See also PC112

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: **PC111**

DATE VERIFIED: **June 5, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

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 PC111

PIN: 3810100004

Subdivision, Tract, Business or Owner Name (if known): Fords Colony

Property Description: Parcel A Section 13A

Site Address:

(For internal use only) **Box:** FC001 **Drawer:** 1

Agreements: (in file as of scan date) **N** **Book or Doc#:** **Page:**

Comments:
This is a combined folder with PC112

A. GENERAL NOTES:

1. THIS DRAWING REPRESENTS AN ACTUAL FIELD SURVEY AND ALL THE INFORMATION SHOWN HEREON IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.
2. HOUSE DIMENSIONS BASED ON INFORMATION SUPPLIED BY OWNER/DEVELOPER. CONTRACTORS TO VERIFY ALL DIMENSIONS.
3. ALL TREES MAY BE REMOVED WITHIN THE CLEARING LIMITS SHOWN HEREON.
4. ALL TREES LARGER THAN 3" IN DIAMETER AND OUTSIDE THE CLEARING LIMITS MAY NOT BE REMOVED WITHOUT THE CONSENT OF FORD'S COLONY OR ITS ASSIGNS.
5. THIS LOT IS NOT IN THE FLOOD PLAIN.
6. I HAVE BEEN RETAINED AND PAID TO STAKE, AS A MINIMUM, THE BUILDING ENVELOPE AND ANY DETACHED ACCESSORY STRUCTURES.

SIGNED: A.D. Sebert DATE 5/22/2001
A.D. SEBERT, L.S.

B: BUILDING SETBACKS (PER COVENANTS):

1. FRONT SETBACK: 15 FEET FROM FRONT LOT LINE
2. REAR SETBACK: 30' OR AS INDICATED
3. SIDE SETBACKS: 5 FEET OR 10 FEET AS INDICATED

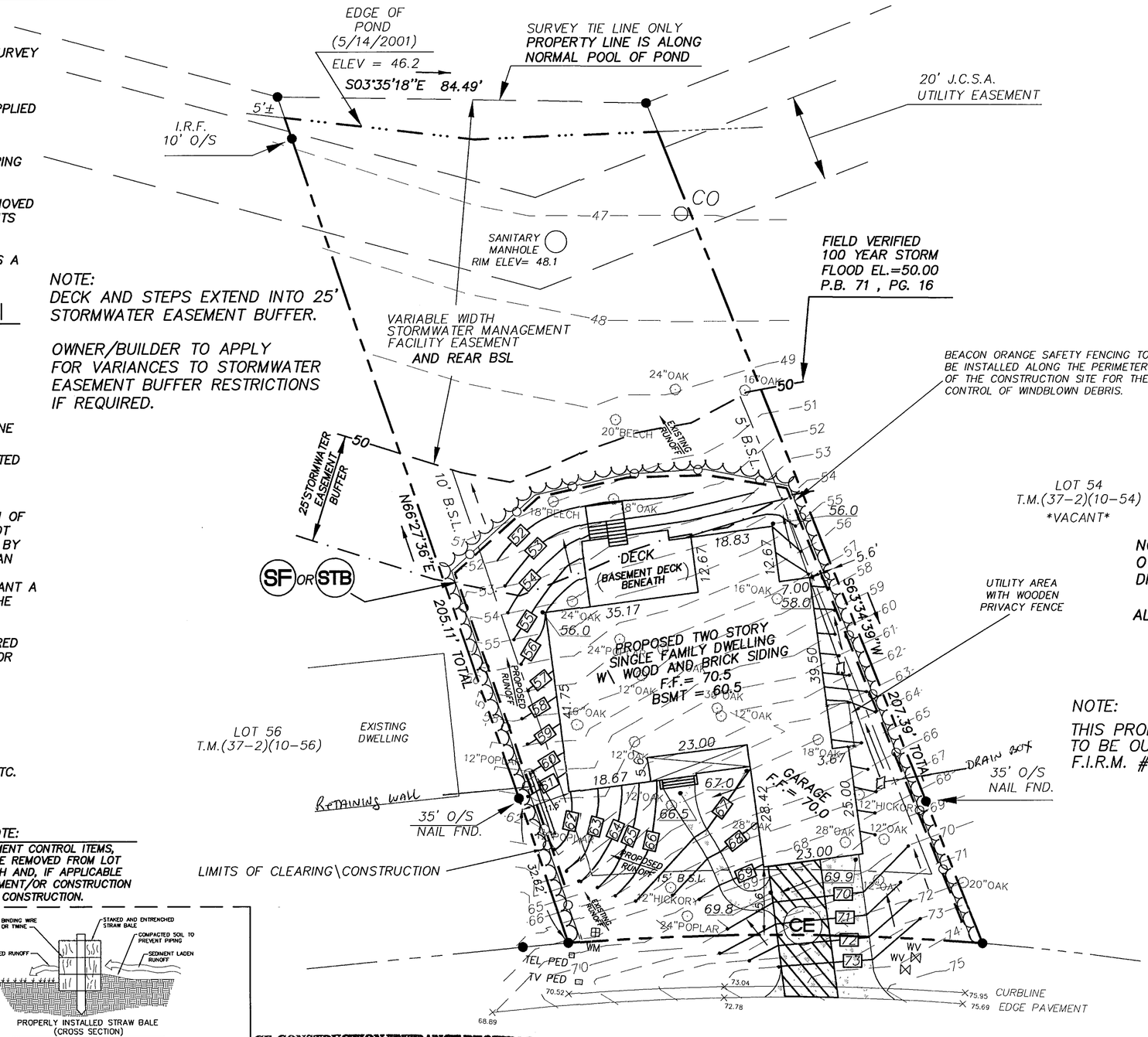
4. IN THE EVENT THE ENVIRONMENTAL CONTROL COMMITTEE SHALL DETERMINE THAT APPLICATION OF THE AFORESAID SETBACKS TO A PARTICULAR LOT WOULD UNREASONABLY LIMIT THE USE THEREOF BY THE OWNER AND EFFECTIVELY DEPRIVE HIM OF AN APPROPRIATE CONSTRUCTION SITE, THE ENVIRONMENTAL CONTROL COMMITTEE SHALL GRANT A VARIANCE TO THE OWNER OF SAID LOT FROM THE PROVISIONS OF THESE SETBACK REQUIREMENTS.

NOTE: OWNER AND CONTRACTOR ARE HEREBY REFERRED TO FORD'S COLONY PROTECTIVE COVENANTS FOR MORE COMPLETE DEFINITIONS AND LOCATIONS OF ADDITIONAL EXISTING EASEMENTS AND SETBACKS NOT SHOWN ON THIS DRAWING.

NOTE: TOPOGRAPHY AS SHOWN IS BASED ON AERIAL PHOTOGRAPHY OF THE FORD'S COLONY PROJECT AND DOES NOT REFLECT ANY NEW CONSTRUCTION OF ROADS AND/OR DITCHES, ETC.

EROSION CONTROL NOTE:

UPON REMOVAL OF ALL EROSION AND SEDIMENT CONTROL ITEMS, ALL TRAPPED/CONTAINED SEDIMENT SHALL BE REMOVED FROM LOT AND PROPERLY DISPOSED OF. ROADSIDE DITCH AND, IF APPLICABLE OUTFALL DITCHES SHALL BE CLEANED OF SEDIMENT/OR CONSTRUCTION DEBRIS ON A REGULAR BASIS DURING CONSTRUCTION.



NOTE:
DECK AND STEPS EXTEND INTO 25' STORMWATER EASEMENT BUFFER.

OWNER/BUILDER TO APPLY FOR VARIANCES TO STORMWATER EASEMENT BUFFER RESTRICTIONS IF REQUIRED.

RECORD MERIDIAN
PLAT BOOK 71 , PAGE 16

GRAPHIC SCALE
20' 0' 20' 40'
SCALE: 1" = 20'

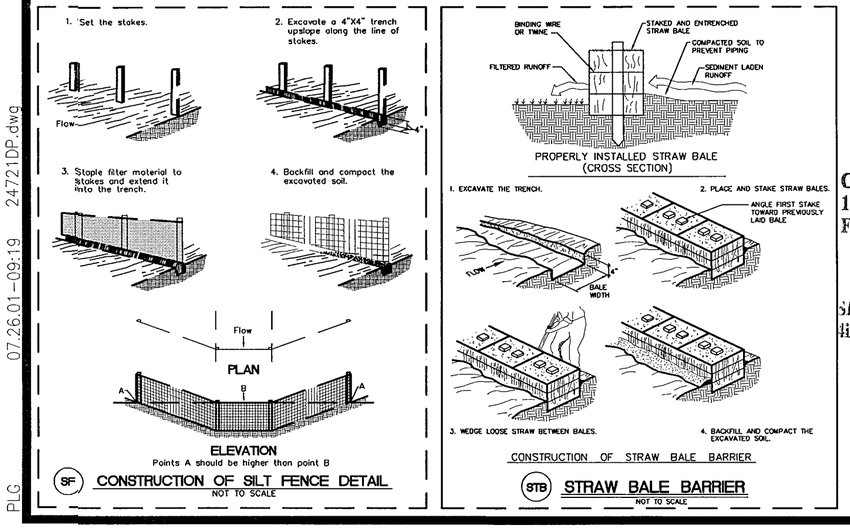
AREA OF LOT 55
17,170 S.F.±
0.394 AC.±

NOTE:
OWNER/ BUILDER TO VERIFY ALL BUILDING DIMENSIONS PRIOR TO BEGINNING CONSTRUCTION.

ALL DIMENSIONS ARE TO FRAME LINE.

NOTE:
THIS PROPERTY LIES IN ZONE X, (AREAS DETERMINED TO BE OUTSIDE THE 500 YEAR FLOOD PLAIN) PER F.I.R.M. #510201-0035 B, DATED 2/06/91.

NOTE:
PROVIDE STONE CONSTRUCTION ENTRANCE DURING CONSTRUCTION. CONTRACTOR RESPONSIBLE FOR KEEPING SOUTH TURNBERRY FREE OF MUD AND DEBRIS ADJACENT TO PROPOSED DRIVEWAY



SF CONSTRUCTION OF SILT FENCE DETAIL
NOT TO SCALE

STB STRAW BALE BARRIER
NOT TO SCALE

CE-CONSTRUCTION ENTRANCE REQUIRED
10ft x 70ft x 6in of #1 STONE ON
FILTER FABRIC

SF-SILT FENCE REQUIRED ENTRENCHED
6in, STAKED EVERY 6ft

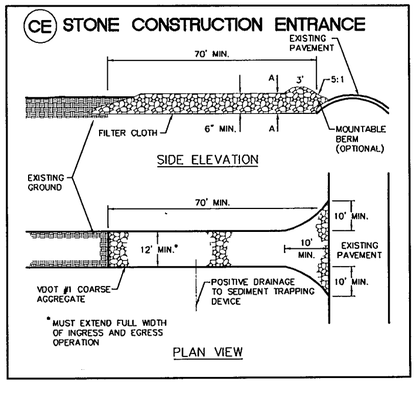
NOTES:

1. ALL DISTURBED AREAS ARE TO BE SEEDED, SODDED, OR MULCHED WITHIN 7 DAYS OF REACHING FINAL GRADE.
2. NO RPA CHESAPEAKE BAY AREAS ARE LOCATED ON OR ADJACENT TO PROPERTY SHOWN.

ECS APPROVED AS NOTED
BY CEO 8-13-01
Wind Exposure A/B

CURVE DATA

DELTA=09°04'53"
RADIUS=600.00'
LENGTH=95.10'
TANGENT=47.65'
CHORD=95.00'
C.B.=N04°35'17"W



TAX PARCEL: (37-2)(10-55)
STREET ADDRESS: #105 SOUTH TURNBERRY

07.26.01-09:19 24721DP.dwg
PLG

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

DEVELOPMENT PLAN
LOT 55, SECTION XIVB
FORD'S COLONY
@ WILLIAMSBURG
ALBANESE RESIDENCE
BUILDER: LARRY KITCHENS
BERKELEY DISTRICT JAMES CITY COUNTY VIRGINIA

COMMONWEALTH OF VIRGINIA
5/22/2001
A.D. SEBERT
NO. 002221
LAND SURVEYOR

No.	DATE	REVISION / COMMENT / NOTE	BY
2	7/26/01	MOVED HOUSE FORWARD, REVISED DIMS. AND GRADING	PLG
1	6/8/01	ADDED GRADING, POND BUFFER, MOVED HOUSE BACK	ADS

Designed ADS/PLG	Drawn ADS/PLG
Scale 1"= 20'	Date 5/22/01
Project No. 24721	
Drawing No. 1 of 1	

PC111_FORDS_COLONY_PARCEL_A_SEC_13A - 003

STANDARD
EROSION AND SEDIMENT CONTROL NOTES
for James City County, Virginia
1992

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 entering onto adjacent properties or State waters. If field inspection reveals the inadequacy of the plan to confine sediment to the project site, appropriate modifications will be made to correct any plan deficiencies.

1. All erosion and sediment control measures shall be installed and maintained in accordance with the "Virginia Erosion and Sediment Control Handbook". The contractor shall be thoroughly familiar with all applicable measures contained therein which may be pertinent to this project.

2. 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.

3. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment on-site must be constructed as a first step in grading and be made functional before upslope land disturbance takes place. Earthen structures such as dams, dikes, and diversions must be seeded and mulched immediately after installation. An on-site pre-construction meeting will be held between the Department of Public Works and the Contractor to identify those measures to be initially installed.

4. Maintenance of all erosion and sediment control measures shall be accomplished in accordance with the "Virginia Erosion and Sediment Control Handbook". Maintenance will include the repair of measures damaged by any subcontractor including those of the public utility companies. At the pre-construction meeting, the contractor will supply Public Works with the name of the individual who will be responsible for ensuring maintenance of installed measures on a daily basis.

5. Surface flows over cut and fill slopes shall be controlled by either redirecting flows from transversing the slopes or by installing mechanical devices to safely lower water downslope without causing erosion. A temporary fill diversion (Std. & Spec. 1.16) shall be installed prior to the end of each working day.

6. Sediment control measures may require minor field adjustments at time of construction to insure their intended purpose is accomplished. Department of Public Works approval will be required for other deviations from the approved plans.

7. The contractor shall strip and pile topsoil at the locations shown on the plan or as directed by the engineer. Silt fence shall be placed at the toe of the stockpile after stripping of topsoil is complete.

8. The contractor shall complete drainage 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. Outfall ditches from drainage structures shall be stabilized immediately after construction of same. This includes installation of erosion control stone where required. Any drainage outfalls required for a street must be completed before street grading begins.

9. Permanent or temporary soil stabilization must be applied to all denuded areas within 7 days after final grade is reached on any portion of the site. Soil stabilization must also be applied to denuded areas which may not be at final grade but will remain dormant (undisturbed) for longer than 30 days. Soil stabilization measures include vegetative establishment, mulching and the early application of gravel base material on areas to be paved.

10. No more than 300' of sanitary sewer, storm sewer, or waterline area 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).

11. If disturbed area stabilization is to be accomplished during the months of December, January, or February, stabilization shall consist of mulching in accordance with Specification 1.75. Seeding will then take place as soon as the season permits.

12. The term Seeding, Final Vegetative Cover or Stabilization, on this site plan shall mean the successful germination and establishment of a stable grass cover from a properly prepared seedbed containing the specified amounts of seed, lime, and fertilizer in accordance with Specification 1.66, Permanent Seeding. Irrigation shall be required as necessary to ensure establishment of grass cover.

13. All slopes steeper than 3:1 shall require the use of erosion control blankets such as excelsior blankets to aid in the establishment of a vegetative cover. Installation shall be in accordance with Specification 1.75, Mulching and Manufacturer's Instructions.

14. Inlet protection in accordance with Specification 1.08 of the Virginia Sediment and Erosion Control Handbook shall be provided for all storm drain inlets as soon as practical following construction of same.

15. Temporary liners, such as polyethylene sheets, shall be provided for all paved ditches until the permanent concrete liner is installed.

16. Paved ditches shall be required wherever erosion is evident. Particular attention shall be paid to those areas where grades exceed 3%.

17. Temporary erosion control measures are not to be removed until all disturbed areas are stabilized. After stabilization is complete, all measures shall be removed within 30 days. Trapped sediment shall be spread and seeded.

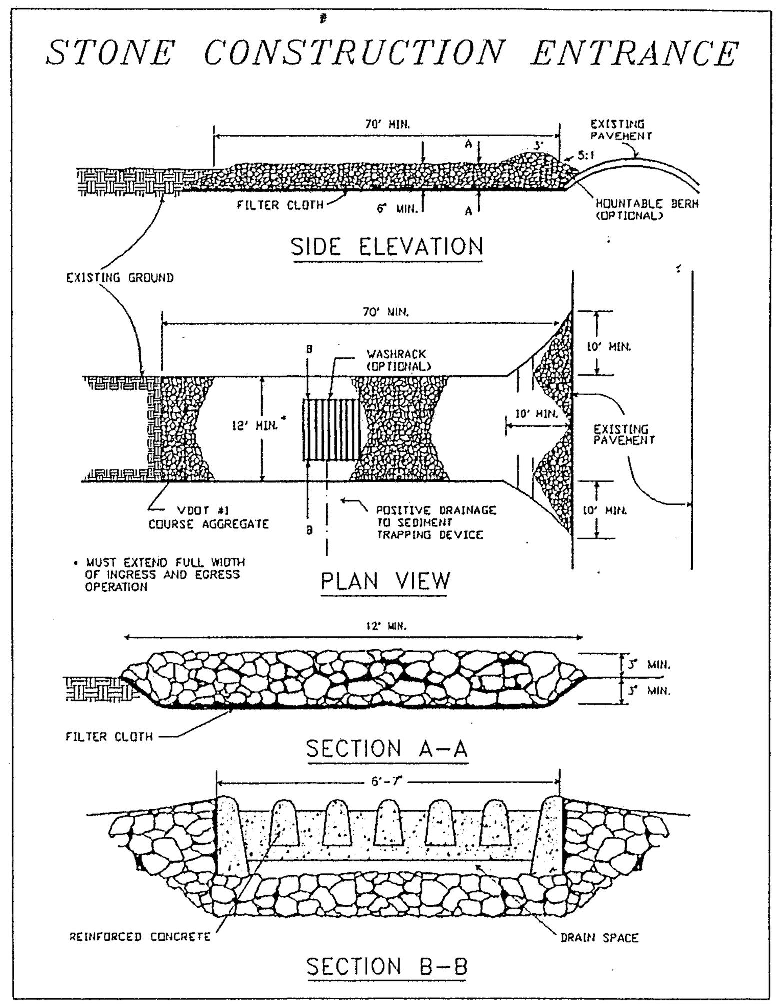
18. Off-site waste or borrow areas shall be approved by James City County prior to the import of any borrow or export of any waste to or from the project site.

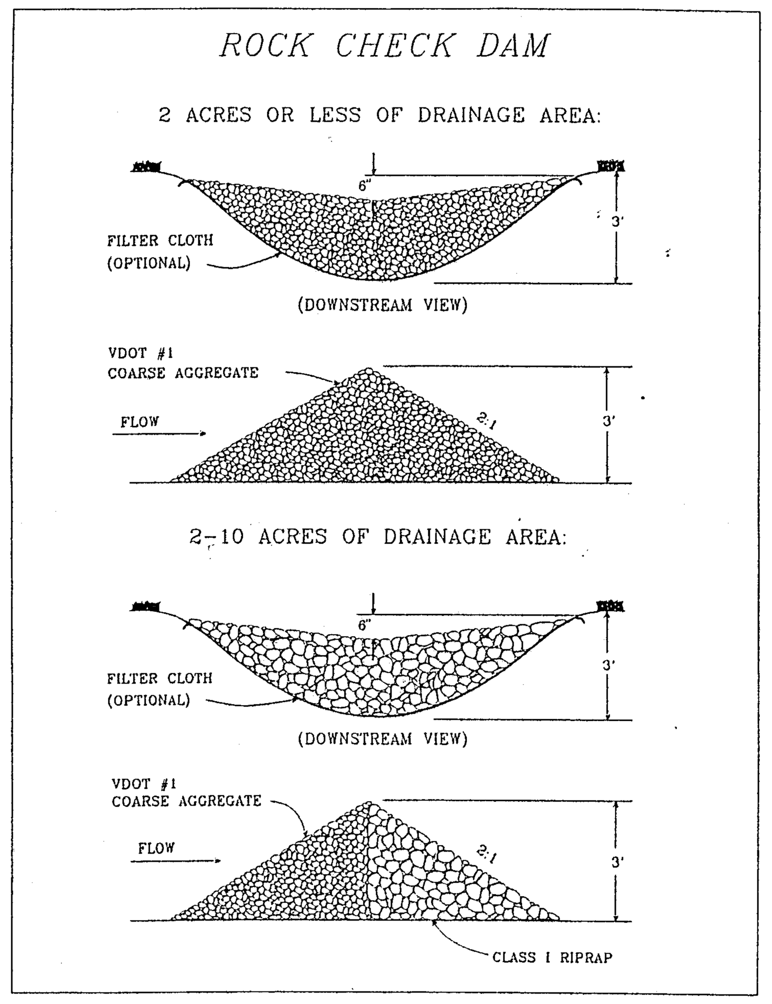
19. All paved and/or piped outfalls will be constructed before road grading and utility installation begins.

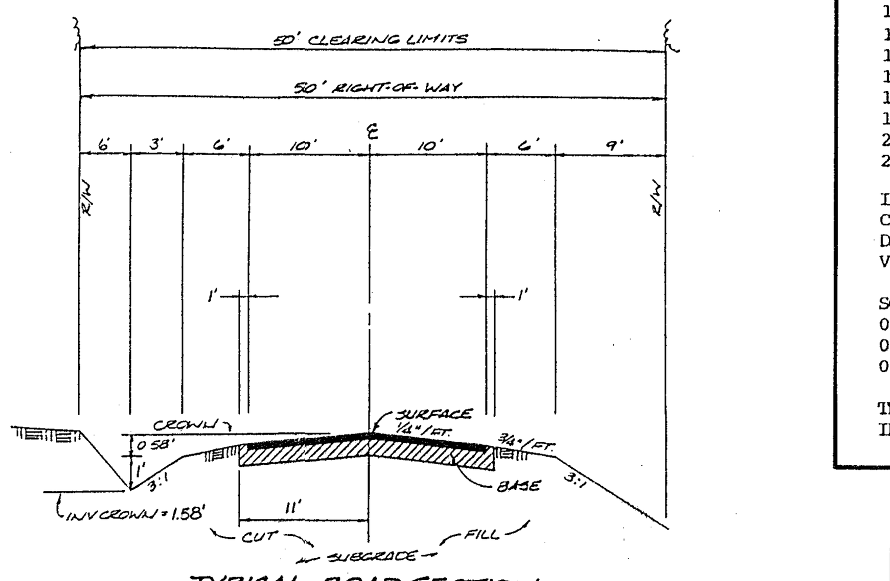
20. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.

21. A preconstruction conference shall be held on-site between the County, the Developer, the Project Engineer and the Contractor prior to issuance of a Land Disturbing Permit. The Contractor shall submit a narrative plan to the County prior to the preconstruction conference detailing the sequence of construction for the project, including installation of erosion control measures.

22. All roadways and shoulders shall be stabilized with at least six inches of crusher run aggregate after grading. Crusher run aggregate shall be the material specified in Section 206 of the Virginia Department of Transportation, Road and Bridge Specifications.







TYPICAL ROAD SECTION
N.T.S.
CATEGORY I, 50' R/W

1. PROVIDE 2-10' LANES, PAVEMENT WIDTH = 20', SLOPE = 1/4" PER FT.
2. PROVIDE 6' SHOULDER WIDTH, SLOPE = 3/4" PER FOOT
3. PROVIDE SSV = 10 OR GREATER
4. BASE - 6" OF AGGREGATE BASE MATERIAL (TYPE I OR APPROVED CRUSHED CONCRETE)
5. SURFACE - 1 1/2" BITUMINOUS CONCRETE (SM-2A), 2" SM-2A @ CUL-DE-SAC BULB.
6. SIDE SLOPES - 4" PER FOOT (3:1) MAXIMUM

CATEGORY II, 50' R/W

IDENTICAL TYPICAL SECTION EXCEPT AS FOLLOWS:
1. BASE - 8" AGGREGATE BASE MATERIAL (TYPE I OR APPROVED CRUSHED CONCRETE)
2. SURFACE - 1 1/2" BITUMINOUS CONCRETE (SM-2A), 2" SM-2A @ CUL-DE-SAC BULB

* STANDARDS PER THE VIRGINIA DEPARTMENT OF TRANSPORTATION SUBDIVISION STREET REQUIREMENTS

GENERAL NOTES

1. THESE DESIGNS ARE BASED ON THE SUBGRADE SOILS, IMMEDIATELY UNDER THE PAVEMENT STRUCTURE, HAVING A SOIL SUPPORT VALUE (SSV) OF 10. IF DIFFERENT THAN 10: ADD 1/2" ASPHALT CONCRETE OR 1" AGGREGATE BASE MATERIAL FOR EACH 5 SSV BELOW; REDUCE BY SAME FOR EACH 10 SSV ABOVE. (SOIL SUPPORT VALUE EQUALS THE CALIFORNIA BEARING RATIO TIMES THE RESILIENCY FACTOR (SSV = CBR × RF)).
2. REPRESENTATIVE CALIFORNIA BEARING RATIO (CBR) SAMPLES, TAKEN AT SUBGRADE ELEVATION, SHOULD BE USED AS THE BASIS FOR EVALUATING THE SOIL SUPPORT VALUE (SSV). GUIDANCE MAY BE OBTAINED FROM V.D.O.T.'S DISTRICT MATERIALS ENGINEER TO DETERMINE TEST METHODS AND THE NUMBER OF SAMPLES REQUIRED TO OBTAIN REPRESENTATIVE CBR VALUES.
3. CEMENT TREATED AGGREGATE (CTA) OR FULL DEPTH ASPHALT CONCRETE MAY BE SUBSTITUTED FOR ANY AGGREGATE, SUBGRADE STABILIZATION, OR SELECT MATERIAL ON BASIS OF 1 INCH OF CTA OR ASPHALT CONCRETE FOR 2 INCHES OF THE OTHER MATERIALS. NEITHER CTA NOR ASPHALT CONCRETE SHOULD BE PLACED DIRECTLY ON A RESILIENT SOIL (AS DEFINED IN VASWANI'S DESIGN GUIDE) UNLESS THE SOIL IS STABILIZED WITH CEMENT OR OTHER APPROVED STABILIZING AGENT. CEMENT TREATED AGGREGATE (CTA) SHOULD HAVE A MINIMUM OF 4 INCHES OF AGGREGATE BASE MATERIAL UNDER IT WHEN LESS THAN 4 INCHES OF ASPHALT CONCRETE IS TO BE APPLIED OVER THE CTA.
4. WHEN THE APPLICATION OF ASPHALT CONCRETE IS SPECIFIED IN POUNDS PER SQUARE YARD (PSY), ITS DEPTH MAY BE DETERMINED FROM THE FOLLOWING AVERAGE WEIGHT/DEPTH FACTOR: BASE - 115 PSY = 1 INCH SURFACE - 110 PSY = 1 INCH
5. ALL UNTREATED AGGREGATE BASE OR SUBBASE MATERIAL SHALL BE 21B GRADATION. IF AGGREGATE IS CEMENT STABILIZED, USE 21A GRADATION.
6. ALL MATERIALS AND CONSTRUCTION CONTROLS SHALL BE IN ACCORDANCE WITH CURRENT V.D.O.T. SPECIFICATIONS AND SPECIAL PROVISIONS.

FORD'S COLONY
PRIVATE STREET CONSTRUCTION NOTES

1. ALL ROADS AND DRAINAGE FACILITIES SHOULD BE CONSTRUCTED IN ACCORDANCE WITH CURRENT REGULATIONS, SPECIFICATIONS AND STANDARDS OF THE JAMES CITY COUNTY PRIVATE STREET ORDINANCE.

2. STANDARD PE-1 ENTRANCES WITH A MINIMUM OF 24' OF 15" CONCRETE CULVERT PIPE SHALL BE REQUIRED FOR ALL DRIVEWAYS

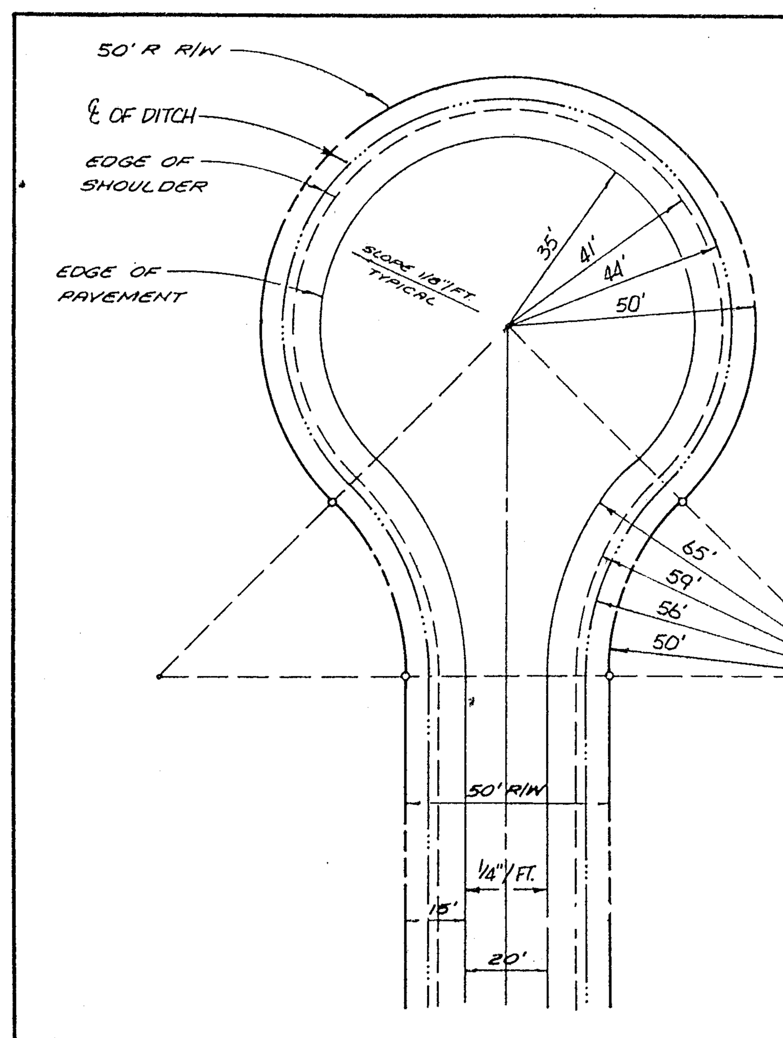
3. ALL SHOULDERS, DITCHES AND BACKSLOPES MUST BE STABILIZED.

4. THE ROAD CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL ITEMS OF ROAD WORK & DRAINAGE WITH EXISTING AND PROPOSED UNDERGROUND UTILITIES (POWER, WATER, SEWER AND TELEPHONE) SUCH THAT NO DUPLICATION OF WORK EFFORT IS INCURRED.

5. ALL ITEMS OF ROADWORK AND DRAINAGE NECESSARY FOR THE ROADS TO BE IN ACCORDANCE WITH JAMES CITY COUNTY'S PRIVATE STREET ORDINANCE.

FORD'S COLONY, SECTION XIII-E
"OUTLINE OF THE INSPECTION PROCEDURE FOR CONSTRUCTION OF PRIVATE STREETS"

1. Upon completion of road grading to subgrade and application of 2" - 3" of "sales stone", the engineer will contact a soils testing firm to obtain representative CBR samples. The location and number of the CBR (California Bearing Ratio) samples is to be determined by the soils engineer. The soils engineer shall then prepare a report which shall include as a minimum the following:
   a) Number and location (including map) of CBR samples and test results of the samples.
   b) Soils engineering analysis.
   c) Recommendations including required alterations of the base material application rate, modifications to the subbase if required, etc. from those designs shown on the approved construction drawings.
2. Base material will be supplied and certified by a VDOT certified and bonded source. Evidence of this will be provided via invoices from supplier.
3. After the County engineer has reviewed and approved the soils engineer's report, base material will be applied at the depths necessary to provide required depth (either by plan or by soils engineer recommendation) after compaction. The contractor in the presence of the engineer will test the depth of the base material at least once every 250 linear feet and report the results. Inadequate depths will require additional base material and subsequent retesting. The engineer will provide the test results to the County engineer.
4. Bituminous concrete will be supplied and certified by a VDOT certificate and bonded source. Evidence of this will be provided via invoices from supplier.
5. After the bituminous concrete has been placed and compacted, cores will be taken at a minimum of 500' intervals to determine the thickness of the asphalt. Inadequate depths will require additional bituminous concrete being installed in the appropriate locations. The contractor in the presence of the engineer will provide test results to James City County. The installation of two courses of bituminous concrete (B-3 and S-5) will require individual core samples resulting in two separate testing reports.
6. Reporting will be performed by a contractor and the licensed engineer as outlined above. The number of samples in each case will be, as a minimum, the total length of roads tested divided by the required interval. In order to preserve the integrity of the project's construction a plan depicting the sampling locations will be provided to the County prior to the actual inspections - not before construction begins as requested in your guidelines.
7. Interim statements from the engineer, with accompanying documentation, will be submitted to the County engineer prior to partial release of surety.
8. Application for final release of surety will be accompanied by the contractor's statement and certification that the specifically named private streets have been constructed in accordance with the approved plans and applicable Virginia Department of Transportation Standards. Contractor's certification shall be supported by the inspections performed by the engineer (see above).



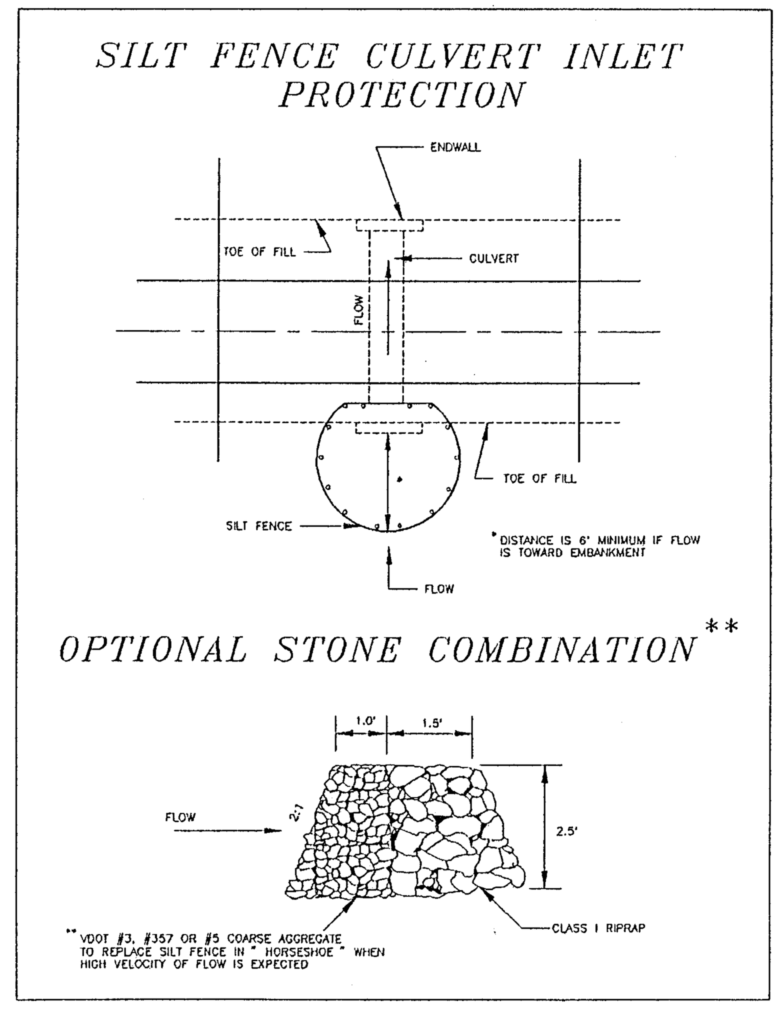
TYPICAL CUL-DE-SAC DETAIL
NOT TO SCALE

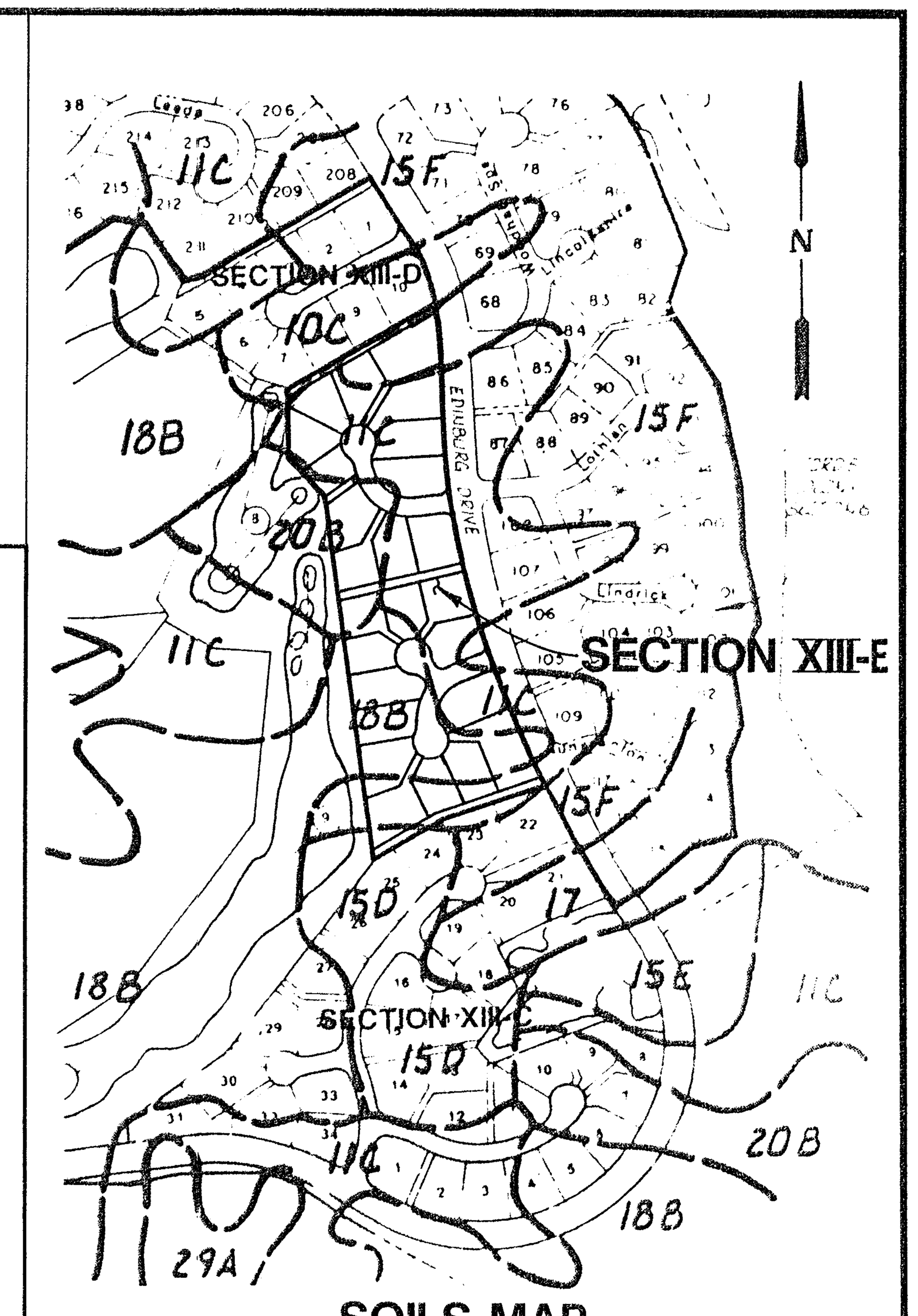
SOIL#	SOIL NAME	TYPICAL SLOPES	EROSION FACTOR (K)
10C	CRAVEN	6 - 10%	0.32 - 0.37
11C	CRAVEN-UCHEE COMPLEX	6 - 10%	0.32 - 0.37
15D	EMPORIA COMPLEX	10 - 15%	0.20 - 0.28
15E	EMPORIA COMPLEX	25 - 50%	0.20 - 0.28
15F	EMPORIA COMPLEX	25 - 50%	0.20 - 0.28
17	JOHNSTON COMPLEX	RELATIVELY FLAT	0.17 - 0.20
18B	KEMPSVILLE	2 - 6 %	0.24 - 0.32
20B	KENANSVILLE	2 - 6 %	0.10 - 0.15
29A	SLAGLE	0 - 2 %	0.24

INFORMATION TAKEN FROM "SOIL SURVEY OF JAMES CITY AND YORK COUNTIES AND THE CITY OF WILLIAMSBURG, VIRGINIA" ISSUED IN APRIL, 1985 BY THE UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE IN COOPERATION WITH VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY.

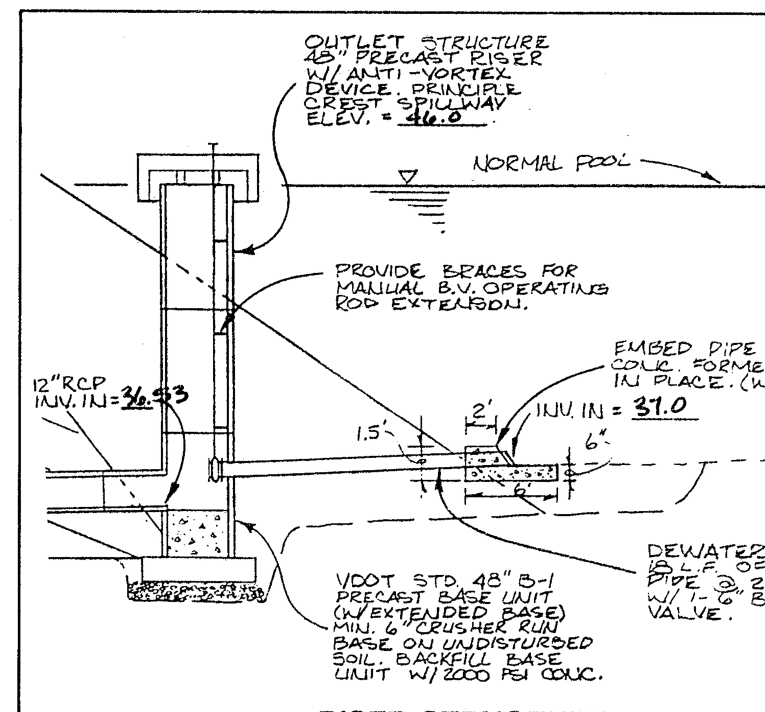
SOIL SUSCEPTIBILITY TO EROSION CLASSIFICATION (K)
0.23 & LOWER - LOW ERODIBILITY
0.23 - 0.36 - MODERATE ERODIBILITY
0.36 & UP - HIGH ERODIBILITY

THE MAP SHOWN IS A "BEST FIT MODEL" OF THE SCS MAPS WITH EXISTING BASE INFORMATION.

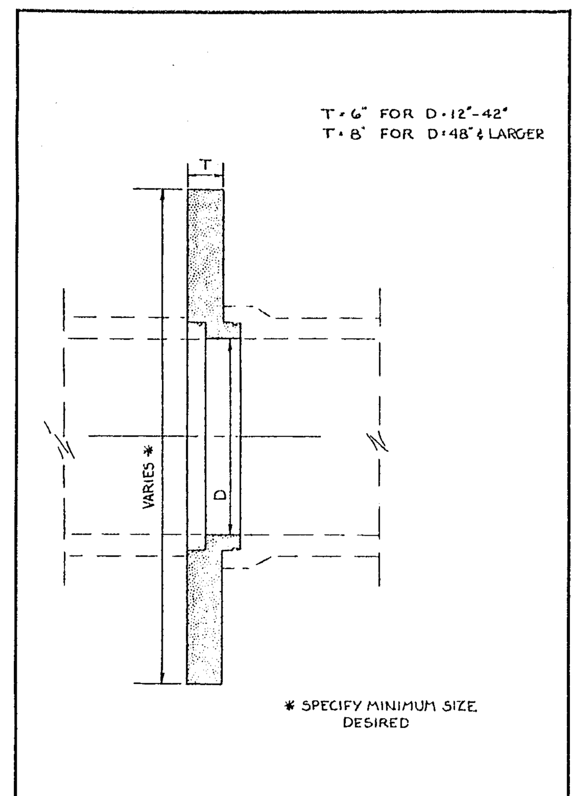




SOILS MAP
SCALE: 1"=400'

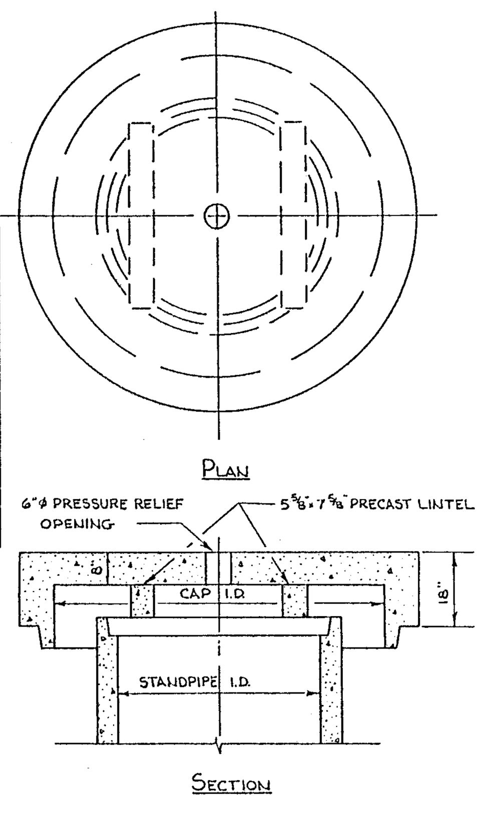


RISER STRUCTURE



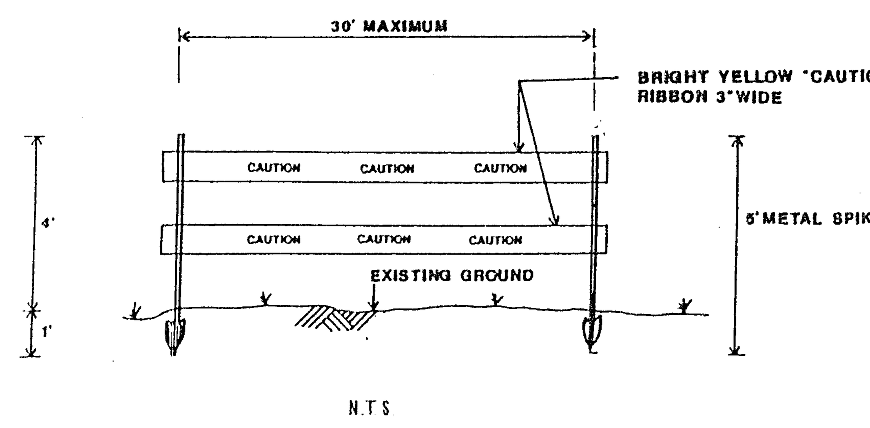
ANTI-SEEP COLLAR

STAND-PIPE I.D.	CAP I.D.	STNPIPE. JOINT WEIGHT	CAP WEIGHT
12"	21"	368#	564#
15"	27"	504#	903#
18"	30"	688#	1,098#
21"	36"	864#	1,549#
24"	42"	2,160#	2,087#
27"	48"	2,616#	2,701#
30"	48"	3,120#	2,701#
36"	60"	4,256#	4,441#
42"	66"	5,568#	5,314#
48"	78"	7,056#	7,307#
54"	90"	10,024#	8,887#
60"	96"	11,992#	10,361#
66"	108"	14,136#	12,958#
72"	114"	16,448#	15,115#



FOR PIPE DETAILS, SEE DWG. RS-74-53

PRECAST CONCRETE ANTI-VORTEX DEVICE



TREE PROTECTION

1. UPON FIELD INSPECTION, DISTANCE BETWEEN SUPPORT STAKES CAN BE DECREASED BY COUNTY OFFICIALS.
2. BARRIER TO BE PLACED IMMEDIATELY AT EDGE OF EASEMENT

No.	DATE	REVISION / COMMENT / NOTE	BY
1	3/22/93	REVISED PER J.C.C. COMMENTS	SOW

COMMONWEALTH OF VIRGINIA
STEVEN O. WIGLEY
No. 019307
3-22-93
PROFESSIONAL ENGINEER

AES CONSULTING ENGINEERS
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
Fax (804) 220-8994

NOTES AND DETAILS
FORD'S COLONY @ WILLIAMSBURG
SECTION XIII-E
OWNER/DEVELOPER: REALTEC, INCORPORATED
JAMES CITY COUNTY VIRGINIA

Designed	Drawn
Scale 1"=50'	Date JAN.,1993
Project No. 5652	
Drawing No. 5	

PC111_FORDS_COLONY_PARCEL_A_SEC_13A - 004

FUTURE
FORD'S COLONY
SECTION XIII A

HOLE #8

10' WIDE GRASS LINED
EMERGENCY SPILLWAY
CREST ELEV=59.5

DAM II
NORMAL POOL = 56.0
(PC 111)

80 LF OF 15"
RCP @ 0.75%
INV. IN=46.8
INV. OUT=46.2

48" RCP RISER,
CREST ELEV. = 56.0

6" DEWATERING PIPE

PROVIDE 20 LF OF
CLASS. AI RIP-RAP
STONE (APPROX.
7 CY REQUIRED)

SEE SHEET 11
FOR DAM
SECTION

TOP OF
DAM=60.5

5' WIDE SAFETY
BENCH @ 0% SLOPE
EL.=55.0

21
FORD'S COLONY
SECTION XIII B

DAM III
NORMAL POOL = 46.0
(PC 112)

ROAD "A"

ROAD "B"

ROAD "C"

ROAD "D"

ROAD "E"

GRAPHIC SCALE
50' 0 50' 100'
SCALE: 1" = 50'

No.	DATE	REVISION / COMMENT / NOTE	BY

COMMONWEALTH OF VIRGINIA
STEVEN O. WIGLEY
No. 019307
PROFESSIONAL ENGINEER

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

CONSULTING ENGINEERS

PLAN - DAM II
FORD'S COLONY AT WILLIAMSBURG

WILLIAMSBURG WEST 9 HOLE COURSE
OWNER/DEVELOPER: REALTEC INCORPORATED
BERKELEY DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
CAH	GG
Scale	Date
1"=50'	2/97

Project No.
5652-63

Drawing No.
5

DAM II 5-15-97 PC 111

PC111_FORDS_COLONY_PARCEL_A_SEC_13A - 005

FUTURE
FORD'S COLONY
SECTION XIII A

DAM II
NORMAL POOL = 56.0
(PC 111)

48" RCP RISER,
CREST ELEV. = 56.0

6" DEWATERING PIPE

80 LF OF 15"
RCP @ 0.75%
INV. IN=46.8
INV. OUT=46.2

PROVIDE 20 LF OF
CLASS AI RIP-RAP
STONE (APPROX.
7 CY REQUIRED)

SEE SHEET 11
FOR DAM
SECTION

TOP OF
DAM=60.5

5' WIDE SAFETY
BENCH @ 0% SLOPE
EL.=55.0

21
FORD'S COLONY
SECTION XIII B

DAM III
NORMAL POOL = 46.0
(PC 112)

ROAD "A"

ROAD "B"

ROAD "C"

ROAD "D"

ROAD "E"

HOLE #8

GRAPHIC SCALE
50' 0 50' 100'
SCALE: 1" = 50'

RECEIVED
MAY 1997
PLANNING DEPARTMENT

S-15-97

No.	DATE	REVISION / COMMENT / NOTE	BY

COMMONWEALTH OF VIRGINIA
STEVEN O. WIGLEY
No. 019307
PROFESSIONAL ENGINEER

5248 Olde Towne Road, Suite 1
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(757) 253-0040
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CONSULTING ENGINEERS

PLAN - DAM II
FORD'S COLONY AT WILLIAMSBURG
WILLIAMSBURG WEST 9 HOLE COURSE

OWNER/DEVELOPER: REALTEC INCORPORATED

BERKELEY DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
CAH	GG
Scale	Date
1"=50'	2/97
Project No.	
5652-63	
Drawing No.	
5	

DAM III 5-15-97 PC 112

FORD'S COLONY
SECTION VI
P.B.47, PG.59-64

EDINBURGH DRIVE 80' R/W

FUTURE
FORD'S COLONY
SECTION XIII A

FORD'S COLONY
SECTION XIII B

DAM II
NORMAL POOL = 56.0

DAM III
NORMAL POOL = 46.0
(P.C. 112)

EX. 8" GRAVITY SEWER

EX. M.H.
TOP=45.99
INV=31.71

EX. M.H.
TOP=53.17
INV IN=41.42(S)
INV OUT=41.45(W)

PROVIDE 20 LF OF CLASS AI RIP-RAP STONE (APPROX. 7 CY REQUIRED)

130 LF OF 12" RCP @ 1.04%
INV. IN=36.53
INV. OUT=36.18

℄ ROAD
EL = 53.0±

EX. M.H.
TOP=52.94
INV IN=33.11(E)
INV OUT=32.29(N)
INV=32.19(S)

EX.C.O.
TOP=
INV=42.93

SEE SHEET 11
FOR DAM
SECTION

6" DEWATERING PIPE

48" RCP RISER,
CREST ELEV. = 46.0

5' WIDE SAFETY
BENCH @ 0% SLOPE
EL.=45.0

ROAD "B"

ROAD "C"

ROAD "D"

GRAPHIC SCALE
50' 0' 50' 100'
SCALE: 1" = 50'

N

No.	DATE	REVISION / COMMENT / NOTE	BY

COMMONWEALTH OF VIRGINIA
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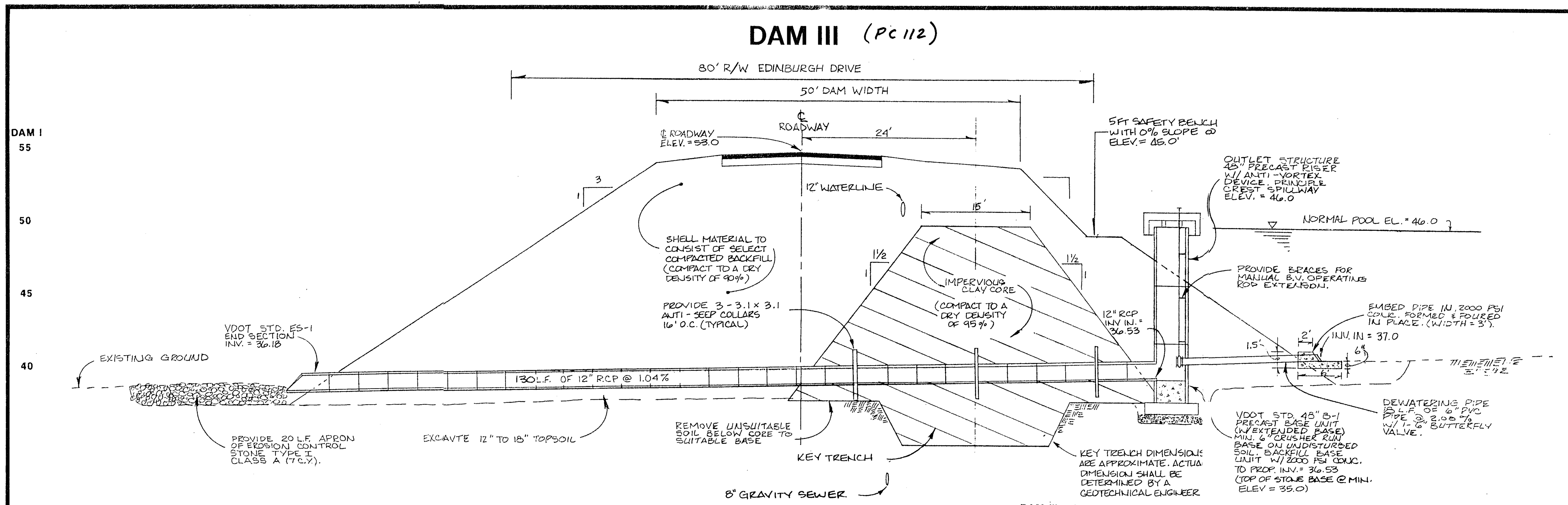
CONSULTING ENGINEERS

PLAN - DAM III
FORD'S COLONY
AT WILLIAMSBURG
WILLIAMSBURG WEST 9 HOLE COURSE
OWNER/DEVELOPER: REALTEC INCORPORATED
BERKELEY DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
CAH	GG
Scale	Date
1"=50'	2/97
Project No.	
5652-63	
Drawing No.	
6	

PC111_FORDS_COLONY_PARCEL_A_SEC_13A - 007

DAM III (PC 112)

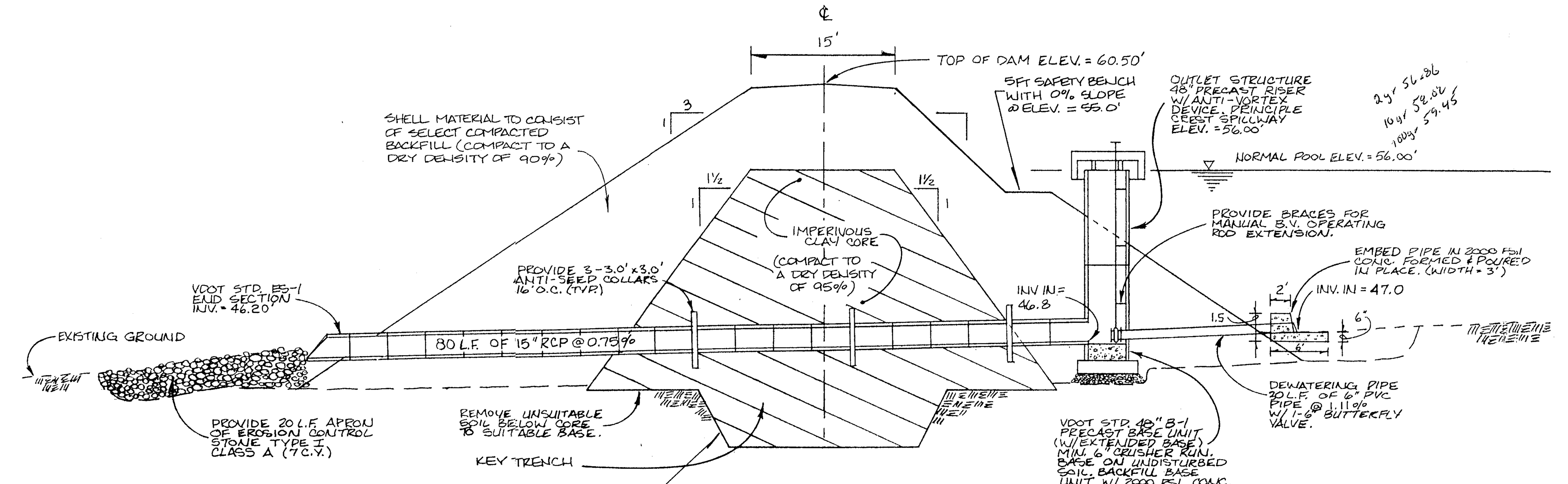


DAM III
(N.T.S.)

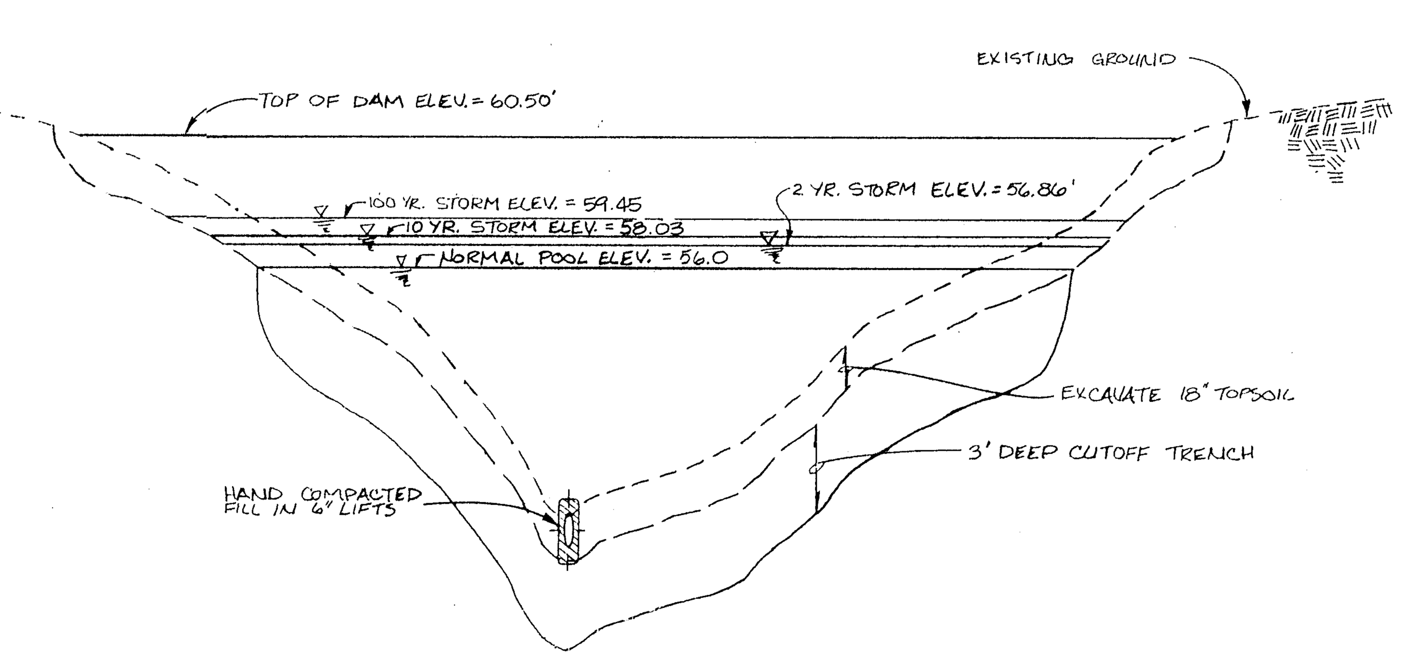
CENTER LINE ROADWAY ELEV. = 53.00'
NORMAL POOL ELEV. = 46.00'
PRINCIPLE CREST SPILLWAY ELEV. = 46.00'
2 YR. STORM ELEV. = 46.95
10 YR. STORM ELEV. = 48.24
100 YR. STORM ELEV. = 49.96
6" PVC PIPE INV. IN ELEV. = 37.00'
12" RCP INV. IN ELEV. = 36.53'
12" RCP INV. OUT ELEV. = 35.18'

DAM III X-SECTION
N.T.S.

