will need to talk with you about this situation after I've had a chance to gather some information.

BMP

1. Is normal pool higher than normal.
2. Can't find control structure
3. Was it built per plan?
4. Is it creating tailwater condition on Holinwell storm pipe system that wasn't anticipated in design?
5. Do gutter comps show that drainage along roll-top gutter is contained for 10-year storm. May overtop gutter down her driveway even before inlet backs up?
6. Meet to look at BMP?

PROTECTING RESOURCES
PRIDE
 IN DELICATE ENVIRONMENTS



SCOTT J. THOMAS, P.E.
 SENIOR ENGINEER

ENVIRONMENTAL DIVISION

101 MOUNTS BAY ROAD, P.O. BOX 8784 (757) 253-6639
 WILLIAMSBURG, VIRGINIA 23187-8784 FAX: (757) 259-4032
 E-MAIL: scottt@james-city.va.us

**ENVIRONMENTAL DIVISION REVIEW COMMENTS
FORD'S COLONY LOT 103 SECTION 10 (109 HOLLINWELL)
DIVISION PLAN NO. E&S - 08 - 08**

April 11, 2008

General:

1. It does not appear that a Land-Disturbing Permit is required for the project.
2. It appears that grading is proposed beyond the property lines of Lot 103 (109 Hollinwell) into areas designated as "Greenways". Evidence of permission from the Greenway owner is required before our Division can approve the drainage improvement plan.
3. Label the area to the east of Lot 103 (109 Hollinwell). Based on County GIS information it appears that this is Lot 107. Also, based on County GIS information, the lot to the west is Lot 115, not Lot 104.
4. Many of the construction notes in the upper-right hand corner of the plan sheet appear to not be needed for this project.
5. The note that labels the greenway to the south of the lot cannot be read. It is covered up by erosion and sediment control Note # 20 and # 21.

Erosion & Sediment Control:

6. Provide a brief sequence of construction which includes when stabilization is to occur.
7. The plan sheet shows a detail for a rock check dam erosion and sediment control measure; however, there is none shown on the plan view.

Stormwater Management / Drainage:

8. Based on County GIS, the potential exists for about ½ acre of upslope drainage area to be conveyed to the proposed inlet. Provide inlet and storm drainage computations to show that triple 8-inch drain pipes have adequate capacity to handle upslope and onsite flows for the 10-year design event. Also, ensure that depth of flow at the inlet does not impact the home (109 Hollinwell) or upslope properties. (Note: Refer to Item # 2.6, # 2.8, # 2.9, # 2.12 and entire Section 4.0 of the *James City County Environmental Division, Stormwater Conveyance Drainage Systems, General Design and Construction Guidelines.*)
9. Provide additional information on the type of HDPE pipe to be used for the project (ie. AASHTO M252, etc.). Provide a bedding details for drain pipe installation or, alternatively, provide notes referencing installation in accordance with ASTM D2321 or VDOT PB-1.

10. Provide a detail for the cleanout structures as proposed. Also, there appears to be a cleanout missing of the easternmost 8-inch pipe at the first bend from the inlet.
11. For the lot owner's benefit, provide a brief maintenance plan for system cleaning and operation, including any special long-term maintenance requirements for the Scourstop © product.



FINA
C 0015





N/F GRAY ASSOCIATES

PUBLIC SERVICE AREA
D.J. MONTAGUE

N/F WARHILL CORPORATION

GOLF MAINTENANCE

WELL #1

A-18
SUGAR BUSH (ROYAL ABDEEN)

A-10
(ST. ANDREW)

A-32

ADMINISTRATIVE BUILDING

SALES OFFICE &
INFORMATION CE

A-8b

A-8
(HIGHLAND HILLS)

A-17
(MCGREGOR DOWNS)

A-34

D-2

GOLF CLUBHOUSE
AND
PRO SHOP

A-33

D-1

FUTURE DEVELOPMENT

MARRIOTT'S
MANOR CLUB

A-5a

MARRIOTT'S
MANOR CLUB II

A-5

B-1
(THE LINKS)

B-1
(THE LINKS)

A-1

H-16

H-15

H-14

H-13

H-12

H-11

H-10

H-9

H-8

H-17

H-18

H-19

H-20

H-21

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109 HOLLINWELL

PC081

109 Holinwell Road
Lot 103, Section 10 Ford's Colony
(Eadie Residence)