DAM II (PC 111)



DAM II X - SECTION
NTS



DAM II PROFILE
SCALE: HORIZ : 1" = 50'
VERT : 1" = 5'

DAM CONSTRUCTION NOTES

1. A GEOTECHNICAL SUBSURFACE EXPLORATION AT THE PROPOSED DAM SITE SHALL BE PERFORMED AT THE CONTRACTOR'S EXPENSE. THE GEOTECHNICAL INVESTIGATION WILL DETERMINE KEY TRENCH DEPTH AND WIDTH ACCORDINGLY. THE GEOTECHNICAL CONSULTANT SHALL SUBMIT TO OWNER/CONTRACTOR HIS/HER RECOMMENDATIONS FOR DAM DESIGN, TRENCH WIDTH, DEPTH, ETC. THESE RECOMENDATIONS ARE HEREBY MADE A PART OF THE DAM'S CONSTRUCTION SPECIFICATIONS. ADDITIONALLY, THE GEOTECHNICAL CONSULTANT WILL ENSURE PROPER MATERIALS AND DAM CONSTRUCTION METHODS ARE USED DURING CONSTRUCTION. AFTER CONSTRUCTION, THE GEOTECHNICAL CONSULTANT SHALL SUBMIT A LETTER DEMONSTRATING THE DAM WAS BUILT IN ACCORDANCE WITH THEIR REPORTS RECOMENDATIONS.

2. SITE PREPARATION: THE CONTRACTOR SHALL STRIP ALL AREAS OF THE PERMANENT CONSTRUCTION TO REMOVE ALL UNSUITABLE MATERIALS. THE UNSUITABLE MATERIALS TO BE REMOVED BY STRIPPING SHALL INCLUDE ALL TOPSOIL, DEBRIS AND VEGETABLE MATTER, INCLUDING STUMPS AND ROOTS, AND ALL OTHER MATERIALS WHICH MAY BE UNSUITABLE FOR USE IN THE PERMANENT CONSTRUCTION.

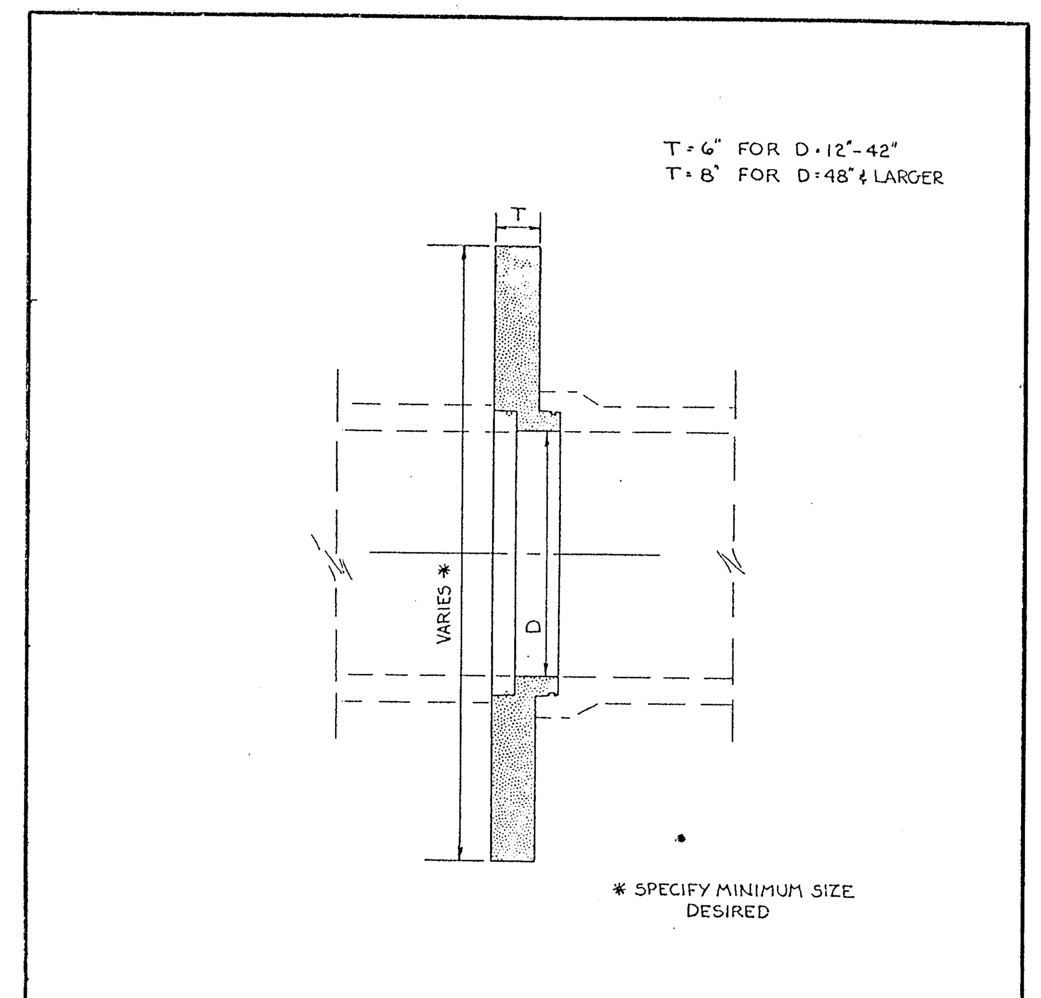
3. EMBANKMENT: THE EXPOSED SUBGRADE SOILS SHALL BE CAREFULLY INSPECTED BY THE GEOTECHNICAL ENGINEER. ANY UNSUITABLE MATERIALS THUS EXPOSED SHALL BE REMOVED AND REPLACED WITH A WELL COMPACTED, SUITABLE MATERIAL. DENSITY TESTING, AT THE DISCRETION OF THE GEOTECHNICAL ENGINEER, SHALL BE PERFORMED AT THIS TIME. THE EMBANKMENT SHALL BE KEYED INTO THE UNDISTURBED (EXISTING) SOIL STRATUM. EMBANKMENT SHOULD BE KEYED AT LEAST 4 FEET INTO THE STRATUM OR AS SPECIFIED BY THE SOILS ENGINEER (WIDTH = 6 FT. MINIMUM). THE EMBANKMENT FOUNDATION AND ABUTMENTS SHALL BEAR ON FIRM AND STABLE EXISTING SUBGRADE WHICH HAS BEEN PREPARED SO AS TO REMOVE ALL ORGANIC, LOOSE, AND GENERALLY UNSUITABLE MATERIAL. ALL MATERIALS TO BE USED FOR BACKFILL OR COMPACTED FILL SHALL BE INSPECTED AND, IF NECESSARY, TESTED BY THE SOILS ENGINEER IN ACCORDANCE WITH ASTM D2487 PRIOR TO PLACEMENT TO DETERMINE IF THEY ARE SUITABLE FOR THE INTENDED USE. THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED BORROW AREAS. IT SHALL BE CLEAN MINERAL SOIL, FREE OF ROOTS, WOOD VEGETATION, OVERSIZED STONES, ROCKS, OR OTHER OBJECTIONABLE MATERIAL. MATERIALS TO BE USED FOR THE CONSTRUCTION OF THE SHELL SHALL BE SELECT BACKFILL FREE OF STUMPS, ROOTS, ROCKS, TRASH, ETC. AND SHALL BE MORE PERVIOUS THAN THE IMPERVIOUS CLAY CORE. AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED A MINIMUM DEPTH OF 4 INCHES PRIOR TO PLACEMENT OF FILL. THE FILL MATERIAL'S MOISTURE CONTENT SHALL BE +3 TO -2 PERCENTAGE POINTS OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D2216 (I.E. IN GENERAL THE FILL MATERIAL SHOULD CONTAIN SUFFICIENT MOISTURE SO THAT IT CAN BE FORMED INTO A BALL WITHOUT CRUMBLING. IF WATER CAN BE SQUEEZED OUT OF THE BALL, IT IS TOO WET FOR PROPER COMPACTION). FILL MATERIAL WILL BE PLACED IN 6 TO 8-INCH CONTINUOUS LAYERS OVER THE ENTIRE LENGTH OF THE FILL. FIRST LIFT ON SUBGRADE MAY BE PLACED AT A DEPTH UP TO 36 INCHES TO BRIDGE SUBGRADE WITH OVER OPTIMUM MOISTURE CONTENT. COMPACTION, AS NOTED ON PLAN, SHALL BE OBTAINED GENERALLY BY USING A SHEEPSFOOT COMPACTOR. FINISHED GRADES SHALL BE MERGED NATURALLY INTO THE EXISTING GRADES.

4. CUTOFF TRENCH/KEY TRENCH: THE TRENCH SHALL BE EXCAVATED ALONG THE CENTERLINE OF THE DAM. THE MINIMUM DEPTH SHALL BE AS DETERMINED BY THE GEOTECHNICAL ENGINEER. THE BOTTOM WIDTH WIDTH SHALL BE WIDE ENOUGH TO PERMIT OPERATION OF COMPACTION EQUIPMENT. THE SIDE SLOPES SHALL BE NO STEEPER THAN 1:1. COMPACTION REQUIREMENTS SHALL BE THE SAME AS THOSE FOR THE EMBANKMENT. THE TRENCH SHALL BE KEPT DRAINED DURING THE BACKFILLING-COMPACTING OPERATIONS.

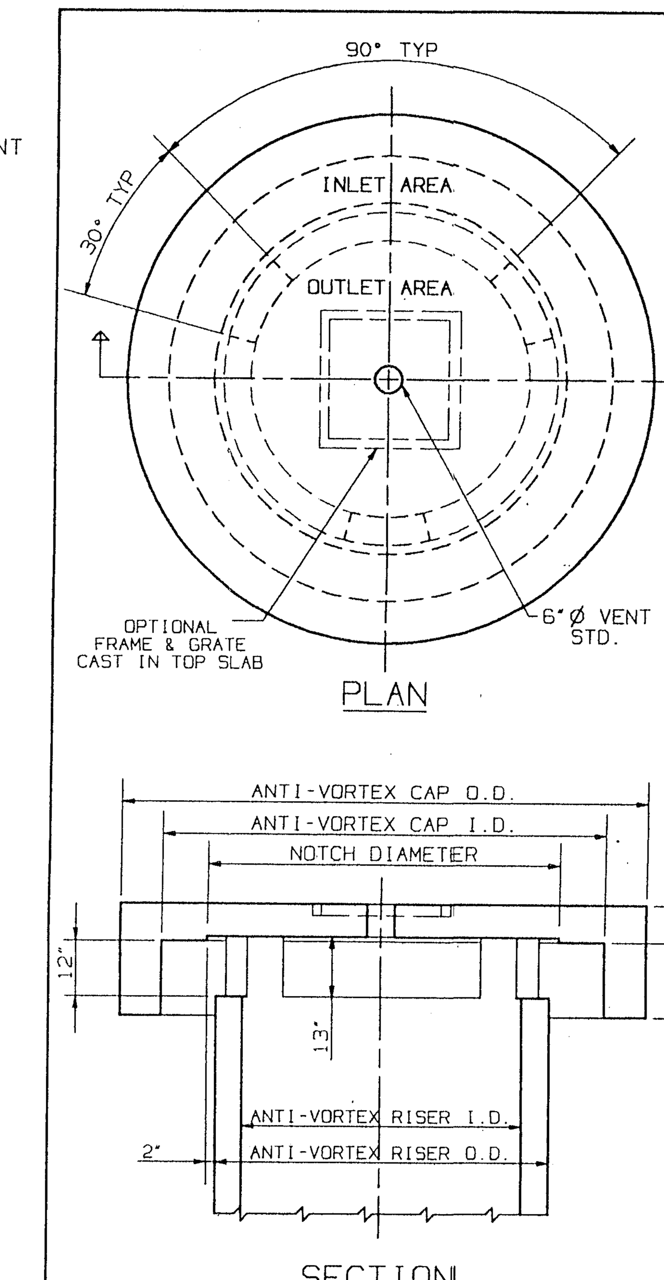
5. PRINCIPAL SPILLWAY: THE BOTTOM OF THE SPILLWAY RISER FOUNDATION BASE EXCAVATION SHALL BE OBSERVED BY THE GEOTECHNICAL ENGINEER TO ENSURE THAT ALL UNSUITABLE AND LOOSE MATERIALS ARE REMOVED AND THAT ACCEPTABLE BEARING CONDITIONS EXIST IN THE FOUNDATION'S BASE. ALL JOINTS IN THE PRINCIPAL SPILLWAY STRUCTURE SHALL BE OF WATERTIGHT CONSTRUCTION. PERVIOUS MATERIALS SUCH AS SAND, GRAVEL OR CRUSHED STONE SHALL NOT BE USED AS BACKFILL AROUND THE BARREL. FILL MATERIAL SHALL BE PLACED AROUND THE PIPE IN 4-INCH LAYERS AND COMPACTED BY HAND TO THE SAME DENSITY AS THE EMBANKMENT. A MINIMUM OF TWO FEET OF FILL SHALL BE HAND-COMPACTED OVER THE BARREL BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.

6. VEGETATIVE STABILIZATION: FINAL VEGETATIVE COVER (STABILIZATION) SHALL CONSIST OF TOPSOILING, LIMING, FERTILIZING, SEEDING, AND MULCHING TO ASSURE A FIRM STAND OF GRASS AS SOON AS PRACTICAL. SEDIMENT BASINS AND OTHER TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED ONLY WHEN STABILIZATION IS COMPLETE. FINAL VEGETAL COVER SHALL BE PROVIDED IN ACCORDANCE WITH THE FOLLOWING:

TOPSOIL: AT LEAST 2" THICKNESS OBTAINED FROM STOCKPILES ON SITE, FREE OF LARGE DEBRIS.
LIME: 4,000#/ACRE (90#/1,000 S.F.)
SEED: KENTUCKY 31 TALL FESCUE 250#/ACRE (6#/1,000 S.F.)
FERTILIZER: 10/20/10 MIX, 1,000#/ACRE (25#/1,000 S.F.)
MULCH: STRAW OR HAY (LOCALLY OBTAINED) 4,000#/ACRE (90#/1,000 S.F.)



ANTI-SEEP COLLAR



NOTE:

1. ANTI-VORTEX DEVICE (CAP AND RISER) MANUFACTURED IN ACCORDANCE WITH ASTM C478.
2. DIMENSIONS SUBJECT TO PERMISSIBLE VARIATIONS OF ASTM C478.
3. INLET AREA (AREA BETWEEN DEVICE I.D. AND RISER O.D.) IS GREATER THAN OUTLET AREA (AREA OF RISER I.D.)
4. SLAB REINFORCEMENT TO BE ASTM A615 #4 BARS @ 8" E.W. CIRCUMFERENTIAL REINFORCEMENT TO BE Asc = 1 @ 0.150 2x6 W2.5 x W2.5 WWF MINIMUM. MATERIAL PROPERTIES: fy = 60 ksi, fc = 4 ksi. CONCRETE COVER OVER REINFORCEMENT (CCOR) = 1", UNLESS NOTED
5. DI-1 FRAME & GRATE IS AVAILABLE FOR 48" I.D. RISERS AND LARGER.

RISER		ANTI-VORTEX CAP		NOTCH DIAMETER	APPROX. CAP WEIGHT
I.D.	O.D.	I.D.	O.D.		
24"	30"	48"	58"	34"	1.49 T
27"	33½"	60"	70" OR 72"	37½"	2.28 T
30"	37"	60"	70" OR 72"	41"	2.26 T
36"	44"	60"	70" OR 72"	48"	2.22 T
42"	51"	72"	86"	55"	3.16 T
48"	58"	84"	100"	62"	4.27 T
54"	66½"	84"	100"	70½"	4.20 T
60"	72"	96"	114"	76"	5.48 T
66"	80½"	96"	114"	84½"	5.39 T
72"	86"	108"	128"	90"	6.83 T
78"	94½"	126"	147"	98½"	8.97 T
84"	100"	126"	147"	104"	8.90 T

CP&P
Technical Manual page 14.1

PRECAST ANTI-VORTEX DEVICE (CAP AND RISER)

ORIGINAL DATE	02-01-95	RCH
LAST REVISION		
SCALE	3/8 = 1'-0"	
TOPIC - PROJECT # - DRAWING #	ST-0847-63	

CONCRETE PIPE & PRODUCTS CO., INC.
P.O. Box 1223 □ Richmond, Virginia 23209 □ 804-233-5471

No.	DATE	REVISION / COMMENT / NOTE	BY

COMMONWEALTH OF VIRGINIA
STEVEN O. WIGLEY
No. 019307
PROFESSIONAL ENGINEER

AES CONSULTING ENGINEERS
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(804) 253-0040
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DAM II & III SECTIONS
FORD'S COLONY AT WILLIAMSBURG
WILLIAMSBURG WEST 9 HOLE COURSE
OWNER/DEVELOPER: REALTEC INCORPORATED
BERKELEY DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
CAH	AES
Scale	Date
AS SHOWN	2/97
Project No.	
5652-63	
Drawing No.	
11	

COUNTY, VA

CTOR

AREAS ARE TO BE SEEDED, SODDED, OR
HIN 7 DAYS OF REACHING FINAL GRADE.
OR IS RESPONSIBLE FOR CONTACTING "MISS
-800-552-7001 72 HOURS PRIOR TO
.
OR SHALL REPORT ANY ERRORS, OMISSIONS,
R DISCREPANCIES TO THE DEVELOPER
ON BEFORE CONTINUING WITH THE WORK.
SEDIMENT CONTROL SHALL CONFORM TO THE
ION AND SEDIMENT CONTROL HANDBOOK,
N.
OR SHALL BE RESPONSIBLE FOR ANY AND ALL
TILITIES, PUBLIC OF PRIVATE, THAT MAY OCCUR
OF CONSTRUCTION ACTIVITIES.
OR SHALL BE RESPONSIBLE FOR REPLACING
G MATERIALS ANY PAVEMENT, DRIVEWAYS,
ALKS, LAWNS, SHRUBS, DITCHES, ETC. THAT
OR DAMAGED DURING OR AS A RESULT OF
ACTIVITIES.

(PER FORD'S COLONY)

30' FROM FRONT LINE
25' OR 25% OF LOT DEPTH, WHICH EVER
IS GREATER, FROM REAR LOT LINE.
10' FROM SIDE LOT LINE

SIONS SHOWN BASED ON INFORMATION
OWNER. BUILDER SHALL VERIFY
NS PRIOR TO CONSTRUCTION.

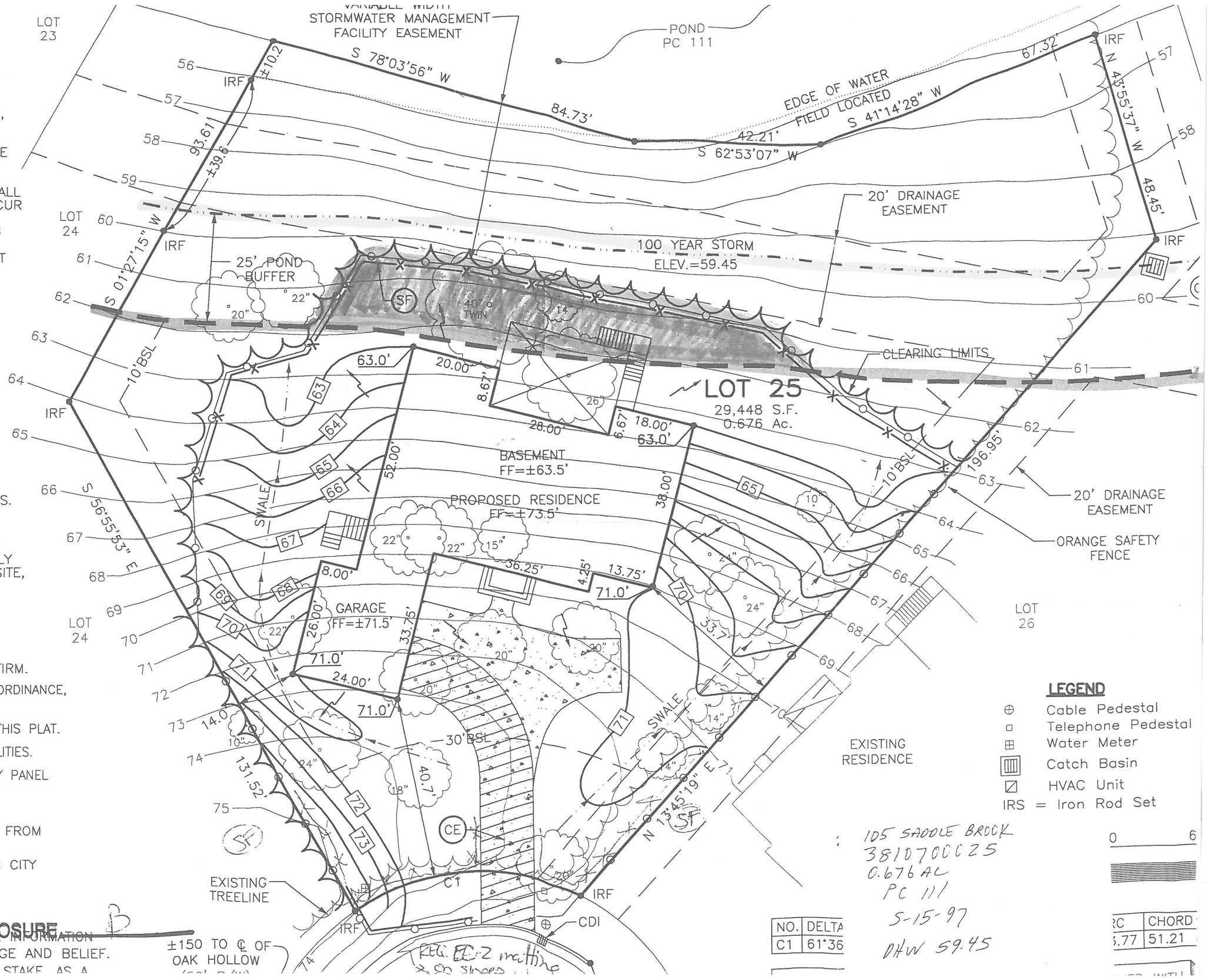
RGER THAN 3" IN DIAMETER AND OUTSIDE
F CLEARING SHOWN MAY NOT BE REMOVED
CONSENT OF FORD'S COLONY OR IT'S ASSIGNS.

THE ENVIRONMENTAL CONTROL COMMITTEE
MINE THAT APPLICATION OF THE AFORESAID
A PARTICULAR LOT WOULD UNREASONABLY
E THEREOF BY THE OWNER AND EFFECTIVELY
HER OF AN APPROPRIATE CONSTRUCTION SITE,
MENTAL CONTROL COMMITTEE SHALL GRANT
O THE OWNER OF SAID LOT FROM THE
F THESE SETBACK REQUIREMENTS.

ORT HAS NOT BEEN FURNISHED TO THIS FIRM.
CE WITH SECTION 19-33 OF THE SUBDIVISION ORDINANCE,
S SHALL BE PLACED UNDERGROUND.
ANY, WERE NOT RESEARCH OR LOCATED FOR THIS PLAT.
DE NO ATTEMPT TO LOCATE UNDERGROUND UTILITIES.
N F.I.R.M. ZONE "X" ACCORDING TO COMMUNITY PANEL
35 B DATED FEBRUARY 6, 1991.
BY PUBLIC WATER AND SEWER
SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM
SHOWN HEREON.
AS SHOWN HEREON ARE RELATED TO JAMES CITY
NTROL NETWORK.

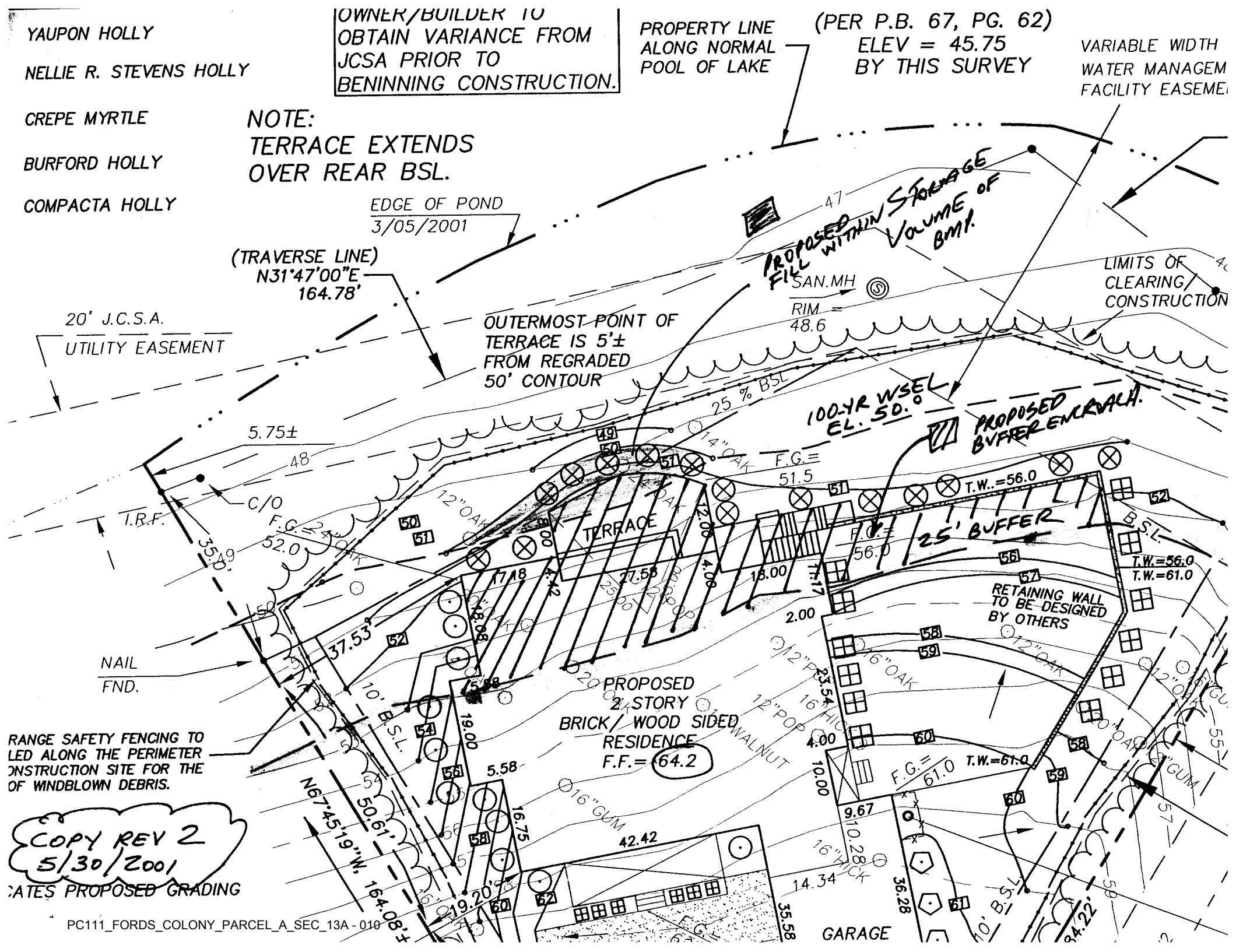
CATION

ESENTS AN ACTUAL FIELD SURVEY. ALL THE INFORMATION
CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.
ES, INC. HAS BEEN RETAINED AND PAID TO STAKE AS A



WIND EXPOSURE

PC111_FORDS COLONY PARCEL A SEC 13A-009


YAUPON HOLLY
NELLIE R. STEVENS HOLLY
CREPE MYRTLE
BURFORD HOLLY
COMPACTA HOLLY
OWNER/BUILDER TO OBTAIN VARIANCE FROM JCSA PRIOR TO BENINNING CONSTRUCTION.
NOTE: TERRACE EXTENDS OVER REAR BSL.
PROPERTY LINE ALONG NORMAL POOL OF LAKE
(PER P.B. 67, PG. 62) ELEV = 45.75 BY THIS SURVEY
VARIABLE WIDTH WATER MANAGEM FACILITY EASEME
EDGE OF POND 3/05/2001
(TRAVERSE LINE) N31°47'00"E 164.78'
PROPOSED FILL WITHIN STORAGE VOLUME OF BMP.
SAN.MH
RIM = 48.6
LIMITS OF CLEARING/ CONSTRUCTION
20' J.C.S.A. UTILITY EASEMENT
OUTERMOST POINT OF TERRACE IS 5'± FROM REGRADED 50' CONTOUR
25 % BSL
100-YR WSEL EL. 50.0
PROPOSED BUFFER ENCROACH.
5.75±
48
C/O
I.R.F.
F.G.= 52.0
F.G.= 51.5
T.W.=56.0
TERRACE
25' BUFFER
F.G.= 56.0
B.S.L.
T.W.=56.0
T.W.=61.0
RETAINING WALL TO BE DESIGNED BY OTHERS
NAIL FND.
37.53'
PROPOSED 2 STORY BRICK/ WOOD SIDED RESIDENCE F.F.= 64.2
RANGE SAFETY FENCING TO LED ALONG THE PERIMETER ONSTRUCTION SITE FOR THE OF WINDBLOWN DEBRIS.
N67°45'19"W, 164.08'
50.61'
42.42
GARAGE
F.G.= 61.0
T.W.=61.0
COPY REV 2 5/30/2001
CATES PROPOSED GRADING

NERAL NOTES:

IS DRAWING REPRESENTS AN ACTUAL FIELD SURVEY
D ALL THE INFORMATION SHOWN HEREON IS
RRECT TO THE BEST OF MY KNOWLEDGE AND
LIEF.
USE DIMENSIONS BASED ON INFORMATION SUPPLIED
OWNER/DEVELOPER.
NTRACTORS TO VERIFY ALL DIMENSIONS.

L TREES MAY BE REMOVED WITHIN THE CLEARING
MITS SHOWN HEREON.
L TREES LARGER THAN 3" IN DIAMETER AND
ITSIDE THE CLEARING LIMITS MAY NOT BE REMOVED
THOUT THE CONSENT OF FORD'S COLONY OR ITS
SIGNS.
IS LOT IS NOT IN THE FLOOD PLAIN.
HAVE BEEN RETAINED AND PAID TO STAKE, AS A
NIMUM, THE BUILDING ENVELOPE AND ANY
TACHED ACCESSORY STRUCTURES.

DATE 9/30/03

G.T. WILSON, JR., L.S.

ILDING SETBACKS (PER COVENANTS):

ONT SETBACK: 30 FEET FROM THE FRONT LOT LINE;
AR SETBACK: 25 FEET OR 25 PERCENT OF THE
PTH OF THE LOT, WHICHEVER IS GREATER, FROM
E REAR LOT LINE;
DE SETBACKS: 10 FEET FROM THE SIDE LOT LINES;

THE EVENT THE ENVIRONMENTAL CONTROL
MMITTEE SHALL DETERMINE THAT APPLICATION OF
E AFORESAID SETBACKS TO A PARTICULAR LOT
OULD UNREASONABLY LIMIT THE USE THEREOF BY
E OWNER AND EFFECTIVELY DEPRIVE HIM OF AN
PPROPRIATE CONSTRUCTION SITE, THE
VIRONMENTAL CONTROL COMMITTEE SHALL GRANT A
ARIANCE TO THE OWNER OF SAID LOT FROM THE
ROVISIONS OF THESE SETBACK REQUIREMENTS.

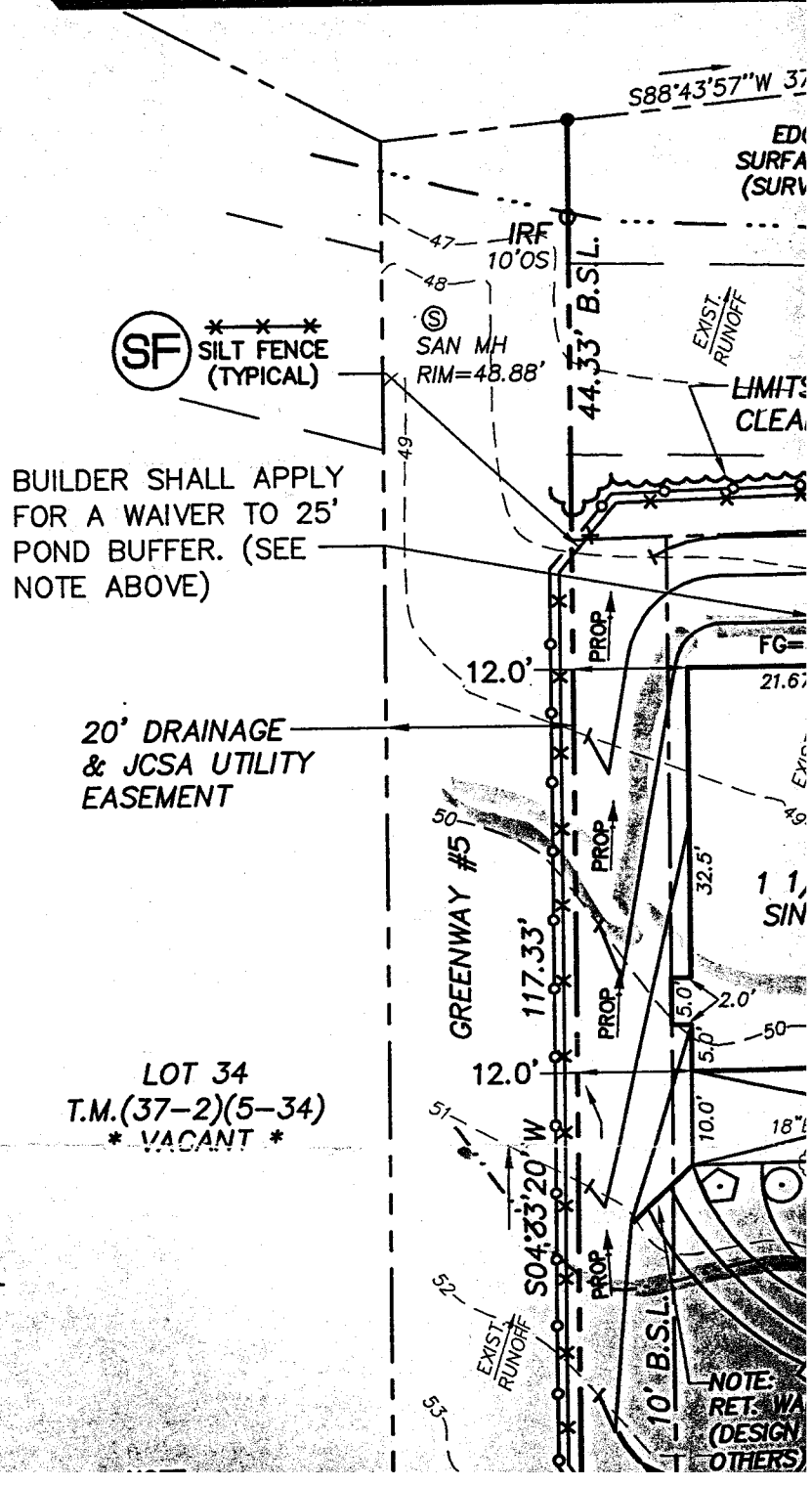
WNER AND CONTRACTOR ARE HEREBY REFERRED
O FORD'S COLONY PROTECTIVE COVENANTS FOR
ORE COMPLETE DEFINITIONS AND LOCATIONS
F ADDITIONAL EXISTING EASEMENTS AND
ETBACKS NOT SHOWN ON THIS DRAWING.

OPOGRAPHY AS SHOWN HAS BEEN FIELD VERIFIED
Y AES BASED UPON THE TBM NOTED. ALSO
AVEMENT AND DITCH C/L ELEVATIONS HAVE BEEN
IELD VERIFIED AND ARE AS SHOWN.

EROSION CONTROL NOTE:

REMOVAL OF ALL EROSION AND SEDIMENT CONTROL ITEMS,
APPED/CONTAINED SEDIMENT SHALL BE REMOVED FROM LOT
ROPERLY DISPOSED OF. ROADSIDE DITCH AND, IF APPLICABLE
DITCHES SHALL BE CLEANED OF SEDIMENT/OR CONSTRUCTION
DEBRIS ON A REGULAR BASIS DURING CONSTRUCTION.

NOTE:
IF CLEARING AND GRADING OR PERMANENT STRUCTURES ARE PROPOSED WITHIN THE POND BUFFER, THIS PLAN SHOULD BE RECONFIGURED TO AVOID ENCROACHMENT INTO THE POND BUFFER; OR ALTERNATIVELY, SUBMIT A WRITTEN REQUEST FOR WAIVER TO THE ENVIRONMENTAL DIVISION. THE WAIVER REQUEST SHOULD INDICATE THAT IMPACTED BUFFER AREA WILL BE STABILIZED OR LANDSCAPED TO RESTORE DISTURBED BUFFER AREA BACK TO MEADOW OR FOREST CONDITION USING NATIVE TREES, SHRUBS OR GROUND COVER TO THE GREATEST EXTENT POSSIBLE. IF A VARIANCE REQUEST IS NECESSARY, IT NEEDS TO BE FROM THE OWNER OR TENANT, CURRENT OR FUTURE, RATHER THAN THE BUILDER OR CONTRACTOR.



1. SET THE STAKES. 2. EXCAVATE A 4" x 4" TRENCH

REQUEST SHOULD INDICATE THAT IMPACTED BUFFER AREA WILL BE STABILIZED OR LANDSCAPED TO RESTORE DISTURBED BUFFER AREA BACK TO MEADOW OR FOREST CONDITION USING NATIVE TREES, SHRUBS OR GROUND COVER TO THE GREATEST EXTENT POSSIBLE. IF A VARIANCE REQUEST IS NECESSARY, IT NEEDS TO BE FROM THE OWNER OR TENANT, CURRENT OR FUTURE, RATHER THAN THE BUILDER OR CONTRACTOR.

SUCH THAT NO DISTURBED AREA DRAINAGE FLOWS ONTO ADJACENT PROPERTIES.

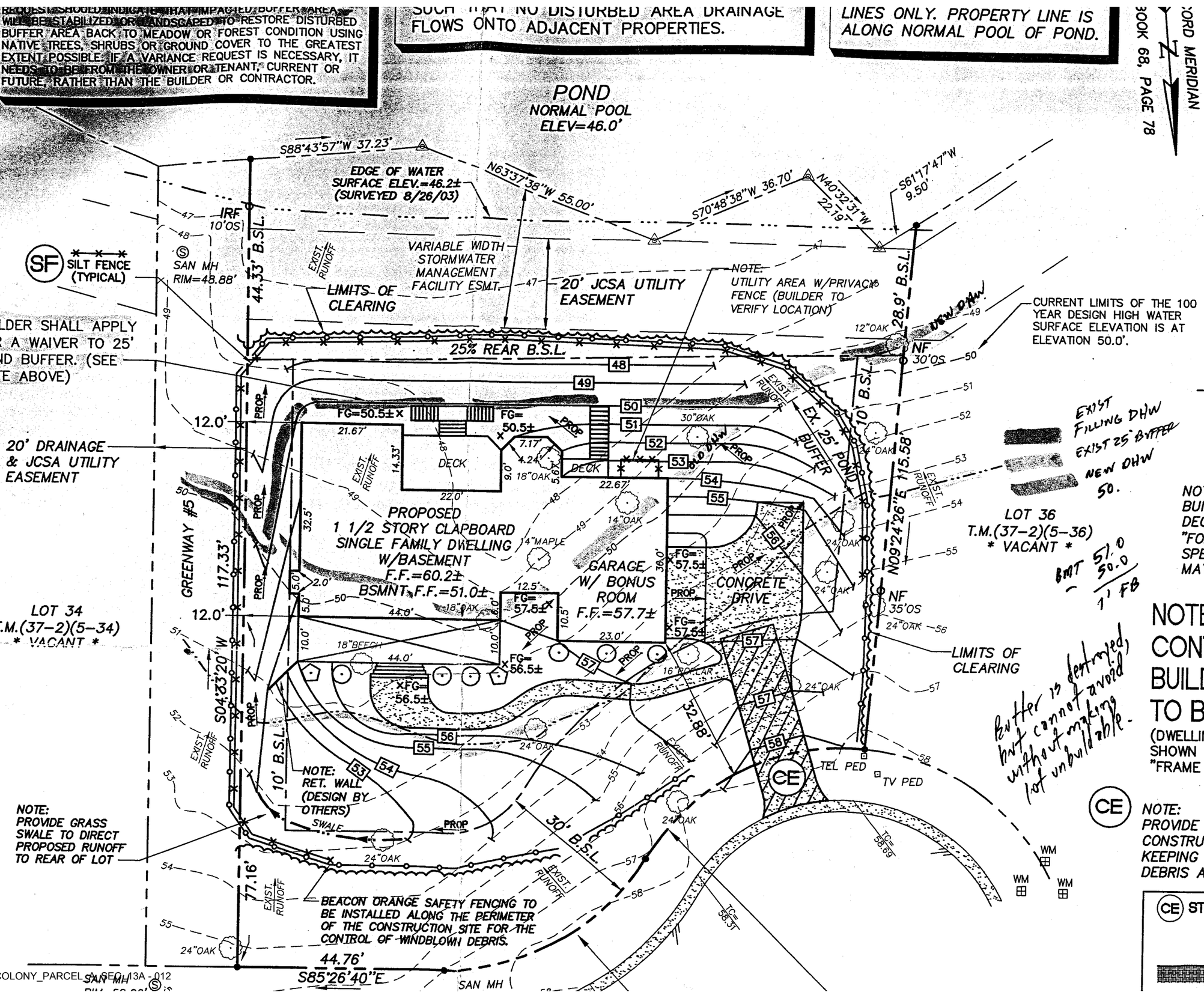
LINES ONLY. PROPERTY LINE IS ALONG NORMAL POOL OF POND.

BOOK 68, PAGE 78

ORD MERIDIAN

COLONY E.C.C..

VS.
E CLEARING
R AND
BE REMOVED
NY OR ITS
AKE, AS A
ANY
/30/03
RONT LOT LINE;
ENT OF THE
TER, FROM
LOT LINES;
ROL
ICATION OF
LAR LOT
EREOF BY
M OF AN
LL GRANT A
ROM THE
IENTS.
EFERRED
ITS FOR
ONS
VERIFIED
ALSO
AVE BEEN
TROL ITEMS,
D FROM LOT
APPLICABLE
CONSTRUCTION
CTION.



AREA OF LOT

21,509 S.F.±
0.494 ACRES±

GRAPHIC SCALE

20' 0' 20

SCALE: 1" = 20'

LANDSCAPE LEGE

YAUPON HOLLY

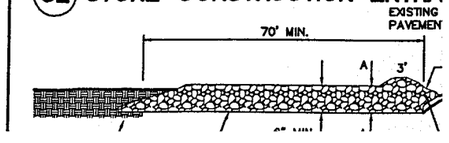
NELLIE R. STEVENS

NOTE:
BUILDER SHALL REFER TO THE
DECLARATION OF PROTECTIVE C
"FORD'S COLONY AT WILLIAMSBU
SPECIFIC LANDSCAPING REQUIRE
MAY NOT BE SHOWN ON THIS F

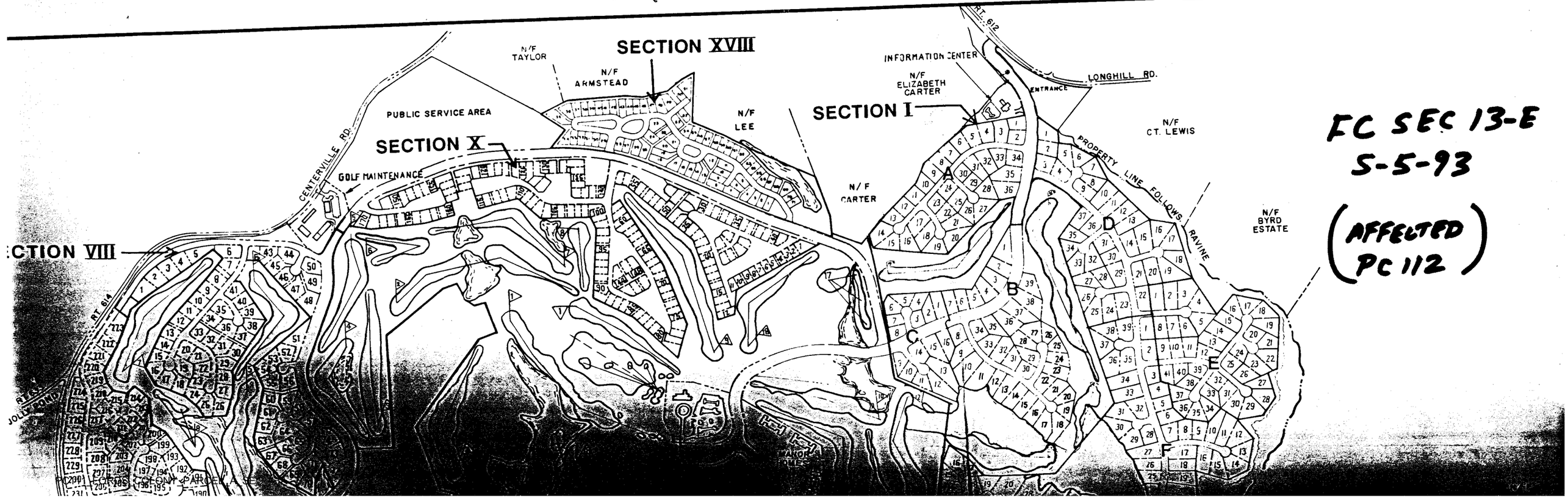
NOTE:
CONTRACTOR TO VER
BUILDING DIMENSIONS
TO BEGINNING CONST
(DWELLING DIMENSIONS AND PROPER
SHOWN ARE COMPUTED TO THE FAC
"FRAME LINE".)

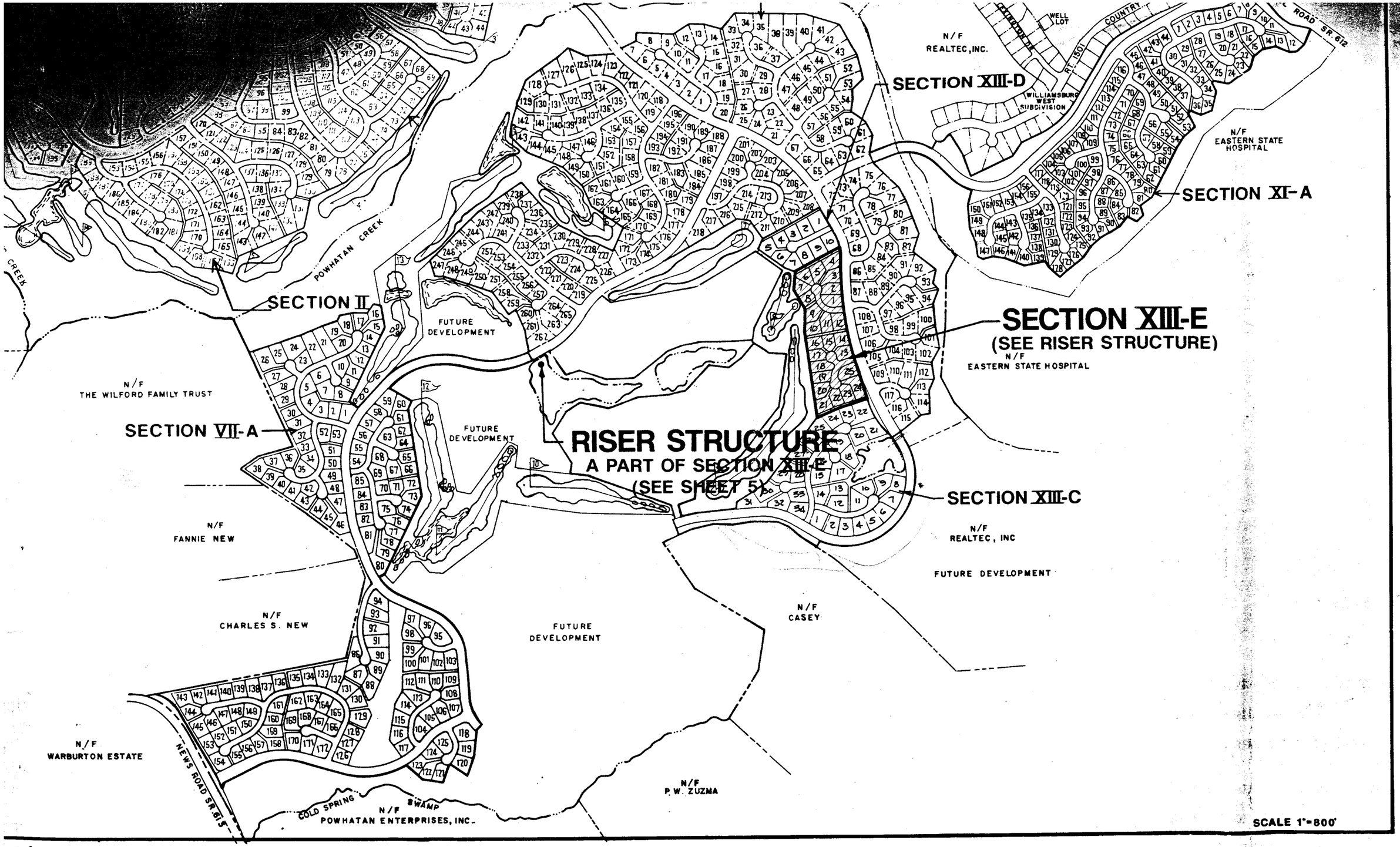
CE NOTE:
PROVIDE STONE CONSTRUCTION ENTR
CONSTRUCTION. CONTRACTOR RESPON
KEEPING RIDGE CROSSING FREE OF M
DEBRIS ADJACENT TO PROPOSED DRI

CE STONE CONSTRUCTION ENTRA



FORD'S COLONY AT WILLIAMSBU
REALTEC INCORPORATED
JAMES CITY COUNTY, VIRGINIA
SECTION XIII-E
CONSTRUCTION PLANS




SECTION XIII-D
SECTION XI-A
SECTION XIII-E
(SEE RISER STRUCTURE)
SECTION II
SECTION VII-A
RISER STRUCTURE
A PART OF SECTION XIII-E
(SEE SHEET 5)
SECTION XIII-C
N/F
REALTEC, INC.
WELL LOT
WILLIAMSBURG WEST SUBDIVISION
N/F
EASTERN STATE HOSPITAL
N/F
EASTERN STATE HOSPITAL
N/F
THE WILFORD FAMILY TRUST
N/F
FANNIE NEW
N/F
CHARLES S. NEW
N/F
WARBURTON ESTATE
N/F
REALTEC, INC
FUTURE DEVELOPMENT
N/F
CASEY
N/F
P. W. ZUZMA
N/F
POWHATAN ENTERPRISES, INC.
POWHATAN CREEK
COLD SPRING SWAMP
NEWS ROAD SR 615
ROAD SR 612
SCALE 1"=800'

CONSUL

** VDOT #3, #357 OR #5 COARSE AGGREGATE TO REPLACE SILT FENCE IN " HORSESHOE " WHEN HIGH VELOCITY OF FLOW IS EXPECTED

CLASS I RIPRAP

FORD'S COLONY
PRIVATE STREET CONSTRUCTION NOTES

1. ALL ROADS AND DRAINAGE FACILITIES SHOULD BE CONSTRUCTED IN ACCORDANCE WITH CURRENT REGULATIONS, SPECIFICATIONS AND STANDARDS OF THE JAMES CITY COUNTY PRIVATE STREET ORDINANCE.

2. STANDARD PE-1 ENTRANCES WITH A MINIMUM OF 24' OF 15" CONCRETE CULVERT PIPE SHALL BE REQUIRED FOR ALL DRIVEWAYS.

3. ALL SHOULDERS, DITCHES AND BACKSLOPES MUST BE STABILIZED.

4. THE ROAD CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL ITEMS OF ROAD WORK & DRAINAGE WITH EXISTING AND PROPOSED UNDERGROUND UTILITIES (POWER, WATER, SEWER AND TELEPHONE) SUCH THAT NO DUPLICATION OF WORK EFFORT IS INCURRED.

5. ALL ITEMS OF ROADWORK AND DRAINAGE NECESSARY FOR THE ROADS TO BE IN ACCORDANCE WITH JAMES CITY COUNTY'S PRIVATE STREET ORDINANCE.

FORD'S COLONY, SECTION XIII-E
"OUTLINE OF THE INSPECTION PROCEDURE FOR CONSTRUCTION OF PRIVATE STREETS"

1. Upon completion of road grading to subgrade and application of 2" - 3" of "sales stone", the engineer will contact a soils testing firm to obtain representative CBR samples. The location and number of the CBR (California Bearing Ratio) samples is to be determined by the soils engineer. The soils engineer shall then prepare a report which shall include as a minimum the following:

   a) Number and location (including map) of CBR samples and test results of the samples.

   b) Soils engineering analysis.

   c) Recommendations including required alterations of the base material application rate, modifications to the subbase if required, etc. from those designs shown on the approved construction drawings.

2. Base material will be supplied and certified by a VDOT certified and bonded source. Evidence of this will be provided via invoices from supplier.

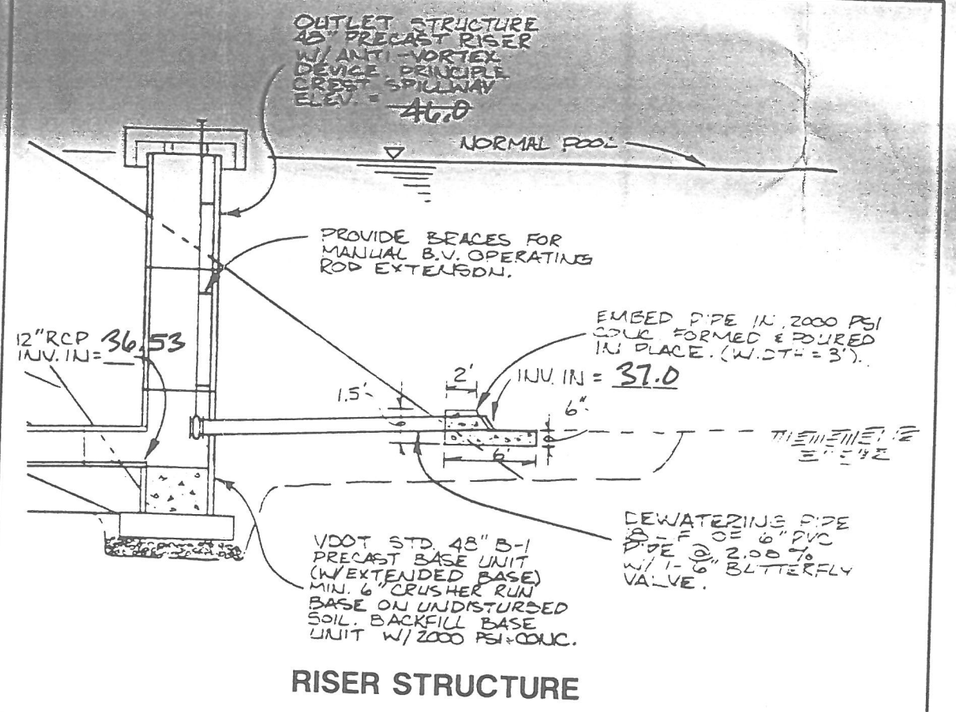
3. After the County engineer has reviewed and approved the soils engineer's report, base material will be applied at the depths necessary to provide required depth (either by plan or by soils engineer recommendation) after compaction. The contractor in the presence of the engineer will test the depth of the base material at least once every 250 linear feet and report the results. Inadequate depths will require additional base material and subsequent retesting. The engineer will provide the test results to the County engineer.

4. Bituminous concrete will be supplied and certified by a VDOT certificate and bonded source. Evidence of this will be provided via invoices from supplier.

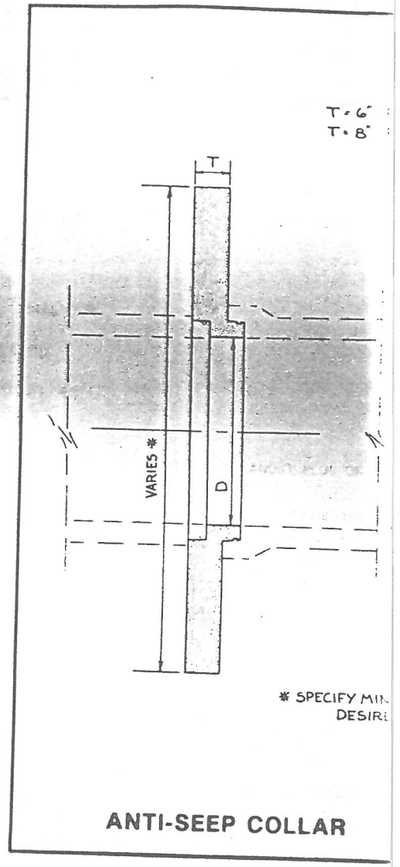
5. After the bituminous concrete has been placed and compacted, cores will be taken at a minimum of 500' intervals to determine the thickness of the asphalt. Inadequate depths will require additional bituminous concrete being installed in the appropriate locations. The contractor in the presence of the engineer will provide test results to James City County. The installation of two courses of bituminous concrete (B-3 and S-5) will require individual core samples resulting in two separate testing reports.

6. Reporting will be performed by a contractor and the licensed engineer as outlined above. The number of samples in each case will be, as a minimum, the total length of roads tested divided by the required interval. In order to preserve the integrity of the project's construction a plan depicting the sampling locations will be provided to the County prior to the actual inspections - not before construction begins as requested in your guidelines.

7. Interim [illegible]

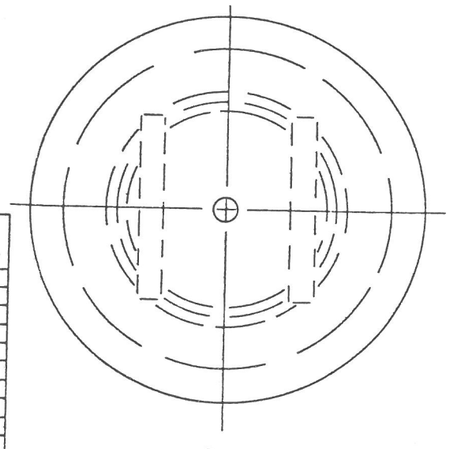


RISER STRUCTURE

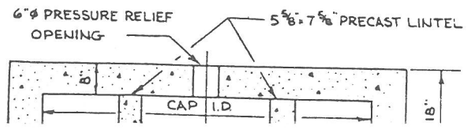


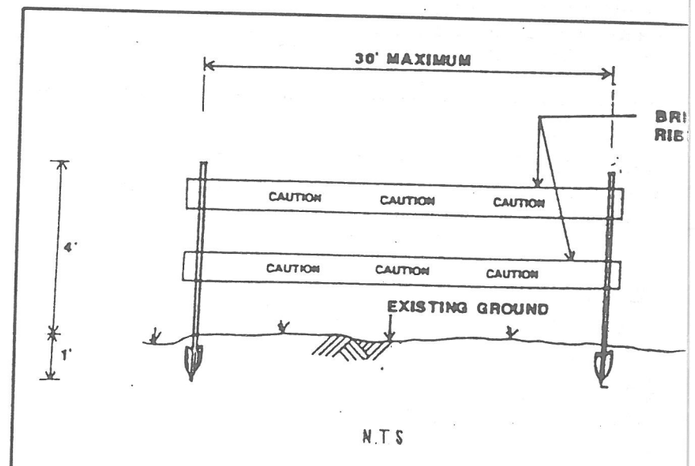
ANTI-SEEP COLLAR

STAND-PIPE I.D.	CAP I.D.	STNPIPE. JOINT WEIGHT	CAP WEIGHT
12"	21"	368#	564#
15"	27"	504#	903#
18"	30"	688#	1,098#
21"	36"	864#	1,549#
24"	42"	2,160#	2,087#
27"	48"	2,616#	2,701#
30"	48"	3,120#	2,701#
36"	60"	4,256#	4,441#
42"	66"	5,568#	5,314#
48"	78"	7,056#	7,307#
54"	90"	10,024#	8,887#
60"	96"	11,992#	10,361#
66"	108"	14,136#	12,958#
72"	114"	16,448#	15,115#



PLAN





3. ALL SHOULDERS,

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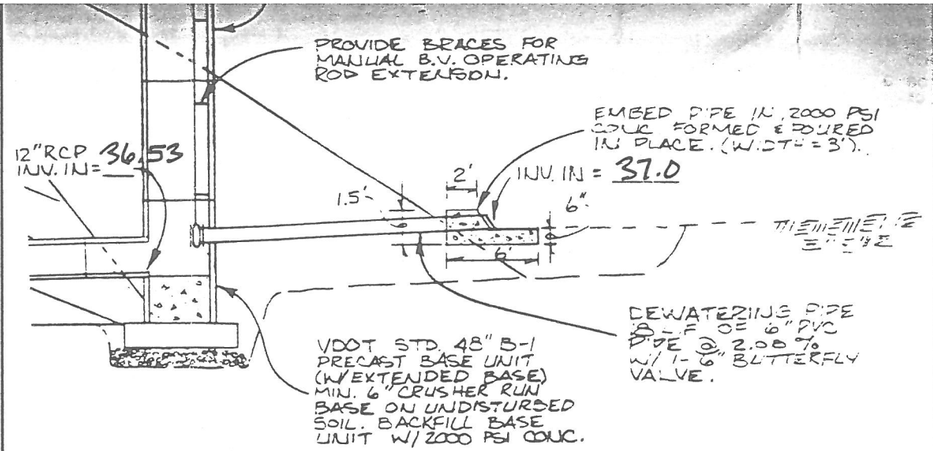
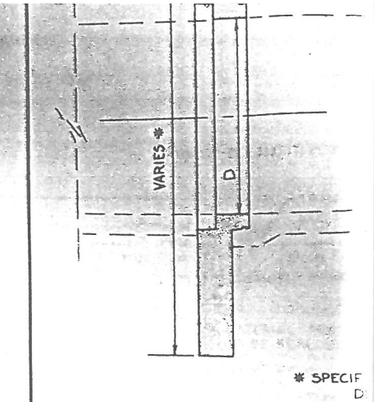
7. Interim statements from the engineer, with accompanying documentation, will be submitted to the County engineer prior to partial release of surety.

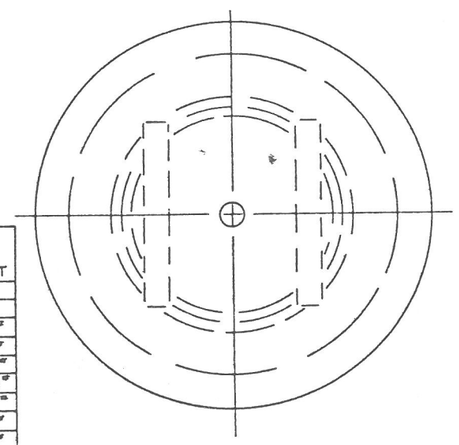
8. Application for final release of surety will be accompanied by the contractor's statement and certification that the specifically named private streets have been constructed in accordance with the approved plans and applicable Virginia Department of Transportation Standards. Contractor's certification shall be supported by the inspections performed by the engineer (see above).



RISER STRUCTURE



ANTI-SEEP COLLAR



PLAN

STAND-PIPE I.D.	CAP I.D.	STNPIPE. JOINT WEIGHT	CAP WEIGHT
12"	21"	368#	564#
15"	27"	504#	903#
18"	30"	688#	1,098#
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66"	108"	14,136#	12,958#
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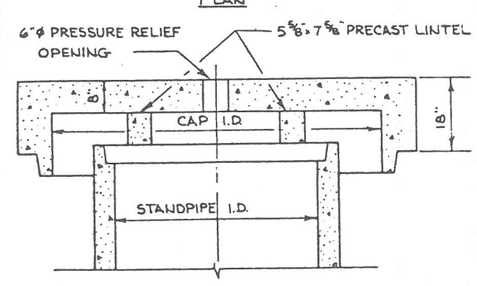
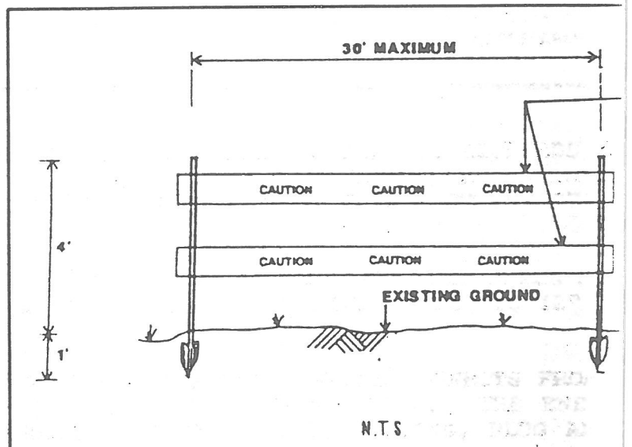


SECTION

FOR PIPE DETAILS, SEE DWG. RS-74-53

PRECAST CONCRETE ANTI-VORTEX DEVICE



TREE PROTECTION

1. UPON FIELD INSPECTION, DISTANCE BETWEEN SUPPORT STAKES CAN BE DECREASED BY COUNTY
2. BARRIER TO BE PLACED IMMEDIATELY AT EDGE O

LINE.
HE DEPTH OF THE LOT,

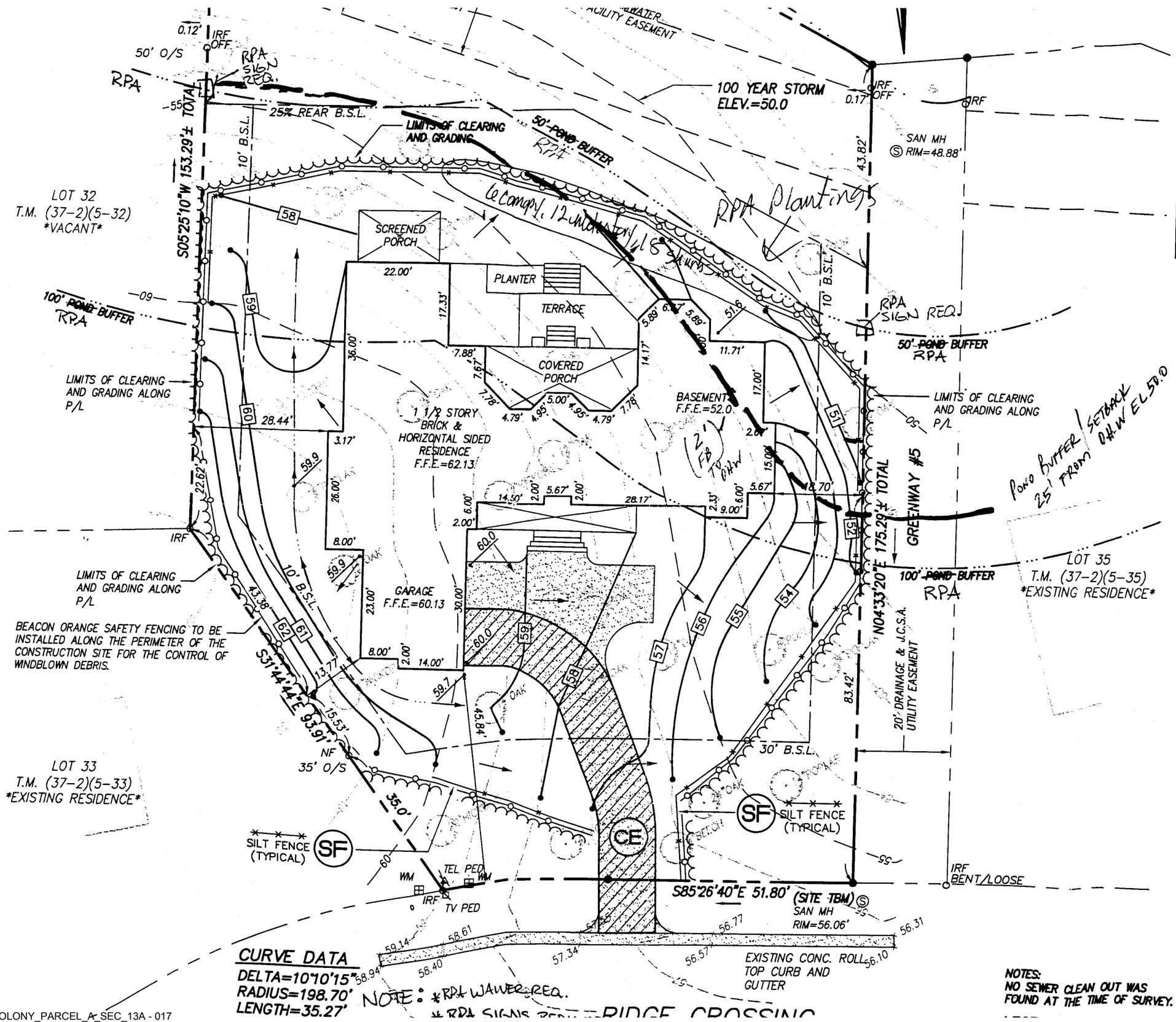
NES.
TTEE SHALL DETERMINE
) A PARTICULAR LOT
THE OWNER AND
STRUCTION SITE, THE
A VARIANCE TO THE
SE SETBACK

O FORD'S COLONY
ITIONS AND LOCATIONS
NOT SHOWN ON THIS

BY AES BASED UPON
LEVATIONS SHOWN HAVE

ALL BE
SUCH
YS ONTO

CONTROL ITEMS,
OVED FROM LOT
, IF APPLICABLE
OR CONSTRUCTION
TRUCTION.



DETERMINED. HOWEVER, 100' AND 5
BUFFERS ARE SHOWN. SHOULD THE
AND/OR OWNER SHOULD CONSULT
AGENCIES.

NOTE:
BUILDER AND/OR OWNER SHALL AP
APPROPRIATE AGENCIES FOR A VA
THE PROVISIONS OF THE BUILDING S
REQUIREMENTS BASED ON STREAM

NOTE:
CONTRACTOR TO VI
BUILDING DIMENSIO
TO BEGINNING CONS
(DWELLING DIMENSIONS AND PRO
SHOWN ARE COMPUTED TO THE
"FRAME LINE".)

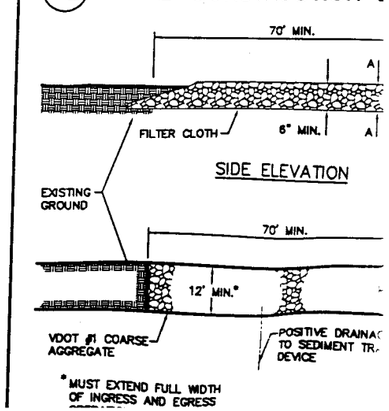
NOTES:
1. ALL DISTURBED AREAS ARE TO BE SEE
MULCHED WITHIN 7 DAYS OF REACHING F
2. NO RPA CHESAPEAKE BAY AREAS ARE
ADJACENT TO PROPERTY SHOWN.

NOTE:
THIS PROPERTY LIES IN ZONE X (AREAS
BE OUTSIDE THE 500 YEAR FLOOD PLA
#510201-0035 B DATED 2/6/91.

NOTE:
PROVIDE STONE CONSTRUCTION ENTRAN
CONSTRUCTION. CONTRACTOR RESPONSIB
RIDGE CROSSING FREE OF MUD AND DEB
PROPOSED DRIVEWAY

NOTES:
NO SEWER CLEAN OUT WAS
FOUND AT THE TIME OF SURVEY.

CE STONE CONSTRUCTION



PC112

DESIGN HIGH WATER ELEV 50.0

POND
NORMAL POOL ELEV= 46.0'
100 YEAR FLOOD ELEV= 50.0'

EDGE OF WATER

PROPERTY LINE ALONG NORMAL POOL OF POND.

TIE LINE ONLY (FOR CLOSURE)

N02°52'48"E 94.78'

S71°14'06"E 82.32'

N75°27'27"E 41.10'

N19°33'18"W 95.81'

S75°50'16"W 116.59'

S18°49'04"E 149.37'

50' RPA BUFFER (FROM EXISTING EDGE OF POND)

100' RPA BUFFER (FROM EXISTING EDGE OF POND)

100 YEAR FLOOD

20' J.C.S.A. UTILITY EASEMENT

20' DRAINAGE & J.C.S.A. UTILITY EASEMENT

VARIABLE WIDTH STORM WATER MANAGEMENT FACILITY EASEMENT

LIMITS OF CLEARING AND GRADING

LIMITS OF CLEARING AND GRADING ALONG P/L

GREENWAY #3

GREENWAY #4

(SITE TBM) SAN MH RIM=59.00'

IRF

SCREEN PORCH

DECK

2 STORY BRICK SIDED RESIDENCE F.F.E.=61.0

GARAGE F.F.E.=59.5

CONCRETE DRIVE

H.P.

B.S.L.

10' B.S.L.

NOTE: PROPOSED UTILITY AREA W/ WOODEN FENCE (BUILDER TO VERFIY LOCATION)

POND BUFFER SETBACK

BEACON ORANGE SAFETY FENCING TO BE INSTALLED ALONG THE PERIMETER OF THE CONSTRUCTION SITE FOR THE CONTROL OF WINDBLOWN DEBRIS.

LOT 45
T.M.(37-2)(6-45)
VACANT LOT

LOT 43
T.M.(37-2)(6-43)
VACANT LOT

N50°58'43"W 80.77'

S50°58'43"E 62.45'

NF 35' O/S

YARD DRAIN TOP=53.6±

DI

IMPACTED POND BUFFER/SETBACK AREA

SILT FENCE (TYPICAL)

SF

CE

WM

TEL PED

LP

CATV PED

EXISTING CONC. ROLL TOP CURB AND GUTTER

CURVE DATA

DELTA=23°54'24"
RADIUS=50.00'
LENGTH=20.86'
TANGENT=10.59'
CHORD=20.71'
C.B.=S23°57'35"W

(1)

STOWE

SAN. SEWER

EX. SAN. SEWER

LIMITS OF CLEARING (TYP)

SS #13A-D-2
1-C.I. GRATE
STA 14+34
TOP @ BC=56.04
INV.=49.00

25 L.F. OF 15" ASCP II @ 4.00%

180 L.F. OF 15" ASCP II @ 1.57% (INCLUDES ES-2 END SECTION)

98 L.F. ASCP

33

36

35

34

32

EX. C.O.

EX. M.H.
RIM=48.30
INV=43.00

SF

OP

100 YEAR STORM ELEV.=50.0

SS #13A-D-1
1-15" ES-2
END SECTION
INV.=46.17

PROVIDE 10' LONG, 5.5' WIDE, 1' DEEP APRON OF CLASS 1A RIPRAP OVER FILTER FABRIC (APPROX. 2 CY REQ'D.)

Inspected by PTM on 6-6-02 pipe under 3' no scouring

DAM III
NORMAL POOL ELEV = 46.00
10 YR. STORM ELEV = 48.24
100 YR. STORM ELEV = 49.96

SS #13A-C-
INV.=46.

PROVIDE 10' LONG, 5.5' WIDE,
APRON OF CLASS II RIPRAP O
FILTER FABRIC (APPROX. 3 CY

COPY FC SEC 13A PLAN
5-3-98
DRAINS TO DAM 3
PC 112

complete 7-8-02

pipe well above water. scouring under

51

52

Install outlet protection and outlet pipe and finish grading and install outlet protection on 6-7-02

44

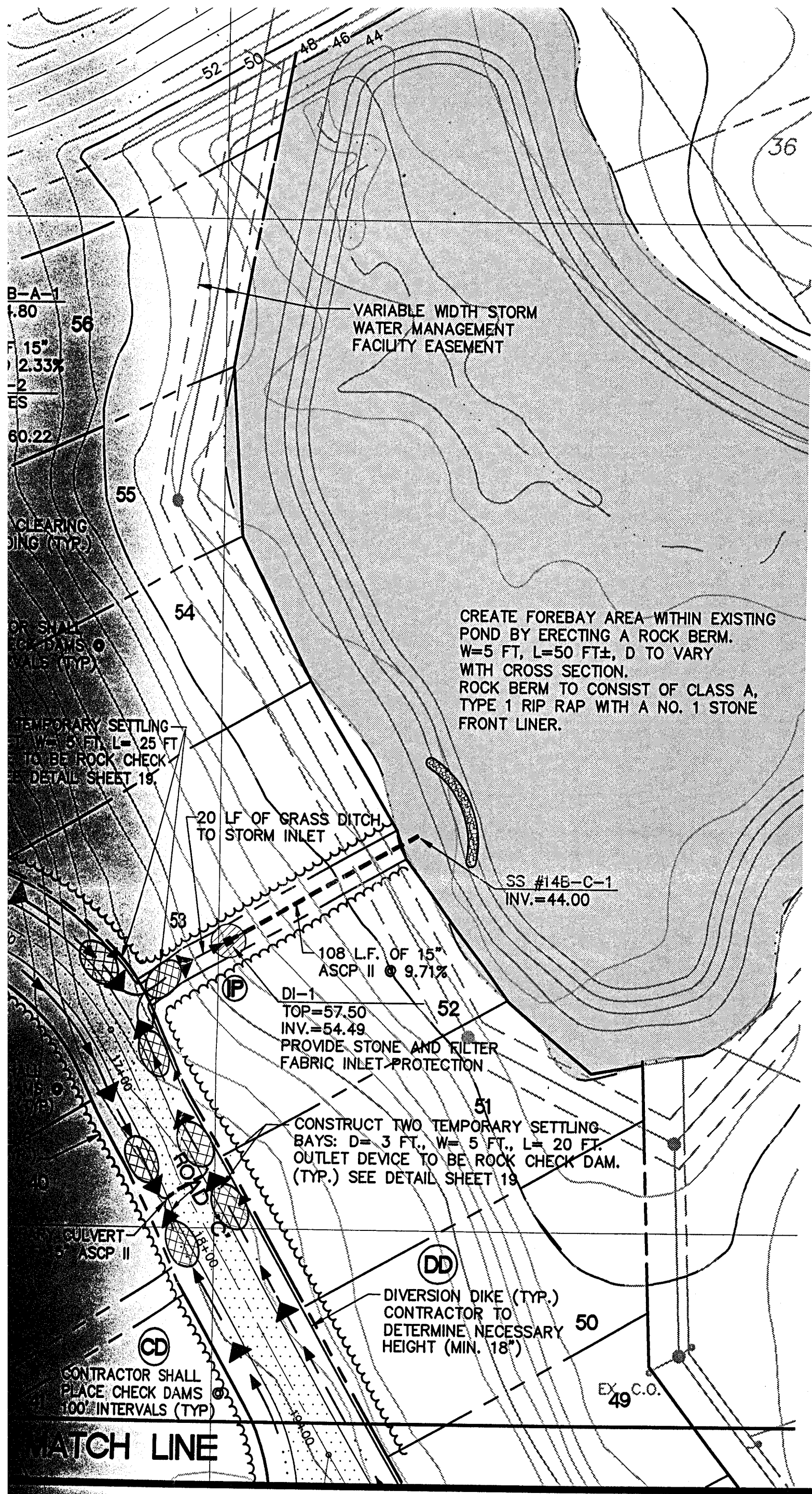
50

4

02.26.98-17:00 FC13ACOR

EAW

111_FORDS_COLONY_PARCEL_A_SEC_13A - 919

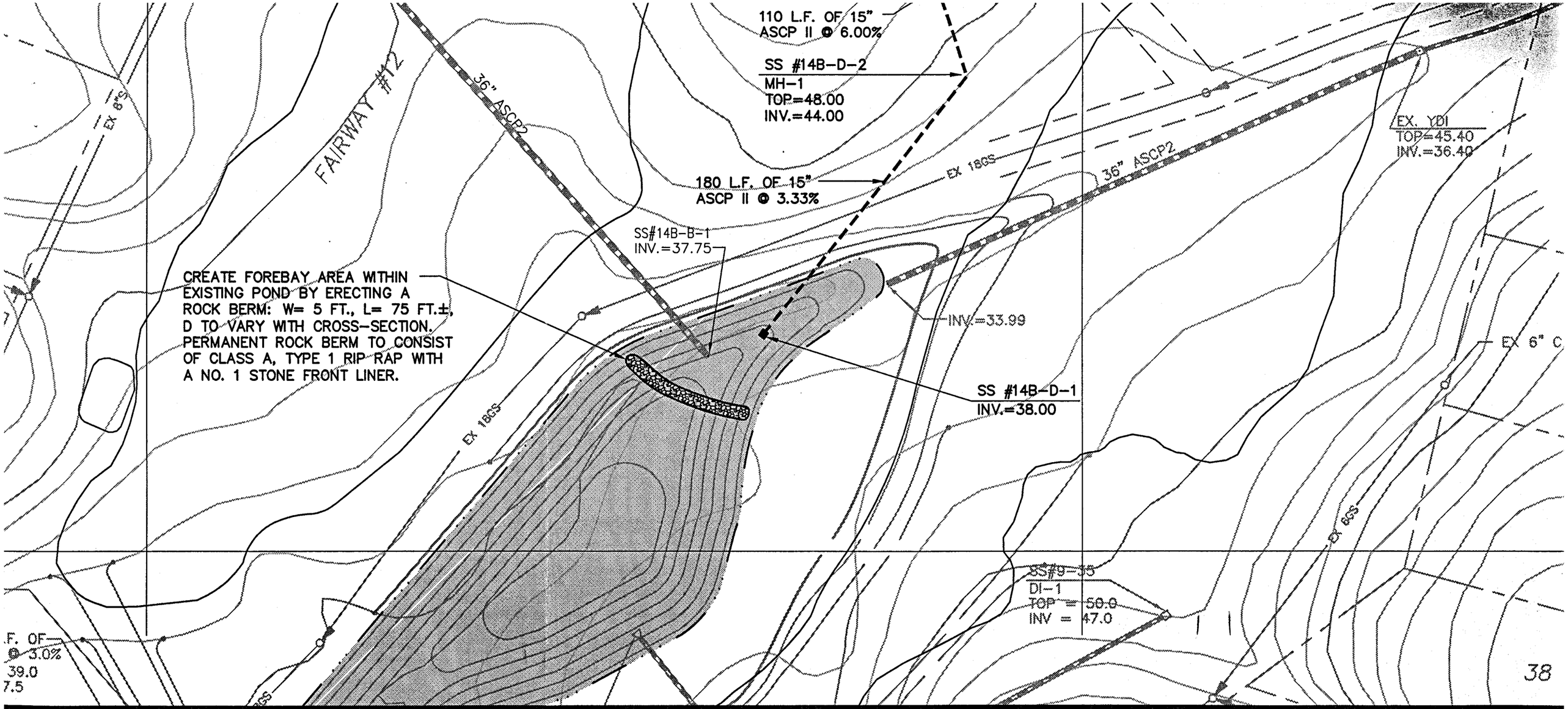


No.	DATE	REVISION / COMMENT / NOTE
1	10/12/98	REVISED PER 10/98 JCC COMMENT LETTER

COMMONWEALTH OF VIRGINIA
STEVEN O. WIGLEY
No. 019307
10/19/98
PROFESSIONAL ENGINEER

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

DRAINAGE PLAN
ONY
BURG
1 - 56)
INCORPORATED
VIRGINIA



)AD STATUS CONTRACTOR TO:

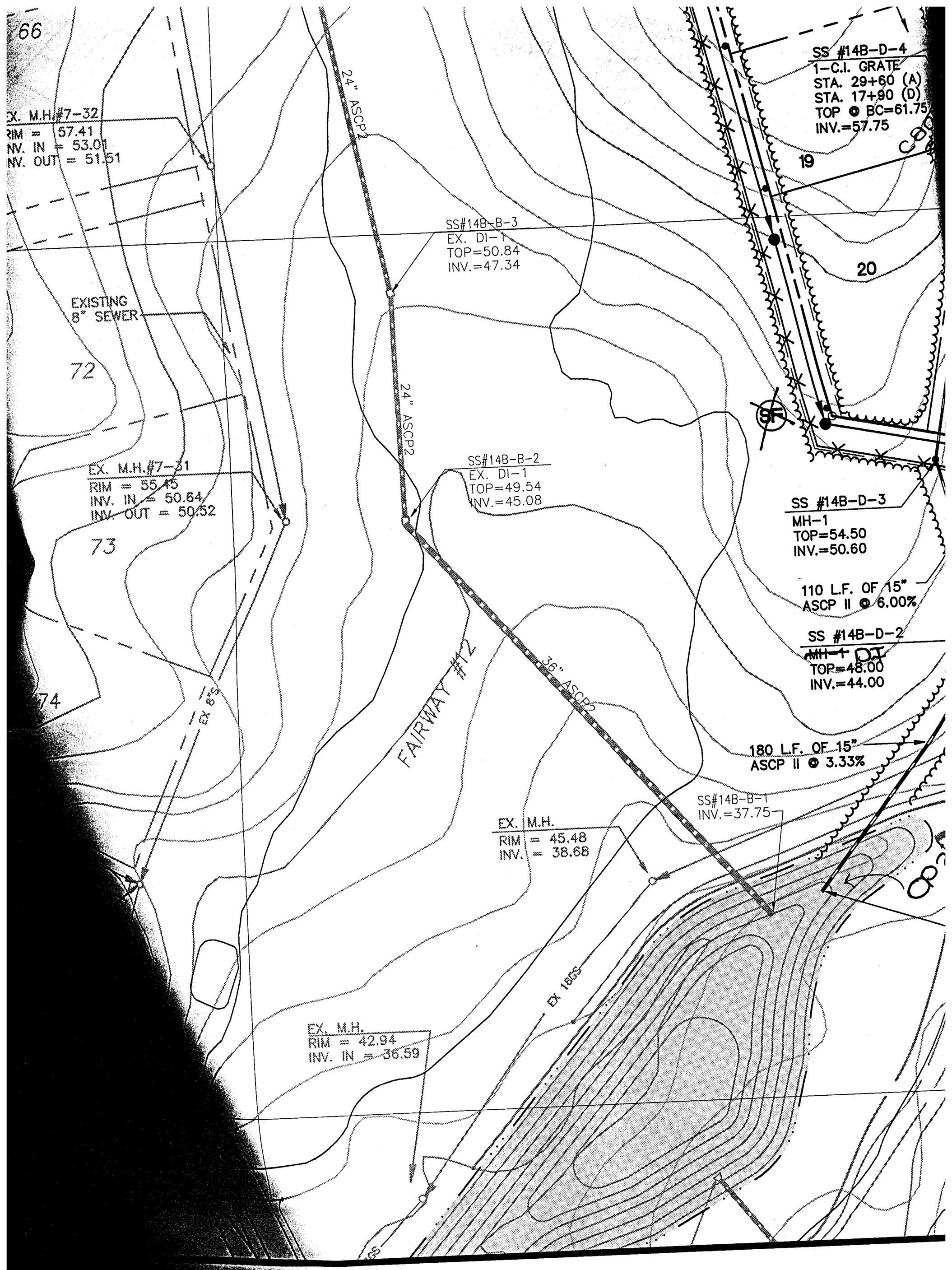
.DWAYS TO DESIGN GRADES.

, ROUGH GRADE TEMPORARY ROADSIDE
)XIMATELY 15' OFFSET FROM CENTERLINE
.NENT VEGETATION.

'S WITH APPROXIMATELY 2 INCHES

:ARY DRAINAGE PLAN TO INCLUDE
)N AND SEDIMENTATION CONTROL

NOTE:
ALL STORM SEWER SYSTEM PIPE SHALL BE TYPE ASCP II OR APPROVED EQUAL N12 PLASTIC PIPE.



NOTE:
ALL STORM SEWER SYSTEM PIPE SHA
OR APPROVED EQUAL N12 PLASTIC P

VARIABLE WIDTH STORM WATER MANAGEMENT FACILITY EASEMENT

100 YEAR STORM ELEV = 49.46

NORMAL POOL ELEVATION=46.00
10 YEAR STORM=48.24
100 YEAR STORM=50.00

100 YEAR STORM ELEVATION=50.00

SS #14B-C-1
INV.=44.00

SS #14B-C-2
1-C.I. GRATE
STA. 16+70
TOP @ BC=68.85
INV.=61.00

175 L.F. OF 15" ASCP II @ 9.71%

15' DRAINAGE EASEMENT

95 L.F. OF 15" ASCP II @ 1.05%

SS #14B-C-3
1-C.I. GRATE
STA. 17+67
TOP @ BC=66.57
INV.=62.00

32 L.F. OF 15" ASCP II @ 1.36%

SS #14B-C-5
2-C.I. GRATES
STA. 18+00
TOP @ BC=66.80
INV. IN=63.25 (C-9)
INV. IN=63.00 (C-6)
INV. OUT=63.00

105 L.F. OF GRASS SWALE @ 1.43%

130 L.F. OF 12" ASCP II @ 4.03%

EX. C.O.

MATCH LINE

OR, remove st and repair erosion and stabilize easement

remove gravel and dirt pile from road shoulder in front of lot 69.

No.	DATE	REVISION / COMMENT / NOTE	BY
1	10/12/98	REVISED PER 10/98 JCC COMMENT LETTER	DPW

COMMONWEALTH OF VIRGINIA
STEVEN O. WIGLEY
No. 019307
10/19/98
PROFESSIONAL ENGINEER

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

PORATED VIRGINIA

HYDROLOGIC REPORT FOR

FORD'S COLONY

AT WILLIAMSBURG

WILLIAMSBURG WEST 9 HOLES

DAM II

5-15-97
FORDS COLONY
SEC 13-B
PC 111

AES CONSULTING ENGINEERS

5248 OLDE TOWNE ROAD

WILLIAMSBURG, VA. 23188

7/25/97

AES JOB #5652-63

Refer to PC 112 for DAM III Comps.
Fords Colony SEC 13-B storm drain comps

Option 1 . STAGE / STORAGE TABLE R to reset

1. RESERVOIR No = 1. 2. RESERVOIR NAME = DAM 2.....
3. S = Ks * Z^b
Ks = 0..... b = 0.....
START ELEV = 0..... INCREMENT = 0...

	STAGE ft	ELEVATION ft	CO AREA sq ft	INC STORAGE cu ft	TOT STORAGE cu ft
4	0.00	56.00.	114665..	0	0
5	2.00	58.00.	162378..	277043	277043
6	4.00	60.00.	210091..	372469	649512
7	0.00	0.00.	0.....	0	0
8	0.00	0.00.	0.....	0	0
9	0.00	0.00.	0.....	0	0
10	0.00	0.00.	0.....	0	0
11	0.00	0.00.	0.....	0	0
12	0.00	0.00.	0.....	0	0
13	0.00	0.00.	0.....	0	0
14	0.00	0.00.	0.....	0	0

Change item number: 0 ↵ to cont

Reservoir No. 1 OUTLET STRUCTURES

CULVERT STRUC A. Q=CoA[2gh/k]^.5

1. WIDTH (in) = 15.
2. HEIGHT (in) = 15.
3. No. BARRELS = 1..
4. INVERT ELEV. = 46.8.....
5. Co = 0.60
6. CULVERT LENGTH (ft) = 80..
7. CULVERT SLOPE (%) = .75.
8. MANNING'S N-VALUE = .013

CULVERT STRUC B. Q=CoA[2gh/k]^.5

9. WIDTH (in) = 0..
10. HEIGHT (in) = 0..
11. No. BARRELS = 0..
12. INVERT ELEV. = 0.....
13. Co = 0.60
14. CULVERT LENGTH (ft) = 0...
15. CULVERT SLOPE (%) = 0...
16. MANNING'S N-VALUE = .013
17. MULTI-STAGE OPTION ? (Y/N) N

WEIR STRUCTURE A. Q=CwLH^EXP

18. CREST LENGTH (ft) = 12.56..
19. CREST ELEVATION = 56.....
20. Cw = 3.00
21. EXP = 1.50
22. MULTI-STAGE OPTION ? (Y/N) Y

WEIR STRUCTURE B. Q=CwLH^EXP

23. CREST LENGTH (ft) = 0.....
24. CREST ELEVATION = 0.....
25. Cw = 3.00
26. EXP = 1.50
27. MULTI-STAGE OPTION ? (Y/N) N

Change item number: 0 ↵ to cont

Option 1 STAGE / STORAGE TABLE R to reset

1. RESERVOIR No = 2. 2. RESERVOIR NAME = EXCAV DAM 2.
3. S = Ks * Z^b
Ks = 0..... b = 0.....
START ELEV = 0..... INCREMENT = 0...

	STAGE ft	ELEVATION ft	CO AREA sq ft	INC STORAGE cu ft	TOT STORAGE cu ft
4	0.00	47.00.	15.....	0	0
5	1.00	48.00.	22880...	11447	11447
6	3.00	50.00.	39803...	62683	74130
7	5.00	52.00.	74023...	113826	187956
8	7.00	54.00.	84517...	158540	346496
9	9.00	56.00.	114665..	199182	545678
10	11.00	58.00.	162378..	277043	822721
11	0.00	0.00.	0.....	0	0
12	0.00	0.00.	0.....	0	0
13	0.00	0.00.	0.....	0	0
14	0.00	0.00.	0.....	0	0

Change item number: 0 ↵ to cont

HYDROLOGIC REPORT

2YR PRE-DEVELOPMENT...
.....
.....

Hyd. No. 1

Hydrograph type	= S.C.S. RUNOFF	Peak discharge	= 27.47 cfs
Storm frequency	= 2 yr	Time interval	= 5 min
Basin area	= 47.8 ac	Basin curve No.	= 70
Ave basin slope	= 2 %	Hydraulic len	= 1930 ft
Basin lag	= 25.2 min	Time of concen	= 42.00 min
Total precip.	= 3.50 in	Distribution	= S.C.S. II

HYDROGRAPH DISCHARGE TABLE

TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfS)	
11.75	1.07	11.83	2.52	11.92	5.75	12.00	10.16
12.08	14.78	12.17	19.43	12.25	23.75	12.33	26.96
12.42	27.47	12.50	26.20	12.58	24.59	12.67	22.68
12.75	20.51	12.83	18.12	12.92	15.57	13.00	12.97
13.08	10.45	13.17	8.32	13.25	7.16	13.33	6.62
13.42	6.16	13.50	5.78	13.58	5.46	13.67	5.20
13.75	4.97	13.83	4.76	13.92	4.57	14.00	4.39
14.08	4.22	14.17	4.06	14.25	3.92	14.33	3.79
14.42	3.67	14.50	3.56	14.58	3.47	14.67	3.38
14.75	3.31	14.83	3.24	14.92	3.18	15.00	3.13
15.08	3.08	15.17	3.03	15.25	2.98	15.33	2.94
15.42	2.89	15.50	2.84	15.58	2.79	15.67	2.74
15.75	2.70	15.83	2.65	15.92	2.60	16.00	2.55
16.08	2.50	16.17	2.45	16.25	2.40	16.33	2.35
16.42	2.31	16.50	2.27	16.58	2.24	16.67	2.21
16.75	2.18	16.83	2.16	16.92	2.13	17.00	2.11
17.08	2.09	17.17	2.08	17.25	2.06	17.33	2.04
17.42	2.02	17.50	2.01	17.58	1.99	17.67	1.97
17.75	1.95	17.83	1.94	17.92	1.92	18.00	1.90
18.08	1.88	18.17	1.86	18.25	1.85	18.33	1.83
18.42	1.81	18.50	1.79	18.58	1.77	18.67	1.75
18.75	1.74	18.83	1.72	18.92	1.70	19.00	1.68
19.08	1.66	19.17	1.64	19.25	1.62	19.33	1.60
19.42	1.58	19.50	1.56	19.58	1.54	19.67	1.53
19.75	1.51	19.83	1.49	19.92	1.47	20.00	1.45
20.08	1.43	20.17	1.41	20.25	1.39	20.33	1.37
20.42	1.36	20.50	1.34	20.58	1.33	20.67	1.32
20.75	1.31	20.83	1.31	20.92	1.30	21.00	1.30
21.08	1.29	21.17	1.29	21.25	1.29	21.33	1.28

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME--OUTFLOW (hrs	cfs)	TIME--OUTFLOW (hrs	cfs)	TIME--OUTFLOW (hrs	cfs)	TIME--OUTFLOW (hrs	cfS)
21.42	1.28	21.50	1.28	21.58	1.27	21.67	1.27
21.75	1.27	21.83	1.26	21.92	1.26	22.00	1.25
22.08	1.25	22.17	1.25	22.25	1.24	22.33	1.24
22.42	1.24	22.50	1.23	22.58	1.23	22.67	1.23
22.75	1.22	22.83	1.22	22.92	1.22	23.00	1.21
23.08	1.21	23.17	1.21	23.25	1.20	23.33	1.20
23.42	1.20	23.50	1.19	23.58	1.19	23.67	1.18
23.75	1.18	23.83	1.18	23.92	1.17	24.00	1.17
24.08	1.14	24.17	1.09	24.25	1.02	24.33	0.92

HYDROLOGIC REPORT

2YR POST DEVELOPMENT..
.....
.....

Hyd. No. 3

Hydrograph type	= S.C.S. RUNOFF	Peak discharge	= 81.71 cfs
Storm frequency	= 2 yr	Time interval	= 3 min
Basin area	= 47.8 ac	Basin curve No.	= 81
Ave basin slope	= 2.6 %	Hydraulic len	= 1150 ft
Basin lag	= 12.8 min	Time of concen	= 21.40 min
Total precip.	= 3.50 in	Distribution	= S.C.S. II

HYDROGRAPH DISCHARGE TABLE

TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfS)	
10.45	1.06	10.50	1.13	10.55	1.20	10.60	1.27
10.65	1.35	10.70	1.44	10.75	1.53	10.80	1.63
10.85	1.74	10.90	1.85	10.95	1.97	11.00	2.10
11.05	2.21	11.10	2.34	11.15	2.47	11.20	2.63
11.25	2.81	11.30	3.06	11.35	3.33	11.40	3.63
11.45	3.96	11.50	4.30	11.55	4.81	11.60	5.65
11.65	7.08	11.70	9.39	11.75	12.95	11.80	18.22
11.85	26.04	11.90	37.33	11.95	51.25	12.00	64.81
12.05	75.60	12.10	81.71	12.15	80.92	12.20	73.81
12.25	64.35	12.30	54.78	12.35	45.31	12.40	36.21
12.45	27.92	12.50	21.20	12.55	16.91	12.60	14.92
12.65	13.78	12.70	12.74	12.75	11.84	12.80	11.08
12.85	10.44	12.90	9.91	12.95	9.46	13.00	9.08
13.05	8.75	13.10	8.45	13.15	8.18	13.20	7.91
13.25	7.67	13.30	7.44	13.35	7.24	13.40	7.04
13.45	6.86	13.50	6.69	13.55	6.52	13.60	6.36
13.65	6.20	13.70	6.05	13.75	5.90	13.80	5.77
13.85	5.63	13.90	5.50	13.95	5.38	14.00	5.26
14.05	5.14	14.10	5.02	14.15	4.92	14.20	4.82
14.25	4.73	14.30	4.65	14.35	4.58	14.40	4.52
14.45	4.47	14.50	4.42	14.55	4.38	14.60	4.34
14.65	4.30	14.70	4.26	14.75	4.22	14.80	4.18
14.85	4.14	14.90	4.10	14.95	4.06	15.00	4.01
15.05	3.97	15.10	3.93	15.15	3.89	15.20	3.85
15.25	3.81	15.30	3.77	15.35	3.72	15.40	3.68
15.45	3.64	15.50	3.60	15.55	3.56	15.60	3.51
15.65	3.47	15.70	3.43	15.75	3.39	15.80	3.34
15.85	3.30	15.90	3.26	15.95	3.22	16.00	3.17
16.05	3.13	16.10	3.09	16.15	3.05	16.20	3.01

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME--OUTFLOW (hrs	cfs)	TIME--OUTFLOW (hrs	cfs)	TIME--OUTFLOW (hrs	cfs)	TIME--OUTFLOW (hrs	cfS)
16.25	2.98	16.30	2.95	16.35	2.93	16.40	2.91
16.45	2.89	16.50	2.87	16.55	2.86	16.60	2.84
16.65	2.83	16.70	2.81	16.75	2.80	16.80	2.78
16.85	2.77	16.90	2.75	16.95	2.74	17.00	2.72
17.05	2.71	17.10	2.69	17.15	2.68	17.20	2.66
17.25	2.65	17.30	2.63	17.35	2.62	17.40	2.60
17.45	2.59	17.50	2.57	17.55	2.56	17.60	2.54
17.65	2.53	17.70	2.51	17.75	2.50	17.80	2.48
17.85	2.46	17.90	2.45	17.95	2.43	18.00	2.42
18.05	2.40	18.10	2.39	18.15	2.37	18.20	2.36
18.25	2.34	18.30	2.33	18.35	2.31	18.40	2.30
18.45	2.28	18.50	2.26	18.55	2.25	18.60	2.23
18.65	2.22	18.70	2.20	18.75	2.19	18.80	2.17
18.85	2.16	18.90	2.14	18.95	2.12	19.00	2.11
19.05	2.09	19.10	2.08	19.15	2.06	19.20	2.05
19.25	2.03	19.30	2.01	19.35	2.00	19.40	1.98
19.45	1.97	19.50	1.95	19.55	1.94	19.60	1.92
19.65	1.90	19.70	1.89	19.75	1.87	19.80	1.86
19.85	1.84	19.90	1.82	19.95	1.81	20.00	1.79
20.05	1.78	20.10	1.76	20.15	1.75	20.20	1.73
20.25	1.72	20.30	1.71	20.35	1.71	20.40	1.70
20.45	1.70	20.50	1.69	20.55	1.69	20.60	1.69
20.65	1.68	20.70	1.68	20.75	1.68	20.80	1.67
20.85	1.67	20.90	1.67	20.95	1.67	21.00	1.66
21.05	1.66	21.10	1.66	21.15	1.65	21.20	1.65
21.25	1.65	21.30	1.64	21.35	1.64	21.40	1.64
21.45	1.64	21.50	1.63	21.55	1.63	21.60	1.63
21.65	1.62	21.70	1.62	21.75	1.62	21.80	1.61
21.85	1.61	21.90	1.61	21.95	1.61	22.00	1.60
22.05	1.60	22.10	1.60	22.15	1.59	22.20	1.59
22.25	1.59	22.30	1.59	22.35	1.58	22.40	1.58
22.45	1.58	22.50	1.57	22.55	1.57	22.60	1.57
22.65	1.56	22.70	1.56	22.75	1.56	22.80	1.55
22.85	1.55	22.90	1.55	22.95	1.55	23.00	1.54
23.05	1.54	23.10	1.54	23.15	1.53	23.20	1.53
23.25	1.53	23.30	1.52	23.35	1.52	23.40	1.52
23.45	1.52	23.50	1.51	23.55	1.51	23.60	1.51
23.65	1.50	23.70	1.50	23.75	1.50	23.80	1.49
23.85	1.49	23.90	1.49	23.95	1.48	24.00	1.48
24.05	1.43	24.10	1.34	24.15	1.20	24.20	1.02

HYDROLOGIC REPORT

2YR POST DEVELOPMENT..
ROUTED THROUGH POND...
.....

Hyd. No. 4

Hydrograph type = RESERVOIR ROUTE Peak discharge = 18.14 cfs
Storm frequency = 2 yr Time interval = 3 min
Inflow hyd. no. = 3 Reservoir no. = 1

HYDROGRAPH DISCHARGE TABLE

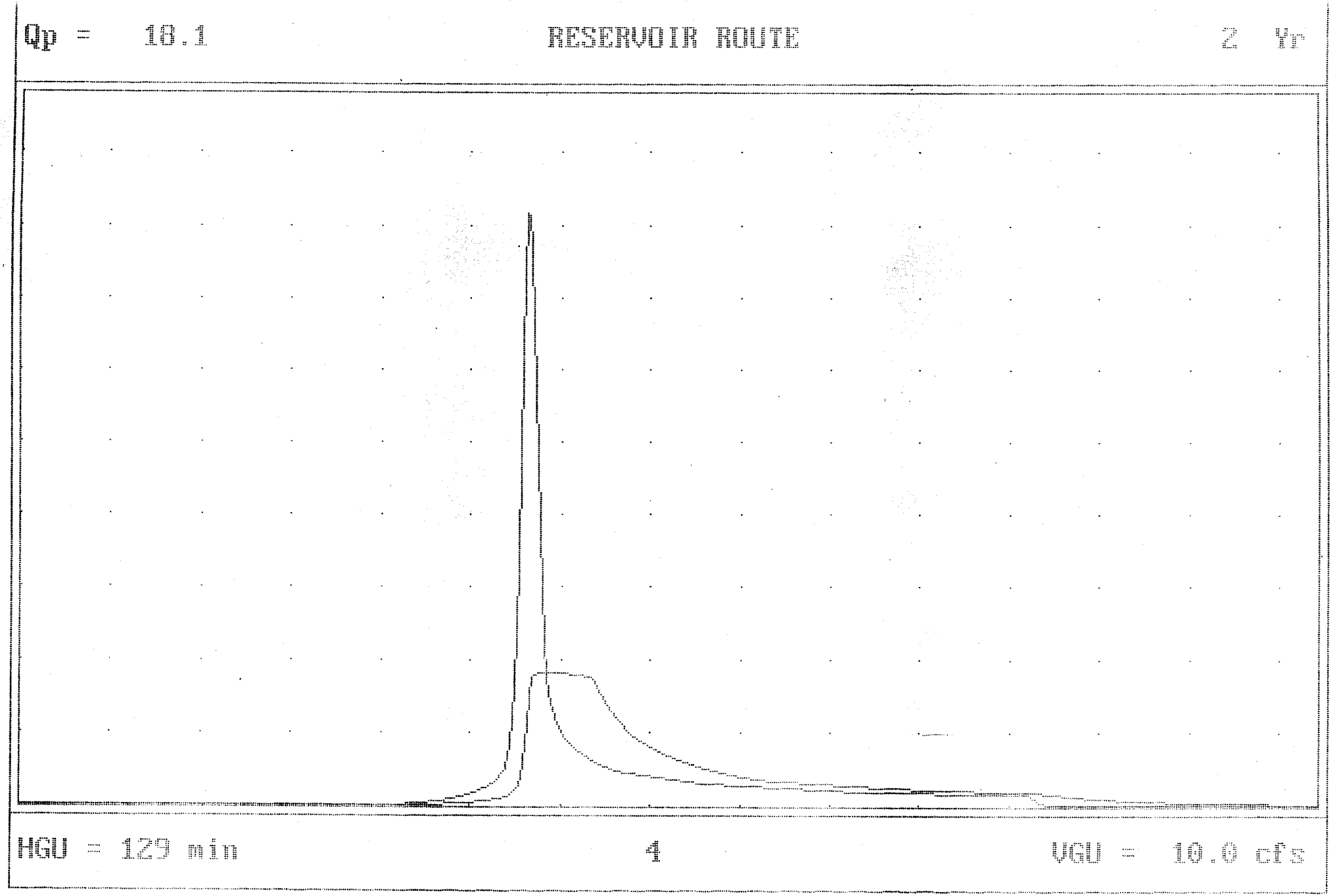
TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
10.45	1.06	1.13	21.98	22.47	0.24
10.50	1.13	1.20	23.65	24.17	0.26
10.55	1.20	1.27	25.41	25.97	0.28
10.60	1.27	1.35	27.28	27.88	0.30
10.65	1.35	1.44	29.26	29.90	0.32
10.70	1.44	1.53	31.35	32.05	0.35
10.75	1.53	1.63	33.58	34.32	0.37
10.80	1.63	1.74	35.95	36.74	0.40
10.85	1.74	1.85	38.47	39.32	0.43
10.90	1.85	1.97	41.15	42.06	0.46
10.95	1.97	2.10	44.00	44.98	0.49
11.00	2.10	2.21	47.04	48.08	0.52
11.05	2.21	2.34	50.24	51.36	0.56
11.10	2.34	2.47	53.61	54.79	0.59
11.15	2.47	2.63	57.15	58.42	0.63
11.20	2.63	2.81	60.91	62.26	0.67
11.25	2.81	3.06	64.91	66.35	0.72
11.30	3.06	3.33	69.24	70.77	0.77
11.35	3.33	3.63	73.99	75.63	0.82
11.40	3.63	3.96	79.20	80.95	0.88
11.45	3.96	4.30	84.90	86.78	0.94
11.50	4.30	4.81	91.14	93.16	1.01
11.55	4.81	5.65	98.09	100.26	1.09
11.60	5.65	7.08	106.20	108.55	1.18
11.65	7.08	9.39	116.36	118.93	1.29

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
11.70	9.39	12.95	129.96	132.84	1.44
11.75	12.95	18.22	149.00	152.30	1.65
11.80	18.22	26.04	176.28	180.18	1.95
11.85	26.04	37.33	215.77	220.54	2.39
11.90	37.33	51.25	273.09	279.14	3.02
11.95	51.25	64.81	352.95	361.67	4.36
12.00	64.81	75.60	456.07	469.01	6.47
12.05	75.60	81.71	578.54	596.48	8.97
12.10	81.71	80.92	711.19	735.84	12.33
12.15	80.92	73.81	842.19	873.82	15.81
12.20	73.81	64.35	961.69	996.92	17.62
12.25	64.35	54.78	1064.24	1099.86	17.81
12.30	54.78	45.31	1147.44	1183.37	17.97
12.35	45.31	36.21	1211.35	1247.52	18.09
12.40	36.21	27.92	1256.63	1292.87	18.12
12.45	27.92	21.20	1284.49	1320.76	18.13
12.50	21.20	16.91	1297.33	1333.61	18.14
12.55	16.91	14.92	1299.15	1335.44	18.14
12.60	14.92	13.78	1294.70	1330.98	18.14
12.65	13.78	12.74	1287.12	1323.39	18.14
12.70	12.74	11.84	1277.39	1313.65	18.13
12.75	11.84	11.08	1265.73	1301.97	18.12
12.80	11.08	10.44	1252.42	1288.65	18.11
12.85	10.44	9.91	1237.74	1273.95	18.11
12.90	9.91	9.46	1221.90	1258.09	18.10
12.95	9.46	9.08	1205.12	1241.27	18.07
13.00	9.08	8.75	1187.58	1223.66	18.04
13.05	8.75	8.45	1169.40	1205.41	18.01
13.10	8.45	8.18	1150.66	1186.60	17.97
13.15	8.18	7.91	1131.42	1167.29	17.94
13.20	7.91	7.67	1111.71	1147.51	17.90
13.25	7.67	7.44	1091.57	1127.29	17.86
13.30	7.44	7.24	1071.04	1106.68	17.82
13.35	7.24	7.04	1050.15	1085.72	17.78
13.40	7.04	6.86	1028.94	1064.43	17.74
13.45	6.86	6.69	1007.44	1042.84	17.70
13.50	6.69	6.52	985.66	1020.98	17.66
13.55	6.52	6.36	963.62	998.86	17.62
13.60	6.36	6.20	941.34	976.50	17.58
13.65	6.20	6.05	918.83	953.90	17.54
13.70	6.05	5.90	896.56	931.08	17.26
13.75	5.90	5.77	875.13	908.51	16.69

HYDROGRAPH DISCHARGE TABLE Cont'd

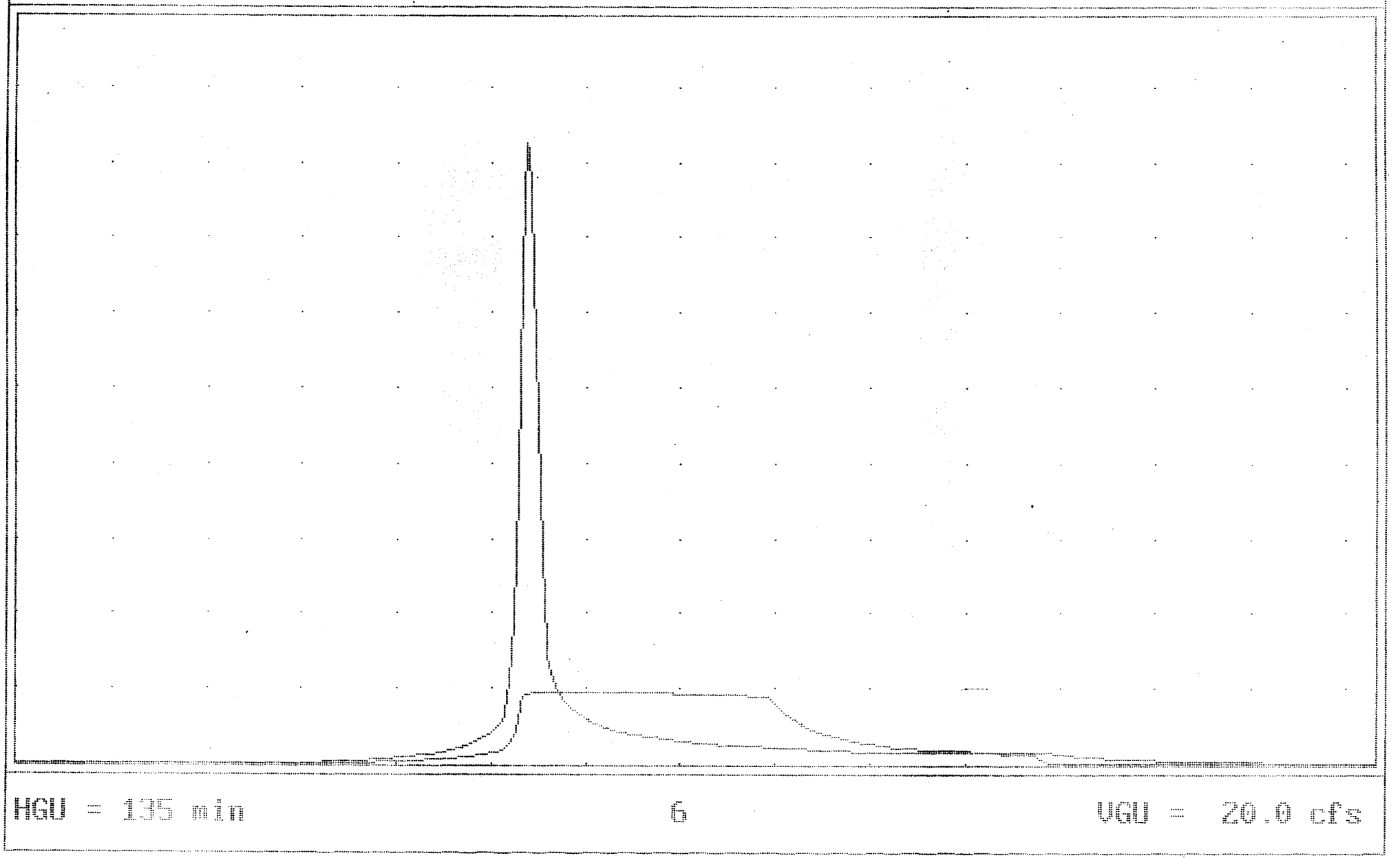
TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
13.80	5.77	5.63	854.51	886.80	16.14
13.85	5.63	5.50	834.68	865.91	15.62
13.90	5.50	5.38	815.60	845.82	15.11
13.95	5.38	5.26	797.25	826.48	14.62
14.00	5.26	5.14	779.58	807.88	14.15
14.05	5.14	5.02	762.58	789.98	13.70
14.10	5.02	4.92	746.22	772.74	13.26
14.15	4.92	4.82	730.48	756.16	12.84
14.20	4.82	4.73	715.33	740.21	12.44
14.25	4.73	4.65	700.77	724.87	12.05
14.30	4.65	4.58	686.79	710.15	11.68
14.35	4.58	4.52	673.37	696.02	11.32
14.40	4.52	4.47	660.52	682.48	10.98
14.45	4.47	4.42	648.21	669.51	10.65
14.50	4.42	4.38	636.42	657.10	10.34
14.55	4.38	4.34	625.15	645.23	10.04
14.60	4.34	4.30	614.37	633.87	9.75
14.65	4.30	4.26	604.03	623.01	9.49
14.70	4.26	4.22	594.02	612.59	9.29
14.75	4.22	4.18	584.32	602.49	9.09
14.80	4.18	4.14	574.93	592.72	8.90
14.85	4.14	4.10	565.82	583.24	8.71
14.90	4.10	4.06	557.00	574.06	8.53
14.95	4.06	4.01	548.44	565.15	8.35
15.00	4.01	3.97	540.14	556.51	8.18
15.05	3.97	3.93	532.09	548.13	8.02
15.10	3.93	3.89	524.27	539.99	7.86
15.15	3.89	3.85	516.68	532.09	7.71
15.20	3.85	3.81	509.31	524.42	7.55



MAX STORAGE = 118556

MAX ELEVATION = 56.86

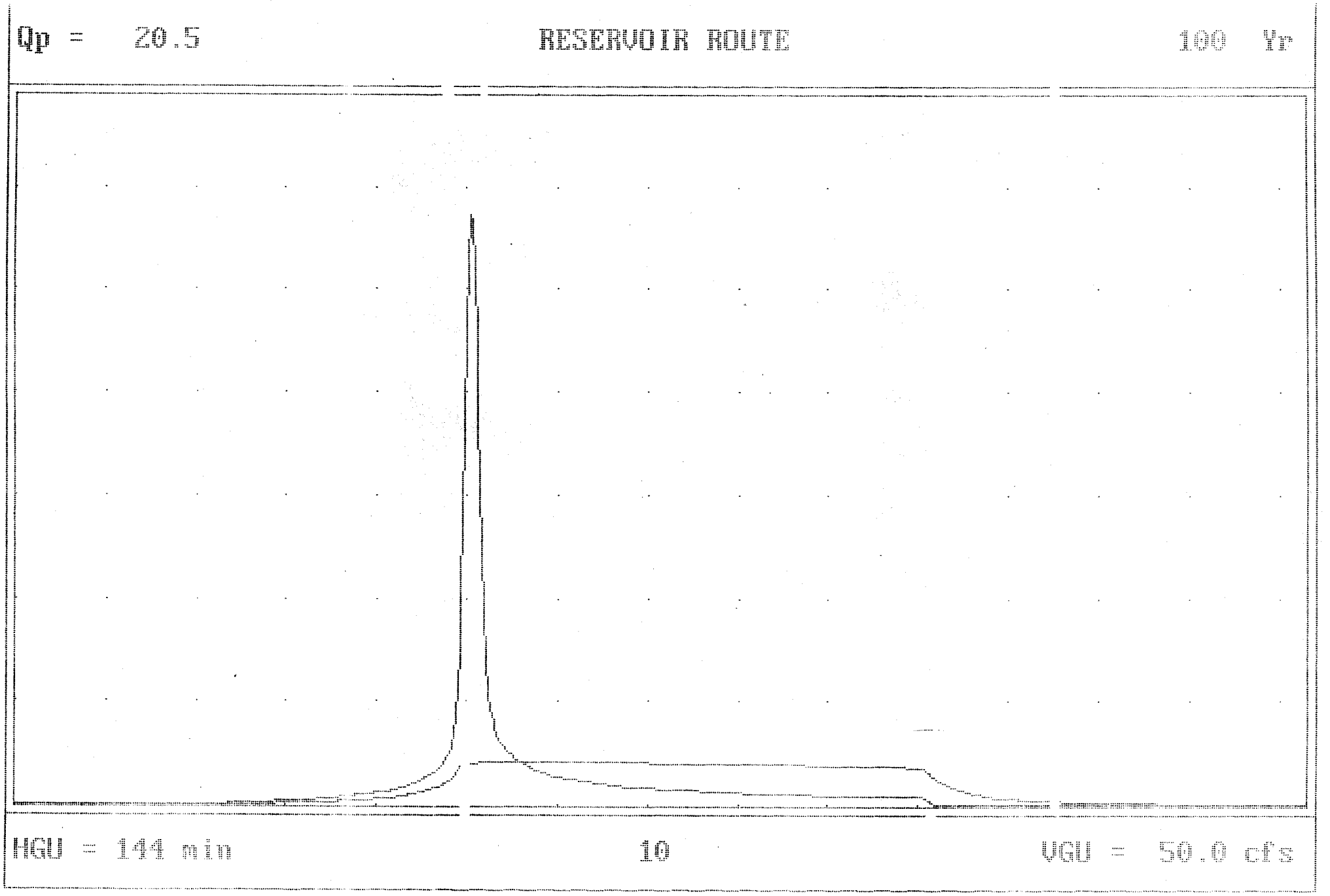
Qp = 19.2 RESERVOIR ROUTE 10 Yr



HGU = 135 min 6 VGU = 20.0 cfs

MAX STORAGE = 281459

MAX ELEVATION = 58.02



MAX STORAGE = 546494

MAX ELEVATION = 59.45

AES CONSULTING ENGINEERS
Engineering, Surveying and Planning
5248 Olde Towne Road, Suite 1
WILLIAMSBURG, VIRGINIA 23188

(757) 253-0040
FAX (757) 220-8994

LETTER OF TRANSMITTAL

TO James City County Development Management

DATE	JOB NO.
June 22, 2000	5652-13

ATTENTION: Mr Wayland Bass, P.E.

RE: Ford's Colony, Section 13 Dam II

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Original Document of Construction Monitoring and Testing (Dam Certification)

JUN 2000 RECEIVED ENVIRONMENTAL DIVISION

JUN 26 2000

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

Wayland,

I understand that Ford's Colony is seeking a surety reduction for this project. I have forwarded a copy of this document to Mr Mike Woolsen in Environmental Division. Please call if you have any questions.

COPY TO _____ SIGNED: V Marc Bass

If enclosures are not as noted, kindly notify us at once.

AES CONSULTING ENGINEERS
Engineering, Surveying and Planning
5248 Olde Towne Road, Suite 1
WILLIAMSBURG, VIRGINIA 23188

(757) 253-0040
FAX (757) 220-8994

LETTER OF TRANSMITTAL

TO James City County Environmental Division

DATE	JOB NO.
June 22, 2000	5652-13

ATTENTION: Mr. Mike Woolsen

RE: Ford's Colony, Section 13
Dam II

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Certification and inspection for Dam II Construction

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

Mike,
Please use this document in fulfilling Surety Reduction for this project.
Original Document has been forwarded to Vaughan Bass.
Many Thanks,
V. Mac B

COPY TO _____ SIGNED: _____

If enclosures are not as noted, kindly notify us at once.

FORD'S COLONY
SECTION 13A

(S-03-98)
LOTS 1-41

STORMWATER MANAGEMENT SPREAD AND SYSTEM CALCULATIONS

Storm Drainage Comps
Refer to PC 111 + PC 112
for BMP File.

RIP RAP CALCS (PER JCC COMMENTS)

→ SYSTEM E

Discharge at SS#13A-E-1 → Q_{10} = 2.02 CFS (frm sys. calcs)

- 12" INV = 65.00
  HGL = 65.60 ∴ Maximum Tailwater Condition
- Apron length = 5 FT (Plate 3.18-4)
- Apron width (defined ditch section exists)

  ∴ apron shall extend across ditch inv and up ditch banks to the top of bank
- Rip rap size → Plate 3.19-3 w/ d = 0.6' & S = 0.01

  d_{50} = 0.25'
- Use Class A1 stone with 6" thickness

PROVIDE 5' LONG, 0.5' DEEP APRON OF CLASS A1 STONE. APRON SHALL EXTEND ACROSS DITCH INV AND UP SIDES TO TOP OF BANK (APPROX 1 CY RQD)

→ SYSTEM D

Discharge at SS#13A-D-1 ⇒ Q_{10} = 4.09 CFS

- ASSUME MAX. TAILWATER
- APRON LENGTH = 10 FT (PLATE 3.18-4)
- APRON WIDTH = 3(1.25') UPSTREAM = 3.75 → 4'
  .4(10) + 1.25 DNSTRM = 5.25 → 5.5'
- STONE SIZE ⇒ Plate 3.19-3 w/ d = 1.25 & S = .017

  d_{50} = 0.50' ∴ use Class A1 w/ 1.0' thickness

PROVIDE 10' LONG, 1' DEEP, 5.5' WIDE APRON OF CLASS A1 RIP RAP OVER FILTER FABRIC. (APPROX 2 CY REQ'D).

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RIP RAP CALCS (CON'T)

→ SYSTEM C

Discharge at SS#13A-C-1 ⇒ Q_{10} = 5.82 CFS

- ASSUME MAX TAILWATER
- APRON LENGTH = 10' (Plate 3.18-4)
- APRON WIDTH = 4' UP
  5.5' DN * use 5.5'
- STONE SIZE ⇒ Plate 3.19-3 w/ d = 1.25 & S = 0.07

  d_{50} = 1.50' ∴ use Class II w/ 1.5' DEPTH

PROVIDE 10' LONG, 1.5' DEEP, 5.5' WIDE APRON OF CLASS II RIP RAP OVER FILTER FABRIC. (APPROX 3 CY REQ'D)

TEMPORARY CULVERTS

→ Road A - Entr. Sta 10+20

60 LF 15" @ 1.0% Q_{10} = 2.5 CFS

- MAX TW
- APRON LENGTH = 5'
- AP. WIDTH → EXTEND ACROSS BOTTOM OF CHANNEL & UP SIDES
- STONE SIZE ⇒ 0.25 ∴ Class AI w/ 0.5' DEEP

PROVIDE 5' LONG, 0.5' DEEP APRON OF R.R. CLASS AI OVER FILT. FAB.
(APPROX 1 CY RQD)

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RIP RAP CALCS (CON'T)

→ Road A Sta 12+80 ±

24' OF 15" @ 1.0% $Q_{10} = 3.3$ CFS

- MAX TW
- APRON LENGTH → 5'
- APRON WIDTH → BOTT DITCH & UP SIDES
- STONE SIZE ⇒ 0.25 ∴ CLASS AI @ 0.5' DEEP

→ Road A Sta 17+30 ±

24' OF 15" @ 1.0% $Q_{10} = 4.5$ CFS

- MAX TW
- APRON L = 5.0'
- WIDTH = BOT DITCH & UP SIDES
- STONE SIZE ⇒ 0.25 ∴ CLASS AI & 0.5' DEEP

→ Road A 20+25 ±

24' OF 15" @ 1.0% $Q_{10} = 3.5$ CFS

∴ same as previous

→ Road A Sta 22+75 ±

24' OF 15" @ 1.0% $Q_{10} = 1.9$ CFS

∴ use min recomendations

5', 0.5', across ditch

CLASS AI

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RIP RAP CALCS CON'T

→ Road C Sta 10+30 ±

24' OF 15" @ 1.0% $Q_{10} = 2.7$ CFS

∴ same apron as previous

5' long, 0.5' deep, line ditch

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TYP SECT: 4":1' → FIG 2.8.13 n=0.05 d = 1.0'

ROAD A:

FROM	TO	DA (ac)	C	T_c	Q_2	V_2	LINING	Q_{10}	V_{10}	d_{10} (in)	REMARKS
11+50 L	10+20 L	0.92	0.46	10	1.92	2.45	GRASS	2.46	2.6	6.2	TYP OK
11+50 L	12+80 L	0.60	0.46	10	1.25	1.60	GRASS	1.60	1.7	7.3	TYP OK
15+00 L	12+80 L	0.90	0.46	10	1.87	2.20	GRASS	2.40	2.30	7.8	TYP OK
15+00 L	17+30 L	0.98	0.46	15	1.72	1.60	GRASS	2.25	1.65	8.8	TYP OK
19+50 L	17+30 L	1.15	0.46	17	1.91	2.6	EC-2 (VESCH 3.36)	2.52	2.95	7.0	TYP OK w/ EC-2
19+50 L	20+25 L	0.69	0.46	10	1.44	2.0	GRASS	1.84	2.15	7.1	TYP OK
21+50 L	20+25 L	0.69	0.46	10	1.44	2.15	GRASS	1.84	2.25	6.9	TYP OK
21+50 L	22+75 L	0.87	0.46	17	1.45	1.90	GRASS	1.91	2.15	7.2	TYP OK
23+10 L	22+75 L (INCLUDES RDE)	0.57	0.46	17	0.95	2.00	GRASS	1.25	2.15	5.8	TYP OK
23+10 L	23+75 L (INCL'S RDE)	0.74	0.46	17	1.23	2.15	GRASS	1.62	2.25	6.6	TYP OK
25+42 L	23+75 L	0.91	0.46	15	1.60	2.8	EC-2	2.09	3.2	6.2	TYP OK w/ EC-2
26+30 L	25+42 L	0.57	0.46	10	1.19	2.7	EC-2	1.52	3.0	5.4	TYP OK w/ EC-2
26+30 L	28+03 L	0.23	0.46	7	0.55	2.15	GRASS	0.69	2.4	4.2	TYP OK
26+30 R	28+03 R	0.23	0.46	7	0.55	2.15	GRASS	0.69	2.4	4.2	TYP OK
26+30 R	23+75 R	0.08	0.65	5	0.29	1.95	GRASS	0.36	2.05	3.2	TYP OK

TEMPORARY SALES ROAD DITCH CALCS

FORD'S COLONY-13A 2-21-98 AES JOB #5652-13A

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FORD'S COLONY-13A | 2-21-98 | AES JOB #5652-13A

TEMPORARY SALES ROAD DITCH CALCS

ROAD A: FROM	TO	DA (ac)	C	Tc	Q_2	V_2	LINING	Q_{10}	V_{10}	d_{10} (in)	REMARKS
23+75 R	23+12 R	0.02	0.65	5	0.07	1.40	GRASS	0.09	1.50	<2	TYP OK
19+50 R	23+12 R	0.14	0.65	7	0.47 3.35 TOT	1.50	GRASS	0.59 4.27 TOT	1.65	12.2	TYP OK
19+50 R	11+60 L RD D	0.34	0.49	10	0.77	1.55	GRASS	0.97	1.60	5.9	TYP OK
15+00 R	11+60 R RD D	0.18	0.65	10	0.53 4.16 TOT	2.35	GRASS	0.68 5.45 TOT	2.55	11.0	TYP OK
15+00 R	10+30 L RD C (INCL'S B)	0.79	0.46	10	1.65	2.25	GRASS	2.11	2.45	7.0	TYP OK
11+50 R	14+30 R RD B (INCL'S B)	1.38	0.46	15	2.42 5.54 TOT	4.00	EC-2	3.17 7.17 TOT	4.40	10.0	TYP OK W/EC-2
11+50 R	10+20 R	0.05	0.65	5	0.18	1.35	GRASS	0.23	1.40	3.1	TYP OK
ROAD B: 16+20± R	14+30 R	0.93	0.46	10	1.94	2.20	GRASS	2.49	2.35	7.9	TYP OK
16+20± L	14+30 L	0.07	0.65	5	0.25	1.25	GRASS	0.32	1.38	3.7	TYP OK
11+45 R RD C	14+30 L	0.12	0.65	10	0.35 2.0 TOT	3.10	EC-2	0.45 2.56 TOT	3.40	6.6	TYP OK W/ EC-2
ROAD C: 11+45 L	12+05±	.07	.65	5	0.25	1.50	GRASS	0.32	1.60	3.5	TYP OK
11+45 R	12+05±	.06	.65	5	0.22	1.40	GRASS	0.27	1.55	3.2	TYP OK

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TYP OUTFALL SECT: 4"/1' = 3:1 FIG 2.8.22 $n=0.05$ $d=1.0'$

OUTFALL DITCH	TOTAL Q_2	V_2	LINING	TOTAL Q_{10}	V_{10}	d_{10}	REMARKS
ROAD B	9.73	4.5	EC-3	12.54	5.0	11"	TYP OK w/ EC-3
ROAD C	0.47	2.8	EC-2	0.59	3.0	3.2	TYP OK w/ EC-2
ROAD D	5.81	4.1	EC-3	7.56	4.4	9	TYP OK w/ EC-3
ROAD A (@ RD E)			— PERMANENT PIPE IN PLACE				

FORD'S COLONY-13A 2-21-98 AES JOB #5652-13A

TEMPORARY SALES ROAD DITCH CALCS

(OUTFALL DITCHES TO LAKES)

Drainage Design - Spread Calcs (Cont)

REVISED AS NECESSARY 2-98

System A:

→ #A-7 STA 28+04 ROAD A Sump – Cul-de-sac

DA = 0.46 AC C = 0.59 I = 3.5 in/hr (VDOT 10-yr constant)

$Q_T = CIA = 0.95$ CFS

P = Grate Perimeter = 7.75' A = Free Open Area = 1.6 SF (from catalog)

Orifice Flow: $Q_{io} = 0.6A\sqrt{2gh}$ Weir Flow: $Q_{iw} = 3.3P(h)^{1.5}$

$h = d_{ALL} = 0.14$ FT $g = 32.2$ FT/S^2 $h = d_{ALL} = 0.14$ FT

$Q_{io} = 2.88$ CFS $Q_{iw} = 1.34$ CFS

* The lower flow value dominates:

$Q_{iw} = 1.34 > Q_T = 0.95 \therefore$ OK

→ #A-5 STA 25+42 ROAD A Grade – Left

DA = ~~0.65~~ 0.57 AC C = ~~0.62~~ 0.46 I = 3.5 in/hr

Q_T = ~~0.12~~ CFS 0.92

$Q_T = \frac{0.56}{n} Z D^{8/3} S_L^{1/2}$ n = 0.016, Z = 1/S_x = 1/.02083 = 48, D = depth at inlet, S_L = longitudinal road slope in FT/FT

~~0.12~~ 0.92 $= \frac{0.56}{0.016}(48)(D^{8/3})(0.0509)^{1/2}$

D = 0.049' ~~0.10'~~ < d_{ALL} = 0.14' ∴ OK ✓

$Q_i = KD^{5/3}$ K = 24 (from chart) D = ~~0.10'~~ 0.10

$Q_i = (24)(.$~~10~~ 0.10$)^{5/3}$

Q_i = ~~0.15~~ CFS 0.52 CFS

→ use 2 grates

~~Q_i = ~~0.12~~ 0.62 > Q_T = 0.12 ∴ OK~~

$Q_i = 1.04 > Q_T = 0.92 \therefore$ OK

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Drainage Design - Spread Calc's (con't)

SYSTEM A CON'T:

#A-4 → STA 23+75 ROAD A Grade-Left

DA = 0.25 C = 0.48 I = 3.5 in/hr

Q_T = 0.42 S_L = 0.0509 FT/FT

D = 0.078' ∴ OK K = 24

Qi = 0.34 CFS

*0.08 CFS ⇒ 10+75 sump

Qi = 0.34 < Q_T = 0.42 ∴ CARRYOVER = 0.08 CFS

#A-3 → STA 23+75 ROAD A Grade-Right

DA = 0.08 AC C = 0.7 I = 3.5 in/hr

Q_T = 0.20 CFS S_L = 0.0509 FT/FT

D = 0.06' ∴ OK K = 24

Qi = 0.22 CFS

Qi = 0.22 ≥ Q_T = 0.20 ∴ OK

#A-10 → STA 11+20 ROAD E Grade-Right

DA = 0.75 AC C = 0.46 I = 3.5 in/hr

Q_T = 1.21 CFS S_L = 0.0235 FT/FT

D = 0.13' ∴ OK K = 19

Qi = 0.63 CFS → use 2 grates ∴ Qi = 1.26 CFS

Qi = 1.26 > Q_T = 1.21 ∴ OK

#A-8 → STA 10+25 ROAD E Sump-Right

DA = 0.31 AC C = 0.47 I = 3.5 in/hr

Q_T = 0.51 + 0.08 (FROM 23+75) = 0.59 CFS

Qiw = 1.34 CFS (from previous calc)

Qiw = 1.34 > Q_T = 0.59 ∴ OK

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Drainage Design - Spread Calcs (Con't)

SYSTEM A - CON'T

#A-11 → 11+20 ROAD E Grade- Left

DA = 0.40 AC C = 0.50 I = 3.5 in/hr

Q_T = 0.70 CFS S_L = 0.0235 FT/FT

D = 0.11' ∴ OK K = 19

$Q_i = (19)(.11)^{5/3} = 0.48$

$Q_i = 0.48 < Q_T = 0.7$ ∴ CARRYOVER = 0.22 CFS

*0.22 CFS ⇒ 10+25 sump

#A-9 → 10+25 ROAD E Sump-Left

DA = 0.37 AC C = 0.49 I = 3.5 in/hr

$Q_T = 0.63 + 0.22 = 0.85$

Q_{iw} = 1.34 CFS

$Q_{iw} = 1.34 > Q_T = 0.85$ ∴ OK

#A-2 → STA 23+12 ROAD A Sump-Right

DA = 0.07 AC C = 0.7 I = 3.5 in/hr

Q_T = 0.17 CFS

Q_{iw} = 1.34 CFS

$Q_{iw} = 1.34 > Q_T = 0.17$ ∴ OK

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STORM SEWER DESIGN / ANALYSIS

Return Period = 10 Yrs
Rainfall file: jcc

Run Date: 02-27-1998
File: 565213AA.ST3

LINE 1 / Q = 18.88 / HT = 24 / WID = 24 / N = .011 / L = 95 / JLC = .75

B-1A TO A-A-1 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	58.02	24.00	52.50	6.01	58.58	0.00	-6.5	3.14
UPSTRM	58.94	18.46	57.40	7.28	59.76	20.23	.84	2.59

Drainage area (ac) =	0.00	Slope of invert (%) =	5.1579
Runoff coefficient =	0.00	Slope energy grade line (%) =	1.2426
Time of conc (min) =	27.51	Critical depth (in) =	18.46
Inlet time (min) =	0.00	Natural ground elev. (ft) =	60.25
Intensity (in/hr) =	3.77	Upstream surcharge (ft) =	0.00
Cumulative C*A =	5.01	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	18.88	Line capacity (cfs) =	60.71
Q catchment (cfs) =	0.00	Inlet length (ft) =	0.00
Q carryover (cfs) =	22.90	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	22.90	Ponding width (ft) =	N/A

LINE 2 / Q = 9.85 / HT = 18 / WID = 18 / N = .011 / L = 271 / JLC = 1.3

A-1 TO A-2 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	59.56	18.00	57.40	5.58	60.04	0.00	1.34	1.77
UPSTRM	71.20	14.37	70.00	6.51	71.86	14.44	3.48	1.51

Drainage area (ac) =	0.07	Slope of invert (%) =	4.6494
Runoff coefficient =	0.70	Slope energy grade line (%) =	4.3609
Time of conc (min) =	15.75	Critical depth (in) =	14.37
Inlet time (min) =	3.50	Natural ground elev. (ft) =	74.98
Intensity (in/hr) =	4.90	Upstream surcharge (ft) =	0.00
Cumulative C*A =	2.01	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	9.85	Line capacity (cfs) =	26.76
Q catchment (cfs) =	0.37	Inlet length (ft) =	2.00
Q carryover (cfs) =	9.66	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.39	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	9.63	Ponding width (ft) =	N/A

LINE 3 / Q = 3.81 / HT = 18 / WID = 18 / N = .011 / L = 64 / JLC = 1.25

A-2 TO A-3 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	72.05	18.00	70.00	2.16	72.13	0.00	3.48	1.77
UPSTRM	72.01	9.03	71.26	4.30	72.30	18.00	3.09	0.89

Drainage area (ac)	= 0.08	Slope of invert (%)	= 1.9688
Runoff coefficient	= 0.70	Slope energy grade line (%)	= 0.2702
Time of conc (min)	= 12.44	Critical depth (in)	= 8.94
Inlet time (min)	= 5.00	Natural ground elev. (ft)	= 75.86
Intensity (in/hr)	= 5.38	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.71	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 3.81	Line capacity (cfs)	= 17.41
Q catchment (cfs)	= 0.39	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 3.26	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.22	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 3.44	Ponding width (ft)	= N/A

LINE 4 / Q = 3.53 / HT = 18 / WID = 18 / N = .011 / L = 25 / JLC = 1.3

A-3 TO A-4 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	72.37	13.33	71.26	2.51	72.47	15.49	3.09	1.40
UPSTRM	72.48	8.60	71.76	4.23	72.75	17.98	2.59	0.83

Drainage area (ac)	= 0.25	Slope of invert (%)	= 2.0000
Runoff coefficient	= 0.48	Slope energy grade line (%)	= 1.1423
Time of conc (min)	= 12.31	Critical depth (in)	= 8.60
Inlet time (min)	= 10.00	Natural ground elev. (ft)	= 75.86
Intensity (in/hr)	= 5.40	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.65	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 3.53	Line capacity (cfs)	= 17.55
Q catchment (cfs)	= 0.70	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 2.77	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.21	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 3.26	Ponding width (ft)	= N/A

LINE 5 / Q = 2.96 / HT = 15 / WID = 15 / N = .011 / L = 160 / JLC = 1.15

A-4 TO A-5 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	72.84	12.94	71.76	2.63	72.95	13.93	2.84	1.13
UPSTRM	74.52	8.26	73.83	4.27	74.80	14.92	8.7	0.69

Drainage area (ac)	= 0.57	Slope of invert (%)	= 1.2937
Runoff coefficient	= 0.46	Slope energy grade line (%)	= 1.1602
Time of conc (min)	= 11.42	Critical depth (in)	= 8.26
Inlet time (min)	= 10.00	Natural ground elev. (ft)	= 83.79
Intensity (in/hr)	= 5.55	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.53	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 2.96	Line capacity (cfs)	= 8.68
Q catchment (cfs)	= 1.52	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 1.44	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.19	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 2.77	Ponding width (ft)	= N/A

LINE 6 / Q = 1.53 / HT = 15 / WID = 15 / N = .011 / L = 88 / JLC = .75

A-5 TO A-6 / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	74.84	12.17	73.83	1.43	74.88	13.51	8.7	1.07
UPSTRM	75.20	5.94	74.71	3.38	75.38	14.67	10.94	0.45

Drainage area (ac)	= 0.00	Slope of invert (%)	= 1.0000
Runoff coefficient	= 0.00	Slope energy grade line (%)	= 0.5751
Time of conc (min)	= 10.93	Critical depth (in)	= 5.94
Inlet time (min)	= 0.00	Natural ground elev. (ft)	= 86.90
Intensity (in/hr)	= 5.63	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.27	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 1.53	Line capacity (cfs)	= 7.63
Q catchment (cfs)	= 0.00	Inlet length (ft)	= 0.00
Q carryover (cfs)	= 1.44	Gutter slope (ft/ft)	= 0.0000
Q captured (cfs)	= 0.00	Cross slope (ft/ft)	= 0.0000
Q bypassed (cfs)	= 1.44	Ponding width (ft)	= N/A

LINE 7 / Q = 1.58 / HT = 15 / WID = 15 / N = .011 / L = 167 / JLC = .75

A-6 TO A-7 / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	75.34	7.54	74.71	2.55	75.44	10.63	10.94	0.62
UPSTRM	77.02	6.03	76.38	3.42	77.20	14.71	2.88	0.46

Drainage area (ac) =	0.46	Slope of invert (%) =	1.0000
Runoff coefficient =	0.59	Slope energy grade line (%) =	1.0541
Time of conc (min) =	10.00	Critical depth (in) =	6.03
Inlet time (min) =	10.00	Natural ground elev. (ft) =	80.52
Intensity (in/hr) =	5.81	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.27	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.58	Line capacity (cfs) =	7.63
Q catchment (cfs) =	1.58	Inlet length (ft) =	2.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.13	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	1.44	Ponding width (ft) =	N/A

LINE 8 / Q = 6.18 / HT = 15 / WID = 15 / N = .011 / L = 40 / JLC = .75

A-2 TO A-8 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	72.05	15.00	70.00	5.03	72.45	0.00	3.73	1.23
UPSTRM	72.32	15.00	70.60	5.03	72.71	0.00	3.13	1.23

Drainage area (ac) =	0.31	Slope of invert (%) =	1.5000
Runoff coefficient =	0.47	Slope energy grade line (%) =	0.6549
Time of conc (min) =	15.53	Critical depth (in) =	11.93
Inlet time (min) =	10.00	Natural ground elev. (ft) =	74.98
Intensity (in/hr) =	4.93	Upstream surcharge (ft) =	0.47
Cumulative C*A =	1.25	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	6.18	Line capacity (cfs) =	9.35
Q catchment (cfs) =	0.85	Inlet length (ft) =	2.00
Q carryover (cfs) =	5.68	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.30	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	6.22	Ponding width (ft) =	N/A

LINE 9 / Q = 1.05 / HT = 15 / WID = 15 / N = .011 / L = 32 / JLC = 1.45

A-8 TO A-9 / DNLN = 8

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	72.61	15.00	70.60	0.86	72.62	0.00	3.13	1.23
UPSTRM	72.63	15.00	71.30	0.86	72.65	0.00	2.52	1.23

Drainage area (ac)	= 0.37	Slope of invert (%)	= 2.1875
Runoff coefficient	= 0.49	Slope energy grade line (%)	= 0.0708
Time of conc (min)	= 10.00	Critical depth (in)	= 4.93
Inlet time (min)	= 10.00	Natural ground elev. (ft)	= 75.08
Intensity (in/hr)	= 5.81	Upstream surcharge (ft)	= 0.08
Cumulative C*A	= 0.18	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 1.05	Line capacity (cfs)	= 11.29
Q catchment (cfs)	= 1.05	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 0.00	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.10	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 0.95	Ponding width (ft)	= N/A

LINE 10 / Q = 4.63 / HT = 15 / WID = 15 / N = .011 / L = 95 / JLC = .75

A-8 TO A-10 / DNLN = 8

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	72.61	15.00	70.60	3.77	72.83	0.00	3.13	1.23
UPSTRM	74.19	10.33	73.33	5.14	74.60	13.89	2.75	0.90

Drainage area (ac)	= 0.75	Slope of invert (%)	= 2.8737
Runoff coefficient	= 0.46	Slope energy grade line (%)	= 1.8614
Time of conc (min)	= 15.00	Critical depth (in)	= 10.33
Inlet time (min)	= 15.00	Natural ground elev. (ft)	= 77.34
Intensity (in/hr)	= 5.00	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.93	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 4.63	Line capacity (cfs)	= 12.94
Q catchment (cfs)	= 1.72	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 3.27	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.26	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 4.73	Ponding width (ft)	= N/A

LINE 11 / Q = 1.16 / HT = 15 / WID = 15 / N = .011 / L = 26 / JLC = 1.25

A-10 TO A-11 / DNLN = 10

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	74.50	14.02	73.33	0.97	74.51	14.50	2.75	1.19
UPSTRM	74.53	10.93	73.59	1.21	74.55	13.34	2.5	0.96

Drainage area (ac) =	0.40	Slope of invert (%) =	1.0000
Runoff coefficient =	0.50	Slope energy grade line (%) =	0.1503
Time of conc (min) =	10.00	Critical depth (in) =	5.17
Inlet time (min) =	10.00	Natural ground elev. (ft) =	77.34
Intensity (in/hr) =	5.81	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.20	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.16	Line capacity (cfs) =	7.63
Q catchment (cfs) =	1.16	Inlet length (ft) =	2.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.11	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	1.05	Ponding width (ft) =	N/A

LINE 12 / Q = 2.11 / HT = 15 / WID = 15 / N = .011 / L = 108 / JLC = .75

A-10 TO A-12 / DNLN = 10

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	74.50	14.02	73.33	1.77	74.55	14.50	2.75	1.19
UPSTRM	78.05	6.98	77.47	3.78	78.27	14.96	1.47	0.56

Drainage area (ac) =	0.19	Slope of invert (%) =	3.8333
Runoff coefficient =	0.45	Slope energy grade line (%) =	3.4499
Time of conc (min) =	11.50	Critical depth (in) =	6.98
Inlet time (min) =	10.00	Natural ground elev. (ft) =	80.20
Intensity (in/hr) =	5.53	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.38	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.11	Line capacity (cfs) =	14.94
Q catchment (cfs) =	0.50	Inlet length (ft) =	3.00
Q carryover (cfs) =	1.72	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.22	Ponding width (ft) =	N/A

LINE 13 / Q = 1.68 / HT = 12 / WID = 12 / N = .011 / L = 142 / JLC = .75

A-12 TO A-13 / DNLN = 12

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	78.22	8.97	77.47	2.67	78.33	10.37	1.72	0.63
UPSTRM	79.41	6.59	78.86	3.80	79.63	11.94	4.33	0.44

Drainage area (ac)	= 0.47	Slope of invert (%)	= 0.9789
Runoff coefficient	= 0.40	Slope energy grade line (%)	= 0.9195
Time of conc (min)	= 10.71	Critical depth (in)	= 6.59
Inlet time (min)	= 10.00	Natural ground elev. (ft)	= 84.20
Intensity (in/hr)	= 5.67	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.30	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 1.68	Line capacity (cfs)	= 4.16
Q catchment (cfs)	= 1.09	Inlet length (ft)	= 3.00
Q carryover (cfs)	= 0.63	Gutter slope (ft/ft)	= 0.0000
Q captured (cfs)	= 0.00	Cross slope (ft/ft)	= 0.0000
Q bypassed (cfs)	= 1.72	Ponding width (ft)	= N/A

LINE 14 / Q = 0.63 / HT = 12 / WID = 12 / N = .011 / L = 128 / JLC = 1.3

A-13 TO A-14 / DNLN = 13

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	79.58	8.61	78.86	1.04	79.59	10.16	4.33	0.60
UPSTRM	79.98	4.03	79.50	2.71	80.10	11.33	1.5	0.23

Drainage area (ac)	= 0.27	Slope of invert (%)	= 0.5000
Runoff coefficient	= 0.40	Slope energy grade line (%)	= 0.3935
Time of conc (min)	= 10.00	Critical depth (in)	= 4.03
Inlet time (min)	= 10.00	Natural ground elev. (ft)	= 82.00
Intensity (in/hr)	= 5.81	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.11	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 0.63	Line capacity (cfs)	= 2.98
Q catchment (cfs)	= 0.63	Inlet length (ft)	= 3.00
Q carryover (cfs)	= 0.00	Gutter slope (ft/ft)	= 0.0000
Q captured (cfs)	= 0.00	Cross slope (ft/ft)	= 0.0000
Q bypassed (cfs)	= 0.63	Ponding width (ft)	= N/A

LINE 15 / Q = 11.37 / HT = 18 / WID = 18 / N = .011 / L = 63 / JLC = .75

A-A-1 TO B-2A / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	59.56	18.00	57.40	6.43	60.20	0.00	1.34	1.77
UPSTRM	60.08	18.00	58.25	6.43	60.73	0.00	1.25	1.77

Drainage area (ac) =	0.49	Slope of invert (%) =	1.3492
Runoff coefficient =	0.30	Slope energy grade line (%) =	0.8394
Time of conc (min) =	27.16	Critical depth (in) =	15.64
Inlet time (min) =	10.00	Natural ground elev. (ft) =	61.00
Intensity (in/hr) =	3.79	Upstream surcharge (ft) =	0.33
Cumulative C*A =	3.00	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	11.37	Line capacity (cfs) =	14.42
Q catchment (cfs) =	0.85	Inlet length (ft) =	3.00
Q carryover (cfs) =	12.41	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	13.27	Ponding width (ft) =	N/A

LINE 16 / Q = 4.04 / HT = 12 / WID = 12 / N = .011 / L = 250 / JLC = 1.2

B-2A TO B-3A / DNLN = 15

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	60.57	12.00	58.25	5.14	60.98	0.00	1.75	0.79
UPSTRM	75.48	10.42	74.61	5.57	75.96	8.11	2.13	0.72

Drainage area (ac) =	0.28	Slope of invert (%) =	6.5440
Runoff coefficient =	0.75	Slope energy grade line (%) =	5.9935
Time of conc (min) =	16.21	Critical depth (in) =	10.42
Inlet time (min) =	10.00	Natural ground elev. (ft) =	77.75
Intensity (in/hr) =	4.84	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.83	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.04	Line capacity (cfs) =	10.77
Q catchment (cfs) =	1.22	Inlet length (ft) =	2.00
Q carryover (cfs) =	3.05	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.24	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	4.04	Ponding width (ft) =	N/A

LINE 17 / Q = 3.05 / HT = 12 / WID = 12 / N = .011 / L = 72 / JLC = .8

B-3A TO B-4A / DNLN = 16

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	76.06	12.00	74.61	3.89	76.29	0.00	2.13	0.79
UPSTRM	76.44	12.00	75.33	3.89	76.67	0.00	2	0.79

Drainage area (ac)	= 0.68	Slope of invert (%)	= 1.0000
Runoff coefficient	= 0.40	Slope energy grade line (%)	= 0.5266
Time of conc (min)	= 15.81	Critical depth (in)	= 8.89
Inlet time (min)	= 10.00	Natural ground elev. (ft)	= 78.33
Intensity (in/hr)	= 4.89	Upstream surcharge (ft)	= 0.11
Cumulative C*A	= 0.62	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 3.05	Line capacity (cfs)	= 4.21
Q catchment (cfs)	= 1.58	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 1.68	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.20	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 3.05	Ponding width (ft)	= N/A

LINE 18 / Q = 1.76 / HT = 12 / WID = 12 / N = .011 / L = 145 / JLC = .9

B-4A TO B-5A / DNLN = 17

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	76.62	12.00	75.33	2.24	76.70	0.00	2	0.79
UPSTRM	77.66	6.75	77.10	3.87	77.90	11.91	2.23	0.46

Drainage area (ac)	= 0.65	Slope of invert (%)	= 1.2207
Runoff coefficient	= 0.45	Slope energy grade line (%)	= 0.8224
Time of conc (min)	= 15.00	Critical depth (in)	= 6.75
Inlet time (min)	= 15.00	Natural ground elev. (ft)	= 80.34
Intensity (in/hr)	= 5.00	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.35	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 1.76	Line capacity (cfs)	= 4.65
Q catchment (cfs)	= 1.46	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 0.36	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.14	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 1.68	Ponding width (ft)	= N/A

LINE 19 / Q = 0.42 / HT = 12 / WID = 12 / N = .011 / L = 25 / JLC = 1.2

B-5A TO B-6A / DNLN = 18

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	77.87	9.26	77.10	0.65	77.88	10.54	2.23	0.65
UPSTRM	77.89	6.38	77.34	0.99	77.90	11.98	2	0.42

Drainage area (ac)	= 0.10	Slope of invert (%)	= 0.9600
Runoff coefficient	= 0.60	Slope energy grade line (%)	= 0.1055
Time of conc (min)	= 5.00	Critical depth (in)	= 3.30
Inlet time (min)	= 5.00	Natural ground elev. (ft)	= 80.34
Intensity (in/hr)	= 7.00	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.06	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 0.42	Line capacity (cfs)	= 4.12
Q catchment (cfs)	= 0.42	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 0.00	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.06	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 0.36	Ponding width (ft)	= N/A

LINE 20 / Q = 7.76 / HT = 15 / WID = 15 / N = .011 / L = 133 / JLC = .75

B-2A TO B-7A / DNLN = 15

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	60.57	15.00	58.25	6.32	61.19	0.00	1.5	1.23
UPSTRM	63.55	13.51	62.42	6.66	64.24	8.98	1.33	1.16

Drainage area (ac)	= 2.20	Slope of invert (%)	= 3.1353
Runoff coefficient	= 0.25	Slope energy grade line (%)	= 2.2918
Time of conc (min)	= 26.42	Critical depth (in)	= 13.51
Inlet time (min)	= 25.00	Natural ground elev. (ft)	= 65.00
Intensity (in/hr)	= 3.85	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 2.02	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 7.76	Line capacity (cfs)	= 13.51
Q catchment (cfs)	= 2.18	Inlet length (ft)	= 3.00
Q carryover (cfs)	= 6.20	Gutter slope (ft/ft)	= 0.0000
Q captured (cfs)	= 0.00	Cross slope (ft/ft)	= 0.0000
Q bypassed (cfs)	= 8.38	Ponding width (ft)	= N/A

LINE 21 / Q = 5.80 / HT = 15 / WID = 15 / N = .011 / L = 255 / JLC = .75

B-7A TO B-8A / DNLN = 20

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	64.06	15.00	62.42	4.73	64.41	0.00	1.33	1.23
UPSTRM	67.38	11.56	66.42	5.71	67.89	12.61	1.33	1.01

Drainage area (ac)	= 4.31	Slope of invert (%)	= 1.5686
Runoff coefficient	= 0.25	Slope energy grade line (%)	= 1.3650
Time of conc (min)	= 25.00	Critical depth (in)	= 11.56
Inlet time (min)	= 25.00	Natural ground elev. (ft)	= 69.00
Intensity (in/hr)	= 3.96	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 1.47	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 5.80	Line capacity (cfs)	= 9.56
Q catchment (cfs)	= 4.26	Inlet length (ft)	= 3.00
Q carryover (cfs)	= 1.94	Gutter slope (ft/ft)	= 0.0000
Q captured (cfs)	= 0.00	Cross slope (ft/ft)	= 0.0000
Q bypassed (cfs)	= 6.20	Ponding width (ft)	= N/A

LINE 22 / Q = 1.94 / HT = 12 / WID = 12 / N = .011 / L = 450 / JLC = 1.06

B-8A TO B-9A / DNLN = 21

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	67.76	12.00	66.42	2.47	67.86	0.00	1.58	0.79
UPSTRM	80.86	7.08	80.00	4.02	81.11	11.80	1	0.48

Drainage area (ac)	= 1.94	Slope of invert (%)	= 3.0178
Runoff coefficient	= 0.20	Slope energy grade line (%)	= 2.8850
Time of conc (min)	= 15.00	Critical depth (in)	= 7.08
Inlet time (min)	= 15.00	Natural ground elev. (ft)	= 82.00
Intensity (in/hr)	= 5.00	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.39	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 1.94	Line capacity (cfs)	= 7.31
Q catchment (cfs)	= 1.94	Inlet length (ft)	= 3.00
Q carryover (cfs)	= 0.00	Gutter slope (ft/ft)	= 0.0000
Q captured (cfs)	= 0.00	Cross slope (ft/ft)	= 0.0000
Q bypassed (cfs)	= 1.94	Ponding width (ft)	= N/A

Drainage Design - Spread Calc's (Con't)

SYSTEM B:

→ STA 20+45 ROAD A Sump - Left
#B-8

DA = ~~1.05~~ 1.38 AC C = 0.45 I = 3.5 in/hr

Q_T = ~~1.55~~ CFS **2.17 CFS**

Q_{iw} = 1.34 CFS → use 2 grates Q_{iw} = 2.68 CFS

Q_{iw} = 2.68 > Q_T = ~~1.05~~ 2.17 ∴ OK

✓ → STA 20+45 ROAD A Sump - Right
#B-7

DA = 0.09 AC C = 0.69 I = 3.5 in/hr

Q_T = 0.22 CFS

Q_{iw} = 1.34 CFS

Q_{iw} = 1.34 > Q_T = 0.22 ∴ OK

✓ → STA 18+15 ROAD A Grade - Right
#B-6

DA = 0.05 AC C = 0.69 I = 3.5 in/hr

Q_T = 0.12 CFS S_L = 0.0367 FT/FT

D = 0.05' ∴ OK K = 22

$Q_i = (22)(0.05)^{5/3}$ = 0.15 CFS

Q_i = 0.15 CFS > Q_T = 0.12 ∴ OK

→ STA 10+50 ROAD D Grade - Left
~~#B-4~~
B-5

DA = 0.12 AC C = 0.47 I = 3.5 in/hr

Q_T = 0.20 CFS S_L = 0.0115 FT/FT

D = 0.078' ∴ OK K = 16

$Q_i = (16)(0.078)^{5/3}$ = 0.23 CFS

Q_i = 0.23 > Q_T = 0.20 ∴ OK

CALCS CHECKED 2-98
REVISED SHEET 7 ALSO

42-381 50 SHEETS EYE-EASE® 5 SQUARE
42-382 100 SHEETS EYE-EASE® 5 SQUARE
42-389 200 SHEETS EYE-EASE® 5 SQUARE
42-392 100 RECYCLED WHITE 5 SQUARE
42-399 200 RECYCLED WHITE 5 SQUARE
Made in U.S.A.
National® Brand

Drainage Design - Spread Calcs (Con't).

SYSTEM B - CON'T

→ STA 16+25 ROAD A Grade-Left
#B-12

DA = 0.40 AC C = 0.45 I = 3.5 in/hr

Q_T = 0.63 CFS S_L = 0.0091 FT/FT

D = 0.12' ∴ OK K = 14

$Q_i = (14)(.12)^{5/3} = 0.41$ CFS → CARRYOVER TO STA 16+90 = 0.22 CFS

$Q_i = 0.41 < Q_T = 0.63$ ∴
CARRYOVER = 0.22 CFS

→ STA 16+90 ROAD A Grade-Left
#B-11

DA = 0.46 AC C = 0.44 I = 3.5 in/hr

$Q_T = 0.71 + 0.22 = 0.93$ CFS S_L = 0.0091 FT/FT

D = 0.14' ∴ OK K = 14

$Q_i = (14)(.14)^{5/3} = 0.53$ → use 2 grates $Q_i = 1.06$ CFS

$Q_i = 1.06 > Q_T = 0.93$ ∴ OK

→ STA 17+45 ROAD A Sump-Left
#B-10

DA = 1.27 AC C = 0.45 I = 3.5 in/hr

Q_T = 2.00 CFS

Q_{iw} = 1.34 CFS → use 2 grates ∴ Q_{iw} = 2.68 CFS

$Q_{iw} = 2.68 > Q_T = 2.00$ ∴ OK

42-381 50 SHEETS EYE-EASE® 5 SQUARE
42-382 100 SHEETS EYE-EASE® 5 SQUARE
42-389 200 SHEETS EYE-EASE® 5 SQUARE
42-392 100 RECYCLED WHITE 5 SQUARE
42-399 200 RECYCLED WHITE 5 SQUARE
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Drainage Design - Spread Calcs (Con't)

SYSTEM B CON'T:

#B-9 → STA 17+45 ROAD A Sump - Right

DA = 0.07 AC C = 0.7 I = 3.5 in/hr

Q_T = 0.17 CFS

Q_{iw} = 1.34 CFS

Q_{iw} = 1.34 > Q_T = 0.17 ∴ OK

→ STA 10+50 ROAD D Grade - Right

~~#B-5~~ B-4

DA = 0.01 AC C = 0.7 I = 3.5 in/hr

Q_T = 0.02 CFS S_L = 0.0115 FT/FT

D = 0.03' ∴ OK K = 16

$Q_i = (16)(.03)^{5/3} = 0.05$ CFS

Q_i = 0.05 > Q_T = 0.02 ∴ OK

#B-3 → STA 11+53 ROAD D Sump - Cul-de-sac

DA = 0.27 AC C = 0.54 I = 3.5 in/hr

Q_T = 0.51 CFS

Q_{iw} = 1.34 CFS

Q_{iw} = 1.34 > Q_T = 0.51 ∴ OK

42-381 50 SHEETS EYE-EASE® 5 SQUARE
42-382 100 SHEETS EYE-EASE® 5 SQUARE
42-389 200 SHEETS EYE-EASE® 5 SQUARE
42-392 100 RECYCLED WHITE 5 SQUARE
42-399 200 RECYCLED WHITE 5 SQUARE
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FC-13A

STORM SEWER DESIGN / ANALYSIS SYS "B"

OK AS IS

Return Period = 10 Yrs
Rainfall file: jcc

Run Date: 01-20-1998
File: 565213AB.ST3

LINE 1 / Q = 12.52 / HT = 18 / WID = 18 / N = .011 / L = 73 / JLC = .75

B-1 TO B-2 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	58.02	18.00	53.00	7.09	58.80	0.00	-6.5	1.77
UPSTRM	58.76	18.00	55.20	7.09	59.54	0.00	2.59	1.77

Drainage area (ac) =	0.74	Slope of invert (%) =	3.0137
Runoff coefficient =	0.45	Slope energy grade line (%) =	1.0183
Time of conc (min) =	24.90	Critical depth (in) =	16.21
Inlet time (min) =	20.00	Natural ground elev. (ft) =	59.30
Intensity (in/hr) =	3.97	Upstream surcharge (ft) =	2.06
Cumulative C*A =	3.16	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	12.52	Line capacity (cfs) =	21.54
Q catchment (cfs) =	1.47	Inlet length (ft) =	3.00
Q carryover (cfs) =	11.71	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	13.17	Ponding width (ft) =	N/A

LINE 2 / Q = 11.47 / HT = 18 / WID = 18 / N = .011 / L = 210 / JLC = 1

B-2 TO B-3 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	59.35	18.00	55.20	6.49	60.00	0.00	2.59	1.77
UPSTRM	65.63	15.93	64.30	6.93	66.37	11.48	4.89	1.65

Drainage area (ac) =	0.27	Slope of invert (%) =	4.3333
Runoff coefficient =	0.54	Slope energy grade line (%) =	3.0339
Time of conc (min) =	23.73	Critical depth (in) =	15.93
Inlet time (min) =	5.00	Natural ground elev. (ft) =	70.70
Intensity (in/hr) =	4.06	Upstream surcharge (ft) =	0.00
Cumulative C*A =	2.83	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	11.47	Line capacity (cfs) =	25.83
Q catchment (cfs) =	1.02	Inlet length (ft) =	2.00
Q carryover (cfs) =	11.12	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.44	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	11.71	Ponding width (ft) =	N/A

LINE 3 / Q = 11.02 / HT = 18 / WID = 18 / N = .011 / L = 105 / JLC = .75

B-3 TO B-4 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	66.37	18.00	64.30	6.23	66.98	0.00	4.89	1.77
UPSTRM	67.67	15.20	66.40	6.92	68.41	13.05	4	1.59

Drainage area (ac) =	0.01	Slope of invert (%) =	2.0000
Runoff coefficient =	0.70	Slope energy grade line (%) =	1.3639
Time of conc (min) =	23.15	Critical depth (in) =	15.20
Inlet time (min) =	3.50	Natural ground elev. (ft) =	71.90
Intensity (in/hr) =	4.11	Upstream surcharge (ft) =	0.00
Cumulative C*A =	2.68	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	11.02	Line capacity (cfs) =	17.55
Q catchment (cfs) =	0.05	Inlet length (ft) =	2.00
Q carryover (cfs) =	11.49	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.42	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	11.12	Ponding width (ft) =	N/A

LINE 4 / Q = 3.29 / HT = 15 / WID = 15 / N = .011 / L = 25 / JLC = 1.35

B-4 TO B-5 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	68.22	15.00	66.40	2.68	68.34	0.00	4.25	1.23
UPSTRM	68.27	15.00	66.90	2.68	68.38	0.00	3.75	1.23

Drainage area (ac) =	0.12	Slope of invert (%) =	2.0000
Runoff coefficient =	0.47	Slope energy grade line (%) =	0.1854
Time of conc (min) =	21.67	Critical depth (in) =	8.70
Inlet time (min) =	10.00	Natural ground elev. (ft) =	71.90
Intensity (in/hr) =	4.24	Upstream surcharge (ft) =	0.12
Cumulative C*A =	0.77	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.29	Line capacity (cfs) =	10.79
Q catchment (cfs) =	0.33	Inlet length (ft) =	2.00
Q carryover (cfs) =	3.01	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.21	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	3.13	Ponding width (ft) =	N/A

LINE 5 / Q = 3.06 / HT = 15 / WID = 15 / N = .011 / L = 48 / JLC = .95

B-5 TO B-6 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	68.42	15.00	66.90	2.50	68.52	0.00	3.75	1.23
UPSTRM	68.60	8.40	67.90	4.33	68.89	14.89	4.36	0.71

Drainage area (ac) =	0.05	Slope of invert (%) =	2.0833
Runoff coefficient =	0.69	Slope energy grade line (%) =	0.7790
Time of conc (min) =	21.40	Critical depth (in) =	8.40
Inlet time (min) =	5.00	Natural ground elev. (ft) =	73.51
Intensity (in/hr) =	4.27	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.72	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.06	Line capacity (cfs) =	11.02
Q catchment (cfs) =	0.24	Inlet length (ft) =	2.00
Q carryover (cfs) =	2.97	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.20	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	3.01	Ponding width (ft) =	N/A

LINE 6 / Q = 3.00 / HT = 15 / WID = 15 / N = .011 / L = 227 / JLC = 1

B-6 TO B-7 / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	68.88	11.72	67.90	2.92	69.01	13.26	4.36	1.03
UPSTRM	72.09	8.32	71.40	4.30	72.38	14.91	2.91	0.70

Drainage area (ac) =	0.09	Slope of invert (%) =	1.5419
Runoff coefficient =	0.69	Slope energy grade line (%) =	1.4849
Time of conc (min) =	20.14	Critical depth (in) =	8.32
Inlet time (min) =	5.00	Natural ground elev. (ft) =	75.57
Intensity (in/hr) =	4.39	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.68	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.00	Line capacity (cfs) =	9.48
Q catchment (cfs) =	0.43	Inlet length (ft) =	2.00
Q carryover (cfs) =	2.74	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.20	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	2.97	Ponding width (ft) =	N/A

LINE 7 / Q = 2.74 / HT = 15 / WID = 15 / N = .011 / L = 25 / JLC = 1.2

B-7 TO B-8 / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	72.38	11.76	71.40	2.65	72.49	13.28	2.91	1.03
UPSTRM	72.78	7.94	71.80	4.15	73.05	14.97	2.51	0.66

Drainage area (ac)	= 1.38	Slope of invert (%)	= 1.6000
Runoff coefficient	= 0.45	Slope energy grade line (%)	= 2.2439
Time of conc (min)	= 20.00	Critical depth (in)	= 7.94
Inlet time (min)	= 20.00	Natural ground elev. (ft)	= 75.57
Intensity (in/hr)	= 4.41	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.62	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 2.74	Line capacity (cfs)	= 9.65
Q catchment (cfs)	= 2.74	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 0.00	Gutter slope (ft/ft)	= 0.0000
Q captured (cfs)	= 0.00	Cross slope (ft/ft)	= 0.0000
Q bypassed (cfs)	= 2.74	Ponding width (ft)	= N/A

LINE 8 / Q = 7.84 / HT = 15 / WID = 15 / N = .011 / L = 40 / JLC = .75

B-4 TO B-9 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	68.22	15.00	66.40	6.39	68.86	0.00	4.25	1.23
UPSTRM	68.75	13.51	67.62	6.74	69.45	8.98	3.5	1.16

Drainage area (ac)	= 0.07	Slope of invert (%)	= 3.0500
Runoff coefficient	= 0.70	Slope energy grade line (%)	= 1.4804
Time of conc (min)	= 22.93	Critical depth (in)	= 13.51
Inlet time (min)	= 5.00	Natural ground elev. (ft)	= 72.38
Intensity (in/hr)	= 4.13	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 1.90	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 7.84	Line capacity (cfs)	= 13.33
Q catchment (cfs)	= 0.34	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 8.38	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.36	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 8.36	Ponding width (ft)	= N/A

LINE 9 / Q = 7.66 / HT = 15 / WID = 15 / N = .011 / L = 25 / JLC = .75

B-9 TO B-10 / DNLN = 8

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	69.27	15.00	67.62	6.24	69.88	0.00	3.5	1.23
UPSTRM	69.53	15.00	68.00	6.24	70.13	0.00	3.12	1.23

Drainage area (ac) =	1.27	Slope of invert (%) =	1.5200
Runoff coefficient =	0.45	Slope energy grade line (%) =	1.0081
Time of conc (min) =	22.79	Critical depth (in) =	13.51
Inlet time (min) =	20.00	Natural ground elev. (ft) =	72.38
Intensity (in/hr) =	4.14	Upstream surcharge (ft) =	0.28
Cumulative C*A =	1.85	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	7.66	Line capacity (cfs) =	9.41
Q catchment (cfs) =	2.52	Inlet length (ft) =	2.00
Q carryover (cfs) =	5.86	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	8.38	Ponding width (ft) =	N/A

LINE 10 / Q = 5.33 / HT = 15 / WID = 15 / N = .011 / L = 55 / JLC = 1.3

B-10 TO B-11 / DNLN = 9

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	69.98	15.00	68.00	4.34	70.27	0.00	3.12	1.23
UPSTRM	70.25	15.00	68.60	4.34	70.54	0.00	2.94	1.23

Drainage area (ac) =	0.46	Slope of invert (%) =	1.0909
Runoff coefficient =	0.44	Slope energy grade line (%) =	0.4877
Time of conc (min) =	22.48	Critical depth (in) =	11.08
Inlet time (min) =	15.00	Natural ground elev. (ft) =	72.79
Intensity (in/hr) =	4.17	Upstream surcharge (ft) =	0.40
Cumulative C*A =	1.28	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	5.33	Line capacity (cfs) =	7.97
Q catchment (cfs) =	1.01	Inlet length (ft) =	2.00
Q carryover (cfs) =	4.85	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	5.86	Ponding width (ft) =	N/A

LINE 11 / Q = 0.90 / HT = 15 / WID = 15 / N = .011 / L = 65 / JLC = .75

B-11 TO B-12 / DNLN = 10

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	70.63	15.00	68.60	0.73	70.64	0.00	2.94	1.23
UPSTRM	70.65	12.48	69.60	0.82	70.66	11.22	2.52	1.09

Drainage area (ac) =	0.40	Slope of invert (%) =	1.5385
Runoff coefficient =	0.45	Slope energy grade line (%) =	0.0318
Time of conc (min) =	15.00	Critical depth (in) =	4.55
Inlet time (min) =	15.00	Natural ground elev. (ft) =	73.38
Intensity (in/hr) =	5.00	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.18	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	0.90	Line capacity (cfs) =	9.47
Q catchment (cfs) =	0.90	Inlet length (ft) =	2.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	0.90	Ponding width (ft) =	N/A

LINE 12 / Q = 3.82 / HT = 12 / WID = 12 / N = .011 / L = 192 / JLC = 1.3

B-11 TO B-13 / DNLN = 10

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	70.63	12.00	68.60	4.87	71.00	0.00	3.19	0.79
UPSTRM	75.73	9.95	74.90	5.49	76.20	9.04	3.5	0.70

Drainage area (ac) =	0.90	Slope of invert (%) =	3.2813
Runoff coefficient =	0.45	Slope energy grade line (%) =	2.7082
Time of conc (min) =	21.42	Critical depth (in) =	9.95
Inlet time (min) =	20.00	Natural ground elev. (ft) =	79.40
Intensity (in/hr) =	4.27	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.90	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.82	Line capacity (cfs) =	7.62
Q catchment (cfs) =	1.79	Inlet length (ft) =	3.00
Q carryover (cfs) =	2.16	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	3.95	Ponding width (ft) =	N/A

LINE 13 / Q = 2.16 / HT = 12 / WID = 12 / N = .011 / L = 255 / JLC = 1.25

B-13 TO B-14 / DNLN = 12

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	76.34	12.00	74.90	2.75	76.46	0.00	3.5	0.79
UPSTRM	78.07	7.48	77.10	4.20	78.34	11.63	2.5	0.51

Drainage area (ac) =	1.09	Slope of invert (%) =	0.8627
Runoff coefficient =	0.45	Slope energy grade line (%) =	0.6046
Time of conc (min) =	20.00	Critical depth (in) =	7.48
Inlet time (min) =	20.00	Natural ground elev. (ft) =	80.60
Intensity (in/hr) =	4.41	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.49	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.16	Line capacity (cfs) =	3.91
Q catchment (cfs) =	2.16	Inlet length (ft) =	3.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.16	Ponding width (ft) =	N/A

Drainage Design-Spread Calc's (Cont)

SYSTEM C:

#C-10 → STA 12+62 ROAD A Sump-Left

DA = 1.50 AC C = 0.44 I = 3.5 in/hr

Q_T = 2.31 CFS

Q_{iw} = 1.34 CFS → use 2 grates ∴ Q_{iw} = 2.68 CFS

$Q_{iw} = 2.68 > Q_T = 2.31$ ∴ OK

#C-9 → STA 12+62 ROAD A Sump-Right

DA = 0.06 AC C = 0.7 I = 3.5 in/hr

Q_T = 0.15 CFS

Q_{iw} = 1.34 CFS

$Q_{iw} = 1.34 > Q_T = 0.15$ ∴ OK

#C-8 → STA 10+25 ROAD B Grade-Right

DA = 0.01 AC C = 0.7 I = 3.5 in/hr

Q_T = 0.02 CFS S = 0.0245 FT/FT

D = 0.03' ∴ OK K = 21

$Q_i = (21)(.03)^{5/3} = 0.06$ CFS

$Q_i = 0.06 > Q_T = 0.02$ ∴ OK

#C-6 → STA 12+10 ROAD B Grade-Right

DA = 0.39 AC C = 0.47 I = 3.5 in/hr

Q_T = 0.64 CFS S = 0.0498 FT/FT

D = 0.09' ∴ OK K = 24

$Q_i = (24)(.09)^{5/3} = 0.43$ CFS → use 2 grates ∴ Q_i = 0.86 CFS

$Q_i = 0.86 > Q_T = 0.64$ ∴ OK

CALCS CHECKED 2-98

42-381 50 SHEETS EYE-EASE® 5 SQUARE
42-382 100 SHEETS EYE-EASE® 5 SQUARE
42-389 200 SHEETS EYE-EASE® 5 SQUARE
42-392 100 RECYCLED WHITE 5 SQUARE
42-399 200 RECYCLED WHITE 5 SQUARE
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Drainage Design - Spread Calcs (Con't)

SYSTEM C-CON'T

#C-7 → STA 10+25 ROAD B Grade - Left

DA = 0.06 C = 0.7 I = 3.5 in/hr

Q_T = 0.15 S = 0.0245 FT/FT

D = 0.06' ∴ OK K = 21

$Q_{iw} = (21)(.06)^{5/3} = 0.19$ CFS

$Q_i = 0.19 > Q_T = 0.15$ ∴ OK

#C-4 → STA 10+25 ROAD C Sump-Left

DA = 0.73 AC C = 0.45 I = 3.5 in/hr

Q_T = 1.15 CFS

Q_{iw} = 1.34 CFS

$Q_{iw} = 1.34 > Q_T = 1.15$ ∴ OK

#C-5 → STA 10+25 ROAD C Sump-Right

DA = 0.05 AC C = 0.7 I = 3.5 in/hr

Q_T = 0.12 CFS

Q_{iw} = 1.34 CFS

$Q_{iw} = 1.34 > Q_T = 0.12$ ∴ OK

#C-2 → STA 12+03 ROAD C Sump-Cul-de-sac

DA = 0.13 AC C = 0.64 I = 3.5 in/hr

Q_T = 0.29 CFS

Q_{iw} = 1.34 CFS

$Q_{iw} = 1.34 > Q_T = 0.29$ ∴ OK

FORD'S COLONY 13A SYS "C" REVISED

STORM SEWER DESIGN / ANALYSIS

Return Period = 10 Yrs
Rainfall file: jcc

Run Date: 02-18-1998
File: 565213AC.ST3

LINE 1 / Q = 5.82 / HT = 15 / WID = 15 / N = .011 / L = 180 / JLC = .75

C-1 TO C-2 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	48.24	15.00	46.70	4.74	48.59	0.00	-9.95	1.23
UPSTRM	58.47	11.58	57.50	5.72	58.97	12.58	7.55	1.02

Drainage area (ac) =	0.13	Slope of invert (%) =	6.0000
Runoff coefficient =	0.64	Slope energy grade line (%) =	5.7692
Time of conc (min) =	21.99	Critical depth (in) =	11.58
Inlet time (min) =	5.00	Natural ground elev. (ft) =	66.30
Intensity (in/hr) =	4.22	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.38	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	5.82	Line capacity (cfs) =	18.69
Q catchment (cfs) =	0.58	Inlet length (ft) =	2.00
Q carryover (cfs) =	5.77	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.30	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	6.05	Ponding width (ft) =	N/A

LINE 2 / Q = 5.51 / HT = 15 / WID = 15 / N = .011 / L = 98 / JLC = .75

C-2 TO C-3 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	58.85	15.00	57.50	4.49	59.16	0.00	7.55	1.23
UPSTRM	60.34	11.27	59.40	5.57	60.82	12.97	6.34	0.99

Drainage area (ac) =	0.00	Slope of invert (%) =	1.9400
Runoff coefficient =	0.00	Slope energy grade line (%) =	1.6961
Time of conc (min) =	21.66	Critical depth (in) =	11.27
Inlet time (min) =	0.00	Natural ground elev. (ft) =	67.00
Intensity (in/hr) =	4.25	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.30	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	5.51	Line capacity (cfs) =	10.63
Q catchment (cfs) =	0.00	Inlet length (ft) =	0.00
Q carryover (cfs) =	5.77	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	5.77	Ponding width (ft) =	N/A

LINE 3 / Q = 5.53 / HT = 15 / WID = 15 / N = .011 / L = 60 / JLC = 1.03

C-3 TO C-5 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	60.70	15.00	59.40	4.51	61.02	0.00	6.34	1.23
UPSTRM	60.94	11.29	60.00	5.58	61.43	12.94	4.4	0.99

Drainage area (ac)	= 0.05	Slope of invert (%)	= 1.0000
Runoff coefficient	= 0.70	Slope energy grade line (%)	= 0.6792
Time of conc (min)	= 21.46	Critical depth (in)	= 11.29
Inlet time (min)	= 3.50	Natural ground elev. (ft)	= 65.65
Intensity (in/hr)	= 4.26	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 1.30	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 5.53	Line capacity (cfs)	= 7.63
Q catchment (cfs)	= 0.26	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 5.80	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.29	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 5.77	Ponding width (ft)	= N/A

LINE 4 / Q = 4.61 / HT = 15 / WID = 15 / N = .011 / L = 28 / JLC = 1.4

C-5 TO C-4 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	61.44	15.00	60.00	3.76	61.66	0.00	4.4	1.23
UPSTRM	62.41	10.31	61.55	5.13	62.82	13.91	2.84	0.90

Drainage area (ac)	= 0.73	Slope of invert (%)	= 5.5400
Runoff coefficient	= 0.45	Slope energy grade line (%)	= 4.1423
Time of conc (min)	= 21.36	Critical depth (in)	= 10.31
Inlet time (min)	= 5.00	Natural ground elev. (ft)	= 65.65
Intensity (in/hr)	= 4.27	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 1.08	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 4.61	Line capacity (cfs)	= 17.96
Q catchment (cfs)	= 2.30	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 2.81	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.26	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 4.84	Ponding width (ft)	= N/A

LINE 5 / Q = 1.06 / HT = 15 / WID = 15 / N = .011 / L = 45 / JLC = 1.07

C-5 TO C-6 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	61.44	15.00	60.00	0.87	61.45	0.00	4.4	1.23
UPSTRM	61.47	10.99	60.53	1.10	61.49	13.28	2.84	0.96

Drainage area (ac)	= 0.39	Slope of invert (%)	= 1.1800
Runoff coefficient	= 0.47	Slope energy grade line (%)	= 0.0766
Time of conc (min)	= 10.00	Critical depth (in)	= 4.95
Inlet time (min)	= 10.00	Natural ground elev. (ft)	= 64.63
Intensity (in/hr)	= 5.81	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.18	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 1.06	Line capacity (cfs)	= 8.29
Q catchment (cfs)	= 1.06	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 0.00	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.10	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 0.96	Ponding width (ft)	= N/A

LINE 6 / Q = 3.26 / HT = 15 / WID = 15 / N = .011 / L = 147 / JLC = .95

C-4 TO C-7 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	62.98	15.00	61.55	2.66	63.09	0.00	2.85	1.23
UPSTRM	65.42	8.67	64.70	4.44	65.72	14.82	5.22	0.73

Drainage area (ac)	= 0.06	Slope of invert (%)	= 2.1400
Runoff coefficient	= 0.70	Slope energy grade line (%)	= 1.7903
Time of conc (min)	= 20.67	Critical depth (in)	= 8.67
Inlet time (min)	= 3.50	Natural ground elev. (ft)	= 71.17
Intensity (in/hr)	= 4.34	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.75	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 3.26	Line capacity (cfs)	= 11.16
Q catchment (cfs)	= 0.31	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 2.68	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.19	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 2.81	Ponding width (ft)	= N/A

LINE 7 / Q = 3.09 / HT = 15 / WID = 15 / N = .011 / L = 28 / JLC = 1.3

C-7 TO C-8 / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	65.71	12.10	64.70	2.91	65.84	13.47	5.22	1.06
UPSTRM	65.70	8.44	65.00	4.34	66.00	14.88	4.91	0.71

Drainage area (ac)	= 0.01	Slope of invert (%)	= 1.0714
Runoff coefficient	= 0.70	Slope energy grade line (%)	= 0.5566
Time of conc (min)	= 20.54	Critical depth (in)	= 8.43
Inlet time (min)	= 3.50	Natural ground elev. (ft)	= 71.17
Intensity (in/hr)	= 4.35	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.71	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 3.09	Line capacity (cfs)	= 7.90
Q catchment (cfs)	= 0.05	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 2.82	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.19	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 2.68	Ponding width (ft)	= N/A

LINE 8 / Q = 3.09 / HT = 15 / WID = 15 / N = .011 / L = 90 / JLC = .75

C-8 TO C-9 / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	66.08	13.00	65.00	2.73	66.20	13.97	4.91	1.13
UPSTRM	66.65	8.43	65.95	4.34	66.95	14.88	3.19	0.71

Drainage area (ac)	= 0.06	Slope of invert (%)	= 1.0556
Runoff coefficient	= 0.70	Slope energy grade line (%)	= 0.8292
Time of conc (min)	= 20.12	Critical depth (in)	= 8.43
Inlet time (min)	= 5.00	Natural ground elev. (ft)	= 70.39
Intensity (in/hr)	= 4.40	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.70	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 3.09	Line capacity (cfs)	= 7.84
Q catchment (cfs)	= 0.29	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 2.72	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.19	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 2.82	Ponding width (ft)	= N/A

LINE 9 / Q = 2.91 / HT = 15 / WID = 15 / N = .011 / L = 25 / JLC = 1.25

C-9 TO C-10 / DNLN = 8

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	66.87	11.07	65.95	3.00	67.01	12.89	3.19	0.97
UPSTRM	67.23	8.19	66.20	4.25	67.51	14.94	2.94	0.69

Drainage area (ac) =	1.50	Slope of invert (%) =	1.0000
Runoff coefficient =	0.44	Slope energy grade line (%) =	0.6015
Time of conc (min) =	20.00	Critical depth (in) =	8.19
Inlet time (min) =	20.00	Natural ground elev. (ft) =	70.39
Intensity (in/hr) =	4.41	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.66	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.91	Line capacity (cfs) =	7.63
Q catchment (cfs) =	2.91	Inlet length (ft) =	2.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.19	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	2.72	Ponding width (ft) =	N/A

Drainage Design - Spread Inlets (Cont)

SYSTEM D:

#D-3 → STA 14+34 ROAD B Sump - Right

DA = 1.85 AC C = 0.4 I = 3.5 in/hr

Q_T = 2.59 CFS

Q_{iw} = 1.34 CFS → use 2 grates ∴ Q_{iw} = 2.68 CFS

Q_{iw} = 2.68 > Q_T = 2.59 ∴ OK

#D-2 → STA 14+34 ROAD B Sump - Left

DA = 0.14 AC C = 0.7 I = 3.5 in/hr

Q_T = 0.34 CFS

Q_{iw} = 1.34 CFS

Q_{iw} = 1.34 > Q_T = 0.34 ∴ OK

CALCS CHECKED 2·98

42-381 50 SHEETS EYE-EASE® 5 SQUARE
42-382 100 SHEETS EYE-EASE® 5 SQUARE
42-389 200 SHEETS EYE-EASE® 5 SQUARE
42-392 100 RECYCLED WHITE 5 SQUARE
42-399 200 RECYCLED WHITE 5 SQUARE
Made in U.S.A.
National® Brand

FC 13A
SYS "D"
(REVISED)

STORM SEWER DESIGN / ANALYSIS

Return Period = 10 Yrs
Rainfall file: jcc

Run Date: 02-18-1998
File: 565213AD.ST3

LINE 1 / Q = 4.09 / HT = 15 / WID = 15 / N = .011 / L = 180 / JLC = .75

D-1 TO D-2 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	48.24	15.00	46.17	3.33	48.41	0.00	-1.41	1.23
UPSTRM	49.81	9.71	49.00	4.87	50.18	14.33	5.79	0.84

Drainage area (ac) =	0.14	Slope of invert (%) =	1.5722
Runoff coefficient =	0.70	Slope energy grade line (%) =	0.9803
Time of conc (min) =	20.11	Critical depth (in) =	9.71
Inlet time (min) =	5.00	Natural ground elev. (ft) =	56.04
Intensity (in/hr) =	4.40	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.93	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.09	Line capacity (cfs) =	9.57
Q catchment (cfs) =	0.69	Inlet length (ft) =	2.00
Q carryover (cfs) =	3.45	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.23	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	3.90	Ponding width (ft) =	N/A

LINE 2 / Q = 3.67 / HT = 15 / WID = 15 / N = .011 / L = 25 / JLC = .75

D-2 TO D-3 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	50.09	13.02	49.00	3.24	50.25	13.98	5.79	1.13
UPSTRM	51.52	9.20	50.50	4.65	51.85	14.61	4.29	0.79

Drainage area (ac) =	1.85	Slope of invert (%) =	6.0000
Runoff coefficient =	0.45	Slope energy grade line (%) =	5.4156
Time of conc (min) =	20.00	Critical depth (in) =	9.20
Inlet time (min) =	20.00	Natural ground elev. (ft) =	56.04
Intensity (in/hr) =	4.41	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.83	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.67	Line capacity (cfs) =	18.69
Q catchment (cfs) =	3.67	Inlet length (ft) =	2.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.22	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	3.45	Ponding width (ft) =	N/A

FC 13A
SYS "D"

STORM SEWER DESIGN / ANALYSIS

Return Period = 10 Yrs
Rainfall file: jcc

Run Date: 01-20-1998
File: 565213AD.ST3

LINE 1 / Q = 4.09 / HT = 15 / WID = 15 / N = .011 / L = 185 / JLC = .75

D-1 TO D-2 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	48.24	15.00	46.00	3.33	48.41	0.00	-1.25	1.23
UPSTRM	49.81	9.71	49.00	4.87	50.18	14.34	5.79	0.84

Drainage area (ac)	= 0.14	Slope of invert (%)	= 1.6216
Runoff coefficient	= 0.70	Slope energy grade line (%)	= 0.9536
Time of conc (min)	= 20.14	Critical depth (in)	= 9.71
Inlet time (min)	= 5.00	Natural ground elev. (ft)	= 56.04
Intensity (in/hr)	= 4.39	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.93	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 4.09	Line capacity (cfs)	= 9.72
Q catchment (cfs)	= 0.69	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 3.45	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.23	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 3.90	Ponding width (ft)	= N/A

LINE 2 / Q = 3.67 / HT = 15 / WID = 15 / N = .011 / L = 25 / JLC = .75

D-2 TO D-3 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	50.08	13.02	49.00	3.24	50.25	13.97	5.79	1.13
UPSTRM	51.52	9.20	50.50	4.65	51.85	14.61	4.29	0.79

Drainage area (ac)	= 1.85	Slope of invert (%)	= 6.0000
Runoff coefficient	= 0.45	Slope energy grade line (%)	= 5.4171
Time of conc (min)	= 20.00	Critical depth (in)	= 9.20
Inlet time (min)	= 20.00	Natural ground elev. (ft)	= 56.04
Intensity (in/hr)	= 4.41	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.83	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 3.67	Line capacity (cfs)	= 18.69
Q catchment (cfs)	= 3.67	Inlet length (ft)	= 2.00
Q carryover (cfs)	= 0.00	Gutter slope (ft/ft)	= 0.0833
Q captured (cfs)	= 0.22	Cross slope (ft/ft)	= 0.0208
Q bypassed (cfs)	= 3.45	Ponding width (ft)	= N/A

Drainage Design-Spread Calcs (Con't)

SYSTEM E:

✓ → STA 10+33 ROAD A SUMP – Right
#E-2

DA = 0.05 AC C = 0.7 I = 3.5 in/hr

Q_T = 0.12 CFS

Q_{iw} = 1.34 CFS

$Q_{iw} = 1.34 > Q_T = 0.12 \therefore$ OK

✓ → STA 10+33 ROAD A SUMP- Left
#E-3

DA = 0.35 AC C = 0.47 I = 3.5 in/hr

Q_T = 0.58 CFS

Q_{iw} = 1.34 CFS

$Q_{iw} = 1.34 > Q_T = 0.58 \therefore$ OK

CALCS CHECKED 2-98 ✓

STORM SEWER DESIGN / ANALYSIS

FC 13A
SYS "E"

Return Period = 10 Yrs
Rainfall file: jcc

Run Date: 01-20-1998
File: 565213AE.ST3

OK AS IS 2-98

LINE 1 / Q = 2.02 / HT = 12 / WID = 12 / N = .011 / L = 180 / JLC = 0

E-1 TO E-2 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	65.60	7.23	65.00	4.09	65.86	9.32	2.77	0.49
UPSTRM	66.40	9.57	65.60	3.01	66.54	9.65	2.22	0.67

Drainage area (ac) =	0.05	Slope of invert (%) =	0.3333
Runoff coefficient =	0.70	Slope energy grade line (%) =	0.3756
Time of conc (min) =	20.29	Critical depth (in) =	7.23
Inlet time (min) =	5.00	Natural ground elev. (ft) =	68.82
Intensity (in/hr) =	4.38	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.46	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.02	Line capacity (cfs) =	2.43
Q catchment (cfs) =	0.24	Inlet length (ft) =	2.00
Q carryover (cfs) =	1.95	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.16	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	2.04	Ponding width (ft) =	N/A

LINE 2 / Q = 1.87 / HT = 12 / WID = 12 / N = .011 / L = 25 / JLC = .75

E-2 TO E-3 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	66.40	9.57	65.60	2.79	66.52	10.72	2.22	0.67
UPSTRM	66.42	8.29	65.73	3.24	66.58	11.09	2.08	0.58

Drainage area (ac) =	0.35	Slope of invert (%) =	0.5200
Runoff coefficient =	0.47	Slope energy grade line (%) =	0.2610
Time of conc (min) =	20.15	Critical depth (in) =	6.97
Inlet time (min) =	10.00	Natural ground elev. (ft) =	68.82
Intensity (in/hr) =	4.39	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.43	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.87	Line capacity (cfs) =	3.04
Q catchment (cfs) =	0.96	Inlet length (ft) =	2.00
Q carryover (cfs) =	1.16	Gutter slope (ft/ft) =	0.0833
Q captured (cfs) =	0.16	Cross slope (ft/ft) =	0.0208
Q bypassed (cfs) =	1.95	Ponding width (ft) =	N/A

LINE 3 / Q = 1.16 / HT = 12 / WID = 12 / N = .011 / L = 27 / JLC = .75

E-3 TO E-4 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	66.54	9.76	65.73	1.69	66.59	10.82	2.08	0.68
UPSTRM	69.36	5.47	68.78	3.32	69.53	11.95	-1	0.35

Drainage area (ac)	= 0.57	Slope of invert (%)	=11.2963
Runoff coefficient	= 0.46	Slope energy grade line (%)	=10.4414
Time of conc (min)	= 20.00	Critical depth (in)	= 5.47
Inlet time (min)	= 20.00	Natural ground elev. (ft)	= 68.78
Intensity (in/hr)	= 4.41	Upstream surcharge (ft)	= 0.00
Cumulative C*A	= 0.26	Additional Q (cfs)	= 0.00
Q = CA * I (cfs)	= 1.16	Line capacity (cfs)	= 14.15
Q catchment (cfs)	= 1.16	Inlet length (ft)	= 1.00
Q carryover (cfs)	= 0.00	Gutter slope (ft/ft)	= 0.0000
Q captured (cfs)	= 0.00	Cross slope (ft/ft)	= 0.0000
Q bypassed (cfs)	= 1.16	Ponding width (ft)	= N/A

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project FORDS COLONY SECTION 13B

Basin # "DAM 111" Location EDINBURGH DRIVE

Total area draining to basin: 96 acres.

Basin Volume Design

Wet Storage:

1. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 96 acres = 6,432 cu. yds. (173,664 CF)

2. Available basin volume = 256,314 cu. yds. at elevation 41.5. (From storage - elevation curve)

3. Excavate 6,500 cu. yds. to obtain required volume*.

   * Elevation corresponding to required volume = invert of the dewatering orifice.

4. Available volume before cleanout required.

   33 cu. yds. x 96 acres = 3,168 cu. yds. (85,536 CF)

5. Elevation corresponding to cleanout level = 40.2.

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 1.3 ft. (Min. = 1.0 ft.)

Dry Storage:

7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 96 acres = 6,432 cu. yds. (173,664 CF)

8. Total available basin volume at crest of riser* = 37,512 cu. yds. at elevation 46.0. (From Storage - Elevation Curve)

* Minimum = 134 cu. yds./acre of total drainage area.

9. Diameter of dewatering orifice = 3" in.

10. Diameter of flexible tubing = 6" in. (diameter of dewatering orifice plus 2 inches).

$Q = S/21{,}600\ sec$

$Q = 756{,}514/21{,}600 = 35\ cfs$

$A = \frac{35}{(64.32 \times 2.25)^{1/2}(0.6)}$

$A = 4.85$

$d = 2\left(\frac{4.85}{3.14}\right)^{1/2}$

$d = 2.5\ ft$ (max)

Use 3" dia. equivalent (3.5 lf of perf. on 6" pvc)

Preliminary Design Elevations

11. Crest of Riser = 46.0

Top of Dam = 53.0

Design High Water = _____

Upstream Toe of Dam = 37.0

Basin Shape

12. Length of Flow / Effective Width — $\frac{L}{We}$ = 900/300 = 3

If > 2, baffles are not required ✓

If < 2, baffles are required _____

Runoff

13. Q_2 = 0.4 cfs (From Chapter 5)

14. Q_{25} = 5.7 cfs (From Chapter 5)

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2$ = N/A cfs. (riser and barrel)

Without emergency spillway, required spillway capacity $Q_p = Q_{25}$ = 5.7 cfs. min. (riser and barrel)

16. With emergency spillway:

Assumed available head (h) = N/A ft. (Using Q_2)

h = Crest of Emergency Spillway Elevation - Crest of Riser Elevation

Without emergency spillway:

Assumed available head (h) = 1.2 ft. (Using Q_{25})

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = 48 in. Actual head (h) = 1.2 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 130 ft.

Head (H) on barrel through embankment = 9 ft.

(From Plate 3.14-7).

19. Barrel diameter = 12 in.

(From Plate 3.14-B [concrete pipe] or Plate 3.14-A [corrugated pipe]).

20. Trash rack and anti-vortex device

Diameter = 78 inches.

Height = 12 inches.

(From Table 3.14-D).

Emergency Spillway Design

21. Required spillway capacity $Q_e = Q_{25} - Q_p$ = N/A cfs.

22. Bottom width (b) = N/A ft.; the slope of the exit channel (s) = N/A ft./foot; and the minimum length of the exit channel (x) = N/A ft.
(From Table 3.14-C).

Anti-Seep Collar Design

23. Depth of water at principal spillway crest (Y) = 9 ft.

Slope of upstream face of embankment (Z) = 3 :1.

Slope of principal spillway barrel (S_b) = 1.04 %

Length of barrel in saturated zone (L_s) = 105 ft.

$L_s = Y(Z+4)\left[1+\frac{S}{0.25-S}\right]$

$= 9(7)\left[1+\frac{0.1}{0.25-0.1}\right]$

$L_s = 105'$

24. Number of collars required = 3 dimensions = 5.9'x5.9'

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 53.0

Design High Water = 47.2

Emergency Spillway Crest = N/A

Principal Spillway Crest = 46.0

Dewatering Orifice Invert = 41.5

Cleanout Elevation = 40.2

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 37.0

Option 1 STAGE / STORAGE TABLE R to reset

1. RESERVOIR No = 1. 2. RESERVOIR NAME = DAM 3.....
3. S = Ks * Z^b
Ks = 0..... b = 0.....
START ELEV = 0..... INCREMENT = 0...

	STAGE ft	ELEVATION ft	CO AREA sq ft	INC STORAGE cu ft	TOT STORAGE cu ft
4	0.00	37.00.	.0000001	0	0
5	4.49	41.49.	.0000001	0	0
6	4.50	41.50.	129728..	648	648
7	5.00	42.00.	152348..	70519	71167
8	9.00	46.00.	223694..	752084	823251
9	13.00	50.00.	358520..	1164428	1987679
10	0.00	0.00.	0.....	0	0
11	0.00	0.00.	0.....	0	0
12	0.00	0.00.	0.....	0	0
13	0.00	0.00.	0.....	0	0
14	0.00	0.00.	0.....	0	0

Change item number: 0 ↵ to cont

Reservoir No. 1 OUTLET STRUCTURES

CULVERT STRUC A. Q=CoA[2gh/k]^.5

1. WIDTH (in) = 12.
2. HEIGHT (in) = 12.
3. No. BARRELS = 1..
4. INVERT ELEV. = 37.....
5. Co = 0.60
6. CULVERT LENGTH (ft) = 130.
7. CULVERT SLOPE (%) = 1.04
8. MANNING'S N-VALUE = .022

CULVERT STRUC B. Q=CoA[2gh/k]^.5

9. WIDTH (in) = 3..
10. HEIGHT (in) = 3..
11. No. BARRELS = 1..
12. INVERT ELEV. = 41.5.....
13. Co = 0.60
14. CULVERT LENGTH (ft) = 0...
15. CULVERT SLOPE (%) = 0...
16. MANNING'S N-VALUE = .013
17. MULTI-STAGE OPTION ? (Y/N) Y

WEIR STRUCTURE A. Q=CwLH^EXP

18. CREST LENGTH (ft) = 12.56..
19. CREST ELEVATION = 46.....
20. Cw = 3.00
21. EXP = 1.50
22. MULTI-STAGE OPTION ? (Y/N) Y

WEIR STRUCTURE B. Q=CwLH^EXP

23. CREST LENGTH (ft) = 0.....
24. CREST ELEVATION = 0.....
25. Cw = 3.00
26. EXP = 1.50
27. MULTI-STAGE OPTION ? (Y/N) N

Change item number: 0 ↵ to cont

Option 1 STAGE / STORAGE TABLE R to reset

1. RESERVOIR No = 2. 2. RESERVOIR NAME = EXCAV DAM 3.
3. S = Ks * Z^b
Ks = 0..... b = 0.....
START ELEV = 0..... INCREMENT = 0...

	STAGE ft	ELEVATION ft	CO AREA sq ft	INC STORAGE cu ft	TOT STORAGE cu ft
4	0.00	37.00.	0.....	0	0
5	1.00	38.00.	1267....	633	633
6	3.00	40.00.	61868...	63135	63768
7	5.00	42.00.	152348..	214216	277984
8	7.00	44.00.	179401..	331749	609733
9	9.00	46.00.	223694..	403095	1012828
10	11.00	48.00.	291107..	514801	1527629
11	0.00	0.00.	0.....	0	0
12	0.00	0.00.	0.....	0	0
13	0.00	0.00.	0.....	0	0
14	0.00	0.00.	0.....	0	0

Change item number: 0 ↵ to cont

HYDROLOGIC REPORT

2YR POST DEVELOPMENT..
AND OUTFLOW FROM DAM 2
.....

Hyd. No. 4

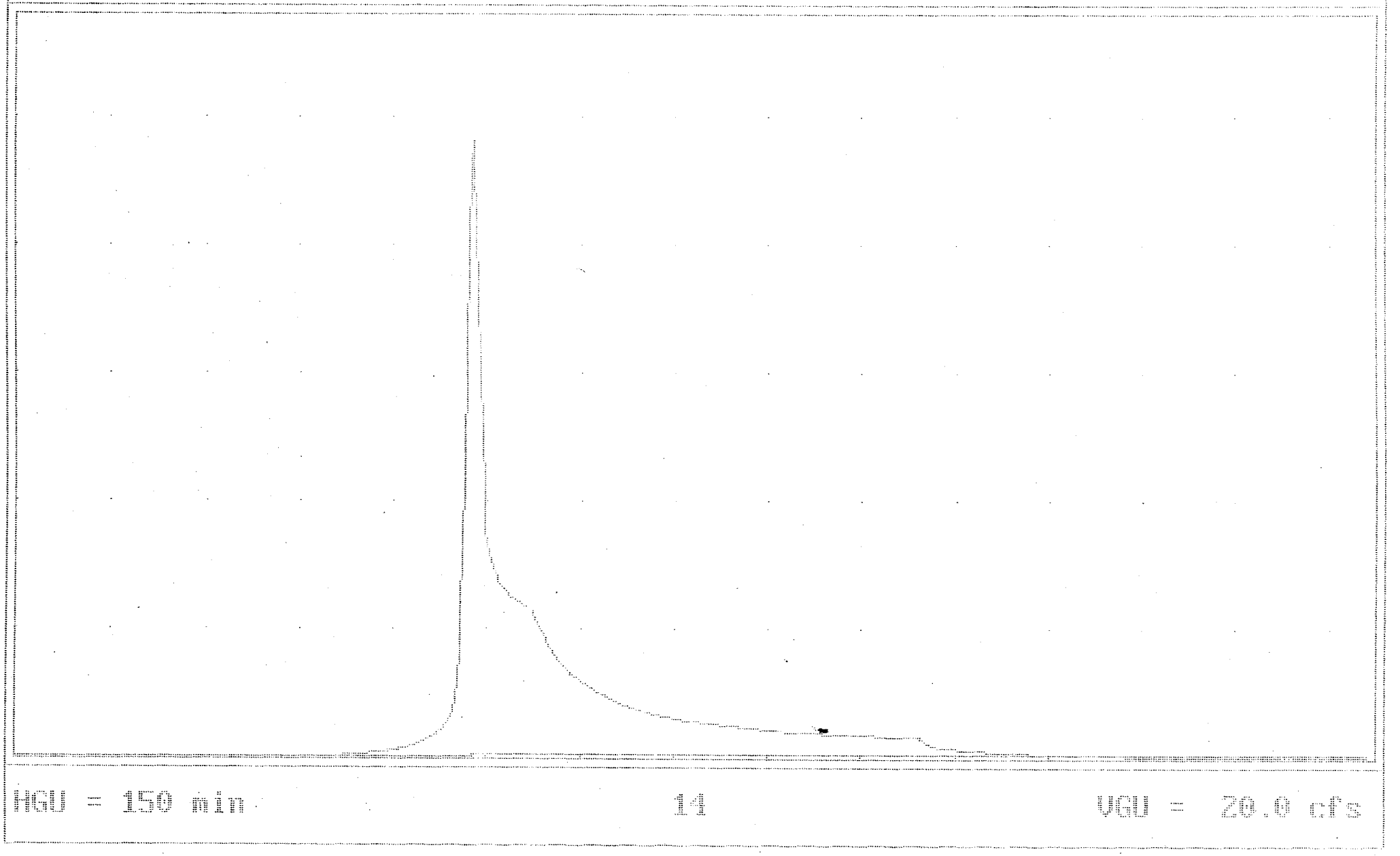
Hydrograph type = COMBINED
Storm frequency = 2 yr
Inflow hyd no's = 3 & 13

Peak discharge = 96.41 cfs
Time interval = 3 min

HYDROGRAPH DISCHARGE TABLE

TIME hrs	INFLOW cfs	HYDROGRAPHS cfs	OUTFLOW HYDROGRAPH cfs
10.05	0.90	0.13	1.03
10.10	0.95	0.14	1.09
10.15	1.00	0.15	1.15
10.20	1.05	0.17	1.22
10.25	1.11	0.18	1.29
10.30	1.17	0.19	1.36
10.35	1.23	0.21	1.44
10.40	1.30	0.23	1.53
10.45	1.37	0.24	1.61
10.50	1.44	0.26	1.70
10.55	1.52	0.28	1.80
10.60	1.60	0.30	1.90
10.65	1.68	0.32	2.01
10.70	1.78	0.35	2.12
10.75	1.88	0.37	2.25
10.80	1.99	0.40	2.38
10.85	2.10	0.43	2.53
10.90	2.23	0.46	2.68
10.95	2.36	0.49	2.84
11.00	2.49	0.52	3.01
11.05	2.59	0.56	3.15
11.10	2.71	0.59	3.30
11.15	2.84	0.63	3.48
11.20	3.00	0.67	3.68
11.25	3.26	0.72	3.98
11.30	3.54	0.77	4.30
11.35	3.85	0.82	4.67
11.40	4.18	0.88	5.06

Qp = 0.1 RESERVOIR ROUTE 2 Yr



MAX STORAGE = 537409

MAX ELEVATION = 44.48

HYDROLOGIC REPORT

25YR POST DEVELOPMENT.
AND OUTFLOW FROM DAM 2
.....

Hyd. No. 8

Hydrograph type = COMBINED
Storm frequency = 25 yr
Inflow hyd no's = 7 & 17

Peak discharge = 196.48 cfs
Time interval = 3 min

HYDROGRAPH DISCHARGE TABLE

TIME hrs	INFLOW cfs	HYDROGRAPHS cfs	OUTFLOW HYDROGRAPH cfs
7.10	0.88	0.16	1.04
7.15	0.90	0.17	1.08
7.20	0.93	0.19	1.12
7.25	0.96	0.20	1.16
7.30	0.99	0.21	1.20
7.35	1.01	0.23	1.24
7.40	1.04	0.24	1.28
7.45	1.07	0.25	1.33
7.50	1.10	0.27	1.37
7.55	1.13	0.28	1.41
7.60	1.16	0.30	1.46
7.65	1.18	0.32	1.50
7.70	1.21	0.33	1.55
7.75	1.24	0.35	1.59
7.80	1.27	0.37	1.64
7.85	1.30	0.38	1.69
7.90	1.33	0.40	1.73
7.95	1.36	0.42	1.78
8.00	1.39	0.44	1.83
8.05	1.42	0.46	1.88
8.10	1.45	0.48	1.93
8.15	1.49	0.50	1.98
8.20	1.52	0.52	2.04
8.25	1.57	0.54	2.10
8.30	1.61	0.56	2.17
8.35	1.66	0.58	2.24
8.40	1.72	0.60	2.32
8.45	1.78	0.63	2.40

HYDROLOGIC REPORT

25 YR POST DEVELOPMENT
AND OUTFLOW FROM DAM 2
ROUTED THROUGH POND...

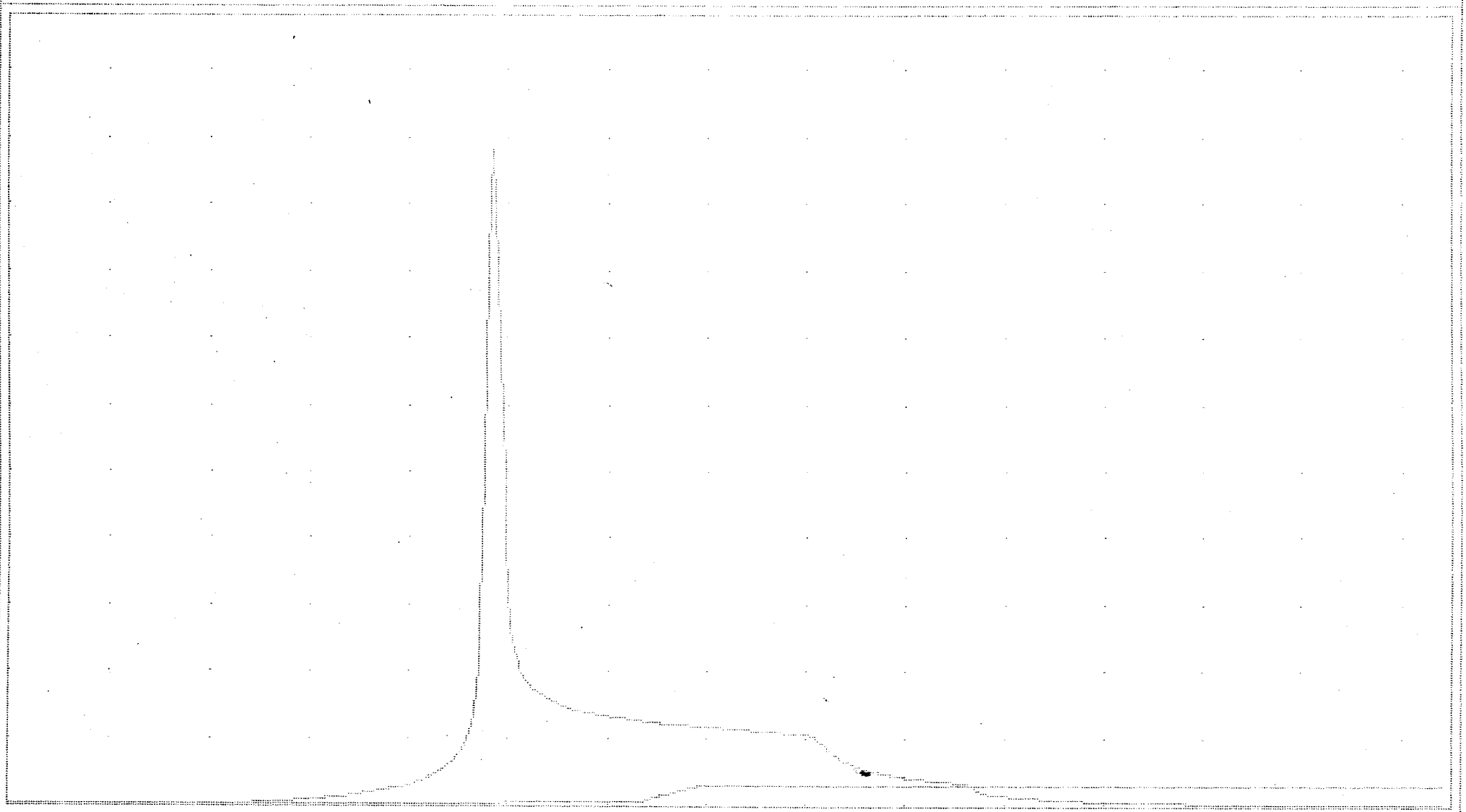
Hyd. No. 18

Hydrograph type = RESERVOIR ROUTE Peak discharge = 5.67 cfs
Storm frequency = 25 yr Time interval = 3 min
Inflow hyd. no. = 8 Reservoir no. = 1

HYDROGRAPH DISCHARGE TABLE

TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
7.10	1.04	1.08	33.41	33.41	0.00
7.15	1.08	1.12	35.52	35.52	0.00
7.20	1.12	1.16	37.71	37.71	0.00
7.25	1.16	1.20	39.97	39.98	0.00
7.30	1.20	1.24	42.33	42.33	0.00
7.35	1.24	1.28	44.76	44.76	0.00
7.40	1.28	1.33	47.28	47.28	0.00
7.45	1.33	1.37	49.88	49.88	0.00
7.50	1.37	1.41	52.56	52.57	0.00
7.55	1.41	1.46	55.34	55.34	0.00
7.60	1.46	1.50	58.20	58.21	0.00
7.65	1.50	1.55	61.15	61.16	0.00
7.70	1.55	1.59	64.19	64.20	0.00
7.75	1.59	1.64	67.32	67.33	0.00
7.80	1.64	1.69	70.54	70.55	0.00
7.85	1.69	1.73	73.86	73.87	0.00
7.90	1.73	1.78	77.27	77.28	0.00
7.95	1.78	1.83	80.77	80.78	0.01
8.00	1.83	1.88	84.37	84.38	0.01
8.05	1.88	1.93	88.06	88.07	0.01
8.10	1.93	1.98	91.85	91.87	0.01
8.15	1.98	2.04	95.75	95.76	0.01
8.20	2.04	2.10	99.76	99.77	0.01
8.25	2.10	2.17	103.88	103.90	0.01
8.30	2.17	2.24	108.13	108.15	0.01

Qp = 5.7 RESERVOIR ROUTE 25 Yr

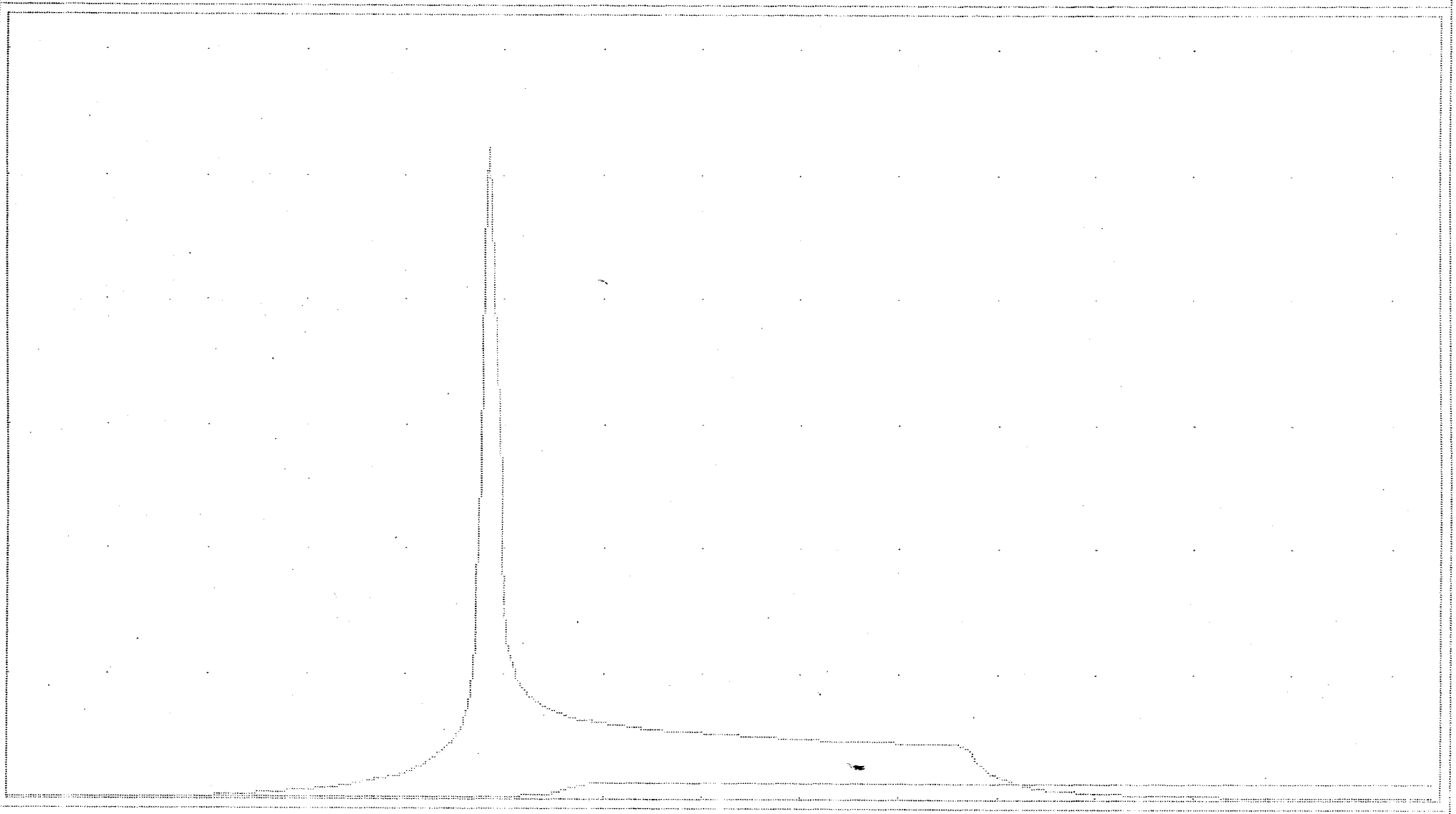


HGU = 150 min 18 VGU = 20.0 cfs

MAX STORAGE = 1171394

MAX ELEVATION = 47.20

Qp = 6.1 RESERVOIR ROUTE 100 Yr



HGU = 150 min 20 VGU = 50.0 cfs

MAX STORAGE = 1609910

MAX ELEVATION = 48.68

new

HYDROLOGIC REPORT FOR

FORD'S COLONY

AT WILLIAMSBURG

WILLIAMSBURG WEST 9 HOLES

DAM III

5-15-97
FORDS COLONY
SEC 13-B
PC 112

AES CONSULTING ENGINEERS

5248 OLDE TOWNE ROAD

WILLIAMSBURG, VA. 23188

7/25/97

AES JOB #5652-63

Refer to PC 111 for DAM II comps.

Option 1 STAGE / STORAGE TABLE R to reset

1. RESERVOIR No = 1. 2. RESERVOIR NAME = DAM 3.....
3. S = Ks * Z^b
Ks = 0..... b = 0.....
START ELEV = 0..... INCREMENT = 0...

	STAGE ft	ELEVATION ft	CO AREA sq ft	INC STORAGE cu ft	TOT STORAGE cu ft
4	0.00	46.00.	223694..	0	0
5	2.00	48.00.	291107..	514801	514801
6	4.00	50.00.	358520..	649627	1164428
7	0.00	0.00.	0.....	0	0
8	0.00	0.00.	0.....	0	0
9	0.00	0.00.	0.....	0	0
10	0.00	0.00.	0.....	0	0
11	0.00	0.00.	0.....	0	0
12	0.00	0.00.	0.....	0	0
13	0.00	0.00.	0.....	0	0
14	0.00	0.00.	0.....	0	0

Change item number: 0 ↵ to cont

Reservoir No. 1 OUTLET STRUCTURES

CULVERT STRUC A. Q=CoA[2gh/k]^.5

1. WIDTH (in) = 12.
2. HEIGHT (in) = 12.
3. No. BARRELS = 1..
4. INVERT ELEV. = 36.53....
5. Co = 0.60
6. CULVERT LENGTH (ft) = 130.
7. CULVERT SLOPE (%) = 1.04
8. MANNING'S N-VALUE = .013

CULVERT STRUC B. Q=CoA[2gh/k]^.5

9. WIDTH (in) = 0..
10. HEIGHT (in) = 0..
11. No. BARRELS = 0..
12. INVERT ELEV. = 0.....
13. Co = 0.60
14. CULVERT LENGTH (ft) = 0...
15. CULVERT SLOPE (%) = 0...
16. MANNING'S N-VALUE = .013
17. MULTI-STAGE OPTION ? (Y/N) N

WEIR STRUCTURE A. Q=CwLH^EXP

18. CREST LENGTH (ft) = 12.56..
19. CREST ELEVATION = 46.....
20. Cw = 3.00
21. EXP = 1.50
22. MULTI-STAGE OPTION ? (Y/N) Y

WEIR STRUCTURE B. Q=CwLH^EXP

23. CREST LENGTH (ft) = 0.....
24. CREST ELEVATION = 0.....
25. Cw = 3.00
26. EXP = 1.50
27. MULTI-STAGE OPTION ? (Y/N) N

Change item number: 0 ↵ to cont

Option 1 STAGE / STORAGE TABLE R to rese

1. RESERVOIR No = 2. 2. RESERVOIR NAME = EXCAV DAM 3.
3. S = Ks * Z^b
Ks = 0..... b = 0.....
START ELEV = 0..... INCREMENT = 0...

	STAGE ft	ELEVATION ft	CO AREA sq ft	INC STORAGE cu ft	TOT STORAGE cu ft
4	0.00	37.00.	0.....	0	0
5	1.00	38.00.	1267....	633	633
6	3.00	40.00.	61868...	63135	63768
7	5.00	42.00.	152348..	214216	277984
8	7.00	44.00.	179401..	331749	609733
9	9.00	46.00.	223694..	403095	1012828
10	11.00	48.00.	291107..	514801	1527629
11	0.00	0.00.	0.....	0	0
12	0.00	0.00.	0.....	0	0
13	0.00	0.00.	0.....	0	0
14	0.00	0.00.	0.....	0	0

Change item number: 0 ↵ to cont

HYDROLOGIC REPORT

2 YR PRE-DEVELOPMENT..
.....
.....

Hyd. No. 1

Hydrograph type	= S.C.S. RUNOFF	Peak discharge	= 31.56 cfs
Storm frequency	= 2 yr	Time interval	= 5 min
Basin area	= 86.9 ac	Basin curve No.	= 70
Ave basin slope	= 2.3 %	Hydraulic len	= 4080 ft
Basin lag	= 51.7 min	Time of concen	= 86.29 min
Total precip.	= 3.50 in	Distribution	= S.C.S. II

HYDROGRAPH DISCHARGE TABLE

TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfS)	
11.75	0.58	11.83	1.38	11.92	3.14	12.00	5.57
12.08	8.16	12.17	10.90	12.25	13.77	12.33	16.75
12.42	19.81	12.50	22.92	12.58	25.96	12.67	28.77
12.75	30.92	12.83	31.56	12.92	31.21	13.00	30.65
13.08	29.91	13.17	29.01	13.25	27.96	13.33	26.79
13.42	25.54	13.50	24.20	13.58	22.78	13.67	21.30
13.75	19.75	13.83	18.14	13.92	16.48	14.00	14.78
14.08	13.08	14.17	11.46	14.25	10.06	14.33	9.21
14.42	8.72	14.50	8.30	14.58	7.93	14.67	7.61
14.75	7.32	14.83	7.07	14.92	6.85	15.00	6.65
15.08	6.46	15.17	6.29	15.25	6.13	15.33	5.99
15.42	5.86	15.50	5.73	15.58	5.61	15.67	5.50
15.75	5.40	15.83	5.30	15.92	5.20	16.00	5.11
16.08	5.02	16.17	4.93	16.25	4.84	16.33	4.75
16.42	4.67	16.50	4.59	16.58	4.51	16.67	4.43
16.75	4.35	16.83	4.28	16.92	4.22	17.00	4.15
17.08	4.09	17.17	4.03	17.25	3.98	17.33	3.93
17.42	3.88	17.50	3.84	17.58	3.80	17.67	3.76
17.75	3.72	17.83	3.68	17.92	3.64	18.00	3.61
18.08	3.58	18.17	3.54	18.25	3.51	18.33	3.48
18.42	3.45	18.50	3.41	18.58	3.38	18.67	3.35
18.75	3.32	18.83	3.28	18.92	3.25	19.00	3.22
19.08	3.18	19.17	3.15	19.25	3.12	19.33	3.08
19.42	3.05	19.50	3.02	19.58	2.98	19.67	2.95
19.75	2.91	19.83	2.88	19.92	2.84	20.00	2.81
20.08	2.78	20.17	2.74	20.25	2.71	20.33	2.67
20.42	2.64	20.50	2.61	20.58	2.58	20.67	2.55
20.75	2.52	20.83	2.49	20.92	2.47	21.00	2.45
21.08	2.43	21.17	2.41	21.25	2.39	21.33	2.38

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfS)	
21.42	2.36	21.50	2.35	21.58	2.34	21.67	2.33
21.75	2.32	21.83	2.31	21.92	2.30	22.00	2.29
22.08	2.29	22.17	2.28	22.25	2.27	22.33	2.27
22.42	2.26	22.50	2.26	22.58	2.25	22.67	2.24
22.75	2.24	22.83	2.23	22.92	2.22	23.00	2.22
23.08	2.21	23.17	2.21	23.25	2.20	23.33	2.19
23.42	2.19	23.50	2.18	23.58	2.17	23.67	2.17
23.75	2.16	23.83	2.16	23.92	2.15	24.00	2.14
24.08	2.12	24.17	2.09	24.25	2.05	24.33	1.99
24.42	1.92	24.50	1.83	24.58	1.74	24.67	1.63
24.75	1.51	24.83	1.38	24.92	1.23	25.00	1.09

HYDROLOGIC REPORT

2YR POST DEVELOPMENT..
AND OUTFLOW FROM DAM 2
.....

Hyd. No. 4

Hydrograph type = COMBINED
Storm frequency = 2 yr
Inflow hyd no's = 3 & 13

Peak discharge = 96.41 cfs
Time interval = 3 min

HYDROGRAPH DISCHARGE TABLE

TIME hrs	INFLOW cfs	HYDROGRAPHS cfs	OUTFLOW HYDROGRAPH cfs
10.05	0.90	0.13	1.03
10.10	0.95	0.14	1.09
10.15	1.00	0.15	1.15
10.20	1.05	0.17	1.22
10.25	1.11	0.18	1.29
10.30	1.17	0.19	1.36
10.35	1.23	0.21	1.44
10.40	1.30	0.23	1.53
10.45	1.37	0.24	1.61
10.50	1.44	0.26	1.70
10.55	1.52	0.28	1.80
10.60	1.60	0.30	1.90
10.65	1.68	0.32	2.01
10.70	1.78	0.35	2.12
10.75	1.88	0.37	2.25
10.80	1.99	0.40	2.38
10.85	2.10	0.43	2.53
10.90	2.23	0.46	2.68
10.95	2.36	0.49	2.84
11.00	2.49	0.52	3.01
11.05	2.59	0.56	3.15
11.10	2.71	0.59	3.30
11.15	2.84	0.63	3.48
11.20	3.00	0.67	3.68
11.25	3.26	0.72	3.98
11.30	3.54	0.77	4.30
11.35	3.85	0.82	4.67
11.40	4.18	0.88	5.06

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW cfs	HYDROGRAPHS cfs	OUTFLOW HYDROGRAPH cfs
11.45	4.54	0.94	5.48
11.50	4.91	1.01	5.92
11.55	5:51	1.09	6.59
11.60	6.56	1.18	7.74
11.65	8.48	1.29	9.77
11.70	11.68	1.44	13.12
11.75	16.35	1.65	18.00
11.80	23.01	1.95	24.96
11.85	32.62	2.39	35.01
11.90	46.28	3.02	49.30
11.95	62.69	4.36	67.05
12.00	77.03	6.47	83.49
12.05	85.08	8.97	94.05
12.10	84.08	12.33	96.41
12.15	74.93	15.81	90.75
12.20	63.01	17.58	80.58
12.25	51.27	17.69	68.96
12.30	40.07	17.79	57.86
12.35	29.97	17.87	47.84
12.40	21.91	17.89	39.80
12.45	16.93	17.91	34.85
12.50	14.79	17.92	32.71
12.55	13.64	17.92	31.56
12.60	12.54	17.92	30.46
12.65	11.55	17.92	29.46
12.70	10.69	17.91	28.60
12.75	9.99	17.90	27.89
12.80	9.42	17.89	27.32
12.85	8.96	17.89	26.85
12.90	8.58	17.88	26.46
12.95	8.26	17.86	26.13
13.00	7.98	17.84	25.83
13.05	7.71	17.82	25.54
13.10	7.45	17.80	25.25
13.15	7.20	17.78	24.98
13.20	6.97	17.76	24.73
13.25	6.77	17.74	24.50
13.30	6.58	17.71	24.29
13.35	6.40	17.69	24.09
13.40	6.24	17.66	23.91
13.45	6.09	17.64	23.73
13.50	5.94	17.61	23.55
13.55	5.79	17.59	23.38
13.60	5.64	17.56	23.21
13.65	5.50	17.54	23.04
13.70	5.37	17.49	22.86

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW cfs	HYDROGRAPHS cfs	OUTFLOW HYDROGRAPH cfs
13.75	5.24	16.91	22.15
13.80	5.12	16.35	21.47
13.85	5:00	15.81	20.82
13.90	4.89	15.30	20.18
13.95	4.78	14.80	19.58
14.00	4.67	14.32	18.99
14.05	4.56	13.86	18.42
14.10	4.46	13.41	17.87
14.15	4.37	12.99	17.35
14.20	4.28	12.58	16.86
14.25	4.21	12.18	16.40
14.30	4.15	11.80	15.96
14.35	4.10	11.44	15.54
14.40	4.06	11.09	15.15
14.45	4.01	10.76	14.77
14.50	3.98	10.44	14.42
14.55	3.94	10.14	14.07
14.60	3.90	9.84	13.75
14.65	3.87	9.56	13.43
14.70	3.83	9.35	13.18
14.75	3.79	9.15	12.94
14.80	3.75	8.95	12.71
14.85	3.72	8.77	12.48
14.90	3.68	8.58	12.26
14.95	3.64	8.41	12.05
15.00	3.60	8.24	11.84
15.05	3.56	8.07	11.63
15.10	3.53	7.91	11.43
15.15	3.49	7.75	11.24
15.20	3.45	7.60	11.05
15.25	3.41	7.45	10.86
15.30	3.37	7.31	10.68
15.35	3.34	7.17	10.50
15.40	3.30	7.03	10.33
15.45	3.26	6.90	10.16
15.50	3.22	6.77	9.99
15.55	3.18	6.64	9.83
15.60	3.14	6.52	9.67
15.65	3.11	6.40	9.51
15.70	3.07	6.29	9.35
15.75	3.03	6.17	9.20
15.80	2.99	6.06	9.05
15.85	2.95	5.96	8.91
15.90	2.91	5.85	8.76
15.95	2.87	5.75	8.62
16.00	2.83	5.65	8.48

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW cfs	HYDROGRAPHS cfs	OUTFLOW HYDROGRAPH cfs
16.05	2.79	5.55	8.34
16.10	2.76	5.45	8.21
16.15	2:72	5.36	8.08
16.20	2.69	5.27	7.96
16.25	2.67	5.18	7.85
16.30	2.65	5.09	7.74
16.35	2.63	5.01	7.64
16.40	2.61	4.93	7.54
16.45	2.60	4.85	7.44
16.50	2.58	4.77	7.35
16.55	2.57	4.70	7.26
16.60	2.56	4.62	7.18
16.65	2.54	4.55	7.09
16.70	2.53	4.48	7.01
16.75	2.51	4.42	6.93
16.80	2.50	4.35	6.86
16.85	2.49	4.29	6.78
16.90	2.47	4.23	6.71
16.95	2.46	4.17	6.63
17.00	2.45	4.12	6.56
17.05	2.43	4.06	6.49
17.10	2.42	4.01	6.43
17.15	2.41	3.96	6.36
17.20	2.39	3.91	6.30
17.25	2.38	3.86	6.23
17.30	2.36	3.81	6.17
17.35	2.35	3.76	6.11
17.40	2.34	3.72	6.05
17.45	2.32	3.67	6.00
17.50	2.31	3.63	5.94
17.55	2.30	3.59	5.88
17.60	2.28	3.55	5.83
17.65	2.27	3.51	5.78
17.70	2.25	3.47	5.72
17.75	2.24	3.43	5.67
17.80	2.23	3.39	5.62
17.85	2.21	3.36	5.58
17.90	2.20	3.34	5.54
17.95	2.18	3.32	5.51
18.00	2.17	3.30	5.47
18.05	2.16	3.29	5.44
18.10	2.14	3.27	5.41
18.15	2.13	3.25	5.37
18.20	2.11	3.23	5.34
18.25	2.10	3.21	5.31
18.30	2.09	3.19	5.28

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW cfs	HYDROGRAPHS cfs	OUTFLOW HYDROGRAPH cfs
18.35	2.07	3.17	5.24
18.40	2.06	3.15	5.21
18.45	2.04	3.13	5.18
18.50	2.03	3.11	5.14
18.55	2.02	3.10	5.11
18.60	2.00	3.08	5.08
18.65	1.99	3.06	5.05
18.70	1.97	3.04	5.01
18.75	1.96	3.02	4.98
18.80	1.94	3.00	4.95
18.85	1.93	2.99	4.92
18.90	1.92	2.97	4.88
18.95	1.90	2.95	4.85
19.00	1.89	2.93	4.82
19.05	1.87	2.91	4.79
19.10	1.86	2.90	4.76
19.15	1.84	2.88	4.72
19.20	1.83	2.86	4.69
19.25	1.82	2.84	4.66
19.30	1.80	2.82	4.63
19.35	1.79	2.81	4.59
19.40	1.77	2.79	4.56
19.45	1.76	2.77	4.53
19.50	1.74	2.75	4.50
19.55	1.73	2.74	4.47
19.60	1.72	2.72	4.43
19.65	1.70	2.70	4.40
19.70	1.69	2.68	4.37
19.75	1.67	2.67	4.34
19.80	1.66	2.65	4.31
19.85	1.64	2.63	4.28
19.90	1.63	2.61	4.24
19.95	1.62	2.60	4.21
20.00	1.60	2.58	4.18
20.05	1.59	2.56	4.15
20.10	1.57	2.55	4.12
20.15	1.56	2.53	4.09
20.20	1.55	2.51	4.06
20.25	1.54	2.49	4.04
20.30	1.54	2.48	4.01
20.35	1.53	2.46	3.99
20.40	1.53	2.44	3.97
20.45	1.52	2.43	3.95
20.50	1.52	2.41	3.93
20.55	1.52	2.40	3.92
20.60	1.52	2.38	3.90

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW cfs	HYDROGRAPHS cfs	OUTFLOW HYDROGRAPH cfs
20.65	1.51	2.37	3.88
20.70	1.51	2.35	3.86
20.75	1.51	2.34	3.84
20.80	1.51	2.32	3.83
20.85	1.50	2.31	3.81
20.90	1.50	2.29	3.79
20.95	1.50	2.28	3.78
21.00	1.49	2.27	3.76
21.05	1.49	2.25	3.75
21.10	1.49	2.24	3.73
21.15	1.49	2.23	3.72
21.20	1.48	2.22	3.70
21.25	1.48	2.20	3.68
21.30	1.48	2.19	3.67
21.35	1.48	2.18	3.66
21.40	1.47	2.17	3.64
21.45	1.47	2.16	3.63
21.50	1.47	2.15	3.61
21.55	1.46	2.13	3.60
21.60	1.46	2.12	3.59
21.65	1.46	2.11	3.57
21.70	1.46	2.10	3.56
21.75	1.45	2.09	3.55
21.80	1.45	2.08	3.53
21.85	1.45	2.07	3.52
21.90	1.45	2.06	3.51
21.95	1.44	2.05	3.49
22.00	1.44	2.04	3.48
22.05	1.44	2.03	3.47
22.10	1.43	2.02	3.46
22.15	1.43	2.01	3.45
22.20	1.43	2.00	3.43
22.25	1.43	2.00	3.42
22.30	1.42	1.99	3.41
22.35	1.42	1.98	3.40
22.40	1.42	1.97	3.39
22.45	1.42	1.96	3.38
22.50	1.41	1.95	3.36
22.55	1.41	1.94	3.35
22.60	1.41	1.94	3.34
22.65	1.40	1.93	3.33
22.70	1.40	1.92	3.32
22.75	1.40	1.91	3.31
22.80	1.40	1.90	3.30
22.85	1.39	1.90	3.29
22.90	1.39	1.89	3.28

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW cfs	HYDROGRAPHS cfs	OUTFLOW HYDROGRAPH cfs
22.95	1.39	1.88	3.27
23.00	1.38	1.87	3.26
23.05	1.38	1.87	3.25
23.10	1.38	1.86	3.24
23.15	1.38	1.85	3.23
23.20	1.37	1.85	3.22
23.25	1.37	1.84	3.21
23.30	1.37	1.83	3.20
23.35	1.37	1.83	3.19
23.40	1.36	1.82	3.18
23.45	1.36	1.81	3.17
23.50	1.36	1.81	3.16
23.55	1.35	1.80	3.15
23.60	1.35	1.79	3.15
23.65	1.35	1.79	3.14
23.70	1.35	1.78	3.13
23.75	1.34	1.78	3.12
23.80	1.34	1.77	3.11
23.85	1.34	1.76	3.10
23.90	1.33	1.76	3.09
23.95	1.33	1.75	3.08
24.00	1.33	1.75	3.07
24.05	1.27	1.74	3.01
24.10	1.14	1.73	2.88
24.15	0.96	1.72	2.68
24.20	0.72	1.71	2.43
24.25	0.51	1.69	2.21
24.30	0.34	1.67	2.01
24.35	0.21	1.64	1.85
24.40	0.10	1.62	1.72
24.45	0.03	1.59	1.62
24.50	0.00	1.55	1.55
24.55	0.00	1.52	1.52
24.60	0.00	1.49	1.49
24.65	0.00	1.46	1.46
24.70	0.00	1.43	1.43
24.75	0.00	1.39	1.39
24.80	0.00	1.36	1.36
24.85	0.00	1.34	1.34
24.90	0.00	1.31	1.31
24.95	0.00	1.28	1.28
25.00	0.00	1.25	1.25
25.05	0.00	1.22	1.22
25.10	0.00	1.20	1.20
25.15	0.00	1.17	1.17
25.20	0.00	1.15	1.15

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW cfs	HYDROGRAPHS cfs	OUTFLOW HYDROGRAPH cfs
25.25	0.00	1.12	1.12
25.30	0.00	1.10	1.10
25.35	0.00	1.07	1.07
25.40	0.00	1.05	1.05
25.45	0.00	1.03	1.03
25.50	0.00	1.00	1.00

HYDROLOGIC REPORT

2 YR POST DEVELOPMENT.
AND OUTFLOW FROM DAM 2
ROUTED THROUGH POND...

Hyd. No. 14

Hydrograph type = RESERVOIR ROUTE Peak discharge = 12.02 cfs
Storm frequency = 2 yr Time interval = 3 min
Inflow hyd. no. = 4 Reservoir no. = 1

HYDROGRAPH DISCHARGE TABLE

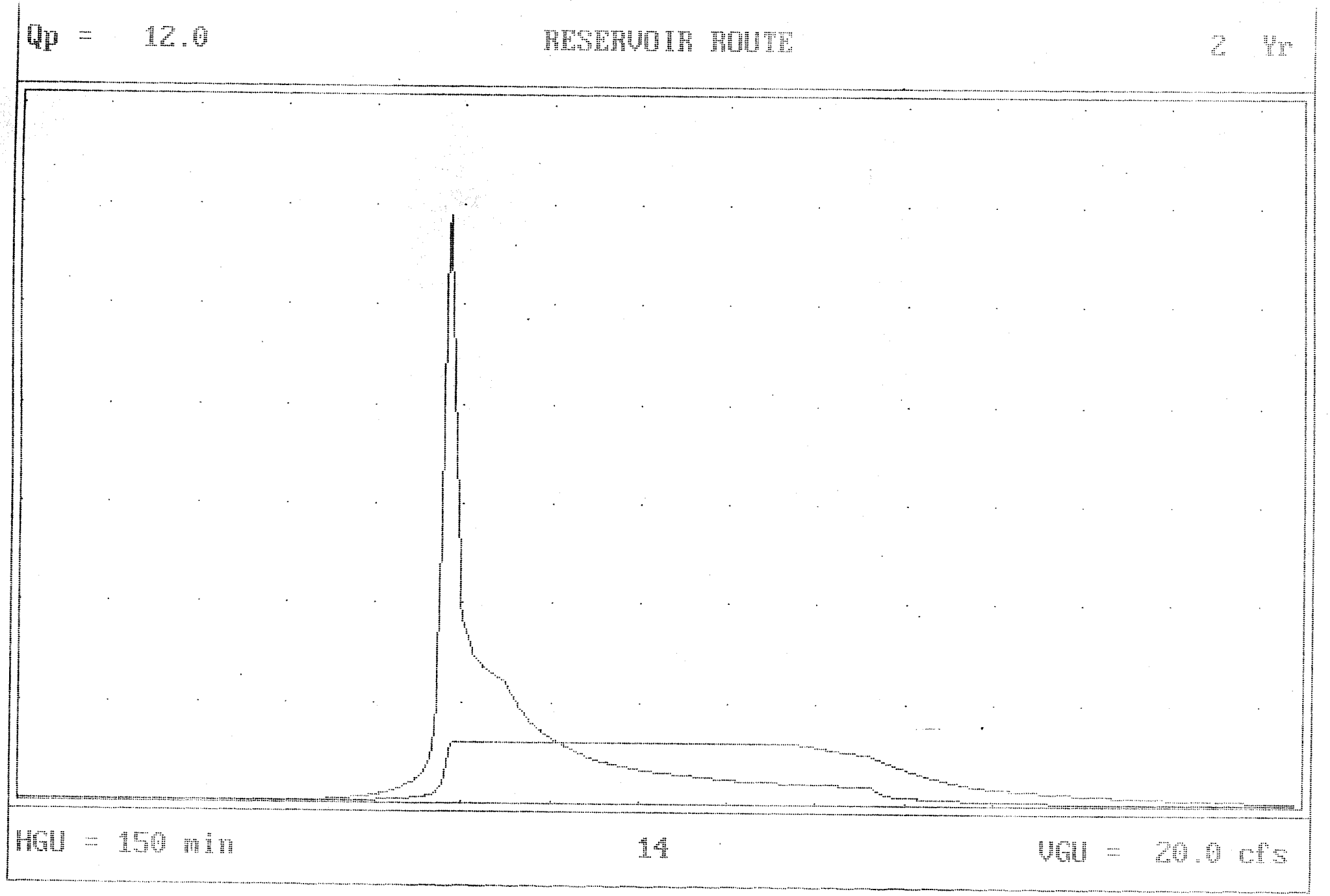
TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
9.85	1.02	1.08	26.20	26.51	0.16
9.90	1.08	1.14	27.96	28.29	0.17
9.95	1.14	1.20	29.82	30.17	0.18
10.00	1.20	1.27	31.77	32.15	0.19
10.05	1.27	1.34	33.84	34.24	0.20
10.10	1.34	1.41	36.01	36.44	0.21
10.15	1.41	1.49	38.30	38.76	0.23
10.20	1.49	1.57	40.72	41.20	0.24
10.25	1.57	1.66	43.27	43.78	0.26
10.30	1.66	1.76	45.96	46.50	0.27
10.35	1.76	1.86	48.80	49.38	0.29
10.40	1.86	1.96	51.80	52.42	0.31
10.45	1.96	2.07	54.97	55.62	0.33
10.50	2.07	2.19	58.31	59.00	0.35
10.55	2.19	2.31	61.84	62.57	0.37
10.60	2.31	2.44	65.55	66.33	0.39
10.65	2.44	2.58	69.47	70.29	0.41
10.70	2.58	2.73	73.61	74.48	0.44
10.75	2.73	2.89	77.99	78.92	0.46
10.80	2.89	3.07	82.63	83.61	0.49
10.85	3.07	3.25	87.55	88.59	0.52
10.90	3.25	3.44	92.77	93.87	0.55
10.95	3.44	3.65	98.30	99.46	0.58
11.00	3.65	3.81	104.16	105.39	0.62
11.05	3.81	4.00	110.31	111.62	0.65

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
11.10	4.00	4.20	116.73	118.12	0.69
11.15	4.20	4.45	123.47	124.93	0.73
11.20	4.45	4.81	130.57	132.12	0.77
11.25	4.81	5.21	138.19	139.83	0.82
11.30	5.21	5.65	146.47	148.21	0.87
11.35	5.65	6.13	155.49	157.33	0.92
11.40	6.13	6.63	165.30	167.26	0.98
11.45	6.63	7.18	175.98	178.06	1.04
11.50	7.18	8.00	187.57	189.79	1.11
11.55	8.00	9.42	200.37	202.74	1.19
11.60	9.42	11.94	215.23	217.78	1.28
11.65	11.94	16.11	233.82	236.59	1.39
11.70	16.11	22.18	258.80	261.87	1.53
11.75	22.18	30.85	293.61	297.09	1.74
11.80	30.85	43.35	342.59	346.65	2.03
11.85	43.35	61.14	411.90	416.78	2.44
11.90	61.14	83.08	510.34	516.39	3.02
11.95	83.08	103.19	646.13	654.56	4.21
12.00	103.19	115.81	820.19	832.41	6.11
12.05	115.81	117.91	1022.56	1039.19	8.31
12.10	117.91	109.91	1236.44	1256.28	9.92
12.15	109.91	96.70	1442.85	1464.26	10.70
12.20	96.70	82.08	1626.66	1649.46	11.40
12.25	82.08	68.10	1782.00	1805.43	11.71
12.30	68.10	55.50	1908.70	1932.18	11.74
12.35	55.50	45.40	2008.78	2032.31	11.76
12.40	45.40	39.18	2086.13	2109.69	11.78
12.45	39.18	36.49	2147.13	2170.71	11.79
12.50	36.49	35.05	2199.19	2222.80	11.80
12.55	35.05	33.67	2247.11	2270.73	11.81
12.60	33.67	32.41	2292.18	2315.82	11.82
12.65	32.41	31.33	2334.60	2358.26	11.83
12.70	31.33	30.45	2374.67	2398.35	11.84
12.75	30.45	29.73	2412.76	2436.45	11.85
12.80	29.73	29.14	2449.22	2472.93	11.86
12.85	29.14	28.65	2484.36	2508.08	11.86
12.90	28.65	28.24	2518.41	2542.15	11.87
12.95	28.24	27.87	2551.55	2575.30	11.88
13.00	27.87	27.51	2583.89	2607.65	11.88
13.05	27.51	27.16	2615.48	2639.26	11.89
13.10	27.16	26.83	2646.35	2670.15	11.90
13.15	26.83	26.52	2676.53	2700.34	11.90

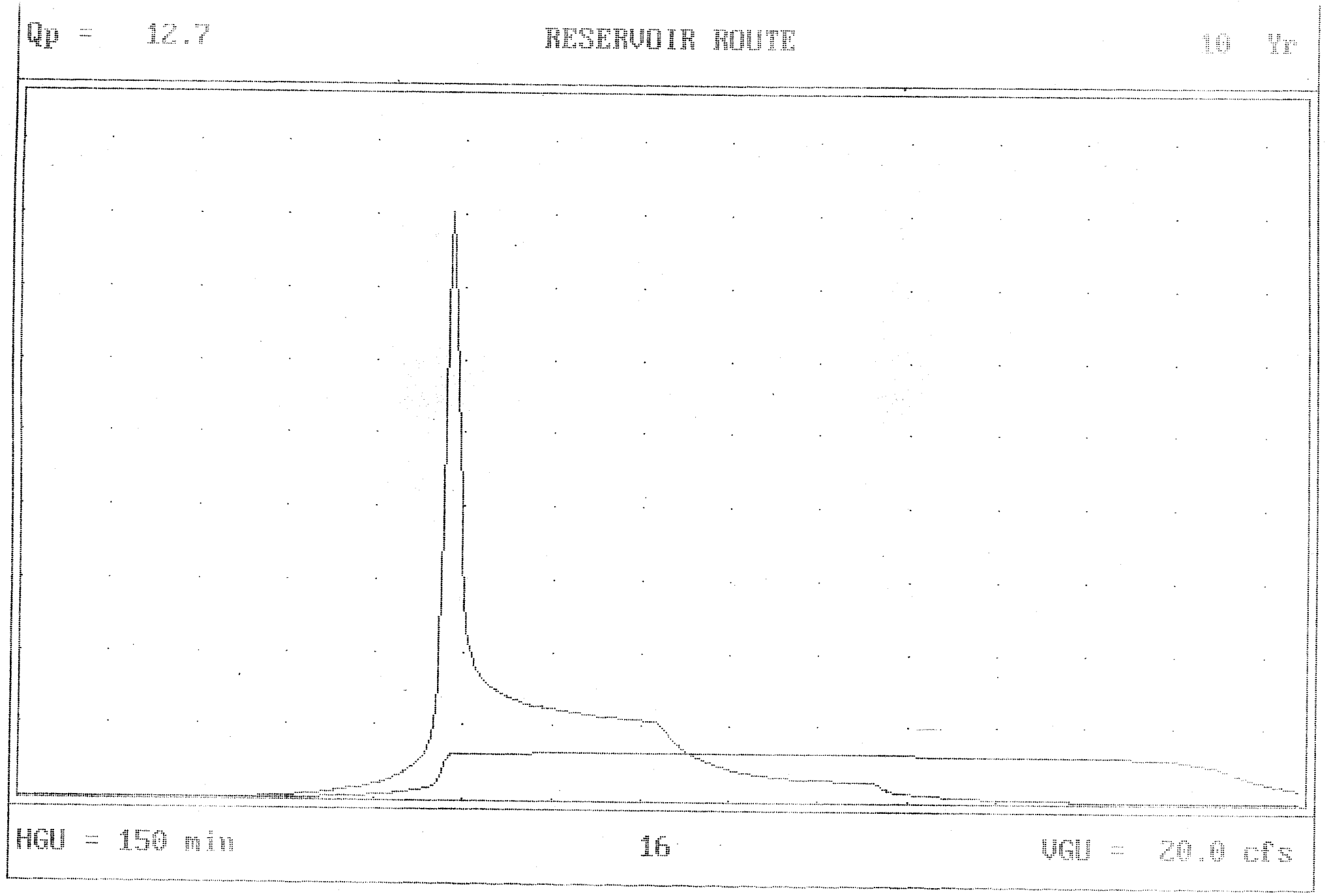
HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
13.20	26.52	26.23	2706.05	2729.87	11.91
13.25	26.23	25.97	2734.97	2758.80	11.92
13.30	25.97	25.73	2763.34	2787.18	11.92
13.35	25.73	25.50	2791.19	2815.04	11.93
13.40	25.50	25.28	2818.55	2842.42	11.93
13.45	25.28	25.07	2845.46	2869.34	11.94
13.50	25.07	24.86	2871.92	2895.81	11.94
13.55	24.86	24.65	2897.95	2921.85	11.95
13.60	24.65	24.45	2923.55	2947.46	11.95
13.65	24.45	24.23	2948.72	2972.64	11.96
13.70	24.23	23.49	2973.47	2997.40	11.97
13.75	23.49	22.78	2997.26	3021.20	11.97
13.80	22.78	22.09	3019.58	3043.53	11.97
13.85	22.09	21.43	3040.49	3064.45	11.98
13.90	21.43	20.80	3060.06	3084.02	11.98
13.95	20.80	20.18	3078.31	3102.29	11.99
14.00	20.18	19.59	3095.31	3119.29	11.99
14.05	19.59	19.01	3111.09	3135.08	11.99
14.10	19.01	18.47	3125.70	3149.70	12.00
14.15	18.47	17.96	3139.19	3163.19	12.00
14.20	17.96	17.47	3151.61	3175.61	12.00
14.25	17.47	17.02	3163.03	3187.04	12.00
14.30	17.02	16.59	3173.50	3197.52	12.01
14.35	16.59	16.18	3183.09	3207.11	12.01
14.40	16.18	15.80	3191.84	3215.87	12.01
14.45	15.80	15.43	3199.80	3223.83	12.01
14.50	15.43	15.08	3207.01	3231.04	12.01
14.55	15.08	14.74	3213.50	3237.53	12.02
14.60	14.74	14.42	3219.29	3243.32	12.02



MAX STORAGE = 293451

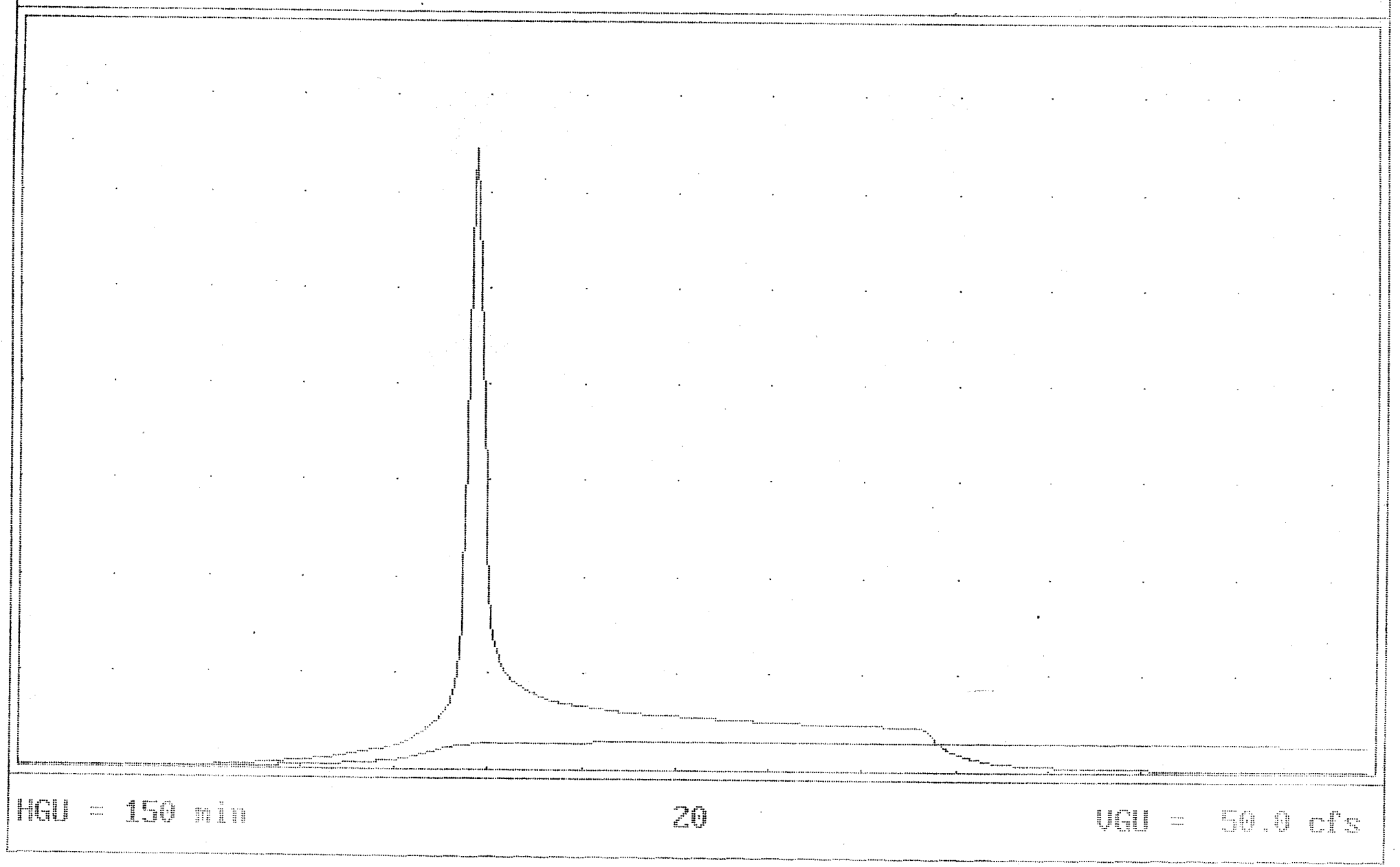
MAX ELEVATION = 47.14



MAX STORAGE = 592736

MAX ELEVATION = 48.24

Qp = 13.9 RESERVOIR ROUTE 100 Yr



MAX STORAGE = 1349960

MAX ELEVATION = [redacted] DHW

CONSULTING ENGINEERS
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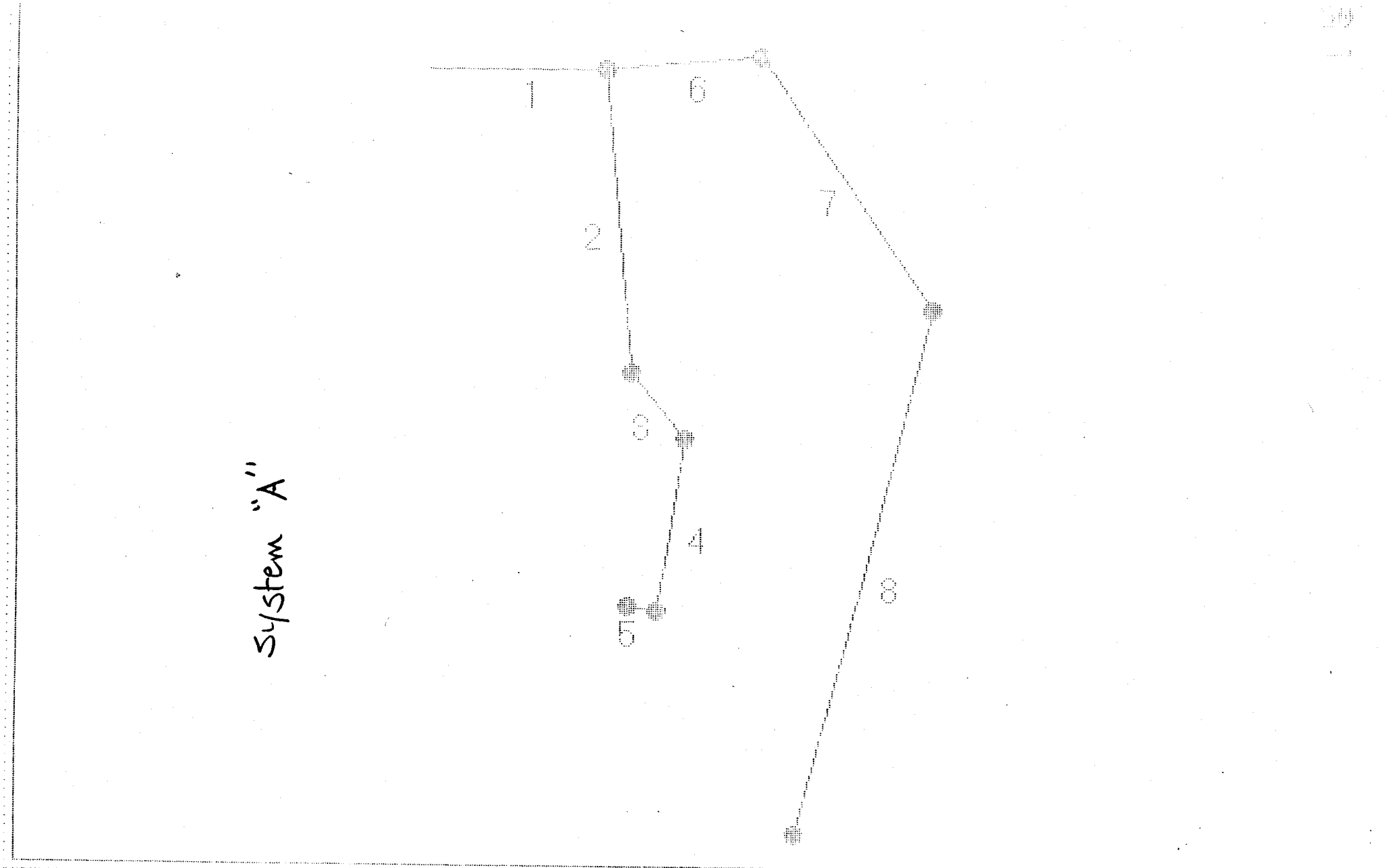
Drainage Calculations

Ford's Colony Section 13 B

FORD'S COLONY
WILLIAMSBURG



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[PgUp] Enlarge [PgDn] Reduce [Esc] Ex

STORM SEWER TABULATION

DATA FILE: a:FC13SYSA.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 02-26-1997

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, AdQ (CFS)		PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
5	0.1	0.60	0.1	0.1	5.0	7.00	0.42		3.6	12	25	1.000	0.041	0.53	78.18	76.63	5A - 6A
							0.42	0.0		12				0.53	78.17	76.38	4
4	0.6	0.35	0.2	0.3	15.0	5.00	1.44		3.4	12	145	0.910	0.523	3.58	77.89	77.38	4A - 5A
							1.44	0.0		12				1.83	77.13	76.06	3
3	0.7	0.35	0.2	0.5	15.8	4.89	2.57		3.6	12	72	1.000	0.458	3.64	76.90	76.06	3A - 4A
							2.57	0.0		12				3.27	76.57	75.34	2
2	0.3	0.75	0.2	0.7	16.2	4.84	3.56		9.3	12	250	6.836	5.514	5.28	76.14	75.34	2A - 3A
							3.56	0.0		12				4.53	62.36	58.25	1
1	0.5	0.30	0.1	3.9	27.2	3.79	14.79		15.5	18	150	2.167	1.984	8.37	61.00	58.25	1A - 2A
							14.79	0.0		18				8.37	58.02	55.00	OUTFALL

8	1.6	0.20	0.3	0.3	15.0	5.00	1.59		6.2	12	450	3.018	2.930	3.72	80.86	80.00	8A - 9A
							1.59	0.0		12				2.02	67.67	66.42	7
7	3.0	0.20	0.6	0.9	25.0	3.96	3.59		8.1	15	255	1.569	1.034	4.61	67.18	66.42	7A - 8A
							3.59	0.0		15				2.93	64.54	62.42	6
6	10.5	0.20	2.1	3.0	26.4	3.85	11.61		18.6	18	133	3.135	1.122	6.68	63.85	62.42	2A - 7A
							11.61	0.0		18				6.57	62.36	58.25	1

STORM SEWER DESIGN / ANALYSIS

Return Period = 10 Yrs
Rainfall file: JCC

Run Date: 02-26-1997
File: a:FC13SYSA.ST3

LINE 1 / Q = 14.79 / HT = 18 / WID = 18 / N = .013 / L = 150 / JLC = 1.25

1A - 2A / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	58.02	18.00	55.00	8.37	59.11	0.00	N/A	1.77
UPSTRM	61.00	18.00	58.25	8.37	62.08	0.00	1.25	1.77

Drainage area (ac) =	0.49	Slope of invert (%) =	2.1667
Runoff coefficient =	0.30	Slope energy grade line (%) =	1.9838
Time of conc (min) =	27.16	Critical depth (in) =	16.93
Inlet time (min) =	10.00	Natural ground elev. (ft) =	61.00
Intensity (in/hr) =	3.79	Upstream surcharge (ft) =	1.25
Cumulative C*A =	3.90	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	14.79	Line capacity (cfs) =	15.46
Q catchment (cfs) =	0.85	Inlet length (ft) =	0.00
Q carryover (cfs) =	15.20	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	16.06	Ponding width (ft) =	N/A

LINE 2 / Q = 3.56 / HT = 12 / WID = 12 / N = .013 / L = 250 / JLC = 1

2A - 3A / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	62.36	12.00	58.25	4.53	62.67	0.00	1.75	0.79
UPSTRM	76.14	9.60	75.34	5.28	76.57	9.60	2.25	0.67

Drainage area (ac) =	0.28	Slope of invert (%) =	6.8360
Runoff coefficient =	0.75	Slope energy grade line (%) =	5.5596
Time of conc (min) =	16.21	Critical depth (in) =	9.60
Inlet time (min) =	0.00	Natural ground elev. (ft) =	78.59
Intensity (in/hr) =	4.84	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.74	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.56	Line capacity (cfs) =	9.31
Q catchment (cfs) =	0.00	Inlet length (ft) =	0.00
Q carryover (cfs) =	2.94	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.94	Ponding width (ft) =	N/A

LINE 3 / Q = 2.57 / HT = 12 / WID = 12 / N = .013 / L = 72 / JLC = 1.1

3A - 4A / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	76.57	12.00	75.34	3.27	76.74	0.00	2.25	0.79
UPSTRM	76.90	10.12	76.06	3.64	77.11	8.72	2.24	0.71

Drainage area (ac) =	0.68	Slope of invert (%) =	1.0001
Runoff coefficient =	0.35	Slope energy grade line (%) =	0.5125
Time of conc (min) =	15.81	Critical depth (in) =	8.16
Inlet time (min) =	10.00	Natural ground elev. (ft) =	79.31
Intensity (in/hr) =	4.89	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.53	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.57	Line capacity (cfs) =	3.56
Q catchment (cfs) =	1.38	Inlet length (ft) =	0.00
Q carryover (cfs) =	1.56	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.94	Ponding width (ft) =	N/A

LINE 4 / Q = 1.44 / HT = 12 / WID = 12 / N = .013 / L = 145 / JLC = 1.4

4A - 5A / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	77.13	12.00	76.06	1.83	77.18	0.00	2.25	0.79
UPSTRM	77.89	6.10	77.38	3.58	78.09	12.00	2.5	0.40

Drainage area (ac) =	0.65	Slope of invert (%) =	0.9103
Runoff coefficient =	0.35	Slope energy grade line (%) =	0.6250
Time of conc (min) =	15.00	Critical depth (in) =	6.10
Inlet time (min) =	15.00	Natural ground elev. (ft) =	80.88
Intensity (in/hr) =	5.00	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.29	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.44	Line capacity (cfs) =	3.40
Q catchment (cfs) =	1.14	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.42	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	1.56	Ponding width (ft) =	N/A

LINE 5 / Q = 0.42 / HT = 12 / WID = 12 / N = .013 / L = 25 / JLC = 1.5

5A - 6A / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	78.17	12.00	76.38	0.53	78.17	0.00	3.5	0.79
UPSTRM	78.18	12.00	76.63	0.53	78.18	0.00	3.25	0.79

Drainage area (ac) =	0.10	Slope of invert (%) =	1.0000
Runoff coefficient =	0.60	Slope energy grade line (%) =	0.0405
Time of conc (min) =	5.00	Critical depth (in) =	3.30
Inlet time (min) =	5.00	Natural ground elev. (ft) =	80.88
Intensity (in/hr) =	7.00	Upstream surcharge (ft) =	0.55
Cumulative C*A =	0.06	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	0.42	Line capacity (cfs) =	3.56
Q catchment (cfs) =	0.42	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	0.42	Ponding width (ft) =	N/A

LINE 6 / Q = 11.61 / HT = 18 / WID = 18 / N = .013 / L = 133 / JLC = 1

2A - 7A / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	62.36	18.00	58.25	6.57	63.03	0.00	1.25	1.77
UPSTRM	63.85	17.14	62.42	6.68	64.54	7.69	1.08	1.74

Drainage area (ac) =	10.54	Slope of invert (%) =	3.1353
Runoff coefficient =	0.20	Slope energy grade line (%) =	1.1402
Time of conc (min) =	26.42	Critical depth (in) =	15.93
Inlet time (min) =	25.00	Natural ground elev. (ft) =	65.00
Intensity (in/hr) =	3.85	Upstream surcharge (ft) =	0.00
Cumulative C*A =	3.02	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	11.61	Line capacity (cfs) =	18.59
Q catchment (cfs) =	8.34	Inlet length (ft) =	0.00
Q carryover (cfs) =	3.92	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	12.27	Ponding width (ft) =	N/A

What about
7A-8A 2.95 AC
8A-9A 1.59 AC

LINE 7 / Q = 3.59 / HT = 15 / WID = 15 / N = .013 / L = 255 / JLC = 1.5

7A - 8A / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	64.54	15.00	62.42	2.93	64.68	0.00	1.33	1.23
UPSTRM	67.18	9.10	66.42	4.61	67.51	14.65	1.33	0.78

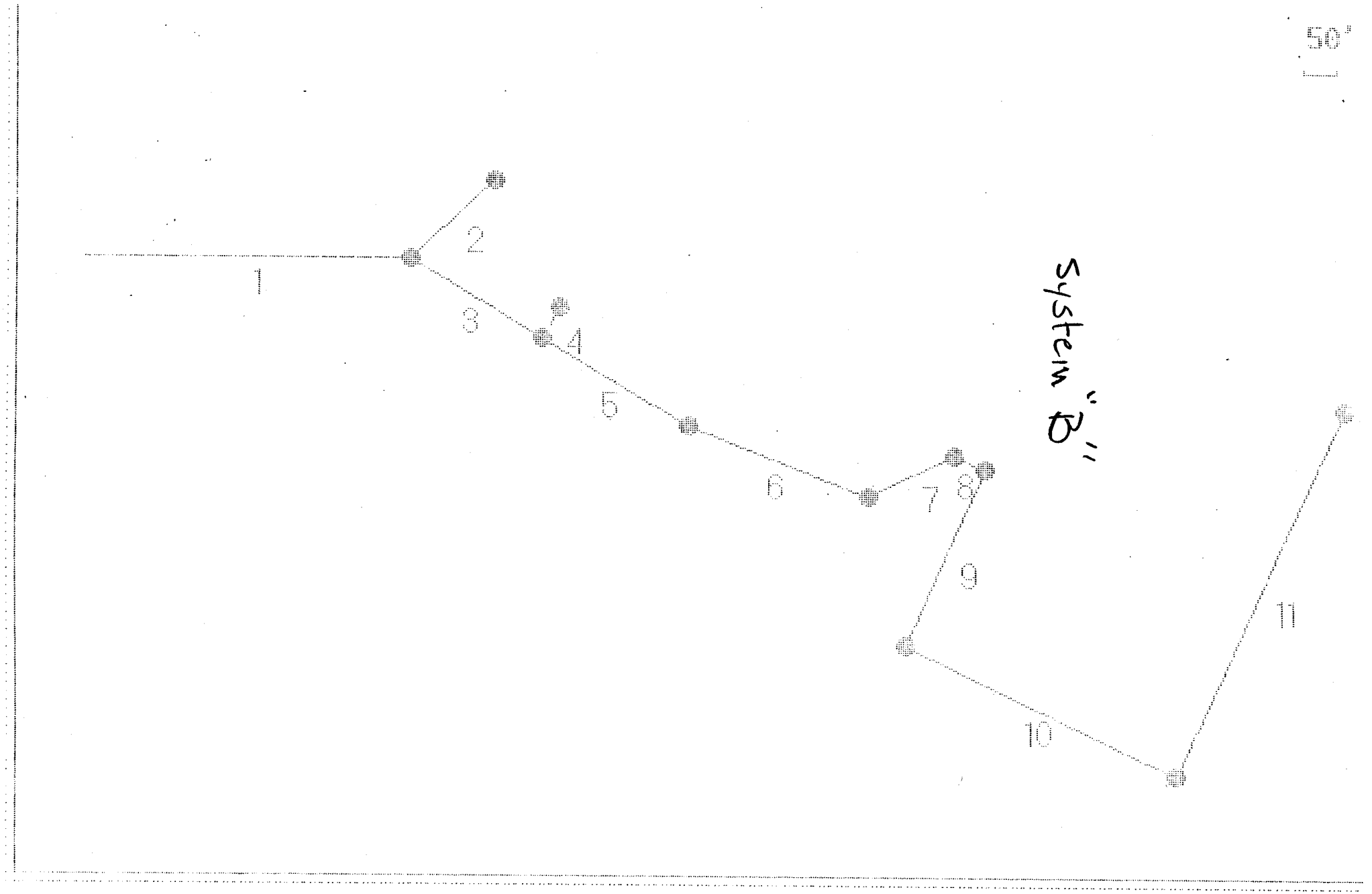
Drainage area (ac) =	2.95	Slope of invert (%) =	1.5686
Runoff coefficient =	0.20	Slope energy grade line (%) =	1.1112
Time of conc (min) =	25.00	Critical depth (in) =	9.10
Inlet time (min) =	25.00	Natural ground elev. (ft) =	69.00
Intensity (in/hr) =	3.96	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.91	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.59	Line capacity (cfs) =	8.09
Q catchment (cfs) =	2.33	Inlet length (ft) =	0.00
Q carryover (cfs) =	1.59	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	3.92	Ponding width (ft) =	N/A

LINE 8 / Q = 1.59 / HT = 12 / WID = 12 / N = .013 / L = 450 / JLC = 1.5

8A - 9A / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	67.67	12.00	66.42	2.02	67.74	0.00	1.58	0.79
UPSTRM	80.86	6.41	80.00	3.72	81.07	11.97	1	0.43

Drainage area (ac) =	1.59	Slope of invert (%) =	3.0178
Runoff coefficient =	0.20	Slope energy grade line (%) =	2.8915
Time of conc (min) =	15.00	Critical depth (in) =	6.41
Inlet time (min) =	15.00	Natural ground elev. (ft) =	82.00
Intensity (in/hr) =	5.00	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.32	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.59	Line capacity (cfs) =	6.19
Q catchment (cfs) =	1.59	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	1.59	Ponding width (ft) =	N/A



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STORM SEWER TABULATION

DATA FILE: a:FC13SYSB.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 02-26-1997

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, AdQ (CFS)		PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
2	1.8	0.30	0.6	0.6	15.0	5.00	2.76		9.0	12	84	6.429	5.344	4.67	68.63	67.50	2B - 3B
							2.76	0.0		12				3.51	64.14	62.10	1
1	0.2	0.50	0.1	2.8	36.2	3.25	8.92		12.4	15	240	3.687	2.190	7.45	63.28	62.10	1B - 2B
							8.92	0.0		15				7.27	58.02	53.25	OUTFALL

4	0.2	0.60	0.1	0.1	5.0	7.00	0.71		3.6	12	25	1.000	0.117	0.91	71.35	70.31	4B - 5B
							0.71	0.0		12				0.91	71.82	70.36	3
3	0.2	0.35	0.1	2.1	35.6	3.28	6.81		17.2	15	112	7.107	6.220	6.22	71.10	70.06	2B - 4B
							6.81	0.0		15				5.55	64.14	62.10	1

11	1.4	0.25	0.3	0.3	30.0	3.60	1.22		3.9	12	290	1.207	1.058	3.38	84.24	83.50	11B - 12B
							1.22	0.0		12				1.56	81.17	80.00	10
10	2.9	0.20	0.6	0.9	31.6	3.50	3.21		6.5	15	220	1.000	0.698	4.41	80.72	80.00	10B - 11B
							3.21	0.0		15				2.61	79.18	77.80	9
9	0.8	0.35	0.3	1.2	32.8	3.43	4.09		6.5	15	138	1.000	0.360	3.66	78.87	77.80	9B - 10B
							4.09	0.0		15				3.33	78.37	76.42	8
8	1.1	0.35	0.4	1.6	33.6	3.39	5.36		6.5	15	25	1.000	0.691	4.37	77.93	76.42	8B - 9B
							5.36	0.0		15				4.37	77.75	76.17	7
7	0.1	0.60	0.1	1.6	33.7	3.38	5.53		6.5	15	70	1.000	0.657	4.65	77.33	76.17	7B - 8B
							5.53	0.0		15				4.51	76.87	75.47	6
6	0.2	0.60	0.1	1.8	34.1	3.36	5.90		6.5	15	143	1.000	0.836	4.81	76.87	75.47	6B - 7B
							5.90	0.0		15				4.81	75.68	74.04	5
5	0.4	0.40	0.1	1.9	34.9	3.31	6.30		11.5	15	125	3.184	2.576	5.96	75.04	74.04	4B - 6B
							6.30	0.0		15				5.14	71.82	70.06	3

STORM SEWER DESIGN / ANALYSIS

Return Period = 10 Yrs
Rainfall file: JCC

Run Date: 02-26-1997
File: a:FC13SYSB.ST3

LINE 1 / Q = 8.92 / HT = 15 / WID = 15 / N = .013 / L = 240 / JLC = 1

1B - 2B / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	58.02	15.00	53.25	7.27	58.84	0.00	N/A	1.23
UPSTRM	63.28	14.11	62.10	7.45	64.14	7.08	2.25	1.20

Drainage area (ac) =	0.24	Slope of invert (%) =	3.6875
Runoff coefficient =	0.50	Slope energy grade line (%) =	2.2069
Time of conc (min) =	36.24	Critical depth (in) =	14.11
Inlet time (min) =	10.00	Natural ground elev. (ft) =	65.60
Intensity (in/hr) =	3.25	Upstream surcharge (ft) =	0.00
Cumulative C*A =	2.75	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	8.92	Line capacity (cfs) =	12.40
Q catchment (cfs) =	0.70	Inlet length (ft) =	0.00
Q carryover (cfs) =	12.32	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	13.02	Ponding width (ft) =	N/A

LINE 2 / Q = 2.76 / HT = 12 / WID = 12 / N = .013 / L = 84 / JLC = 1.25

2B - 3B / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	64.14	12.00	62.10	3.51	64.33	0.00	2.5	0.79
UPSTRM	68.63	8.45	67.50	4.67	68.97	10.95	.5	0.59

Drainage area (ac) =	1.84	Slope of invert (%) =	6.4286
Runoff coefficient =	0.30	Slope energy grade line (%) =	5.5183
Time of conc (min) =	15.00	Critical depth (in) =	8.45
Inlet time (min) =	15.00	Natural ground elev. (ft) =	69.00
Intensity (in/hr) =	5.00	Upstream surcharge (ft) =	0.13
Cumulative C*A =	0.55	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.76	Line capacity (cfs) =	9.03
Q catchment (cfs) =	2.76	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.76	Ponding width (ft) =	N/A

LINE 3 / Q = 6.81 / HT = 15 / WID = 15 / N = .013 / L = 112 / JLC = 1.2

2B - 4B / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	64.14	15.00	62.10	5.55	64.62	0.00	2.25	1.23
UPSTRM	71.10	12.53	70.06	6.22	71.70	11.13	2.24	1.09

Drainage area (ac) =	0.21	Slope of invert (%) =	7.1072
Runoff coefficient =	0.35	Slope energy grade line (%) =	6.3287
Time of conc (min) =	35.62	Critical depth (in) =	12.53
Inlet time (min) =	10.00	Natural ground elev. (ft) =	73.56
Intensity (in/hr) =	3.28	Upstream surcharge (ft) =	0.00
Cumulative C*A =	2.08	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	6.81	Line capacity (cfs) =	17.22
Q catchment (cfs) =	0.43	Inlet length (ft) =	0.00
Q carryover (cfs) =	9.14	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	9.57	Ponding width (ft) =	N/A

LINE 4 / Q = 0.71 / HT = 12 / WID = 12 / N = .013 / L = 25 / JLC = 1.5

4B - 5B / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	71.82	12.00	70.06	0.91	71.84	0.00	2.5	0.79
UPSTRM	71.85	12.00	70.31	0.91	71.87	0.00	2.25	0.79

Drainage area (ac) =	0.17	Slope of invert (%) =	1.0000
Runoff coefficient =	0.60	Slope energy grade line (%) =	0.1171
Time of conc (min) =	5.00	Critical depth (in) =	4.30
Inlet time (min) =	5.00	Natural ground elev. (ft) =	73.56
Intensity (in/hr) =	7.00	Upstream surcharge (ft) =	0.54
Cumulative C*A =	0.10	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	0.71	Line capacity (cfs) =	3.56
Q catchment (cfs) =	0.71	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	0.71	Ponding width (ft) =	N/A

Should be 1.17 Ac. on Sheet 7

LINE 5 / Q = 6.30 / HT = 15 / WID = 15 / N = .013 / L = 125 / JLC = 1.15

4B - 6B / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	71.82	15.00	70.06	5.14	72.23	0.00	2.25	1.23
UPSTRM	75.04	12.05	74.04	5.96	75.60	11.92	2.73	1.06

Drainage area (ac) =	0.36	Slope of invert (%) =	3.1840
Runoff coefficient =	0.40	Slope energy grade line (%) =	2.6898
Time of conc (min) =	34.92	Critical depth (in) =	12.05
Inlet time (min) =	15.00	Natural ground elev. (ft) =	78.03
Intensity (in/hr) =	3.31	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.90	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	6.30	Line capacity (cfs) =	11.52
Q catchment (cfs) =	0.72	Inlet length (ft) =	0.00
Q carryover (cfs) =	7.71	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	8.42	Ponding width (ft) =	N/A

LINE 6 / Q = 5.90 / HT = 15 / WID = 15 / N = .013 / L = 143 / JLC = 0

6B - 7B / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	75.68	15.00	74.04	4.81	76.04	0.00	2.73	1.23
UPSTRM	76.87	15.00	75.47	4.81	77.23	0.00	4.18	1.23

Drainage area (ac) =	0.20	Slope of invert (%) =	1.0000
Runoff coefficient =	0.60	Slope energy grade line (%) =	0.8354
Time of conc (min) =	34.13	Critical depth (in) =	11.66
Inlet time (min) =	0.00	Natural ground elev. (ft) =	80.90
Intensity (in/hr) =	3.36	Upstream surcharge (ft) =	0.15
Cumulative C*A =	1.76	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	5.90	Line capacity (cfs) =	6.46
Q catchment (cfs) =	0.00	Inlet length (ft) =	0.00
Q carryover (cfs) =	7.71	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	7.71	Ponding width (ft) =	N/A

LINE 7 / Q = 5.53 / HT = 15 / WID = 15 / N = .013 / L = 70 / JLC = 1.25

7B - 8B / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	76.87	15.00	75.47	4.51	77.19	0.00	4.18	1.23
UPSTRM	77.33	13.97	76.17	4.65	77.67	7.59	4.19	1.19

Drainage area (ac) =	0.09	Slope of invert (%) =	1.0000
Runoff coefficient =	0.60	Slope energy grade line (%) =	0.6847
Time of conc (min) =	33.74	Critical depth (in) =	11.29
Inlet time (min) =	5.00	Natural ground elev. (ft) =	81.61
Intensity (in/hr) =	3.38	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.64	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	5.53	Line capacity (cfs) =	6.46
Q catchment (cfs) =	0.38	Inlet length (ft) =	0.00
Q carryover (cfs) =	7.33	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	7.71	Ponding width (ft) =	N/A

LINE 8 / Q = 5.36 / HT = 15 / WID = 15 / N = .013 / L = 25 / JLC = 1.5

8B - 9B / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	77.75	15.00	76.17	4.37	78.05	0.00	4.19	1.23
UPSTRM	77.93	15.00	76.42	4.37	78.22	0.00	3.94	1.23

Drainage area (ac) =	1.12	Slope of invert (%) =	1.0000
Runoff coefficient =	0.35	Slope energy grade line (%) =	0.6901
Time of conc (min) =	33.60	Critical depth (in) =	11.12
Inlet time (min) =	15.00	Natural ground elev. (ft) =	81.61
Intensity (in/hr) =	3.39	Upstream surcharge (ft) =	0.26
Cumulative C*A =	1.58	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	5.36	Line capacity (cfs) =	6.46
Q catchment (cfs) =	1.96	Inlet length (ft) =	0.00
Q carryover (cfs) =	5.37	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	7.33	Ponding width (ft) =	N/A

LINE 9 / Q = 4.09 / HT = 15 / WID = 15 / N = .013 / L = 138 / JLC = 1.5

9B - 10B / DNLN = 8

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	78.37	15.00	76.42	3.33	78.54	0.00	3.94	1.23
UPSTRM	78.87	12.82	77.80	3.66	79.08	10.57	5.26	1.12

Drainage area (ac) =	0.79	Slope of invert (%) =	1.0000
Runoff coefficient =	0.35	Slope energy grade line (%) =	0.3862
Time of conc (min) =	32.83	Critical depth (in) =	9.71
Inlet time (min) =	10.00	Natural ground elev. (ft) =	84.32
Intensity (in/hr) =	3.43	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.19	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.09	Line capacity (cfs) =	6.46
Q catchment (cfs) =	1.61	Inlet length (ft) =	0.00
Q carryover (cfs) =	3.76	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	5.37	Ponding width (ft) =	N/A

LINE 10 / Q = 3.21 / HT = 15 / WID = 15 / N = .013 / L = 220 / JLC = 1.5

10B - 11B / DNLN = 9

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	79.18	15.00	77.80	2.61	79.29	0.00	5.26	1.23
UPSTRM	80.72	8.60	80.00	4.41	81.02	14.84	.75	0.73

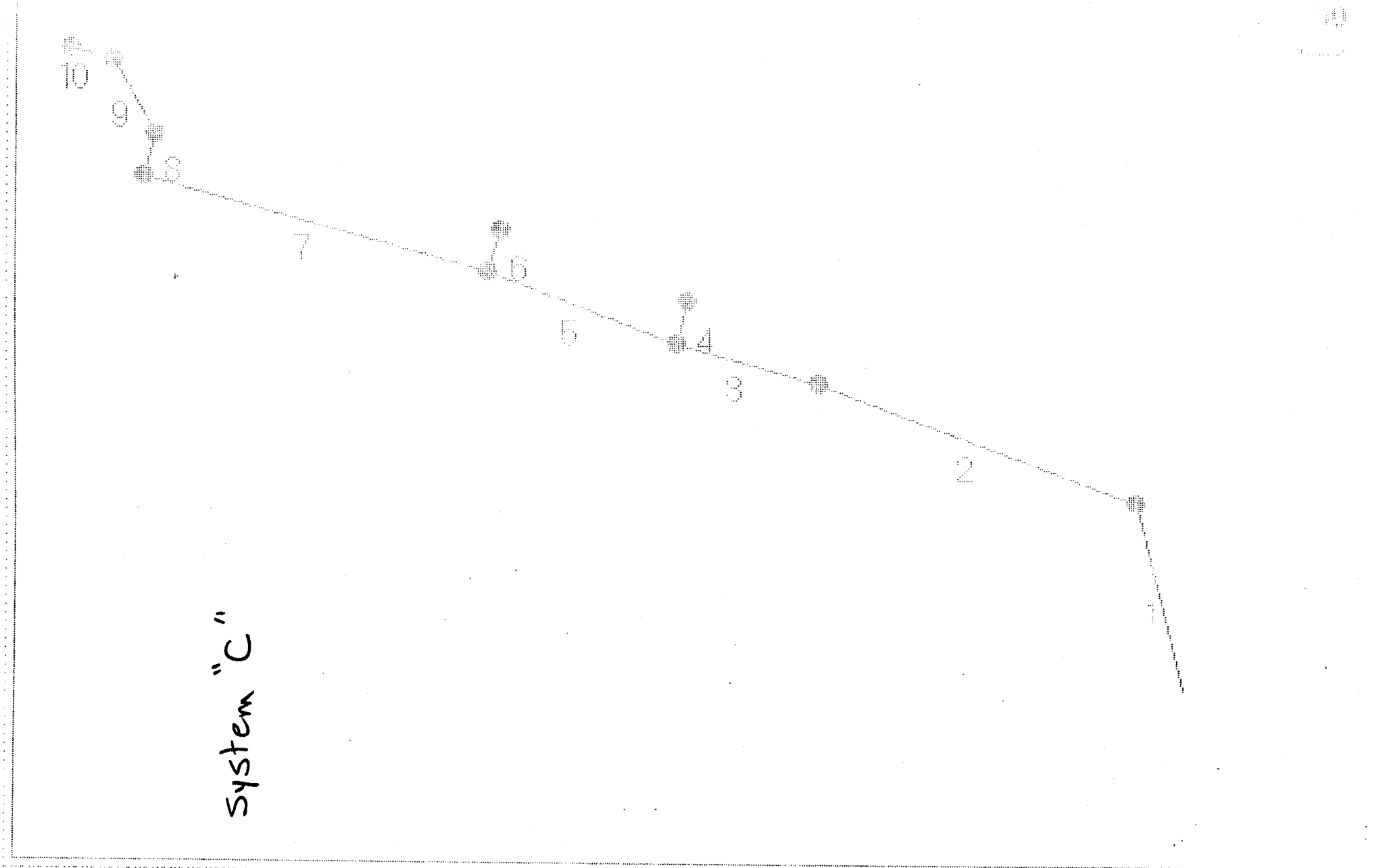
Drainage area (ac) =	2.88	Slope of invert (%) =	1.0000
Runoff coefficient =	0.20	Slope energy grade line (%) =	0.7871
Time of conc (min) =	31.61	Critical depth (in) =	8.60
Inlet time (min) =	20.00	Natural ground elev. (ft) =	82.00
Intensity (in/hr) =	3.50	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.92	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.21	Line capacity (cfs) =	6.46
Q catchment (cfs) =	2.54	Inlet length (ft) =	0.00
Q carryover (cfs) =	1.22	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	3.76	Ponding width (ft) =	N/A

LINE 11 / Q = 1.22 / HT = 12 / WID = 12 / N = .013 / L = 290 / JLC = 1.5

11B - 12B / DNLN = 10

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	81.17	12.00	80.00	1.56	81.21	0.00	1	0.79
UPSTRM	84.24	5.63	83.50	3.38	84.41	11.98	1	0.36

Drainage area (ac) =	1.36	Slope of invert (%) =	1.2069
Runoff coefficient =	0.25	Slope energy grade line (%) =	1.0139
Time of conc (min) =	30.00	Critical depth (in) =	5.63
Inlet time (min) =	30.00	Natural ground elev. (ft) =	85.50
Intensity (in/hr) =	3.60	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.34	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.22	Line capacity (cfs) =	3.91
Q catchment (cfs) =	1.22	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	1.22	Ponding width (ft) =	N/A



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E

STORM SEWER TABULATION

DATA FILE: a:FC13BYBC.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 02-26-1997

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, AdQ (CFS)		PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
4	0.1	0.56	0.0	0.0	7.5	6.34	0.28		4.2	12	25	1.000	0.005	0.36	66.33	64.57	4C - 5C
							0.28	0.0		12				0.36	66.33	64.32	3
3	0.6	0.55	0.3	1.1	17.4	4.69	5.37		7.5	12	88	3.193	2.364	7.01	65.26	64.32	3C - 4C
							5.37	0.0		12				6.34	63.18	61.51	2
2	0.3	0.50	0.1	1.3	17.9	4.64	5.96		7.0	15	200	1.000	1.000	6.30	62.41	61.51	2C - 3C
							5.96	0.0		15				6.30	60.41	59.51	1
1	1.2	0.30	0.4	1.6	30.0	3.60	5.93		16.5	15	112	5.589	2.200	5.78	60.48	59.51	1C - 2C
							5.93	0.0		15				4.83	58.02	53.25	OUTFALL

6	0.1	0.50	0.1	0.1	5.0	7.00	0.45		3.6	12	25	1.000	0.048	0.58	73.71	72.62	6C - 7C
							0.45	0.0		12				0.58	73.70	72.37	5
5	0.3	0.45	0.1	0.8	16.7	4.77	3.76		10.9	12	120	6.710	5.720	5.44	73.19	72.37	4C - 6C
							3.76	0.0		12				4.78	66.33	64.32	3

10	0.9	0.50	0.4	0.4	15.0	5.00	2.22		4.2	12	25	1.000	0.896	2.83	82.43	81.28	10C - 11C
							2.22	0.0		12				2.83	82.21	81.03	9
9	0.2	0.60	0.1	0.6	15.1	4.98	2.75		4.2	12	50	1.000	0.371	3.65	81.95	81.03	9C - 10C
							2.75	0.0		12				3.51	81.76	80.53	8
8	0.0	0.75	0.0	0.6	15.4	4.94	2.77		4.2	12	25	1.000	0.341	3.67	81.45	80.53	8C - 9C
							2.77	0.0		12				3.53	81.36	80.28	7
7	0.0	0.65	0.0	0.6	15.6	4.92	2.89		8.2	12	210	3.767	3.477	4.77	81.00	80.28	6C - 8C
							2.89	0.0		12				3.68	73.70	72.37	5

LINE 9 / Q = 2.75 / HT = 12 / WID = 12 / N = .011 / L = 50 / JLC = 1.25

9C - 10C / DNLN = 8

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	81.76	12.00	80.53	3.51	81.95	0.00	2.97	0.79
UPSTRM	81.95	11.01	81.03	3.65	82.15	6.59	2.5	0.75

Drainage area (ac) =	0.18	Slope of invert (%) =	1.0000
Runoff coefficient =	0.60	Slope energy grade line (%) =	0.4029
Time of conc (min) =	15.14	Critical depth (in) =	8.44
Inlet time (min) =	5.00	Natural ground elev. (ft) =	84.53
Intensity (in/hr) =	4.98	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.55	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.75	Line capacity (cfs) =	4.21
Q catchment (cfs) =	0.76	Inlet length (ft) =	0.00
Q carryover (cfs) =	2.22	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.98	Ponding width (ft) =	N/A

LINE 10 / Q = 2.22 / HT = 12 / WID = 12 / N = .011 / L = 25 / JLC = 1.25

10C - 11C / DNLN = 9

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	82.21	12.00	81.03	2.83	82.33	0.00	2.5	0.79
UPSTRM	82.43	11.93	81.28	2.83	82.55	1.83	2.25	0.78

Drainage area (ac) =	0.89	Slope of invert (%) =	1.0000
Runoff coefficient =	0.50	Slope energy grade line (%) =	0.2731
Time of conc (min) =	15.00	Critical depth (in) =	7.59
Inlet time (min) =	15.00	Natural ground elev. (ft) =	84.53
Intensity (in/hr) =	5.00	Upstream surcharge (ft) =	0.15
Cumulative C*A =	0.44	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.22	Line capacity (cfs) =	4.21
Q catchment (cfs) =	2.22	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.22	Ponding width (ft) =	N/A

LINE 7 / Q = 2.89 / HT = 12 / WID = 12 / N = .011 / L = 210 / JLC = 1.03

6C - 8C / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	73.70	12.00	72.37	3.68	73.91	0.00	2.5	0.79
UPSTRM	81.00	8.65	80.28	4.77	81.35	10.77	3.22	0.61

Drainage area (ac) =	0.04	Slope of invert (%) =	3.7667
Runoff coefficient =	0.65	Slope energy grade line (%) =	3.5450
Time of conc (min) =	15.56	Critical depth (in) =	8.65
Inlet time (min) =	5.00	Natural ground elev. (ft) =	84.50
Intensity (in/hr) =	4.92	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.59	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.89	Line capacity (cfs) =	8.17
Q catchment (cfs) =	0.18	Inlet length (ft) =	0.00
Q carryover (cfs) =	3.03	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	3.21	Ponding width (ft) =	N/A

LINE 8 / Q = 2.77 / HT = 12 / WID = 12 / N = .011 / L = 25 / JLC = 1.5

8C - 9C / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	81.36	12.00	80.28	3.53	81.56	0.00	3.22	0.79
UPSTRM	81.45	11.03	80.53	3.67	81.66	6.55	2.97	0.76

Drainage area (ac) =	0.01	Slope of invert (%) =	1.0000
Runoff coefficient =	0.75	Slope energy grade line (%) =	0.4033
Time of conc (min) =	15.42	Critical depth (in) =	8.47
Inlet time (min) =	5.00	Natural ground elev. (ft) =	84.50
Intensity (in/hr) =	4.94	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.56	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.77	Line capacity (cfs) =	4.21
Q catchment (cfs) =	0.05	Inlet length (ft) =	0.00
Q carryover (cfs) =	2.98	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	3.03	Ponding width (ft) =	N/A

LINE 5 / Q = 3.76 / HT = 12 / WID = 12 / N = .011 / L = 120 / JLC = 1.1

4C - 6C / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	66.33	12.00	64.32	4.78	66.68	0.00	2.5	0.79
UPSTRM	73.19	9.86	72.37	5.44	73.65	9.19	2.49	0.69

Drainage area (ac) =	0.30	Slope of invert (%) =	6.7100
Runoff coefficient =	0.45	Slope energy grade line (%) =	5.8070
Time of conc (min) =	16.72	Critical depth (in) =	9.86
Inlet time (min) =	12.50	Natural ground elev. (ft) =	75.87
Intensity (in/hr) =	4.77	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.79	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.76	Line capacity (cfs) =	10.90
Q catchment (cfs) =	0.72	Inlet length (ft) =	0.00
Q carryover (cfs) =	3.67	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	4.39	Ponding width (ft) =	N/A

LINE 6 / Q = 0.45 / HT = 12 / WID = 12 / N = .013 / L = 25 / JLC = 1.5

6C - 7C / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	73.70	12.00	72.37	0.58	73.70	0.00	2.5	0.79
UPSTRM	73.71	12.00	72.62	0.58	73.72	0.00	2.25	0.79

Drainage area (ac) =	0.13	Slope of invert (%) =	1.0000
Runoff coefficient =	0.50	Slope energy grade line (%) =	0.0476
Time of conc (min) =	5.00	Critical depth (in) =	3.43
Inlet time (min) =	5.00	Natural ground elev. (ft) =	75.87
Intensity (in/hr) =	7.00	Upstream surcharge (ft) =	0.09
Cumulative C*A =	0.06	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	0.45	Line capacity (cfs) =	3.56
Q catchment (cfs) =	0.45	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	0.45	Ponding width (ft) =	N/A

LINE 3 / Q = 5.37 / HT = 12 / WID = 12 / N = .011 / L = 88 / JLC = 1.4

3C - 4C / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	63.18	12.00	61.51	6.84	63.91	0.00	2.5	0.79
UPSTRM	65.26	11.29	64.32	7.01	66.02	5.66	2.5	0.77

Drainage area (ac) =	0.57	Slope of invert (%) =	3.1932
Runoff coefficient =	0.55	Slope energy grade line (%) =	2.4045
Time of conc (min) =	17.39	Critical depth (in) =	11.29
Inlet time (min) =	15.00	Natural ground elev. (ft) =	67.82
Intensity (in/hr) =	4.69	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.14	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	5.37	Line capacity (cfs) =	7.52
Q catchment (cfs) =	1.57	Inlet length (ft) =	0.00
Q carryover (cfs) =	4.68	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	6.24	Ponding width (ft) =	N/A

LINE 4 / Q = 0.28 / HT = 12 / WID = 12 / N = .011 / L = 25 / JLC = 0

4C - 5C / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	66.33	12.00	64.32	0.36	66.33	0.00	2.5	0.79
UPSTRM	66.33	12.00	64.57	0.36	66.33	0.00	2.25	0.79

Drainage area (ac) =	0.08	Slope of invert (%) =	1.0000
Runoff coefficient =	0.56	Slope energy grade line (%) =	0.0045
Time of conc (min) =	7.50	Critical depth (in) =	2.71
Inlet time (min) =	7.50	Natural ground elev. (ft) =	67.82
Intensity (in/hr) =	6.34	Upstream surcharge (ft) =	0.76
Cumulative C*A =	0.04	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	0.28	Line capacity (cfs) =	4.21
Q catchment (cfs) =	0.28	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	0.28	Ponding width (ft) =	N/A

STORM SEWER DESIGN / ANALYSIS

Return Period = 10 Yrs
Rainfall file: JCC

Run Date: 02-26-1997
File: a:FC13SYSC.ST3

LINE 1 / Q = 5.93 / HT = 15 / WID = 15 / N = .012 / L = 112 / JLC = 0

1C - 2C / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	58.02	15.00	53.25	4.83	58.38	0.00	N/A	1.23
UPSTRM	60.48	11.69	59.51	5.78	61.00	12.44	4.24	1.03

Drainage area (ac) =	1.21	Slope of invert (%) =	5.5893
Runoff coefficient =	0.30	Slope energy grade line (%) =	2.3394
Time of conc (min) =	30.00	Critical depth (in) =	11.69
Inlet time (min) =	30.00	Natural ground elev. (ft) =	65.00
Intensity (in/hr) =	3.60	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.65	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	5.93	Line capacity (cfs) =	16.54
Q catchment (cfs) =	1.31	Inlet length (ft) =	0.00
Q carryover (cfs) =	7.13	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	8.44	Ponding width (ft) =	N/A

LINE 2 / Q = 5.96 / HT = 15 / WID = 15 / N = .012 / L = 200 / JLC = 1.25

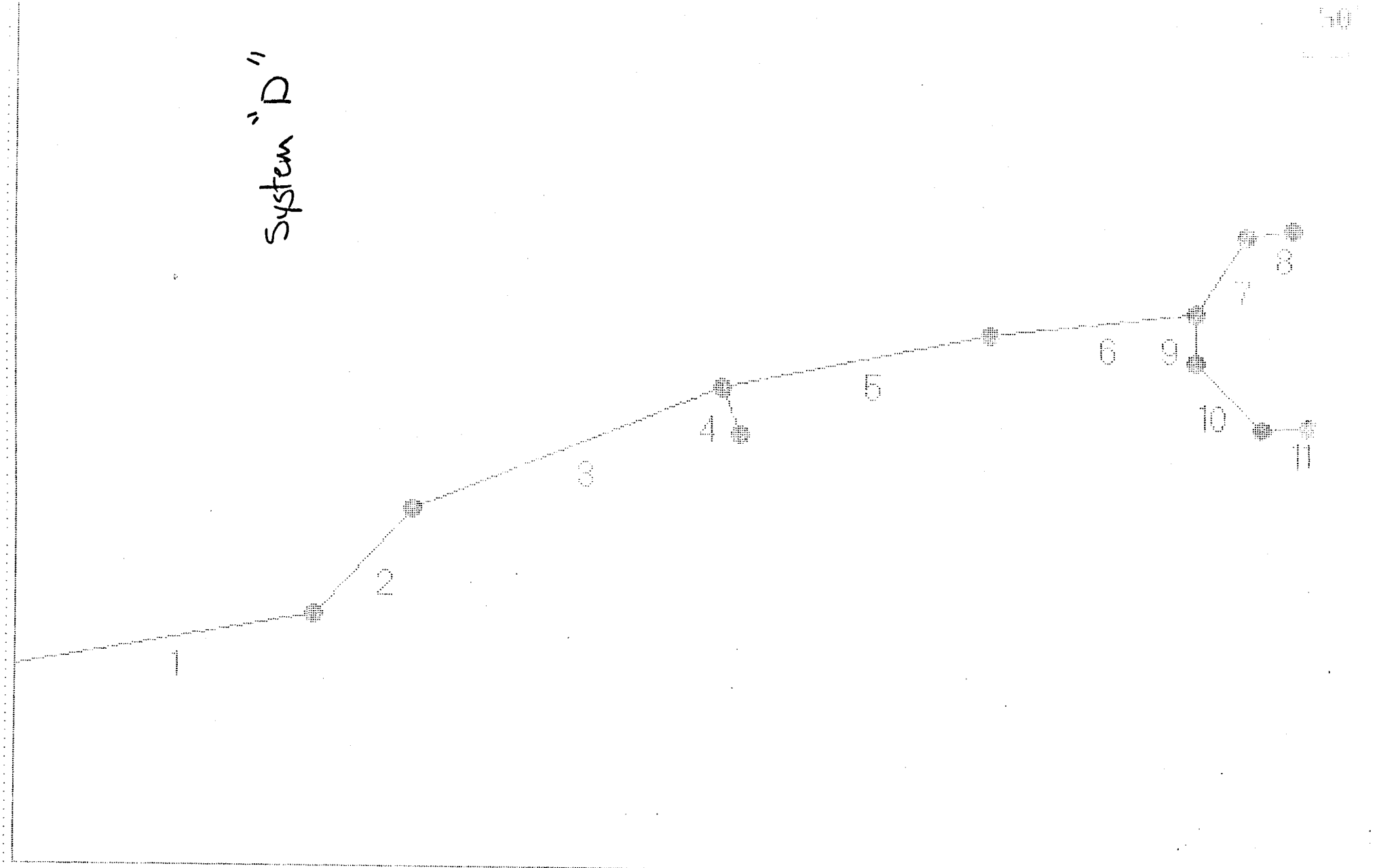
2C - 3C / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	60.41	10.79	59.51	6.30	61.03	13.48	4.24	0.95
UPSTRM	62.41	10.79	61.51	6.30	63.03	13.48	2.25	0.95

Drainage area (ac) =	0.28	Slope of invert (%) =	1.0000
Runoff coefficient =	0.50	Slope energy grade line (%) =	1.0000
Time of conc (min) =	17.88	Critical depth (in) =	11.72
Inlet time (min) =	7.50	Natural ground elev. (ft) =	65.01
Intensity (in/hr) =	4.64	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.28	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	5.96	Line capacity (cfs) =	7.00
Q catchment (cfs) =	0.89	Inlet length (ft) =	0.00
Q carryover (cfs) =	6.24	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	7.13	Ponding width (ft) =	N/A

Note: Normal depth assumed

System "D"



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STORM SEWER TABULATION

DATA FILE: a:FC13SYSD.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 02-26-1997

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, AdQ (CFS)		PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
4	0.2	0.60	0.1	0.1	7.5	6.34	0.57		3.6	12	25	1.000	0.075	0.73	62.07	60.17	4D - 5D
							0.57	0.0		12				0.73	62.05	59.92	3
3	0.8	0.45	0.4	1.2	15.0	5.00	6.03		7.4	12	173	4.353	3.750	7.77	60.88	59.92	3D - 4D
							6.03	0.0		12				7.68	54.40	52.39	2
2	1.2	0.40	0.5	1.7	16.0	4.87	8.17		11.7	15	73	3.301	2.128	6.95	53.53	52.39	2D - 3D
							8.17	0.0		15				6.66	51.98	49.98	1
1	0.2	0.30	0.0	1.7	16.4	4.82	8.32		13.5	15	155	4.344	1.362	7.07	51.13	49.98	1D - 2D
							8.32	0.0		15				6.78	48.24	43.25	OUTFALL

8	0.2	0.60	0.1	0.1	7.5	6.34	0.84		3.6	12	25	1.000	0.265	1.84	73.73	73.10	8D - 9D
							0.84	0.0		12				1.22	73.66	72.85	7
7	0.2	0.60	0.1	0.3	7.6	6.31	1.59		9.6	12	47	7.277	5.989	3.72	73.38	72.85	7D - 8D
							1.59	0.0		12				2.02	70.57	69.43	6
6	0.0	0.75	0.0	0.5	8.0	6.21	2.94		5.0	12	107	1.991	1.480	4.81	70.16	69.43	6D - 7D
							2.94	0.0		12				3.74	68.57	67.30	5
5	0.6	0.45	0.3	0.7	10.0	5.81	4.31		8.0	12	142	5.000	4.120	5.87	67.91	67.02	4D - 6D
							4.31	0.0		12				5.49	62.05	59.92	3

11	0.2	0.60	0.1	0.1	7.5	6.34	0.72		3.6	12	25	1.000	0.359	2.15	70.95	70.40	11D - 12D
							0.72	0.0		12				1.22	70.86	70.15	10
10	0.1	0.60	0.1	0.2	7.6	6.31	1.25		3.6	12	47	1.000	0.053	2.89	70.69	70.15	10D - 11D
							1.25	0.0		12				1.60	70.66	69.68	9
9	0.0	0.80	0.0	0.2	7.9	6.25	1.29		3.6	12	25	1.000	0.116	1.70	70.60	69.68	7D - 10D
							1.29	0.0		12				1.64	70.57	69.43	6

STORM SEWER DESIGN / ANALYSIS

Return Period = 10 Yrs
Rainfall file: JCC

Run Date: 02-26-1997
File: a:FC13SYSD.ST3

LINE 1 / Q = 8.32 / HT = 15 / WID = 15 / N = .013 / L = 155 / JLC = 1.1

1D - 2D / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	48.24	15.00	43.25	6.78	48.95	0.00	N/A	1.23
UPSTRM	51.13	13.73	49.98	7.07	51.90	8.37	1.01	1.18

Drainage area (ac) =	0.16	Slope of invert (%) =	4.3438
Runoff coefficient =	0.30	Slope energy grade line (%) =	1.9024
Time of conc (min) =	16.37	Critical depth (in) =	13.73
Inlet time (min) =	10.00	Natural ground elev. (ft) =	52.25
Intensity (in/hr) =	4.82	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.73	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	8.32	Line capacity (cfs) =	13.46
Q catchment (cfs) =	0.28	Inlet length (ft) =	0.00
Q carryover (cfs) =	9.38	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	9.66	Ponding width (ft) =	N/A

LINE 2 / Q = 8.17 / HT = 15 / WID = 15 / N = .013 / L = 73 / JLC = 1.15

2D - 3D / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	51.98	15.00	49.98	6.66	52.67	0.00	1.02	1.23
UPSTRM	53.53	13.73	52.39	6.95	54.28	8.37	1.99	1.18

Drainage area (ac) =	1.18	Slope of invert (%) =	3.3014
Runoff coefficient =	0.40	Slope energy grade line (%) =	2.2103
Time of conc (min) =	15.96	Critical depth (in) =	13.73
Inlet time (min) =	15.00	Natural ground elev. (ft) =	55.64
Intensity (in/hr) =	4.87	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.68	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	8.17	Line capacity (cfs) =	11.73
Q catchment (cfs) =	2.36	Inlet length (ft) =	0.00
Q carryover (cfs) =	7.02	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	9.38	Ponding width (ft) =	N/A

LINE 3 / Q = 6.03 / HT = 12 / WID = 12 / N = .013 / L = 173 / JLC = 1.25

3D - 4D / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	54.40	12.00	52.39	7.68	55.31	0.00	2.25	0.79
UPSTRM	60.88	11.55	59.92	7.77	61.82	4.58	2.5	0.78

Drainage area (ac) =	0.83	Slope of invert (%) =	4.3526
Runoff coefficient =	0.45	Slope energy grade line (%) =	3.7628
Time of conc (min) =	15.00	Critical depth (in) =	11.55
Inlet time (min) =	15.00	Natural ground elev. (ft) =	63.42
Intensity (in/hr) =	5.00	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.21	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	6.03	Line capacity (cfs) =	7.43
Q catchment (cfs) =	1.87	Inlet length (ft) =	0.00
Q carryover (cfs) =	5.15	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	7.02	Ponding width (ft) =	N/A

LINE 4 / Q = 0.57 / HT = 12 / WID = 12 / N = .013 / L = 25 / JLC = 1.5

4D - 5D / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	62.05	12.00	59.92	0.73	62.06	0.00	2.5	0.79
UPSTRM	62.07	12.00	60.17	0.73	62.08	0.00	2.25	0.79

Drainage area (ac) =	0.15	Slope of invert (%) =	1.0000
Runoff coefficient =	0.60	Slope energy grade line (%) =	0.0748
Time of conc (min) =	7.50	Critical depth (in) =	3.84
Inlet time (min) =	7.50	Natural ground elev. (ft) =	63.42
Intensity (in/hr) =	6.34	Upstream surcharge (ft) =	0.90
Cumulative C*A =	0.09	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	0.57	Line capacity (cfs) =	3.56
Q catchment (cfs) =	0.57	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	0.57	Ponding width (ft) =	N/A

LINE 5 / Q = 4.31 / HT = 12 / WID = 12 / N = .013 / L = 142 / JLC = 1.25

4D - 6D / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	62.05	12.00	59.92	5.49	62.52	0.00	2.5	0.79
UPSTRM	67.91	10.62	67.02	5.87	68.44	7.65	5.31	0.74

Drainage area (ac) =	0.60	Slope of invert (%) =	5.0000
Runoff coefficient =	0.45	Slope energy grade line (%) =	4.1663
Time of conc (min) =	10.00	Critical depth (in) =	10.62
Inlet time (min) =	10.00	Natural ground elev. (ft) =	73.33
Intensity (in/hr) =	5.81	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.74	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.31	Line capacity (cfs) =	7.96
Q catchment (cfs) =	1.57	Inlet length (ft) =	0.00
Q carryover (cfs) =	3.01	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	4.58	Ponding width (ft) =	N/A

LINE 6 / Q = 2.94 / HT = 12 / WID = 12 / N = .013 / L = 107 / JLC = 1.15

6D - 7D / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	68.57	12.00	67.30	3.74	68.79	0.00	5.02	0.79
UPSTRM	70.16	8.72	69.43	4.81	70.52	10.69	2.9	0.61

Drainage area (ac) =	0.02	Slope of invert (%) =	1.9907
Runoff coefficient =	0.75	Slope energy grade line (%) =	1.6120
Time of conc (min) =	8.04	Critical depth (in) =	8.72
Inlet time (min) =	5.00	Natural ground elev. (ft) =	73.33
Intensity (in/hr) =	6.21	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.47	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.94	Line capacity (cfs) =	5.02
Q catchment (cfs) =	0.10	Inlet length (ft) =	0.00
Q carryover (cfs) =	2.91	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	3.01	Ponding width (ft) =	N/A

LINE 7 / Q = 1.59 / HT = 12 / WID = 12 / N = .013 / L = 47 / JLC = 1.3

7D - 8D / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	70.57	12.00	69.43	2.02	70.63	0.00	2.9	0.79
UPSTRM	73.38	6.41	72.85	3.72	73.60	11.97	2.5	0.43

Drainage area (ac) =	0.20	Slope of invert (%) =	7.2766
Runoff coefficient =	0.60	Slope energy grade line (%) =	6.3114
Time of conc (min) =	7.64	Critical depth (in) =	6.41
Inlet time (min) =	7.50	Natural ground elev. (ft) =	76.35
Intensity (in/hr) =	6.31	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.25	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.59	Line capacity (cfs) =	9.61
Q catchment (cfs) =	0.76	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.84	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	1.60	Ponding width (ft) =	N/A

LINE 8 / Q = 0.84 / HT = 12 / WID = 12 / N = .013 / L = 25 / JLC = 1.3

8D - 9D / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	73.66	9.77	72.85	1.22	73.69	10.83	2.5	0.68
UPSTRM	73.73	6.74	73.10	1.84	73.78	11.91	2.25	0.45

Drainage area (ac) =	0.22	Slope of invert (%) =	1.0000
Runoff coefficient =	0.60	Slope energy grade line (%) =	0.3833
Time of conc (min) =	7.50	Critical depth (in) =	4.65
Inlet time (min) =	7.50	Natural ground elev. (ft) =	76.35
Intensity (in/hr) =	6.34	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.13	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	0.84	Line capacity (cfs) =	3.56
Q catchment (cfs) =	0.84	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	0.84	Ponding width (ft) =	N/A

LINE 9 / Q = 1.29 / HT = 12 / WID = 12 / N = .013 / L = 25 / JLC = 1.45

7D - 10D / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	70.57	12.00	69.43	1.64	70.61	0.00	2.9	0.79
UPSTRM	70.60	11.02	69.68	1.70	70.64	6.57	2.65	0.76

Drainage area (ac)	=	0.01	Slope of invert (%)	=	1.0000
Runoff coefficient	=	0.80	Slope energy grade line (%)	=	0.1300
Time of conc (min)	=	7.90	Critical depth (in)	=	5.77
Inlet time (min)	=	5.00	Natural ground elev. (ft)	=	73.33
Intensity (in/hr)	=	6.25	Upstream surcharge (ft)	=	0.00
Cumulative C*A	=	0.21	Additional Q (cfs)	=	0.00
Q = CA * I (cfs)	=	1.29	Line capacity (cfs)	=	3.56
Q catchment (cfs)	=	0.06	Inlet length (ft)	=	0.00
Q carryover (cfs)	=	1.25	Gutter slope (ft/ft)	=	0.0000
Q captured (cfs)	=	0.00	Cross slope (ft/ft)	=	0.0000
Q bypassed (cfs)	=	1.31	Ponding width (ft)	=	N/A

LINE 10 / Q = 1.25 / HT = 12 / WID = 12 / N = .013 / L = 47 / JLC = 1.3

10D - 11D / DNLN = 9

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	70.66	11.81	69.68	1.60	70.70	11.90	2.65	0.78
UPSTRM	70.69	6.46	70.15	2.89	70.82	11.96	2.5	0.43

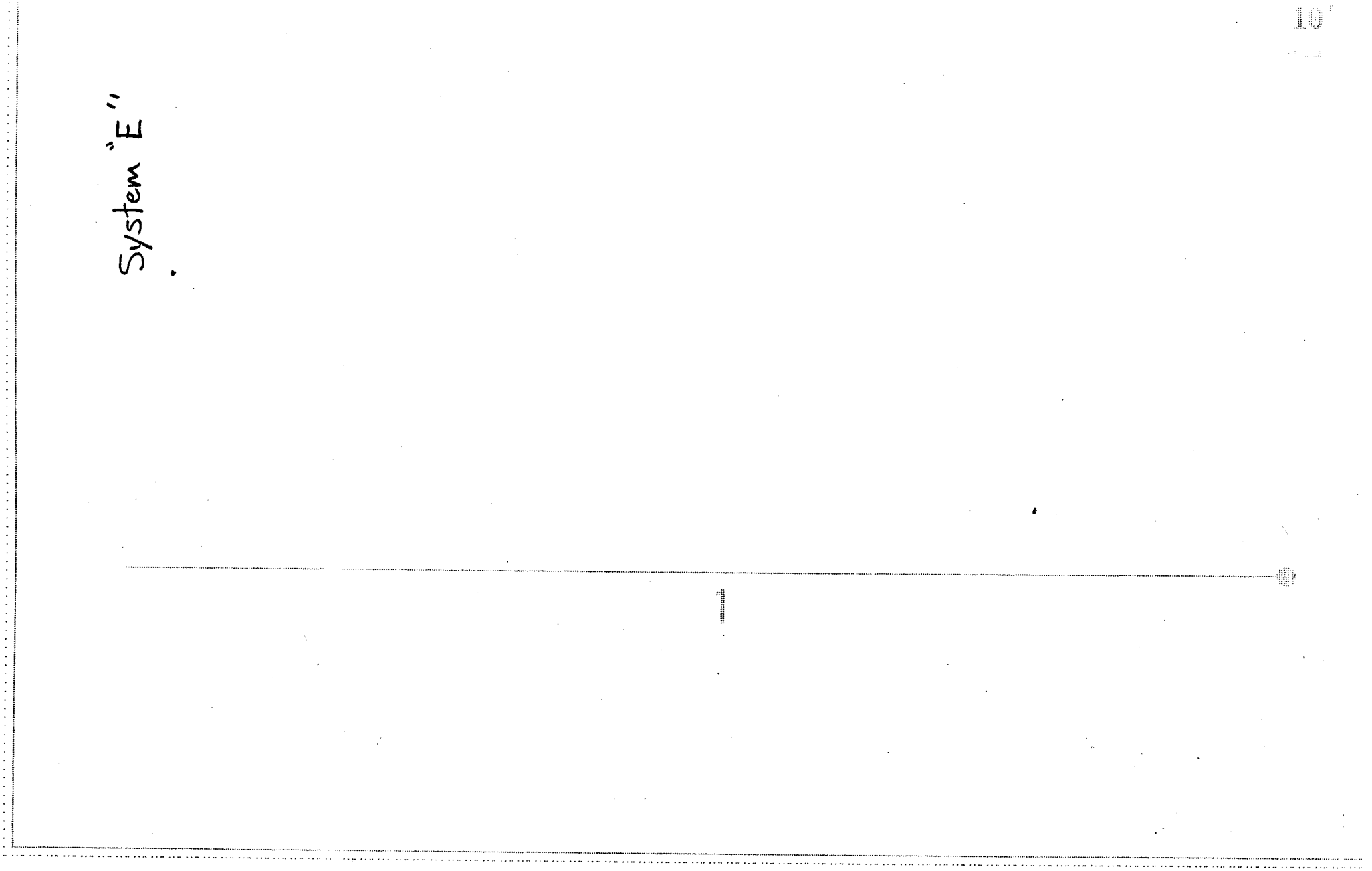
Drainage area (ac)	=	0.14	Slope of invert (%)	=	1.0000
Runoff coefficient	=	0.60	Slope energy grade line (%)	=	0.2455
Time of conc (min)	=	7.64	Critical depth (in)	=	5.69
Inlet time (min)	=	7.50	Natural ground elev. (ft)	=	73.65
Intensity (in/hr)	=	6.31	Upstream surcharge (ft)	=	0.00
Cumulative C*A	=	0.20	Additional Q (cfs)	=	0.00
Q = CA * I (cfs)	=	1.25	Line capacity (cfs)	=	3.56
Q catchment (cfs)	=	0.53	Inlet length (ft)	=	0.00
Q carryover (cfs)	=	0.72	Gutter slope (ft/ft)	=	0.0000
Q captured (cfs)	=	0.00	Cross slope (ft/ft)	=	0.0000
Q bypassed (cfs)	=	1.25	Ponding width (ft)	=	N/A

LINE 11 / Q = 0.72 / HT = 12 / WID = 12 / N = .013 / L = 25 / JLC = 1.45

11D - 12D / DNLN = 10

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	70.86	8.49	70.15	1.22	70.88	10.10	2.5	0.59
UPSTRM	70.95	5.32	70.40	2.15	71.02	11.92	2.25	0.34

Drainage area (ac) =	0.19	Slope of invert (%) =	1.0000
Runoff coefficient =	0.60	Slope energy grade line (%) =	0.1380
Time of conc (min) =	7.50	Critical depth (in) =	4.32
Inlet time (min) =	7.50	Natural ground elev. (ft) =	73.65
Intensity (in/hr) =	6.34	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.11	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	0.72	Line capacity (cfs) =	3.56
Q catchment (cfs) =	0.72	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	0.72	Ponding width (ft) =	N/A



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STORM SEWER DESIGN / ANALYSIS

Return Period = 10 Yrs
Rainfall file: JCC

Run Date: 02-26-1997
File: a:FC13SYSE.ST3

LINE 1 / Q = 2.20 / HT = 12 / WID = 12 / N = .013 / L = 215 / JLC = 1

1E - 2E / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	48.25	12.00	43.50	2.80	48.37	0.00	N/A	0.79
UPSTRM	64.89	7.54	63.98	4.23	65.16	11.60	2.25	0.52

Drainage area (ac) =	0.53	Slope of invert (%) =	9.5256
Runoff coefficient =	0.65	Slope energy grade line (%) =	7.6810
Time of conc (min) =	7.50	Critical depth (in) =	7.54
Inlet time (min) =	7.50	Natural ground elev. (ft) =	67.23
Intensity (in/hr) =	6.34	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.35	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.20	Line capacity (cfs) =	10.99
Q catchment (cfs) =	2.20	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.20	Ponding width (ft) =	N/A

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STORM SEWER TABULATION

DATA FILE: a:FC13SYSE.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 02-26-1997

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769 PAGE 1 OF 1

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, AdQ (CFS)	PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
1	0.5	0.65	0.3	0.3	7.5	6.34	2.20	11.0	12	215	9.526	7.737	4.23	64.89	63.98	1E - 2E
							2.20 0.0		12				2.80	48.25	43.50	OUTFALL

AES
CONSULTING ENGINEERS
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
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Grate Inlet and Roadway Spread Calculations

Ford's Colony Section 13 B

FORD'S COLONY
WILLIAMSBURG

Ford's Colony Section 13B

2/26/97

Curb Inlet Calculations System "A"

SS # 13B-6A Road "A" STA 24+80 (L) - Grade

DA = .10 AC C = .60 I = 3.5 in/hr (VDOT Constant)

$Q_{total} = CIA = .21$ cfs N = .016 $S_L = .0107$ ft/ft = 1.07%

$Q_t = \frac{.56}{N} Z D^{8/3} S^{1/2}$ Solve for D = Depth

D = .079

$Z = 1/S_t = 1/.02 = 50$ DMAX = .13' = Max spread = 6.25'

$Q_{Intercepted} = KD^{5/3}$ K = 16 (from chart)

$Q_i = 16(.076)^{5/3} = .23$ cfs

$Q_b = Q_t - Q_i = .21 - .23 = 0$ cfs ←

SS # 13B-5A Road A STA 24+80 (R) - Grade

DA = .68 C = .35 Q_t = .83

S_L = .011 K = 16 D = .131'

Q_i = .60 cfs * Use 2 grates ∴ Q_i = (.60) x 2 = 1.20 cfs

$Q_b = Q_t - Q_i = 0$ ←

SS # 13B-4A Road A STA 26+27 (R) - Grade

DA = .65 C = .35 Q_t = .80 cfs

S_L = .01 K = 15 D = .130'

Q_i = .50 cfs

$Q_b = Q_t - Q_i = .3$ cfs carrover to SS # 13B-4A ←

System A (Cont)

SS# 13B-3A Road "A" STA 26+65 - sump

DA = .28 C = .75 I = 3.5 Q = .73

Q_c = .73 + .30 = 1.03 cfs

P = Grate Perimeter 1 grate = 7.75 2 grates = 15.5'

A = Free open Area 1 grate = 1.68 ft² 2 grates = 3.36 ft²

Check orifice vs weir flow

for T_{max} 6.25'

$Q_{io} = .6 A \sqrt{2gh}$ (orifice) $Q_{iw} = 3.3 P(H)^{1.5}$ (weir)

Q_{io} = 2.91 cfs Q_{iw} = 1.20 cfs

Use the lower value Q_{iw} = 1.2 cfs weir

→ Q_i = 1.2 cfs > 1.03 cfs

Curb Inlet calculations - System B

SS #13B - 10B Road "A" STA 20+29 (R) - Grade

DA = .79 Ac C = .35 Q_k = .968 cfs

S_L = .0133 K = 17 D = .13'

Q_i = .60 cfs Q_i for 2 grates = 1.20

→ 1.20 cfs > .97 cfs use 2 grates

SS #13B - 9B Road A STA 21+65 (R) Sump

DA = 1.12 Ac C = .35 Q = 1.37 cfs

Q_{iw} = 1.20 cfs (1 grate) Q_{iw} = 2.39 cfs (2 grates)

use 2 grates

→ 2.39 cfs > 1.37 cfs

SS #13B - 8B Road "A" STA 21+65 (L) Sump

DA = .09 C = .60 Q = .19 cfs

Q_{iw} = 1.20 cfs

use 1 grate

→ 1.20 cfs > .19 cfs use 1 grate

System B (cont)

SS #13B-7B Road E STA 10+60 (L) - Grade

DA = .20 C = .60 Q = .42 cfs

S_L = .0160 K = 18 D = .10'

Q_i = .38 cfs

→ .42 cfs - .38 cfs = .04 cfs carry over to structure SS#13B-6B

SS #13B-6B Road E STA 12+02 (L) - Grade

DA = .36 C = .40 Q = .50

Q_t = .50 + .04 = .54 cfs

S_L = .0371 K = 15 D = .08'

Q_i = .41 cfs

→ .54 cfs - .41 cfs = .13 cfs carry over to structure SS#13B-4B

SS #13B-4B Road E STA 13+23 (L) - Grade

DA = .21 C = .35 Q = .26 cfs

Q_t = .26 + .13 (carryover)

= .39 cfs

S_L = .0371 K = 28

D = .07'

Q_i = .33 cfs

→ .39 cfs - .33 cfs = .06 cfs carrover to structure SS#13B-2B

System B (Cont)

SS #13B-5B Road E STA 13+23 (R)-Grade

DA = .17 C = .60 Q = .36 cfs

S_L = .0371 K = 28 D = .07'

Q_i = .31 cfs

→ .36 cfs − .31 cfs = .05 cfs carryover to structure SS#13B-2B

SS #13B-2B Road E Sump

DA = .24 C = .50 Q = .42 cfs

Q_t = .42 cfs + .06 Carryover from 9B + .05 carry over from 5B

Q_t = .53 cfs

Q_{iw} = 1.20 cfs

→ 1.20 cfs > .53 cfs use 1 grate

Curb Inlet Calculations system C

SS # 13B - 11C ROAD A STA 16+40 sump

DA = .89 C = .50 Q = 1.56 cfs

for MAX D = .13

Q_{iw} = 1.20 for one grate Q_{iw} 2.39 cfs for 2 grates

2.39 cfs > 1.56 cfs

→ use 2 grates

SS # 13B - 10C ROAD A STA 16+40 sump

DA = .18 C = .60 I = 3.5 Q = .38 cfs

D_{iw} = 1.20 cfs D = .08'

→ for 1 grate use 1 grate

SS # 13B - 9C ROAD D STA 10+31 (L) Grade

DA = .01 C = .75 Q = .03 cfs

S_L = .0367 D = .03' K = 24

Q_i = .07 cfs

→ .07 cfs > .03 cfs

use 1 grate

SS # 8C Road D Sta 10+31 (R) grade

DA = .04 C = .65 Q = .09 cfs

S_L = .0367 D = .05' K = 24

Q_i = .14 cfs

.14 cfs > .09 cfs

OK

System C cont

SS # 13B - 7C Road D STA 12+57 (L) Grade

DA = .13 C = .50 Q = .23 cfs

S_L = .08 D = .06' K = 28

Q_i = .23 cfs

→ .23 cfs = .23 cfs
use 1 grate

SS # 13B - 6C Road D STA 12+57 (R) Grade

DA = .30 C = .45 Q = .47 cfs

S_L = .08 D .07' K = 28

Q_i = .37 cfs

→ .47 cfs - .37 cfs = .10 cfs carryover
to SS # 13B 4C

SS # 13B - 4C Road D STA 13+70 (R) Grade

DA = .57 C = .55 Q = 1.09 cfs

Q_t = 1.09 cfs + .10 cfs
from SS # 13B 6C
= 1.19 cfs (total)

S_L = .0217

D = .127'

Q_i = .70 cfs

→ 1.19 cfs - .70 cfs = .49 cfs carryover to
SS # 13B - 3C

System C (Cont)

SS# 13B-5C ROAD D STA 13+70 (L) Grade

DA = .08 C=.56 Q= .16 cfs

SL=.0217 D= .06' K=20

Q_i= .18cfs ok

use 1 grate

SS# 13B-3C ROAD D STA 14+60 Sump

DA= .28 C=.50 Q= .49cfs

Q_T = .49 cfs + .54 cfs carryover from SS# 13B-4C

D_{MAX} = .13

Q_T= 1.03cfs

Q_{iw} = 1.20 cfs > 1.03 cfs use 1 grate

System D

SS # 13B - 9D ROAD B STA 13+79 (L) Grade

DA = .22 C = .60 Q = .47

S_L = .0729 K = 28 D = .07'

Q_i = .37 cfs

→ .47 cfs - .37 cfs = .10 cfs carryover to SS # 13B - 12D

SS # 13B - 8D Road B STA 13+79 (R) Grade

DA = .20 C = .60 Q = .42 cfs

S_L = .0729 K = 28 .07'

Q_i = .35 cfs

→ .42 cfs - .35 cfs = .07 cfs carryover to structure SS # 13B - 8D

SS # 13B - 12D Road B STA 14+86 (L) - Sump

DA = .19 Ac C = .60 Q = .40 cfs

Q_t = .40 cfs + .10 cfs from SS # 13B - 9D

w D_{MAX} = .13' Q_t = .50 cfs

→ $Q_{i\,weir}$ = 1.20 cfs > .50 cfs

∴ use 1 grate

SS # 13B - 11D Road B STA 14+86 (R) Sump

DA = .14 Ac C = .60 Q = .29 cfs

w/ D_{MAX} = .13'

$Q_{i\,weir}$ = 1.20 cfs > .29 cfs

→ ∴ use 1 grate

System D cont

SS #13B-10D ROAD C STA 10+38 (L) Grade

DA = .01 AC C = .80 Q = .03 cfs

SL = .0367 K = 22 D = .03'

→ Qi = .07 cfs ∴ use 1 grate

SS # #13B-7D ROAD C STA 10+38 (R) Grade

DA = .02 C = .75 Q = .05 cfs + .07 cfs carryover from SS#13B-8

SL = .0367 Qc = .12 cfs

K = 22 D = .05

→ Qi = .15 cfs ∴ use 1 grate

SS # 13B-6D ROAD C STA 11+43 (R) Grade

DA = .60 C = .45 Q = .95 cfs

SL = .0125 D = .13'

K = 16

→ Qi = .57 cfs

.95 cfs − .57 cfs = .38 cfs carryover to SS# 13B-4D

SS # 13B-4D ROAD C STA 12+80 (R) Grade

DA = .83 C = .45 Q = 1.31 cfs

SL = .08 D = .11'

K = 29

Qi = .70 cfs

→ 1.31 cfs − .70 cfs = .61 cfs carryover to SS#13B-3D

System D cont

SS #13B-5D Road B Sta 12+80 (L) grade

DA = .15 Ac C = .50 Q = .26 cfs

S_L = .08 D = .06

K = 29

Q_i = .27 cfs > .26 cfs

→ therefore use 1 grate

SS #13B-3D Road B sta 14+50 (sump)

DA = 1.18 Ac C = .40 Q = 1.65 cfs

Q_t = 1.65 cfs + .61 cfs
from SS#13B 4.

for D = .13 Q_t = 2.26 cfs

→ Q_i (weir) for 2 grates = 2.39 cfs

use 2 grates

System E

SS #13B-2E ROAD B Sump

DA = .53 C = .60 Q = 1.11 cfs

Q_i min for D = .13

is Q_i = 1.20 cfs > 1.11

→ use 1 grate

Reservoir Report

English

Reservoir No. 1 - Dam 3

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	46.00	223,694	0	0
2.00	48.00	291,107	514,801	514,801
4.00	50.00	358,520	649,627	1,164,428 ← current

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 12.0	0.0	0.0	0.0
Span in	= 12.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 36.53	0.00	0.00	0.00
Length ft	= 130.0	0.0	0.0	0.0
Slope %	= 1.04	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= -----	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.6	0.0	0.0	0.0
Crest El. ft	= 46.00	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Eqn. Exp.	= 1.50	0.00	0.00	0.00
Multi-Stage	= Yes	No	No	No

Tailwater Elevation = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	46.00	8.40	---	---	---	0.00	---	---	---	0.00
2.00	514,801	48.00	0.00	---	---	---	0.00	---	---	---	12.52
4.00	1,164,428	50.00	0.00	---	---	---	0.00	---	---	---	13.62

Hydrograph Plot

English

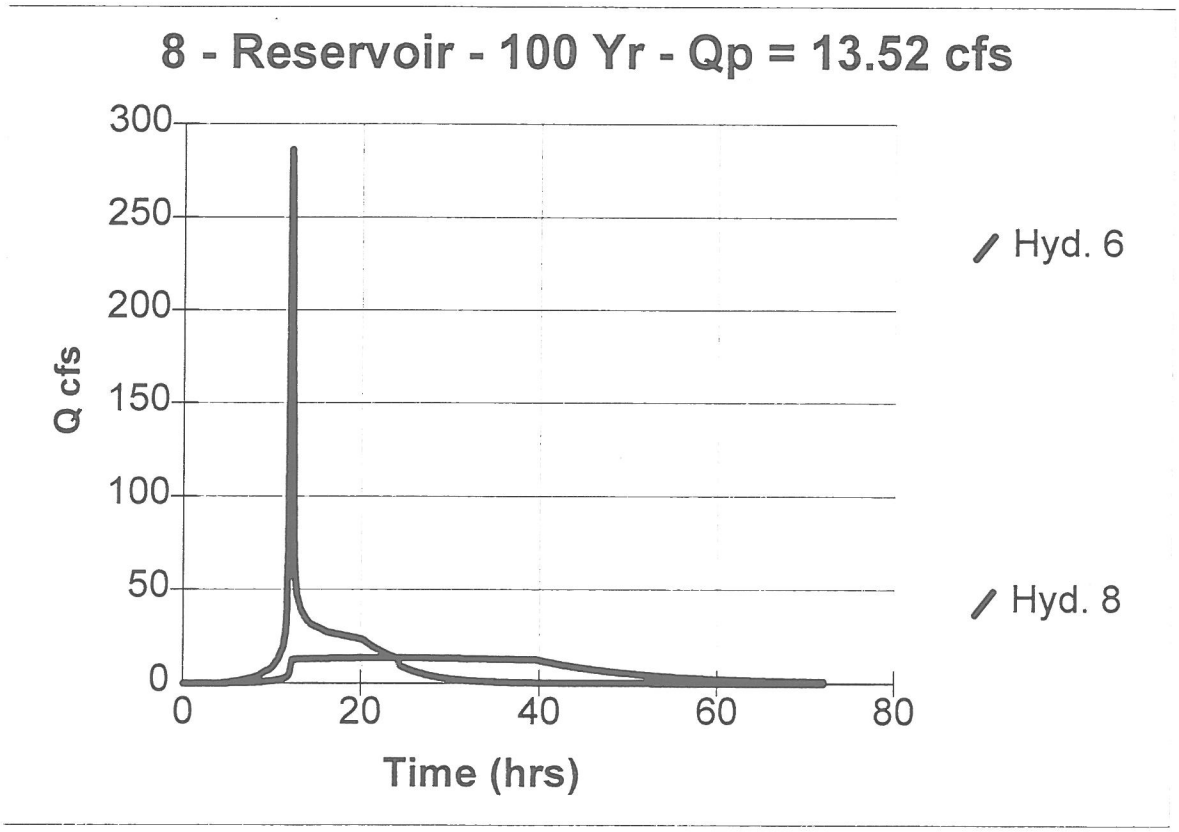
Hyd. No. 8

Routed Dam 3

Hydrograph type	= Reservoir	Peak discharge	= 13.52 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Inflow hyd. No.	= 6	Reservoir name	= Dam 3
Max. Elevation	= 49.81 ft ← current	Max. Storage	= 1,102,537 cuft

Storage Indication method used.

Total Volume = 1,815,911 cuft



Reservoir Report

English

Reservoir No. 3 - Revised_Dam 3

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	46.00	223,694	0	0
2.00	48.00	291,037	514,731	514,731
4.00	50.00	358,220	649,257	1,163,988 ← updated storage

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 12.0	0.0	0.0	0.0
Span in	= 12.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 36.53	0.00	0.00	0.00
Length ft	= 130.0	0.0	0.0	0.0
Slope %	= 1.04	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= -----	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.6	0.0	0.0	0.0
Crest El. ft	= 46.00	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Eqn. Exp.	= 1.50	0.00	0.00	0.00
Multi-Stage	= Yes	No	No	No

Tailwater Elevation = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	46.00	8.40	---	---	---	0.00	---	---	---	0.00
2.00	514,731	48.00	0.00	---	---	---	0.00	---	---	---	12.52
4.00	1,163,988	50.00	0.00	---	---	---	0.00	---	---	---	13.62

Hydrograph Plot

English

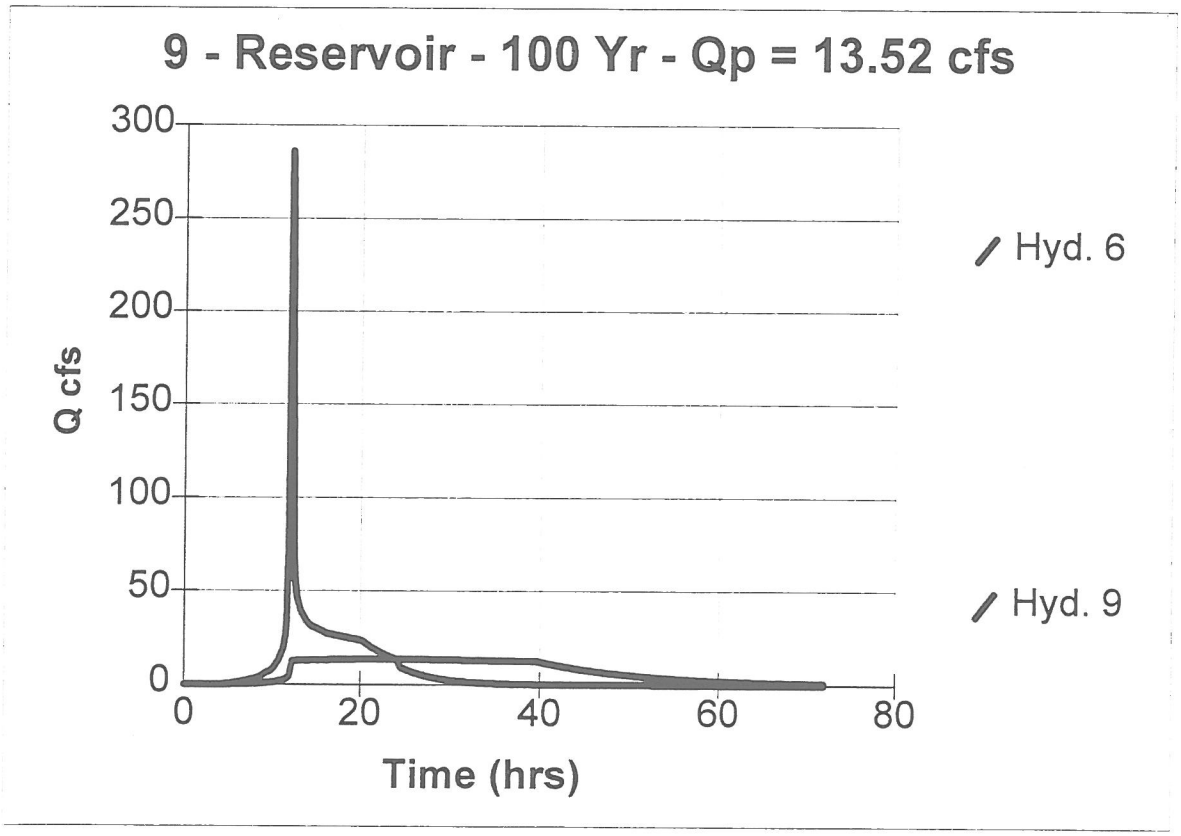
Hyd. No. 9

Rev. Dam3 Routed

Hydrograph type	= Reservoir	Peak discharge	= 13.52 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Inflow hyd. No.	= 6	Reservoir name	= Revised_Dam 3
Max. Elevation	= 49.81 ft ← NO NET CHANGE	Max. Storage	= 1,102,512 cuft

Storage Indication method used.

Total Volume = 1,815,925 cuft



FAX

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Reservoir Report

Reservoir No. 1 - Dam 3

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	46.00	223,694	0	0
2.00	48.00	291,037	514,731	514,731
4.00	50.00	358,220	649,257	1,163,988 (current pond volume)

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 12.0	0.0	0.0	0.0
Span in	= 12.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 36.53	0.00	0.00	0.00
Length ft	= 130.0	0.0	0.0	0.0
Slope %	= 1.04	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.60	0.00	0.00	0.00
Crest El. ft	= 46.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Riser	—	—	—
Multi-Stage	= Yes	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Stage / Storage / Discharge Table

Note: All outflows have been analyzed under inlet and outlet control

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	46.00	0.00	—	—	—	0.00	—	—	—	—	0.00
2.00	514,731	48.00	9.22	—	—	—	9.22	—	—	—	—	9.22
4.00	1,163,988	50.00	9.97	—	—	—	9.90	—	—	—	—	9.90

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

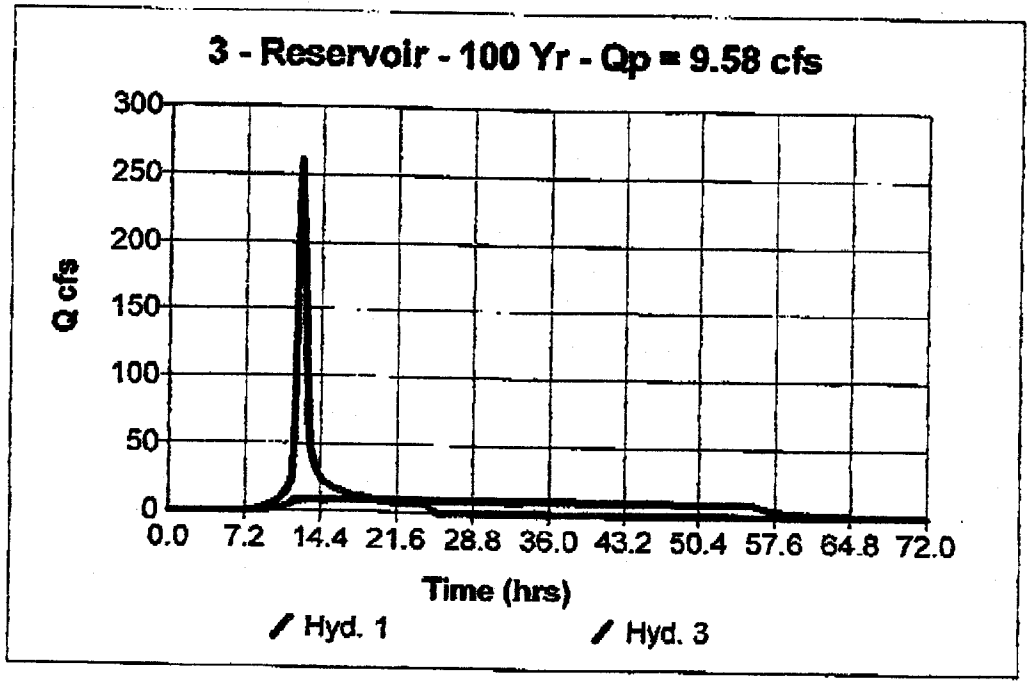
Hyd. No. 3

Dam 3 Routed

Hydrograph type	= Reservoir	Peak discharge	= 9.58 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Inflow hyd. No.	= 1	Reservoir name	= Dam 3
Max. Elevation	= 49.93 ft – Current Design Elevation	Max. Storage	= 1,141,627 cuft

Storage indication method used.

Hydrograph Volume = 1,572,094 cuft



Reservoir Report

Reservoir No. 2 - Dam 3 (revised)

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	46.00	222,119	0	0
2.00	48.00	288,397	510,516	510,516
4.00	50.00	354,500	642,897	1,153,413 (NET REDUCTION – 10,575 cu.ft)

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 12.0	0.0	0.0	0.0
Span in	= 12.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 36.53	0.00	0.00	0.00
Length ft	= 130.0	0.0	0.0	0.0
Slope %	= 1.04	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.60	0.00	0.00	0.00
Crest El. ft	= 46.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= Riser	—	—	—
Multi-Stage	= Yes	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Stage / Storage / Discharge Table

Note: All outflows have been analyzed under inlet and outlet control.

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	46.00	0.00	—	—	—	0.00	—	—	—	—	0.00
2.00	510,516	48.00	9.22	—	—	—	9.22	—	—	—	—	9.22
4.00	1,153,413	50.00	9.97	—	—	—	9.90	—	—	—	—	9.90

Hydrograph Plot

Hydraflow Hydrographs by Intellisolve

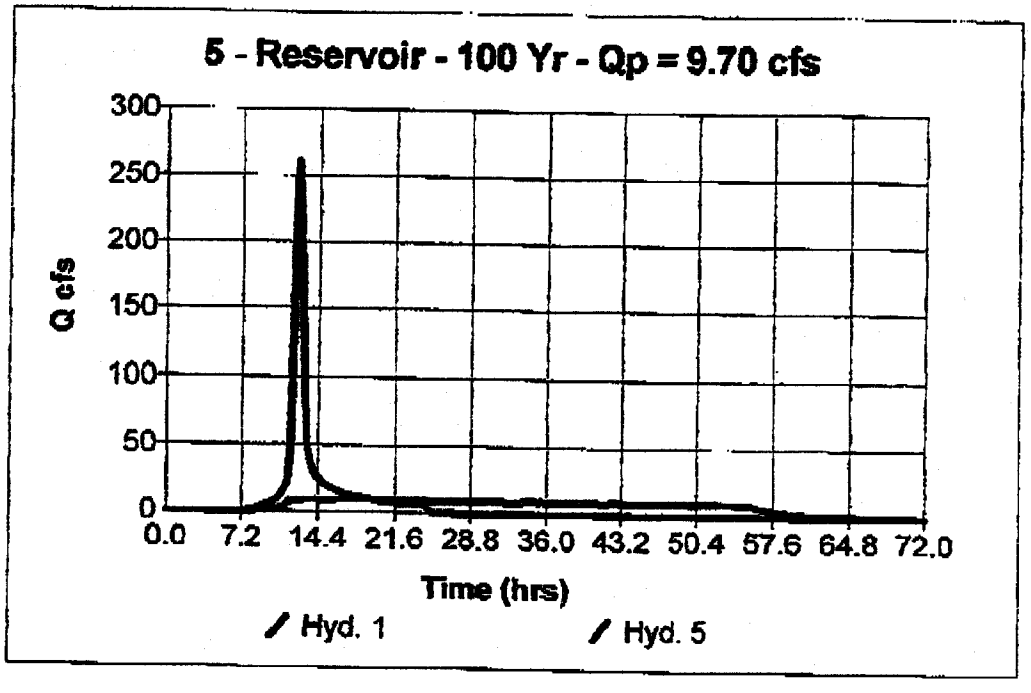
Hyd. No. 5

Dam 3 Routed (Revised)

Hydrograph type	= Reservoir	Peak discharge	= 9.70 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Inflow hyd. No.	= 1	Reservoir name	= Dam 3 (revised)
Max. Elevation	= 49.96 ft – Revised Elevation	Max. Storage	= 1,139,805 cuft

Storage Indication method used.

Hydrograph Volume = 1,572,176 cuft



TOTAL P.06

RESULTS OF CONSTRUCTION MONITORING AND TESTING
DAM AT SECTION II
FORD'S COLONY
JAMES CITY COUNTY, VIRGINIA

ECS PROJECT NO. R3967

Prepared for:

Mr. Jimmy Minor
Longhill Excavating, Inc.
5099 Longhill Road
Williamsburg, Virginia 23188
July 16, 1998

ENGINEERING CONSULTING SERVICES, LTD.
Geotechnical • Construction Materials • Environmental

July 15, 1998

Mr. Jimmy Minor
Longhill Excavating, Inc.
5099 Longhill Road
Williamsburg, Virginia 23188

REF: Results of Construction Monitoring and Testing
Dam at Section II
Ford's Colony Development
James City County, Virginia

ECS Project No. R3967

Dear Mr. Minor:

As requested, Engineering Consulting Services, Ltd. (ECS, Ltd.) observed and evaluated the construction of the above referenced dam. ECS, Ltd.'s field observations and testing generally included determining the depth of the key trench and observing the placement and compaction of material used for the core and the shell of the dam. ECS, Ltd. conducted density testing to determine the degree of compaction during the fill placement for the core and the shell.

The undersigned Senior Geotechnical Engineer was on site on October 9, 1997, to coordinate test pits throughout the centerline of the proposed dam. At the time of this initial visit the project area had just recently been cleared of trees and underbrush. The centerline of the dam had been staked by AES Consulting Engineers.

Based on the results of these test pits, it was recommended that the key trench extend to an approximate depth of elevation 39 feet throughout the center most section and north shoulder of the dam. At the southern most shoulder of the dam, it was recommended that the key trench be stepped up to approximately elevation 44 feet and continue to be stepped up at the south shoulder as required so as to maintain a minimum 3-foot embedment depth.

ECS recommended that the key trench be a minimum 6-feet wide at the base and the core comprised of relatively impermeable clay material. In general accordance with the Dam Construction Notes and X-Section shown on the plans by AES, the core of the dam should be compacted to at least 95% of the core material's maximum dry density based on the Standard Proctor (ASTM D698), and the shell of the dam should be compacted to at least 90% of the shell material's maximum dry density based on the Standard Proctor (ASTM D698).

2119-D North Hamilton Street, Richmond Virginia 23230 • (804) 353-6333 • Fax (804) 353-9478
Offices: Richmond, VA • Washington, D.C. • Norfolk, VA • Williamsburg, VA • Roanoke, VA • Fredericksburg, VA • Danville, VA
Baltimore, MD • Frederick, MD • Research Triangle Park, NC • Wilmington, NC • Charlotte, NC • Greensboro, NC • Greenville, SC • Atlanta, GA

The Standard Proctor test values from the construction of the Dam at Section VI & XIV (ECS Project No. R3621) were used as the basis for determining the percent of compaction during fill placement. In accordance with the project plans and the recommendations of ECS, Ltd., the core of the dam was compacted to at least 95% of the soil's maximum dry density as determined by the Standard Proctor and the shell of the dam was compacted to at least 90% of the soil's maximum dry density as determined by the Standard Proctor. Due to a rapid seepage of water during excavation of the key trench, an acceptable bridge lift was used to minimize the affects of the influx of water. In addition, deeper sections of the key trench were excavated and backfilled in approximate 15 foot segments. During fill placement and construction, an ECS, Ltd. technician made periodic site visits on a routine basis and/or at the request of Longhill Excavating to observe fill placement operations and determine the percent compaction of the fill soils being placed.

The field reports documenting the site visits, and the results of the field density tests are included with this letter.

Based on the initial site visit by the Senior Geotechnical Engineer and the results of the compaction testing performed by ECS technicians during construction of the core and shell, it is ECS, Ltd.'s professional opinion that **the dam was constructed in general accordance with the project drawings and specifications and/or in accordance with generally accepted engineering construction practices for a dam of this size and type.**

ECS, Ltd. appreciates the opportunity to be of service to you on this project. Please feel free to call if you have any questions that require further assistance.

Respectfully,

ENGINEERING CONSULTING SERVICES, LTD.

Bradford J. Harris
Staff Geotechnical Engineer

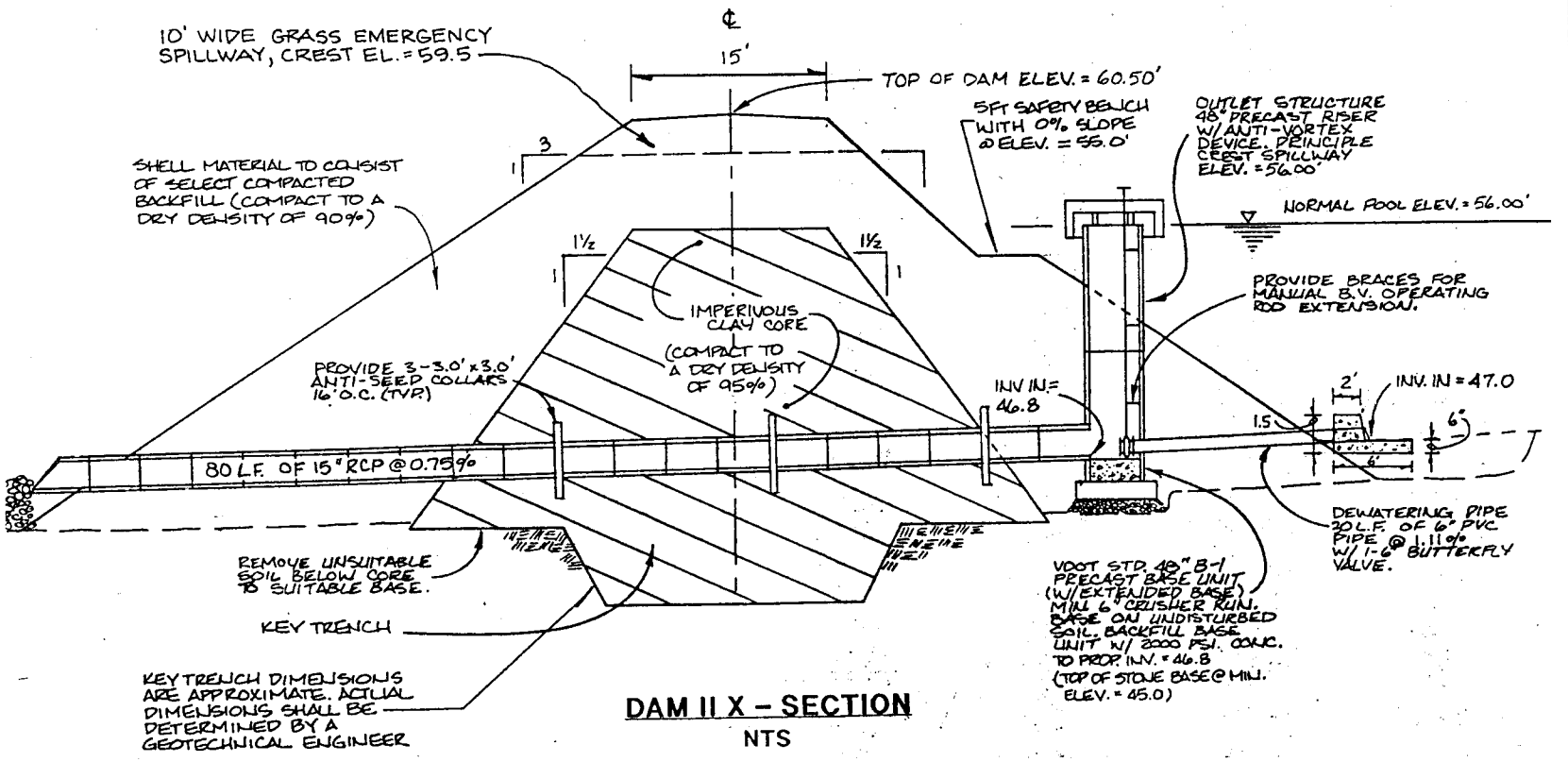
David E. Stinnette, P.E.
Senior Geotechnical Engineer

COMMONWEALTH OF VIRGINIA
DAVID E. STINNETTE
NO. 028419
PROFESSIONAL ENGINEER

Attachments: I. Dam Cross-Section
II. Key Trench Letter and Field Reports with Density Test Results
III. Standard Proctor Laboratory Test Results (from ECS Project No. R3621)

GEOTECH/LTRS/R3967LT2

DAM II



DAM II X – SECTION
NTS

Reference: AES Consulting Engineers [Project No. 5652-63, Dated 2/97]

AES LTD
ENGINEERING CONSULTING SERVICES, LTD.
2119-D North Hamilton Street
Richmond, VA 23230
PH: (804) 353-6333
FAX: (804) 353-9478

DAM II - CROSS SECTION

DAM AT SECTION II
FORD'S COLONY
JAMES CITY COUNTY, VIRGINIA
For
LONGHILL EXCAVATING

DES	NTS	R3967	7-10-98	1 of 1

ENGINEERING CONSULTING SERVICES, LTD.
Geotechnical • Construction Materials • Environmental

October 9, 1997

Mr. Jimmy Minor
Longhill Excavating, Inc.
5099 Longhill Road
Williamsburg, Virginia 23188

ECS Project No. R3967

REF: Dam II – Williamsburg West (9 Hole Golf Course)
Ford's Colony Development
James City County, Virginia

Dear Mr. Minor:

As requested, the undersigned engineer visited the above referenced project site on October 7, 1997, to observe and evaluate three (3) test pits performed along the centerline of the proposed dam. The test pits were performed for the purpose of evaluating the shallow subsurface conditions and establishing key trench construction parameters. The test pits, performed with a tracked excavator, were extended to depths on the order of 12 to 16 feet below the existing surface grades at the approximate locations indicated on the diagram attached with this letter. In general, one test pit was performed near the center of the ravine and one test pit was performed at each shoulder location. A log of each test pit is included with this letter.

Based on the results of these test pits, it is our recommendation that the key trench extend to an approximate depth of elevation 39 feet throughout the center most section and north shoulder of the dam. At the southern most shoulder of the dam, we anticipate that the key trench may be stepped up to approximately elevation 44 feet and continue to be stepped up at the south shoulder as required so as to maintain a minimum 3-foot embedment depth.

We recommend that the key trench be a minimum 6-feet wide at the base and the core comprised of relatively impermeable clay material. In general accordance with the Dam Construction Notes and X-Section shown on the plans by AES, the core of the dam should be compacted to at least 95% of the core materials maximum dry density based on the Standard Proctor (ASTM D698).

It is recommended that field personnel with Engineering Consulting Services, Ltd. (ECS, Ltd.) be present on-site during critical key trench excavation and backfilling operations so as to confirm suitable bearing material for the key trench and to perform compaction testing.

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It is noted that the test pits encountered erratic subsurface soil conditions. Typically a clayey SAND material was encountered throughout the low point of the dam and along the south embankment to depths of approximately EL. 40 to 44 feet. The test pit on the north side of the embankment encountered similar type material to a depth of approximate EL. 44 feet where a deposit of organic silt containing large roots and significant wood material was encountered to a depth of approximate EL. 40 feet. We expect that a key trench extended to an elevation of approximately 39 feet should be sufficient to penetrate the upper permeable and/or unsuitable organic materials that were observed throughout the center and north side of the dam alignment.

ECS, Ltd. has appreciated the opportunity to be of service to you on this project. Please feel free to call us should you have questions or need further assistance.

Respectfully,

ENGINEERING CONSULTING SERVICES, LTD.

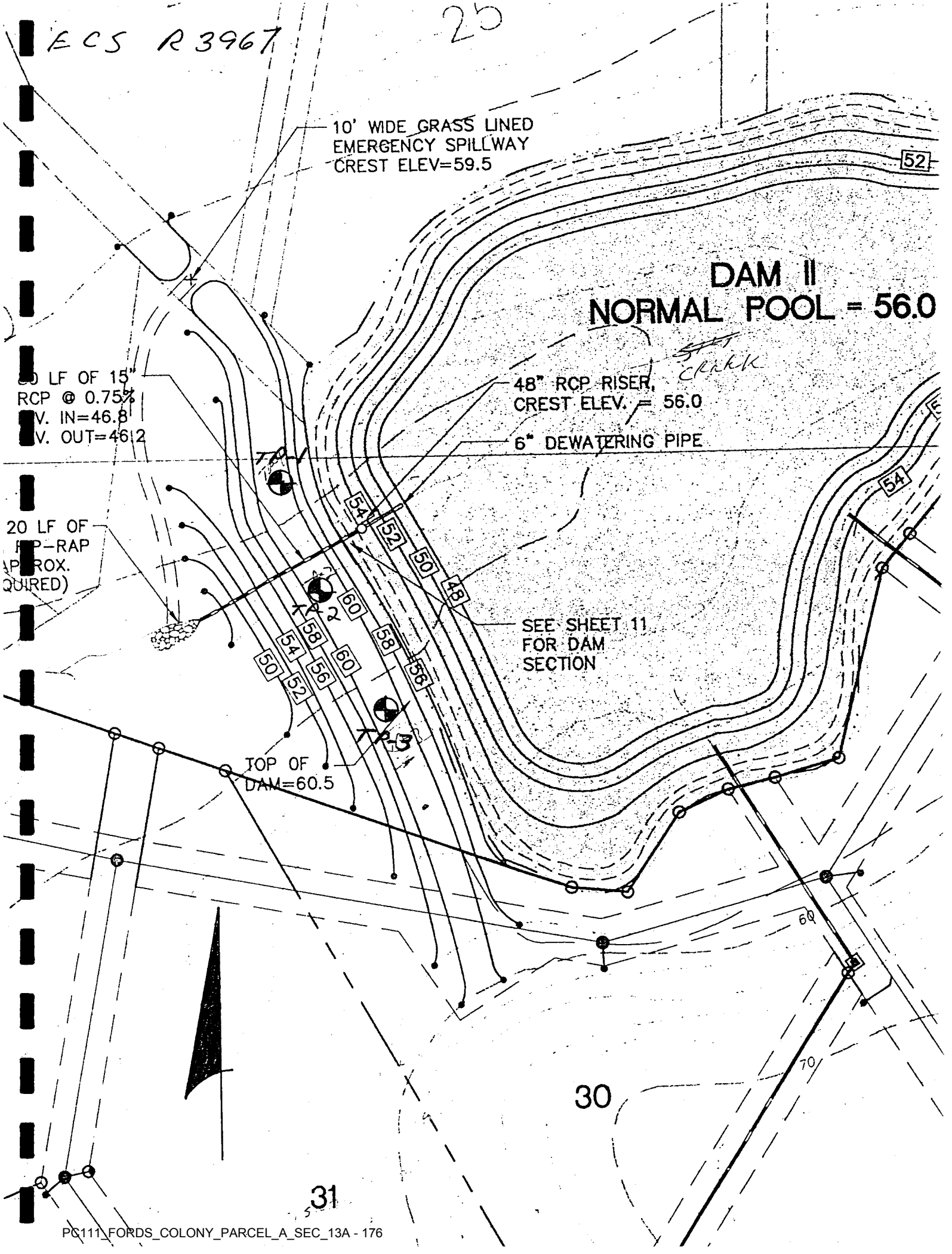
David E. Stinnette, P.E.
Engineering Services Manager

Attachments: I. Test Pit Location Diagram
II. Test Pit Logs

GEOTECH/LTRS/R3967LTR

ECS R3967

25


10' WIDE GRASS LINED
EMERGENCY SPILLWAY
CREST ELEV=59.5
DAM II
NORMAL POOL = 56.0
48" RCP RISER,
CREST ELEV. = 56.0
6" DEWATERING PIPE
LF OF 15"
RCP @ 0.75%
V. IN=46.8
V. OUT=46.2
20 LF OF
RIP-RAP
ROX.
QUIRED)
SEE SHEET 11
FOR DAM
SECTION
TOP OF
DAM=60.5
52
54
52
50
48
60
58
54
56
60
58
56
50
52
54
60
70
30
31

TEST PIT FIELD LOG

JOB NO. R3967 TEST PIT NO. TP-1

JOB NAME AND LOCATION DAM II - WMSBG WEST (9 HOLE GC)

OWNER FORD'S COLONY ENGINEER AES

ARCHITECT _____ WEATHER CLEAR DATE 10/7/97

EXCAVATION EQUIPMENT

TIME STARTED 11:00 CONTRACTOR LONGHILL MAKE _____

TIME COMPLETED 11:15 OPERATOR _____ MODEL _____

GROUND ELEV. 51 +/- CAPACITY _____ c.v. REACH _____ ft.

DEPTH	QP	SOIL DESCRIPTION	WATER CONTENT	EXCAV. EFFORT	BOULDER COUNT QTY. CL.	REMARK NO.
0		TAN AND GRAY, SILTY SAND WITH CLAY (SM).				
1'						
2'						
3'						
4'						
5'						
6'						
7'		(el. 44)				
8'		DARK BROWN, ORGANIC SILT WITH LARGE ROOTS AND WOOD DEBRIS (OH).				
9'						
10'						
11'		(el. 40)				
12'		ORANGISH AND GRAYISH TAN, CLAYEY SAND (SC-CL).				
13'						
14'						

REMARKS: (END @ 16 FT)

QP = CALIBRATED PENETROMETER (TONS/FT^2)

ECS LTD
14000 THUNDERBOLT PLACE
SUITE R
CHANTILLY, VA. 22021
703/471-8400
FAX/834-5527

PROPORTIONS USED

TRACE (tr.)	5-12%
WITH (w/)	12-29%
ADD TO NAME (SANDY)	30-50%

ABBREV.

F - FINE
M - MEDIUM
C - COURSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E - EASY
M - MODERATE
D - DIFFICULT

GROUNDWATER

TPFLRAC

TEST PIT FIELD LOG

JOB NO. R3967 TEST PIT NO. TP-2

JOB NAME AND LOCATION DAM II - WMSBG WEST (9 HOLE G.C)

OWNER FORD'S COLONY ENGINEER AES

ARCHITECT _____ WEATHER CLEAR DATE 10/7/97

EXCAVATION EQUIPMENT

TIME STARTED 11:15 CONTRACTOR LONGHILL MAKE _____

TIME COMPLETED 11:30 OPERATOR _____ MODEL _____

GROUND ELEV. 49 +/- CAPACITY _____ c.v. REACH _____ ft.

DEPTH	QP	SOIL DESCRIPTION	WATER CONTENT	EXCAV. EFFORT	BOULDER COUNT QTY. CL.	REMARK NO.
0		GRAYISH BROWN, SANDY SILT WITH ORGANICS (TOPSOIL)				
1'						
2'		(el. 47)				
3'		ORANGISH TAN, SILTY SAND WITH TRACE CLAY (SM)				
4'						
5'						
6'						
7'						
8'						
9'		(el. 40)				
10'		ORANGE AND GRAY, SILTY CLAY WITH SAND (CL-SC). SATURATED.				
11'						
12'						
13'						
14'		(el. 35) GRAYISH TAN SILTY SAND WITH				

REMARKS: MARINE SHELL HASH (SM). (END @ 15.5 FT)

QP = CALIBRATED PENETROMETER (TONS/FT^2)

ECS LTD
14000 THUNDERBOLT PLACE
SUITE R
CHANTILLY, VA. 22021
703/471-8400
FAX/834-5527

PROPORTIONS USED

TRACE (tr.)	5-12%
WITH (w/)	12-29%
ADD TO NAME (SANDY)	30-50%

ABBREV.

F - FINE
M - MEDIUM
C - COURSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E - EASY
M - MODERATE
D - DIFFICULT

GROUNDWATER

TEST PIT FIELD LOG

JOB NO. R3967 TEST PIT NO. TP-3

JOB NAME AND LOCATION DAM II - WMSBG. WEST (9 HOLE G.C.)

OWNER FORD'S COLONY ENGINEER AES

ARCHITECT _____ WEATHER CLEAR DATE 10/7/97

EXCAVATION EQUIPMENT

TIME STARTED 11:30 CONTRACTOR LONGHILL MAKE _____

TIME COMPLETED 11:45 OPERATOR _____ MODEL _____

GROUND ELEV. 52 +/- CAPACITY _____ c.v. REACH _____ ft.

DEPTH	QP	SOIL DESCRIPTION	WATER CONTENT	EXCAV. EFFORT	BOULDER COUNT QTY. CL.	REMARK NO.
0		TOPSOIL				
1'		LIGHT GRAYISH TAN, SANDY AND CLAYEY SILT (ML-SM)				
2'		(el. 50)				
3'		ORANGISH RED, CLAYEY SAND (SC)				
4'						
5'						
6'						
7'						
8'		(el. 44)				
9'		TANNISH ORANGE, SILTY CLAY WITH TRACE SAND (CL)				
10'						
11'						
12'		(el. 40)				
13'		TANNISH GRAY, SILTY SAND WITH MARINE SHELL FRAGMENTS (SM)				
14'						

REMARKS: (END @ 12 FT +)

QP = CALIBRATED PENETROMETER (TONS/FT^2)

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14000 THUNDERBOLT PLACE
SUITE R
CHANTILLY, VA. 22021
703/471-8400
FAX/834-5527

PROPORTIONS USED

TRACE (tr.)	5-12%
WITH (w/)	12-29%
ADD TO NAME (SANDY)	30-50%

ABBREV.

F - FINE
M - MEDIUM
C - COURSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E - EASY
M - MODERATE
D - DIFFICULT

GROUNDWATER

TPFL.RAC

ECS, Ltd.
Engineering Co. ulting Services, Ltd.
2119-D North Hamilton Street
Richmond, VA 23230
Phone: (804)353-6333
Fax #: (804)353-9478

MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Monday 10/13/97

Location James City County, VA Weather/Temp / °

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 10:45 Depart Job 11:00

Tolls $ 0.00 Total Hours on Job 0.25

Travel Chg$ 0.00 Laboratory Time 0.25

Mileage 12 Travel Time 0.25

TOTAL CHARGEABLE HOURS 0.75

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned engineering technician arrived on site, as requested, to observe the excavation of the dam key.

Excavations extended into clayey material approximately 8 feet below ground surface. Due to rapid seepage of water, contractor is obligated to construct the dam in 15 foot (length) sections to escape the influx of groundwater.

By Jennifer Bilskis

ECS, Ltd.
Engineering Consulting Services, Ltd.
2119-D North Hamilton Street
Richmond, VA 23230
Phone: (804)353-6333
Fax #: (804)353-9478

MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Monday 10/13/97

Location James City County, VA Weather/Temp Sunny /85°

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 14:00 Depart Job 17:00

Tolls $ 0.00 Total Hours on Job 3.00

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 10 Travel Time 0.25

TOTAL CHARGEABLE HOURS 3.75

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned engineering technician arrived on site as requested, to observe the compaction of soils for the core of the new dam. Various elevations from 45 feet to 52.5 feet were tested. Only half of the dam was excavated as of today.

Utilizing the Nuclear Method (ASTM D-2922) to check the compaction of soils, test results indicated that the compacted soils met the project requirements of 95% of the maximum dry density as determined by using the Standard Proctor (ASTM D-698).

By David Eakes

FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: Dam #2 JOB NO.: R 3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: Mon 13 Oct. 1997

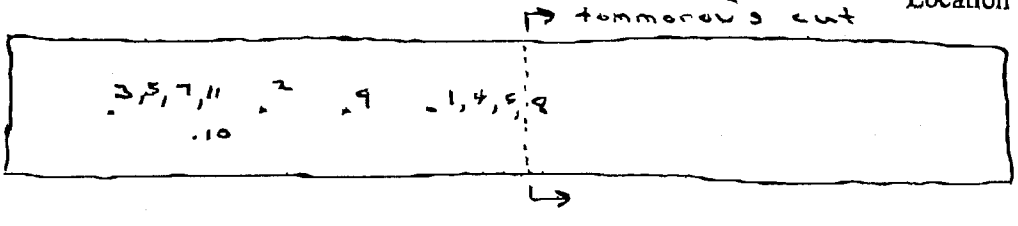
STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: Longhill Excavating CLIENT: Longhill Excavating TECH: Eakes

TEST NO.	10-13-1	10-13-2	10-13-3	10-13-4	10-13-5	10-13-6	10-13-7
MOISTURE CONTENT (PCF)	7.4	9.0	8.9	8.4	8.6	9.1	9.0
WET DENSITY (PCF)	121.7	117.0	125.1	123.7	115.5	124.9	125.7
DRY DENSITY (PCF)	114.3	108.0	116.1	115.3	106.9	115.8	117.8
MOISTURE CONTENT (%)	6.44	8.32	7.69	7.29	8.0	7.85	7.52
STANDARD PROCTOR MODIFIED PROCTOR	117.6	103.3	117.6	117.6	103.3	117.6	117.6
OPT. WATER CONTENT	12.5	19.0	12.5	12.5	19.0	12.5	12.5
LIFT, ELEVATION OR SOIL MARK	elev. 45	elev 46.5	elev 48	elev 46	elev 49	elev 47	elev 50
PROBE DEPTH (INCH)	6	6	6	6	6	6	6
PERCENT COMPACTION	97.2	104.5	98.7	98.0	103.5	98.5	100.1
REQUIRED COMPACTION	95	95	95	95	95	95	95
RAR (TEST NO.)							

RAR = Area Rerolled-Retest

Location Diagram/Remarks:



FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: Dam #2 JOB NO.: R 3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: Mon 13, Oct. 1997

STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: Longhill Excavating CLIENT: Longhill Excavating TECH: Eakes

TEST NO.	10-13-8	10-13-9	10-13-10	10-13-11	10-13-12		
MOISTURE CONTENT (PCF)	9.5	9.0	9.3	9.7			
WET DENSITY (PCF)	125.4	119.5	124.1	121.0			
DRY DENSITY (PCF)	115.9	110.5	114.8	111.4			
MOISTURE CONTENT (%)	9.19	8.11	8.13	8.69			
STANDARD PROCTOR MODIFIED PROCTOR	117.6	103.3	117.6	117.6			
OPT. WATER CONTENT	12.5	19.0	12.5	12.5			
LIFT, ELEVATION OR SOIL MARK	elev 48.5	elev 49.5	elev 51	elev 52.5			
PROBE DEPTH (INCH)	6	6	6	6			
PERCENT COMPACTION	98.6	107.0	97.6	94.7			
REQUIRED COMPACTION	95	95	95	95			
AR (TEST NO.)							

AR = Area Rerolled-Retest

Location Diagram/Remarks:

ECS, Ltd.
Engineering Consulting Services, Ltd.
2119-D North Hamilton Street
Richmond, VA 23230
Phone: (804)353-6333
Fax #: (804)353-9478

MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Tuesday 10/14/97

Location James City County, VA Weather/Temp Sunny /85 °

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 15:00 Depart Job 17:00

Tolls $ 0.00 Total Hours on Job 2.00

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 10 Travel Time 0.25

TOTAL CHARGEABLE HOURS 2.75

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned engineering technician arrived on site, as requested, to observe the compaction of soils for the core of the new dam. Various elevations from 52 feet were tested.

Utilizing the Nuclear Method (ASTM D-2922) to check the compaction of soils, test results indicated that the compacted soils met the project requirements of 95% of the maximum dry density as determined by using the Standard Proctor (ASTM D-698).

By David Eakes

FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: Dam #2 JOB NO.: R 3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: Tues. 14 Oct. 1997

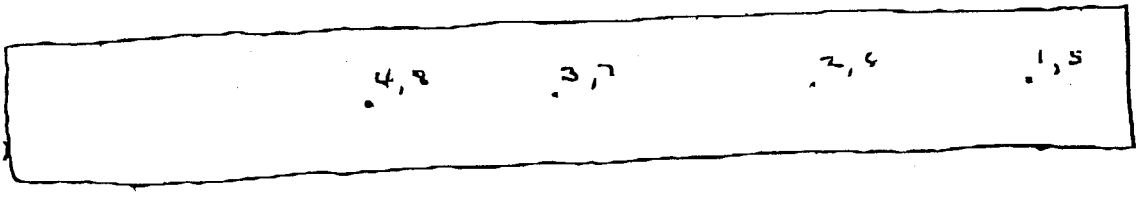
STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: Longhill Excavating CLIENT: _____ TECH: Eakes

TEST NO.	10-14-1	10-14-2	10-14-3	10-14-4	10-14-5	10-14-6	10-14-7	10-14-
MOISTURE CONTENT (PCF)	9.2	9.4	8.4	9.1	9.2	8.4	9.4	9.8
WET DENSITY (PCF)	116.1	115.6	113.9	119.9	120.3	117.6	117.8	123.4
DRY DENSITY (PCF)	106.9	106.2	105.5	110.8	111.1	109.1	108.4	113.6
MOISTURE CONTENT (%)	8.6	8.81	7.95	8.2	8.26	7.74	8.73	8.61
STANDARD PROCTOR MODIFIED PROCTOR	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3
OPT. WATER CONTENT	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
LIFT, ELEVATION OR SOIL MARK	elev. 45	elev 47	elev 48	elev 50	elev 48	elev 49	elev 50	elev 52
PROBE DEPTH (INCH)	6	6	6	6	6	6	6	6
PERCENT COMPACTION	103.5	102.8	102.2	107.3	107.6	105.6	104.9	110.0
REQUIRED COMPACTION	95	95	95	95	95	95	95	95
AR (TEST NO.)								

AR = Area Rerolled-Retest

Location Diagram/Remarks:



ECS, Ltd.
Engineering Consulting Services, Ltd.
2119-D North Hamilton Street
Richmond, VA 23230
Phone: (804)353-6333
Fax #: (804)353-9478

MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Friday 10/24/97

Location James City County, VA Weather/Temp / °

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 12:00 Depart Job 13:00

Tolls $ 0.00 Total Hours on Job 1.00

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 12 Travel Time 0.25

TOTAL CHARGEABLE HOURS 1.75

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned engineering technician arrived on site, as requested, to observe the compaction of soils for the new dam. Various elevations were tested.

Utilizing the nuclear method (ASTM D-2922) to check the compaction of soils, test results indicated that the compacted materials met the project requirements of 95% of the maximum dry density as determined by using the standard proctor (ASTM D-698).

By David Eakes

FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: Dam #2 JOB NO.: R 3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: Fri, 24 Oct, 1997

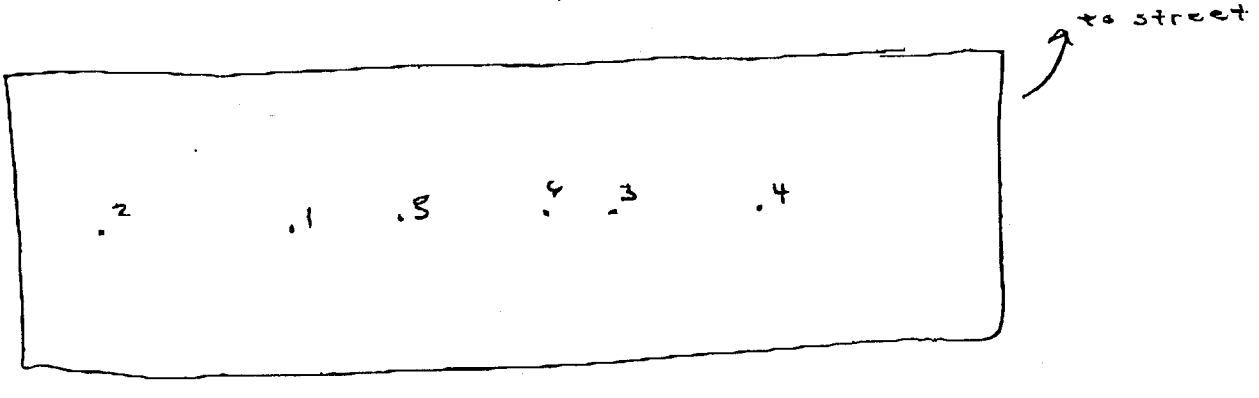
STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: Longhill Excavating CLIENT: _____ TECH: Eakes

TEST NO.	10-24-1	10-24-2	10-24-3	10-24-4	10-24-5	10-24-6	
MOISTURE CONTENT (PCF)	9.6	9.6	9.7	10.4	9.9	9.7	
WET DENSITY (PCF)	123.5	123.6	122.5	125.4	122.8	122.2	
DRY DENSITY (PCF)	113.8	114.3	112.8	115.0	112.9	112.5	
MOISTURE CONTENT (%)	8.47	8.12	8.63	9.06	8.8	8.63	
STANDARD PROCTOR MODIFIED PROCTOR	117.6	117.6	117.6	117.6	117.6	117.6	
OPT. WATER CONTENT	12.5	12.5	12.5	12.5	12.5	12.5	
LIFT, ELEVATION OR SOIL MARK	elev. 49'	elev. 50'	elev. 51'	elev. 53'	elev. 50'	elev. 52'	
PROBE DEPTH (INCH)	6	6	6	6	6	6	
PERCENT COMPACTION	96.77	97.20	95.92	97.81	95.98	95.66	
REQUIRED COMPACTION	95	95	95	95	95	95	
* AR (TEST NO.)							

* AR = Area Rerolled-Retest

Location Diagram/Remarks:



OCT-28-97 TUE 13:52 G K YODER MECH CORP

ECS, Ltd.
Engineering Consulting Services, Ltd.
2119-D North Hamilton Street
Richmond, VA 23230
Phone: (804)353-6333
Fax #: (804)353-9478

MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Friday 10/31/97

Location James City County, VA Weather/Temp Drizzly /60 °

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 14:30 Depart Job 15:45

Tolls $ 0.00 Total Hours on Job 1.25

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 10 Travel Time 0.25

TOTAL CHARGEABLE HOURS 2.00

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned engineering technician arrived on site, as requested, to observe the compaction of the core soils for various elevations of the dam.

Utilizing the Nuclear Method (ASTM D-2922) to check the compaction of soils, test results indicated that the compacted materials met the project requirements of 95% of the maximum dry density as determine by using the Standard Proctor (ASTM D-698).

By David Eakes

FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: Dam #2 JOB NO.: R3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: Fri. 31 Oct. 1997

STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: Longhill Excavating CLIENT: Longhill Excavating TECH: Eakes

TEST NO.	10-31-1	10-31-2	10-31-3	10-31-4	10-31-5	10-31-6	10-31-7	10-
MOISTURE CONTENT (PCF)	9.2	9.6	9.4	9.5	9.6	10.1	9.5	9.
WET DENSITY (PCF)	130.1	127.8	126.2	127.3	122.3	122.9	125.9	12
DRY DENSITY (PCF)	120.9	118.2	116.8	117.8	112.7	112.8	116.4	11
MOISTURE CONTENT (%)	7.62	8.16	8.05	8.06	8.52	8.91	8.15	8.
STANDARD PROCTOR MODIFIED PROCTOR	117.6	117.6	117.6	117.6	117.6	117.6	117.6	11
OPT. WATER CONTENT	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12
LIFT, ELEVATION OR SOIL MARK								
PROBE DEPTH (INCH)	6	6	6	6	6	6	6	6
PERCENT COMPACTION	102.8	100.5	99.31	100.2	95.82	95.92	99.0	99
REQUIRED COMPACTION	95	95	95	95	95	95	95	9
* AR (TEST NO.)								

* AR = Area Rerolled-Retest

Location Diagram/Remarks:

NOV- 4-97 TUE 14:23 G K YOUER MECH CORP

ECS, Ltd.
Engineering Consulting Services, Ltd.
2119-D North Hamilton Street
Richmond, VA 23230
Phone: (804)353-6333
Fax #: (804)353-9478

MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Tuesday 01/06/98

Location James City County, VA Weather/Temp Rain /60 °

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 09:30 Depart Job 10:15

Tolls $ 0.00 Total Hours on Job 0.75

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 12 Travel Time 0.25

TOTAL CHARGEABLE HOURS 1.50

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned engineering technician arrived on site, as requested, to observe the compaction of soils for the shell of the new dam.

Utilizing the Nuclear Method (ASTM D-2922) to check the compaction of soils, test results indicated that the compacted soils, met the project requirements of 90% of the maximum dry density as determined by using the Standard Proctor (ASTM D-698).

By David Eakes

FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: Dam II JOB NO.: R3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: Tues 6 Jan. 98

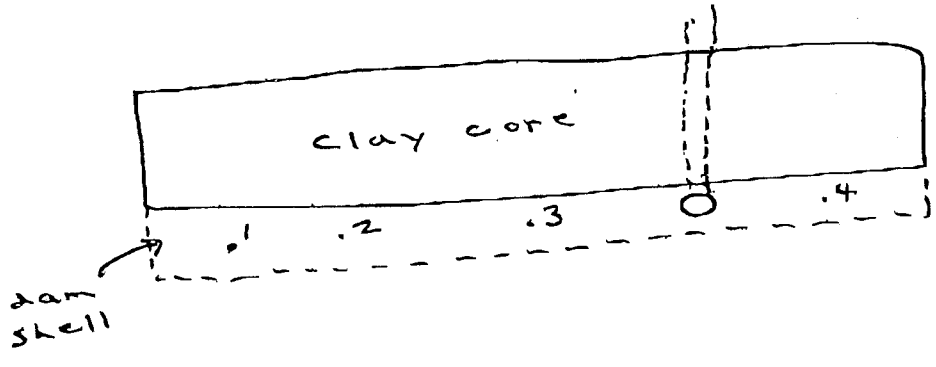
STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: Longhill Excavating CLIENT: Longhill Excavating TECH: Eakes

TEST NO.	1-6-1 ~~1-6-1~~	1-6-2	1-6-3	1-6-4			
MOISTURE CONTENT (PCF)	16.4	15.8	15.0	16.1			
WET DENSITY (PCF)	127.0	126.6	122.9	124.5			
DRY DENSITY (PCF)	110.6	110.9	107.9	108.4			
MOISTURE CONTENT (%)	14.85	14.23	13.94	14.84			
STANDARD PROCTOR MODIFIED PROCTOR	117.6	117.6	117.6	117.6			
OPT. WATER CONTENT	12.5	12.5	12.5	12.5			
LIFT, ELEVATION OR SOIL MARK	elev. 54'	elev. 52'	elev. 49'	elev. 49'			
PROBE DEPTH (INCH)	6	6	6	6			
PERCENT COMPACTION	94.0	94.0	91.8	92.2			
REQUIRED COMPACTION	90	90	90	90			
* AR (TEST NO.)							

* AR = Area Rerolled-Retest

Location Diagram/Remarks:



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MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Wednesday 01/07/98

Location James City County, VA Weather/Temp Cloudy /65 °

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 09:15/09:45 Depart Job 14:00/15:00

Tolls $ 0.00 Total Hours on Job 1.50

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 12 Travel Time 0.25

TOTAL CHARGEABLE HOURS 2.25

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned engineering technician arrived on site, as requested, to observe the compaction of soils for the shell of the new dam.

Utilizing the Nuclear Method (ASTM D-2922) to check the compaction of soils, test results indicated that the compacted soils met the project requirements of 90% of the maximum dry density as determined by using the Standard Proctor (ASTM D-698).

By David Eakes

FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: Dam #2 II JOB NO.: R 3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: Wed. 7 Jan 98

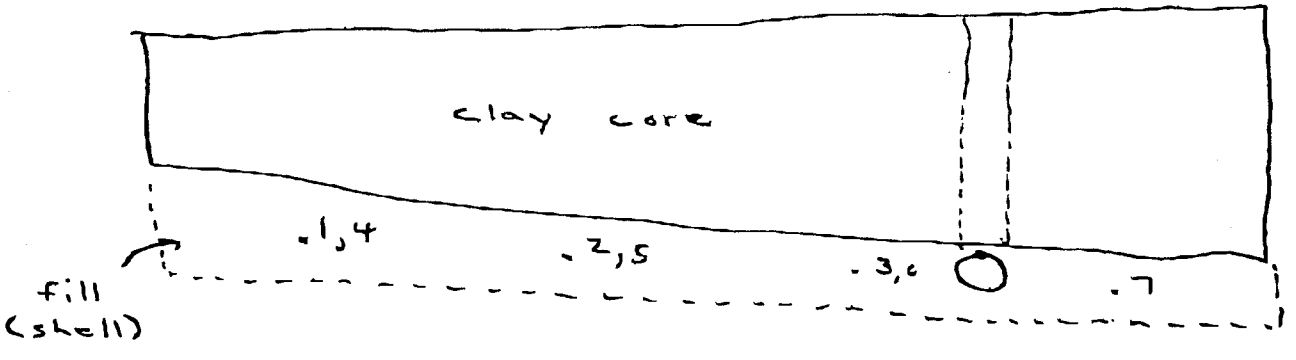
STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: Longhill Excavating CLIENT: Longhill Excavating TECH: Eakes

TEST NO.	1-7-1	1-7-2	1-7-3	1-7-4	1-7-5	1-7-6	1-7-7
MOISTURE CONTENT (PCF)	17.2	17.8	14.1	14.8	19.2	18.1	18.5
WET DENSITY (PCF)	127.0	126.8	124.6	127.6	125.8	123.6	126.2
DRY DENSITY (PCF)	109.9	109.6	110.5	107.8	106.5	105.5	107.7
MOISTURE CONTENT (%)	15.61	16.33	12.79	18.38	18.05	17.11	17.18
STANDARD PROCTOR MODIFIED PROCTOR	117.6	117.6	117.6	117.6	117.6	117.6	117.6
OPT. WATER CONTENT	12.5	12.5	12.5	12.5	12.5	12.5	12.5
LIFT, ELEVATION OR SOIL MARK	elev 55.5	elev. 53.5	elev. 50.5	elev. 59	elev. 55	elev. 52	elev. 52
PROBE DEPTH (INCH)	6	6	6	6	6	6	6
PERCENT COMPACTION	93.5	92.7	94.0	92.	90.56	89.7	91.5
REQUIRED COMPACTION	90	90	90	90	90	90	90
* AR (TEST NO.)							

* AR = Area Rerolled-Retest

Location Diagram/Remarks:



JAN- 8-98 THU 17:12 G K YODER MECH CORP 18048251980 P.08

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Engineering Consulting Services, Ltd.
2119-D North Hamilton Street
Richmond, VA 23230
Phone: (804)353-6333
Fax #: (804)353-9478

MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Monday 06/22/98

Location James City County, VA Weather/Temp Cloudy /85 °

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 08:00 Depart Job 08:30

Tolls $ 0.00 Total Hours on Job 0.50

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 15 Travel Time 0.25

TOTAL CHARGEABLE HOURS 1.25

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned Engineering Technician arrived on site, as requested, to observe the placement and compaction of engineered fill for elevations 57' and 58' on the core of the dam. Please see attached sketch.

The Nuclear Method (ASTM D-2922) was used to test the compaction of the soils. Test results indicated that the compacted material at the areas tested met or exceeded the project requirements of 90% of the maximum dry density as obtained in our laboratory by using the Standard Proctor Method (ASTM D-698). Several areas required recompaction after initial testing to achieve the required compaction.

Soils observed on this date appeared to be placed in accordance with project specifications with regard to thickness and moisture content.

By Jason Quinter

FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: FORDS COLONY OAM 2 JOB NO.: R3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: 6/22/98

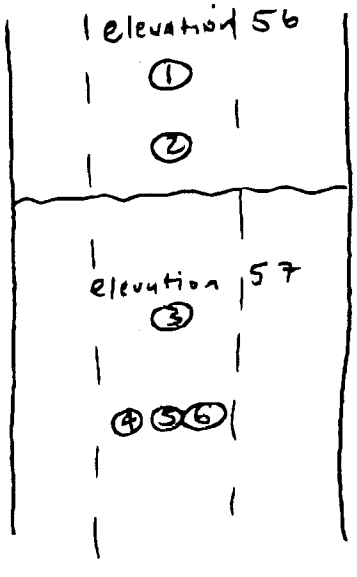
STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: LONGHILL CLIENT: _____ TECH: J. QUINTER

TEST NO.	1	2	3	4	5	6	
MOISTURE CONTENT (PCF)	17.8	17.8	19.7	18.5	19.6	18.7	
WET DENSITY (PCF)	128.3	132.6	130.5	123.0	123.9	124.7	
DRY DENSITY (PCF)	110.6	114.8	110.7	104.5	104.2	108.0	
MOISTURE CONTENT (%)	16.07	15.55	17.79	17.71	18.93	17.35	
STANDARD PROCTOR MODIFIED PROCTOR	117.6	117.6	117.6	117.6	117.6	117.6	
OPT. WATER CONTENT	12.9	12.9	12.9	12.9	12.9	12.9	
LIFT, ELEVATION OR SOIL MARK	56	56	57	57	57	57	
PROBE DEPTH (INCH)	8"	8"	8"	8"	8"	8"	
PERCENT COMPACTION	94	98	94	89	89	92	
REQUIRED COMPACTION	90	90	90	90	90	90	
AR (TEST NO.)							

* AR = Area Rerolled-Retest

Location Diagram/Remarks:



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Fax #: (804)353-9478

MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Monday 06/22/98

Location James City County, VA Weather/Temp Clear /95 °

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 12:00 Depart Job 13:15

Tolls $ 0.00 Total Hours on Job 1.25

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 15 Travel Time 0.25

TOTAL CHARGEABLE HOURS 2.00

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned Engineering Technician arrived on site, as requested, to observe the placement and compaction of engineered fill for elevations 54 and 55 on dam number 2 at Ford's Colony (please see attached sketch).

The Nuclear Method (ASTM D-2922) was used to test the compaction of soils. Test results indicated that the compacted material (the dam shell) met or exceeded the project requirements of 90% of the maximum dry density as obtained in our laboratory by using the Standard Proctor Method (ASTM D-698).

Several areas required recompaction after initial testing to achieve the required compaction. Soils observed on this date appeared to be placed in accordance with project specifications with regard to lift thickness and moisture content.

By Jason Quinter

FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: FORDS COLONY DAM 2 JOB NO.: R3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: 6-22-98

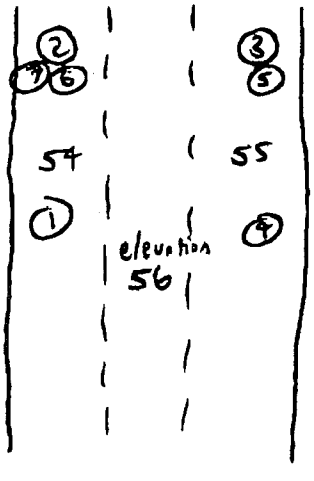
STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: LONGHILL CLIENT: _____ TECH: J. QUINTER

TEST NO.	1	2	3	4	5	6	7
MOISTURE CONTENT (PCF)	15.6	18.8	21.9	20.4	17.4	18.9	18.5
WET DENSITY (PCF)	125.1	121.5	125.2	126.2	124.5	119.6	124.6
DRY DENSITY (PCF)	109.5	102.7	103.3	105.8	107.1	100.7	106.1
MOISTURE CONTENT (%)	14.25	18.32	21.17	19.34	16.24	18.76	17.45
STANDARD PROCTOR MODIFIED PROCTOR	117.6	117.6	117.6	117.6	117.6	117.6	117.6
OPT. WATER CONTENT	12.4	12.4	12.4	12.4	12.4	12.4	12.4
LIFT, ELEVATION OR SOIL MARK	54	54	55	55	55	54	54
PROBE DEPTH (INCH)	8"	8"	8"	8"	8"	8"	8"
PERCENT COMPACTION	93	87	88	90	91	86	90
REQUIRED COMPACTION	90	90	90	90	90	90	90
* AR (TEST NO.)							

* AR = Area Rerolled-Retest

Location Diagram/Remarks:



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MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Tuesday 06/23/98

Location James City County, VA Weather/Temp P/Cloudy/90

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 16:15 Depart Job 17:00

Tolls $ 0.00 Total Hours on Job 0.75

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 15 Travel Time 0.25

TOTAL CHARGEABLE HOURS 1.50

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned engineering technician arrived on site, as requested, to observe the compaction of engineered fill for the dam at elevation 58' and 59'.

The Nuclear Method was used to test the compaction of the soils. Test results indicated that the compacted material at the areas tested, met or exceeded the project requirements of 90% of the maximum dry density as obtained in our laboratory by using the Standard Proctor Method.

By Joe Bamert

FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: Ford's Colony Dam II JOB NO.: R 3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: 6-23-98

STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: Longhill CLIENT: _____ TECH: Barnert

TEST NO.	1	2	3	4			
MOISTURE CONTENT (PCF)	20.0	20.4	21.7	21.3			
WET DENSITY (PCF)	127.7	127.1	129.1	129.0			
DRY DENSITY (PCF)	107.8	106.6	107.4	107.6			
MOISTURE CONTENT (%)	18.51	19.16	2020	19.83			
STANDARD PROCTOR / MODIFIED PROCTOR	117.6	117.6	117.6	117.6			
OPT. WATER CONTENT	12.4	12.4	12.4	12.4			
FT. ELEVATION OR SOIL MARK	59' S. End	59"	58"	58'			
PROBE DEPTH (INCH)	8"	8"	8"	8"			
PERCENT COMPACTION	91.7	90.7	91.3	91.5			
REQUIRED COMPACTION	90%	→	→	→			
AR (TEST NO.)							

* AR = Area Rerolled-Retest

Location Diagram/Remarks:

(2) 70' from S. End

(3) 170' from S. End

(4) 200' from S. End

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MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Thursday 06/25/98

Location James City County, VA Weather/Temp Sunny / °

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job 10:30 Depart Job 11:15

Tolls $ 0.00 Total Hours on Job 0.75

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 12 Travel Time 0.25

TOTAL CHARGEABLE HOURS 1.50

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

The undersigned arrived on site, as requested, to observe the compaction of soils on dam #2 in Ford's Colony.

Utilizing the Nuclear Method (ASTM D-2922) test results indicated that the final lift for dam shell material at elevation 60.5 appeared to meet the project requirements of 90% of maximum dry density as determined by the Standard Proctor (103.3).

However, ECS was unable to verify the use of the correct proctor values and therefore collected a sample of the shell material for verification by the use of a one point proctor.

By Tyson Dubbe

REPORT # 11

FIELD DENSITY TEST - NUCLEAR METHOD
ASTM D - 2922

PROJECT: DAM #2 JOB NO.: R3967

SUBJECT: NUCLEAR FIELD DENSITY TESTS DATE: THURS. 6/25

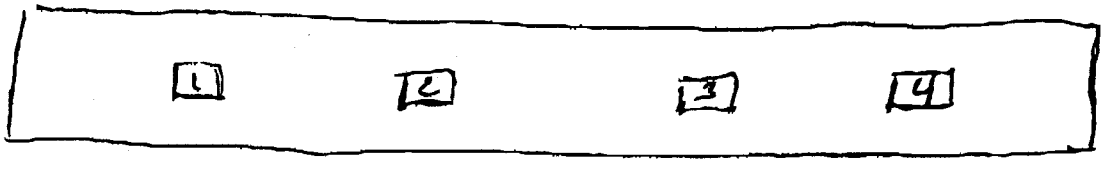
STANDARD COUNTY DENSITY _____ STANDARD COUNT MOISTURE _____

CONTRACTOR: LONGHILL EXC. CLIENT: LONGHILL EXC. TECH: _____

TEST NO.	6-25-1	6-25-2	6-25-3	6-25-4			
MOISTURE CONTENT (PCF)	22.0	20.7	19.4	19.5			
WET DENSITY (PCF)	122.3	121.4	121.2	120.7			
DRY DENSITY (PCF)	100.3	100.7	101.8	101.2			
MOISTURE CONTENT (%)	21.92	20.57	19.04	19.25			
STANDARD PROCTOR MODIFIED PROCTOR	103.3	103.3	103.3	103.3			
OPT. WATER CONTENT	19 %	19%	19 %	19 %			
CUT, ELEVATION OR SOIL MARK	ELEV. 60.5	ELEV. 60.5	ELEV. 60.5	ELEV. 60.5			
PROBE DEPTH (INCH)	8"	8"	8"	8"			
PERCENT COMPACTION	97.14%	97.51%	98.58%	97.99%			
REQUIRED COMPACTION	90%	90%	90%	90%			
AR (TEST NO.)							

AR = Area Rerolled-Retest

Location Diagram/Remarks:



→ NORTHWEST

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Fax #: (804)353-9478

MATERIALS ENGINEERING DIVISION
FIELD REPORT

Project No. R3967

Project Dam II (Williamsburg West) Day/Date Monday 06/29/98

Location James City County, VA Weather/Temp / °

Contractor Longhill Excavating Client Longhill Excavating

Equipment $ 0.00 Arrive Job _____ Depart Job _____

Tolls $ 0.00 Total Hours on Job 0.00

Travel Chg$ 0.00 Laboratory Time 0.50

Mileage 0 Travel Time 0.00

TOTAL CHARGEABLE HOURS 0.50

Permit No. _____

Deficiency Noted (D) _ Nuclear gauge (N) _

Summary of Services Performed. Field Test Data, Locations, Elevations & Depths are Estimated.

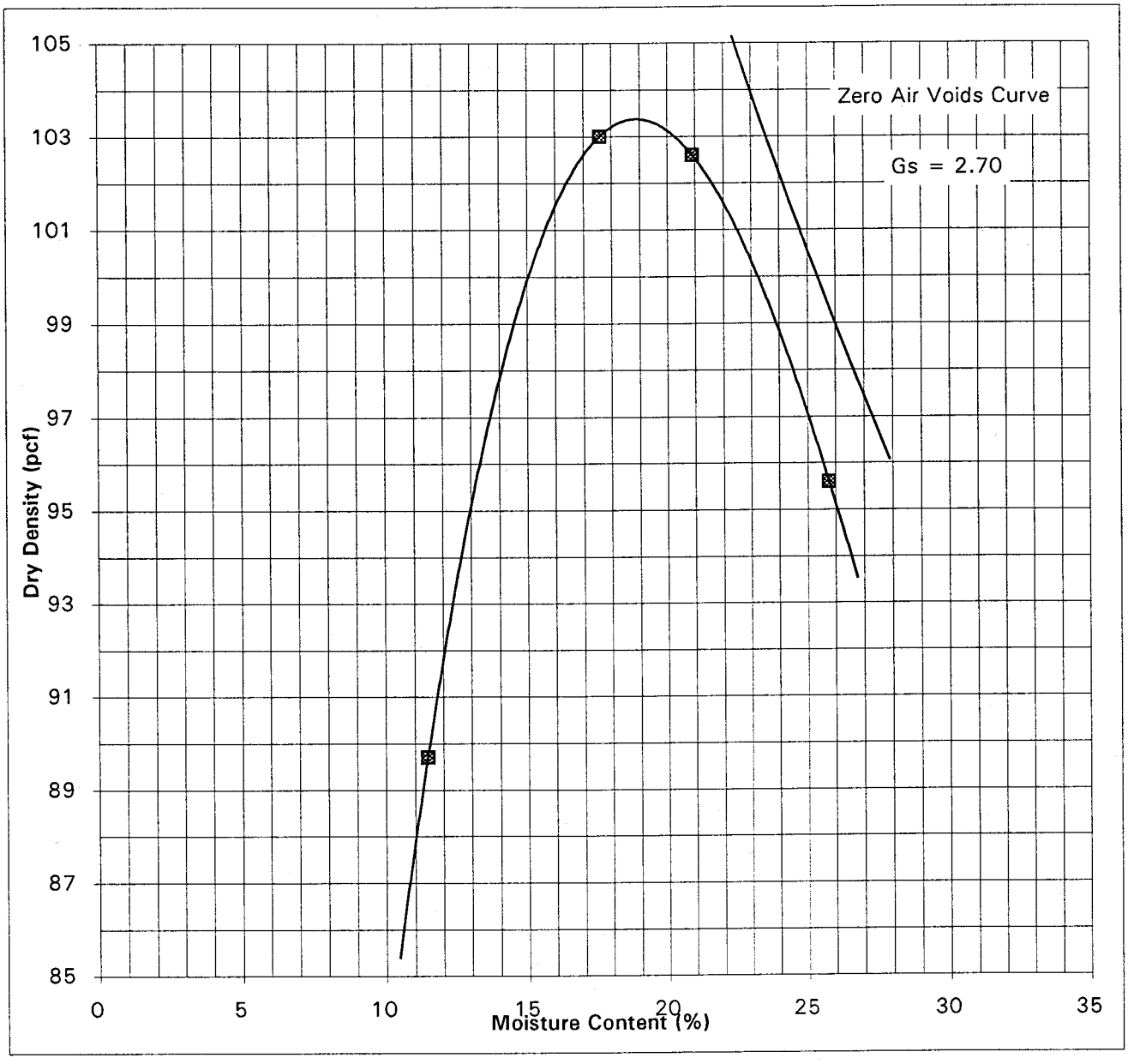
The undersigned reviewed test results of a one point proctor test. Test results indicate that the proctor used for a field report dated 06/25/98 by Tyson Dubbe is correct.

Density tests performed on the final lift of the dam shell at elevation 60.5 meet the project requirements of 90% of the maximum dry density.

Tyson Dubbe's field report is attached. The contractor was informed of test results by phone on Friday 06/29/98.

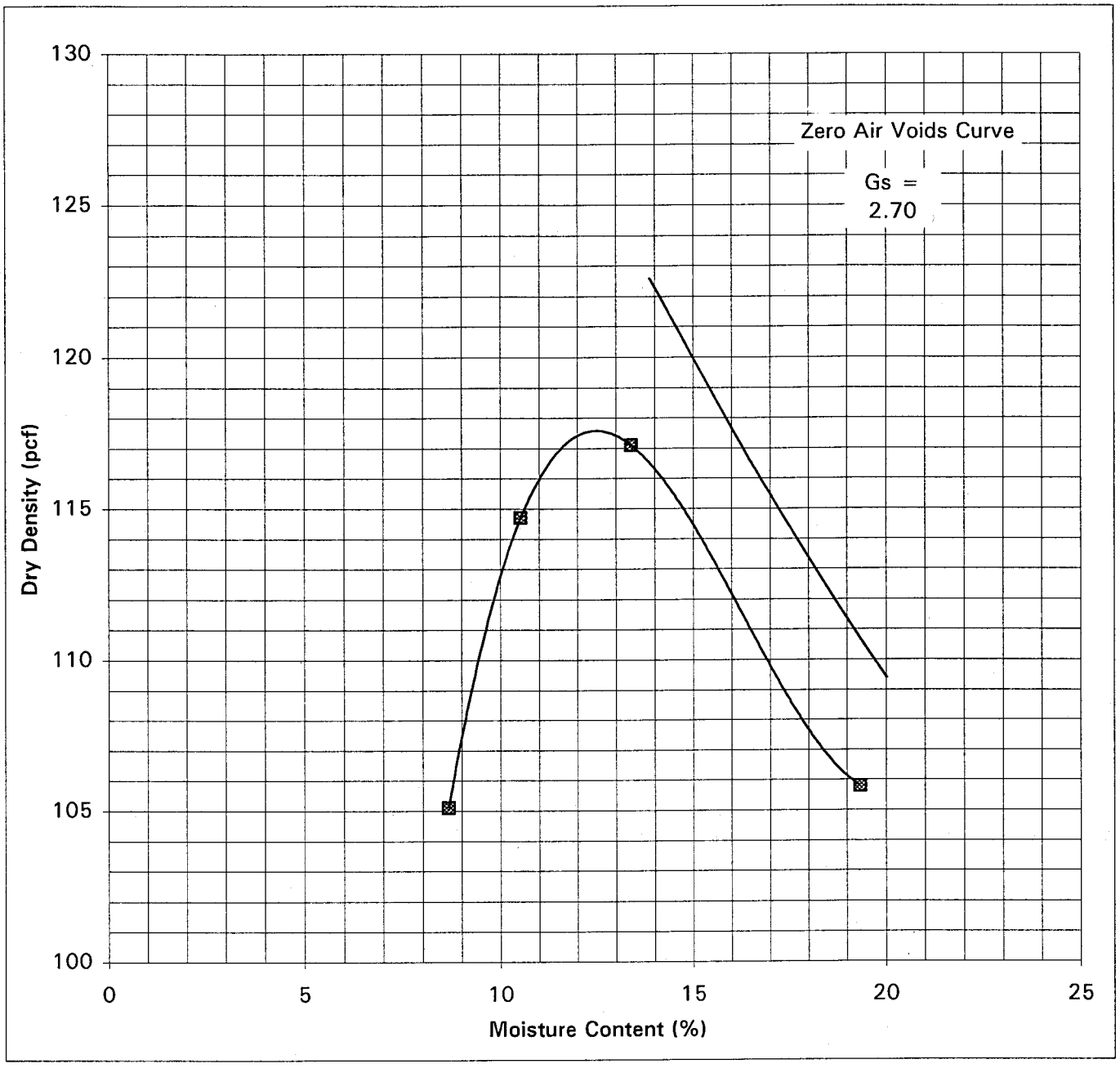
By Jennifer Bilskis

REPORT # 12



Sample No.	P1	Natural Moisture Content	7.6
Street	NA	Percent Passing No. 200 Sieve	56.3
Station	NA	Percent Retained on No. 4 Sieve	NA
Liquid Limit (LL)	39	Percent Retained on 3/4" Sieve	NA
Plastic Limit (PL)	12	Maximum Dry Density (pcf)	103.3
Plasticity Index (PI)	27	Optimum Moisture Content (%)	19.0
Liquidity Index (LI)	NA	Corr. Maximum Dry Density (pcf)	103.3
Description	Sandy CLAY	Corr. Optimum Moisture Content (%)	19.0
Classification	CL	Percent (%) Gravel as Tested	NA
Specific Gravity	2.70	Percent (%) Gravel Total	NA
Test Standard	ASTM	Test Method	A

Project: Dam at Sections VI and XIV	**Engineering Consulting Services, Ltd**
Project No.: R3621	**Richmond, Virginia**
Date: 5/23/97	**Moisture Density Relationship Curve**



Sample No.	P3	Natural Moisture Content	7.1
Street	Location: Pond - Material for Shell	Percent Passing No. 200 Sieve	54.7
Station	NA	Percent Retained on No. 4 Sieve	NA
Liquid Limit (LL)	29	Percent Retained on 3/4" Sieve	NA
Plastic Limit (PL)	16	Maximum Dry Density (pcf)	117.6
Plasticity Index (PI)	13	Optimum Moisture Content (%)	12.5
Liquidity Index (LI)	NA	Corr. Maximum Dry Density (pcf)	117.6
Description	Lt. Brown CLAY w/Fine Sand	Corr. Optimum Moisture Content (%	12.5
Classification	CL	Percent (%) Gravel as Tested	NA
Specific Gravity	2.70	Percent (%) Gravel Total	NA
Test Standard	ASTM-D698	Test Method:	A

Project: Dam at Sections VI and XIV **Project No.:** R3621 **Date:** 7/11/97	**Engineering Cosulting Services, Ltd** **Richmond, Virginia** **Moisture Density Relationship Curve**

AES CONSULTING ENGINEERS

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

October 23, 2003

Jerry Lewis
259-4032

Scott J. Thomas, P.E.
James City County Environmental Division
101-E Mounts Bay Road
P.O. Box 8784
Williamsburg, VA 23187-8784

RE: Lot 35, Section XIII-A Ford's Colony at Williamsburg
AES Project No.23911-1

Dear Mr. Thomas:

AES Consulting Engineers is submitting an analysis of the 100-year water surface elevation (WSEL) of the pond known as, Dam 3, in Ford's Colony Section XIII-A. The revisions are required because of the proposed grading activities on Lot 35, Section 13-A of Ford's Colony, which lessens the volume of Dam 3.

To provide a baseline, AES researched the design files and identified the 100-year WSEL to be 49.93 ft (occurring at the 50 contour on mapping associated with the area). According to the current development plan, the grading for the lot will result in altering down to the 48 contour. Our calculations show that the total net loss in volume due to the planned impact will be approximately 10,575 cu. ft., which translates to a change of less than a tenth of a percent in the total storage volume of the pond. The change in the WSEL due to the 100-year storm is negligible (less than a tenth of a foot).

It is our judgment that the grading activities will not have any effects, adverse or otherwise on the area surrounding the pond. We are providing a copy of the previous calculations, as well as the revised calculations for your review. Please feel free to call if you have any questions or concerns regarding this project.

Sincerely,

AES Consulting Engineers

Jason Grimes, E.I.T.
Project Engineer

V. Marc Bennett, P.E.
Project Manager

101.jag.doc

113 Ridge Crossing
Lot 35 Sec 13-A
3720500035
113 Ridge Crossing
Theodore Cichaski
0.49AC
R4
L-35 Sec 13A FC
PC112 DAM III
DHW 49.81 (49.93 ADJUSTED)

APPROVED
James City County
Environmental Division
By: _____
Date: 01-20-04

Meets Engineering portion Analysis of Variance Request.
Need letter from OWNER.
FB BASEMENT TO DHW IS OK (VERTICAL SEPARATION)

LOT 35 Sect 13A FORDS COLONY 113 RIDGE CROSSING
PC 112

January 21, 2004

Scott Thomas
JCC Environmental Division

Mr. Thomas,

This letter is to serve as a request for variance relative to the encroachment of our home building project on the pond buffer at Lot 35 / Section 13A (113 Ridge Crossing) in Ford's Colony Williamsburg. I wish to assure your department that first, we will do all possible to minimize the impact on the buffer area and secondly, that where we do encroach, we will stabilize and/or landscape to restore the disturbed area to a natural state. We will accomplish this using shrub, trees or ground cover that are native to the area whenever possible.

Based on this information, I respectfully request you grant the needed variance allowing us to move forward with our building project. Thank you in advance for your prompt attention to this matter.

Regards,

Ted Cichaski

LOCATION: Lot 35, Section 13-A, Ford's Colony; 113 Ridge Crossing (County BMP ID Code: PC 112)

Engineering report by AES Consulting Engineers dated October 23rd 2003 and variance request as submitted on January 21st 2004 by the Owner/Applicant for clearing, grading and fill placement within the design high water limit of the BMP and within the established 25 ft. pond buffer/setback was reviewed and found to be acceptable. Complete avoidance of design high water and buffer would have severely restricted buildable area on this lot; therefore, issuance of a variance which minimized impacts to the greatest extent possible was in order. Although adequate vertical separation exists between the design high water elevation of the BMP and intended living spaces of the proposed structure, the owner/tenant should be aware of the reduced horizontal separation. Efforts should be made to minimize impact and preserve existing trees and vegetation in the design high water and buffer areas during construction and to landscape or stabilize impacted buffer area to resemble meadow or forest area with native trees, shrubs and ground cover to the greatest extent possible.

Scott J. Thomas
Senior Engineer
Environmental Division

01-21-04
Date

January 21, 2004

Scott Thomas
JCC Environmental Division

Mr. Thomas,

This letter is to serve as a request for variance relative to the encroachment of our home building project on the pond buffer at Lot 35 / Section 13A (113 Ridge Crossing) in Ford's Colony Williamsburg. I wish to assure your department that first, we will do all possible to minimize the impact on the buffer area and secondly, that where we do encroach, we will stabilize and/or landscape to restore the disturbed area to a natural state. We will accomplish this using shrub, trees or ground cover that are native to the area whenever possible.

Based on this information, I respectfully request you grant the needed variance allowing us to move forward with our building project. Thank you in advance for your prompt attention to this matter.

Regards,

Ted Cichaski

TOTAL P.02

Ref: Line # 07-0116
PC 112

January 31, 2007

To: James City County Environmental

From: Fred Kurasiewicz

Re: Construction of my home at 109 Ridge Crossing in Ford's Colony

To whom it may concern,

I would like to request a variance to the 25' pond buffer on my lot for the construction of my new home. The activity in the buffer would include the clearing of my lot and the construction of the right rear part of my home. Thank you for you assistance in this matter. If you have any questions please feel free to call me at 973-267-6837 or Mike Carroll with Hallmark Builders at 757-564-0006.

Fred Kurasiewicz

LOCATION: Lot 34, Ford's Colony Section 13-A, 109 Ridge Crossing (County BMP ID Code: PC 112)

Variance request as submitted by Owner dated January 31, 2007 for clearing, grading and a permanent structure in the pond buffer/setback was reviewed and found to be acceptable. Efforts should be made to preserve existing trees and vegetation in the buffer during construction, to landscape or stabilize impacted pond buffer area to resemble meadow or forest area with native trees, shrubs and ground cover, and to refrain from turfing to the water's edge to the greatest extent possible. *Note: The pond buffer/setback is 25 feet from the 100-year storm design high water El. 50*

Scott J. Thomas
Chief Engineer – Stormwater
Environmental Division

02/02/07
Date

Ref: Line # 07-0116
PC 112

January 31, 2007

To: James City County Environmental

From: Fred Kurasiewicz

Re: Construction of my home at 109 Ridge Crossing in Ford's Colony

To whom it may concern,

I would like to request a variance to the 25' pond buffer on my lot for the construction of my new home. The activity in the buffer would include the clearing of my lot and the construction of the right rear part of my home. Thank you for you assistance in this matter. If you have any questions please feel free to call me at 973-267-6837 or Mike Carroll with Hallmark Builders at 757-564-0006.

Fred Kurasiewicz

James City County
Environmental Division
Single Family Plan Submittal - Miscellaneous

Lot 34, Ford's Colony Section 13-A (109 Ridge Crossing)

Clearing, grading, and permanent structures are shown within the pond setback/buffer as required per page 38 of the James City County BMP manual. A pond buffer should be provided that extends 25 feet outward from the maximum water surface elevation of the pond. Based on information as available in our record files, it appears the 100-year design high water surface elevation for the adjacent dry pond stormwater management facility (BMP # 1, County BMP ID Code: PC 112) is at Elevation 50.00.

Reconfigure the plan to avoid being situated within the pond buffer/setback; or alternatively, submit a written request for waiver to the Environmental Division with supporting information including: correct delineation and labels for the 25 ft. pond buffer/setback and the intent for landscaping/restoration of impacted pond buffer/setback area.

The variance request needs to be from the owner or tenant, current or future, rather than the builder or contractor.

March 2, 2007

RECEIVED
MAR - 6 2007
ENVIRONMENTAL DIVISION

To: Amy Parker
JCC Environmental Department

From: Russ Fick

Re: Pond Buffer on my lot in Ford's Colony (117 Stowe)

Dear Amy,

I would like to request a variance to the 25' pond buffer on my Lot 44 Section 13-B in Ford's Colony. This variance includes clearing, grading, and all activities necessary to construct my new home. Thank you for your help with this matter and call if you have any questions.

Russ Fick
860-827-2310 work#

LOCATION: Lot 44, Ford's Colony Section 13-B, 117 Stowe (County BMP ID Code: PC 112)

Variance request as submitted by Owner dated March 2, 2007 for clearing, grading and a permanent structure in the pond buffer/setback was reviewed and found to be acceptable. The pond buffer/setback extends 25 feet outward from the maximum water surface elevation of the adjacent stormwater management pond facility. Based on available information, it appears the 100-year design high water elevation for the adjacent stormwater management facility (Dam No. 3, County BMP ID Code: PC 112) is at Elevation 50.0.

As a condition of approval, efforts should be made to preserve existing trees and vegetation in the buffer during construction; to landscape or stabilize impacted buffer to resemble meadow or forest area with native trees, shrubs and ground cover; and to refrain from turfing to the water's edge to the greatest extent possible. ***Note: This is approval for a pond buffer/setback variance request only. In no way should this approval be interpreted as approval for associated RPA/RPA buffer impact.***

Scott J. Thomas
Chief Engineer – Stormwater
Environmental Division

03-06-07
Date

March 2, 2007

RECEIVED
MAR - 6 2007
ENVIRONMENTAL DIVISION

To: Amy Parker
JCC Environmental Department

From: Russ Fick

Re: Pond Buffer on my lot in Ford's Colony (117 Stowe)

Dear Amy,

I would like to request a variance to the 25' pond buffer on my Lot 44 Section 13-B in Ford's Colony. This variance includes clearing, grading, and all activities necessary to construct my new home. Thank you for your help with this matter and call if you have any questions.

Russ Fick

Russ Fick
860-827-2310 work#

James City County
Environmental Division
Single Family Plan Submittal - Miscellaneous

Lot 44, Ford's Colony Section 13-B (117 Stowe)

Clearing, grading and permanent structures are proposed within the pond setback/buffer as required per page 38 of the James City County BMP manual. A pond buffer should be provided that extends 25 feet outward from the maximum water surface elevation of the pond. Based on information as available in our record files, it appears the 100-year design high water surface elevation for the adjacent stormwater management facility (Dam No. 3, County BMP ID Code: PC 112) is at Elevation 50.0.

Reconfigure the plan to conform with current setback/buffer requirements; or alternatively, submit a written request for waiver to the Environmental Division with supporting information including: correct delineation of the design high water and 25 ft. buffer/setback; and a waiver request from the owner/tenant. The variance request needs to be from the owner or tenant, current or future, rather than the builder or contractor.

March 2, 2007

RECEIVED
MAR - 6 2007
ENVIRONMENTAL
DIVISION

To: Amy Parker
JCC Environmental Department

From: Russ Fick

Re: Pond Buffer on my lot in Ford's Colony (117 Stowe)

Dear Amy,

I would like to request a variance to the 25' pond buffer on my Lot 44 Section 13-B in Ford's Colony. This variance includes clearing, grading, and all activities necessary to construct my new home. Thank you for your help with this matter and call if you have any questions.

Russ Fick

Russ Fick
860-827-2310 work#

PC111
Pond Buffer
Variance.

MEMO

February 10, 2003

TO

James City County Environmental Division

FROM

Al Woods
P.O. Box 5247
Williamsburg, VA 23187

RE

Waiver Request for the
Construction of home on lot 21, Section 13 B, Ford's Colony
James City County, Virginia

The construction of my home at the above location requires some grading and clearing in the 25 ft. buffer to the line of the 100 year flood elevation, as denoted on the attached site plan. I request a waiver for the above work and promise that the buffer will be stabilized or landscaped to restore the disturbed buffer area back to meadow or forest condition using native trees, shrubs, or ground cover to the greatest extent possible.

Alfred L. Woods

APPROVED
James City County
Environmental Division
By: Scott A. Thomas
Date: 2-12-03

MEMO

February 10, 2003

TO

James City County Environmental Division

FROM

Al Woods
P.O. Box 5247
Williamsburg, VA 23187

RE

Waiver Request for the
Construction of home on lot 21, Section 13 B, Ford's Colony
James City County, Virginia

The construction of my home at the above location requires some grading and clearing in the 25 ft. buffer to the line of the 100 year flood elevation, as denoted on the attached site plan. I request a waiver for the above work and promise that the buffer will be stabilized or landscaped to restore the disturbed buffer area back to meadow or forest condition using native trees, shrubs, or ground cover to the greatest extent possible.

Alfred L. Woods

AB File
PC 111

July 9, 2007

PO Box 632
Block Island, RI 02807

James City County Environmental
10 Mount Bay Rd.
Williamsburg, VA 23185

Attn: Mr. Scott Thomas

Dear Mr. Thomas,

I am writing this letter to seek a waiver to place a small portion (deck corner) of a house in the pond buffer. The building site is 105 Saddlebrook (lot 25 section 13A in Ford's Colony). The site plan submitted to you by Mark Buckley of Promark Custom Homes indicates that only a small corner of the deck infringes upon the 25 foot buffer to the pond. We hope that you will offer a variance and allow this plan to proceed as submitted.

As an aside, my wife and I a very environmentally conscious and would plan on planting proper vegetation after construction to help protect the waters. Please contact me or my wife Joan on her cell (203) 247-7474 on any questions as we are in the Williamsburg area through Thursday July 12 and traveling away from our home number (401) 466-2817 until after August 5.

Sincerely,

David T. Olson

David T. Olson

LOCATION: Lot 25, Ford's Colony Section 13-A, 105 Saddlebrook (County BMP ID Code: PC 111)

Variance request as submitted by Owner dated July 9, 2007 for clearing and a permanent structure in the pond buffer/setback was reviewed and found to be acceptable. The pond buffer/setback extends 25 feet outward from the maximum water surface elevation of the adjacent stormwater management pond facility (El. 59.45).

As a condition of approval, efforts should be made to preserve existing trees and vegetation in the buffer during construction; to landscape or stabilize impacted buffer to resemble meadow or forest area with native trees, shrubs and ground cover; and to refrain from turfing to the water's edge to the greatest extent possible.

Scott J. Thomas, P.E.
Director
Environmental Division

07-10-07
Date

July 9, 2007

PO Box 632
Block Island, RI 02807

James City County Environmental
10 Mount Bay Rd.
Williamsburg, VA 23185

Attn: Mr. Scott Thomas

Dear Mr. Thomas,

I am writing this letter to seek a waiver to place a small portion (deck corner) of a house in the pond buffer. The building site is 105 Saddlebrook (lot 25 section 13A in Ford's Colony). The site plan submitted to you by Mark Buckley of Promark Custom Homes indicates that only a small corner of the deck infringes upon the 25 foot buffer to the pond. We hope that you will offer a variance and allow this plan to proceed as submitted.

As an aside, my wife and I a very environmentally conscious and would plan on planting proper vegetation after construction to help protect the waters. Please contact me or my wife Joan on her cell (203) 247-7474 on any questions as we are in the Williamsburg area through Thursday July 12 and traveling away from our home number (401) 466-2817 until after August 5.

Sincerely,

David T. Olson

David T. Olson

RD FILE

LOT 55, SEC 14 B
FORDS COLONY
105 South Turnberry
GPIN 3721000055
0.39 AC
N/F ANTHONY + ELIZABETH ALBANESE
PC 112

August 9, 2001

4904 Falkirk Mews
Williamsburg, VA 23188

Environmental Division
James City County
County Government Center
101 Mounts Bay Road
Williamsburg, VA 23185

Attn: Scott Thomas

Dear Mr. Thomas:

We are hereby requesting a variance for a deck corner post to the construction of a house on Lot 55, Section XIV B, Ford's Colony, Williamsburg, VA. We acknowledge that the plan will require deck supports and a small amount of fill in the area designated as a storm water buffer, but that the house is not in the buffer zone.

Sincerely,

Anthony + Elizabeth Albanese

Anthony and Elizabeth Albanese

Cc: Lawrence W. Kitchens, Ltd.
General Contractor

Approval

Based on plan as revised on July 26th 2001and supporting documentation hereby submitted, variance to JCC BMP Manual pond buffer and setback requirements reviewed and found to be acceptable. Encroachment into the buffer to consist of deck and corner fill associated with house grading.

Scott J. Thomas

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

08/13/01
Date

August 9, 2001

4904 Falkirk Mews
Williamsburg, VA 23188

Environmental Division
James City County
County Government Center
101 Mounts Bay Road
Williamsburg, VA 23185

Attn: Scott Thomas

Dear Mr. Thomas:

We are hereby requesting a variance for a deck corner post to the construction of a house on Lot 55, Section XIV B, Ford's Colony, Williamsburg, VA. We acknowledge that the plan will require deck supports and a small amount of fill in the area designated as a storm water buffer, but that the house is not in the buffer zone.

Sincerely,

Anthony & Elizabeth Albanese

Anthony and Elizabeth Albanese

Cc: Lawrence W. Kitchens, Ltd.
General Contractor

Scott Thomas

From: Scott Thomas
Sent: Monday, August 13, 2001 12:17 PM
To: Beth Davis
Subject: SF Lot 55 Sec 14B FC

Project: Lot 55, Section 14B, Fords Colony (Single Family)
Tax Parcel: (37-2)(10-55)
RE: SF Site Plan and Variance Request to the JCC BMP Manual for Pond Setback/Buffer

Beth,

I have reviewed SF site plan with a revision date of 7/26/01 and the variance request from the owner dated August 9th 2001. Both the plan and variance request are now acceptable from the engineering aspect. I now forward the plan and all related documents back to you to proceed with your normal SF site plan process.

I have signed and approved the variance request, sent the original back to the owner, faxed a copy to the builder (Larry Kitchens). One copy was inserted into the SF application packet, one copy will go to the as-built file for the BMP and I am going to keep a running file for SF variances of this nature. I put the SF application back in your box with all attachments.

Any questions, see me.

Scott

CONSULTING ENGINEERS

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

June 15, 2001

JUN 2001
RECEIVED
ENVIRONMENTAL DIVISION

Scott J. Thomas, P.E.
James City County Environmental Division
101-E Mounts Bay Road
P.O. Box 8784
Williamsburg, VA 23187-8784

RE: Lot 52, Section XIII-B Ford's Colony at Williamsburg
AES Project No.23712-1

Dear Mr. Thomas:

AES Consulting Engineers is submitting an analysis of the 100-year water surface elevation (WSEL) of the pond known as, Dam 3, in Ford's Colony Section XIII-B. The revisions are required because of the planned grading activities on Lot 52, Section 13-B of Ford's Colony, which lessens the volume of Dam 3.

To provide a baseline, AES researched the design files and identified the 100-year WSEL to be 49.81 ft (occurring at the 50 contour on mapping associated with the area). According to the current development plan, the grading for the lot will result in altering down to the 48 contour. Our calculations show that the total net loss in volume due to the planned impact will be approximately 440 cu. ft., which translates to a change of less than a tenth of a percent in the total storage volume of the pond. The change in the WSEL due to the 100-year storm is negligible.

It is our judgment that the grading activities will not have any effects, adverse or otherwise on the area surrounding the pond. We are providing a copy of the previous calculations, as well as the revised calculations for your review. Please feel free to call if you have any questions or concerns regarding this project.

REVIEWED & FOUND SATISFACTORY
OK.
06-19-01

Sincerely,

AES Consulting Engineers

Jason Grimes, E.I.T.
Project Engineer

V. Marc Bennett, P.E.
Project Manager

S:\Op\Jason\23712-1\2371201l01.jag.doc

James City County
Environmental Division
Single Family Plan Submittal - Miscellaneous

Lot 35, Section 13-A, Ford's Colony (113 Ridge Crossing)

Permanent structures and lot grading as proposed are shown within the 100-year storage volume (design high water) and pond setback/buffer as required per page 38 of the James City County BMP manual. A pond buffer should be provided that extends 25 feet outward from the maximum water surface elevation of the pond. Based on information as available in our record files, it appears the 100-year design high water surface elevation for the adjacent stormwater management facility (Dam No. 3, County BMP ID Code: PC 112, County Plan No. S-15-97) is at Elevation 50.47. However, a subsequent analysis of the BMP by AES Consulting Engineers on June 15th 2001 for a variance request associated with Lot 52, Section 8-B (AES Project No. 23712-1) established a revised 100-year water surface elevation for the pond at Elevation 49.81. Therefore, design high water for this application will remain at Elevation 49.81.

It is obvious to see from the lot arrangement that the plan cannot be reconfigured to avoid the 100-year water surface elevation or the pond buffer without seriously restricting development on the lot. Therefore, submit a written request for waiver to the Environmental Division with supporting information including: correct delineation of the design high water elevation AND the 25 ft. buffer/setback; proposed horizontal and vertical separations to final design high water elevation; an engineering analyses that the proposed lot fill material will have no adverse impact on the storage volume or function of the stormwater management facility; and stabilization or landscaping plan to restore disturbed buffer area back to meadow or forest condition using native trees, shrubs or ground cover to the greatest extent possible. The variance request needs to be from the owner or tenant, current or future, rather than the builder or contractor.

Also, General Note # 5 states that "this lot is not in the flood plain". This note should be clarified to indicate that this lot is not in the FEMA defined 100-year special flood hazard area.

259-4032

TO: Jerry Lewis
JCC Environmental

From: Steve Rome
Rome Building & Development

Jerry,

Here is the report about which we spoke last week. Please call me at (757) 651-8015 when you get this to let me know when you could get approval to code compliance. I need to p/u this permit ASAP.

Thanks
Steve

PC 112
SOUTH TWANBERRY

James City County
Environmental Division
Single Family Plan Submittal - Miscellaneous

Lot 21, Ford's Colony Section 13-B (116 Blenheim)

Clearing and grading is proposed within the 25 ft. pond setback/buffer as required per page 38 of the James City County BMP manual. The pond buffer extends 25 feet outward from the maximum water surface elevation of the pond. Based on available information, it appears the 100-year design high water surface elevation for the adjacent wet pond facility (County BMP ID Code: PC 111) is at Elevation 59.45.

Efforts should be made to preserve existing trees and vegetation in the buffer during construction and to manage the buffer as meadow or forested area.

Reconfigure the limits of clearing and construction as shown on the plan to avoid disturbance of the buffer; or alternatively, submit a written request for waiver to the Environmental Division. The waiver request should indicate that impacted buffer area will be stabilized or landscaped to restore disturbed buffer area back to meadow or forest condition using native trees, shrubs or ground cover to the greatest extent possible. The variance request needs to be from the owner or tenant, current or future, rather than the builder or contractor.

SIT

James City County
Environmental Division
Single Family Plan Submittal - Miscellaneous

Lot 25, Section 13-A Fords Colony (105 Saddle Brook)

Clearing and a permanent structure (deck) are proposed within the 25 ft. pond setback/buffer as required per page 38 of the James City County BMP manual. The pond buffer extends 25 feet outward from the maximum water surface elevation of the pond. Based on available information, it appears the 100-year design high water surface elevation for the adjacent wet pond facility (County BMP ID Code: PC 111) is at Elevation 59.45.

Efforts should be made to preserve existing trees and vegetation in the buffer during construction and to manage the buffer as meadow or forested area.

Reconfigure the plan to conform with current setback/buffer requirements by avoiding disturbance of the pond buffer/setback area; or alternatively, if encroachment cannot be avoided submit a written request for waiver to the Environmental Division. The variance request needs to be from the owner or tenant, current or future, rather than the builder/ contractor. Efforts should be made to preserve existing trees and vegetation in the buffer during construction and to stabilize or landscape disturbed buffer area back to meadow or forest condition using native trees, shrubs or ground cover to the greatest extent possible.

APPLICATION FOR BUILDING PERMIT

101-E Mounts Bay Road, P.O. Box 8784, Williamsburg, VA 23187-8784

(757) 253-6626
FAX: (757) 259-4038

Office Hours: Mon-Fri 8:00 a.m. - 5:00 p.m.

ONTRACTOR INFORMATION

cense No. 2705 024868 A
mpany Name PROMARK CUSTOM HOMES INC
eet Address 115 JOHN BRATTON
y WMBG State VA Zip 23185
one No. (757) 253 2685 Fax. No. (757) 253 6445
Mail Address PROMARKCHC@AOL.COM

nature: Mark Buckley
nt Name: MARK BUCKLEY

OWNER INFORMATION

Name DAVID & JOAN OLSON
Address PO BOX 632
City BLOCK ISLAND State RI Zip 02807
Phone No. ( ) Fax. No. ( )
E-Mail Address
Signature:
Print Name:

RECEIVED
JUN 29 2007
ENVIRONMENTAL DIVISION

Agent: Mark Buckley
Print Name: MARK BUCKLEY

SCRIPTION OF WORK NEW SINGLE FAMILY

ME AS PLAN NUMBER _____ (Lists Options)

(For Commercial Projects Only)
Site Plan No. _____ Date Approved _____

CATION OF WORK

Map No. (38 - 1) (07 - 0 - 0025)
eet Address 105 SADDLE BROOK
WMBG State VA Zip 23188
e _____ Subdivision FORDS COLONY

MECHANICS' LIEN AGENT

Name: T.B.D.
Address:
City State Zip
Phone No. ( ) Fax. No. ( )

ILDING INFORMATION

ies 3 No. Rooms 14 No. Baths 3 1/2 No. Bath Fix. 14
Fireplaces 1 Type ⌀ CLEAR, GAS
erior Finish: (Vinyl, (Brick,) Wood, Other CEMENT BD)
rior Finish: (Gypsum wallboard, Wood, Other)
oring: (Carpet,) (Wood) Vinyl, Other (TILE))
fing: (Asphalt-Fiberglass, Wood, Other)
Type: (Gas,) Heatpump, Electric, Other)
Conditioning-Type: (Central, Window, None)

Floor Area (sq.ft.) 5582
(Do not include Basement, Garage, and Deck/Porch)
Deck (sq.ft.) 168
Porch (sq.ft.) 288
Basement Area (sq.ft.) —
Garage Area (sq.ft.) 612
Total Area (sq.ft.) 6650

nated Construction Value 700000 (Do not include Lot $)

Septic _____ Public Sewer X Grinder Pump _____
Well _____ Public H_2O X

OFFICE USE ONLY

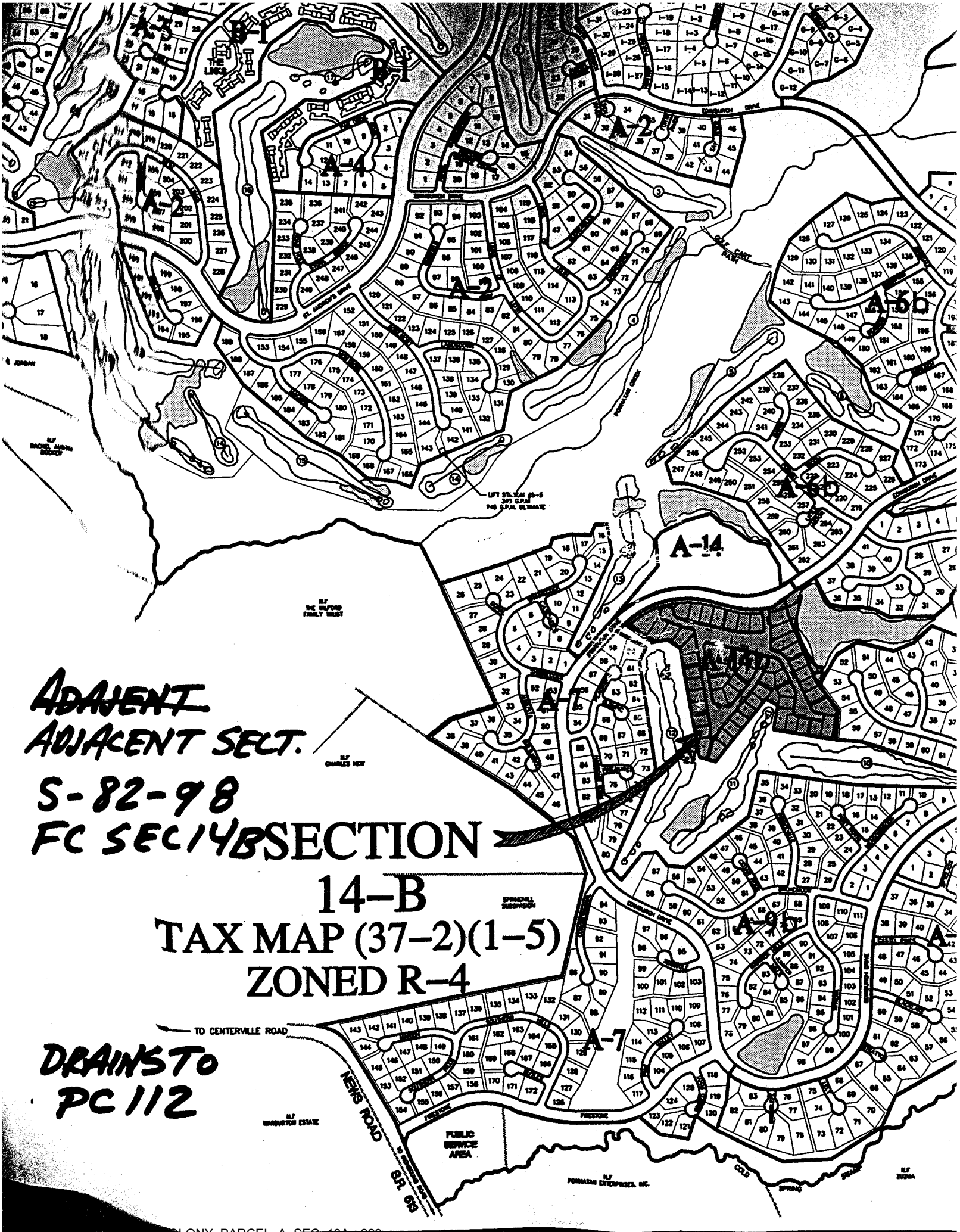
Width
Depth
nt Property Line
ht Property Line
t Property Line
r Property Line

RMIT NO.
E NO. A07-0957
e/Time In 6/29/07
Plan Reviewed

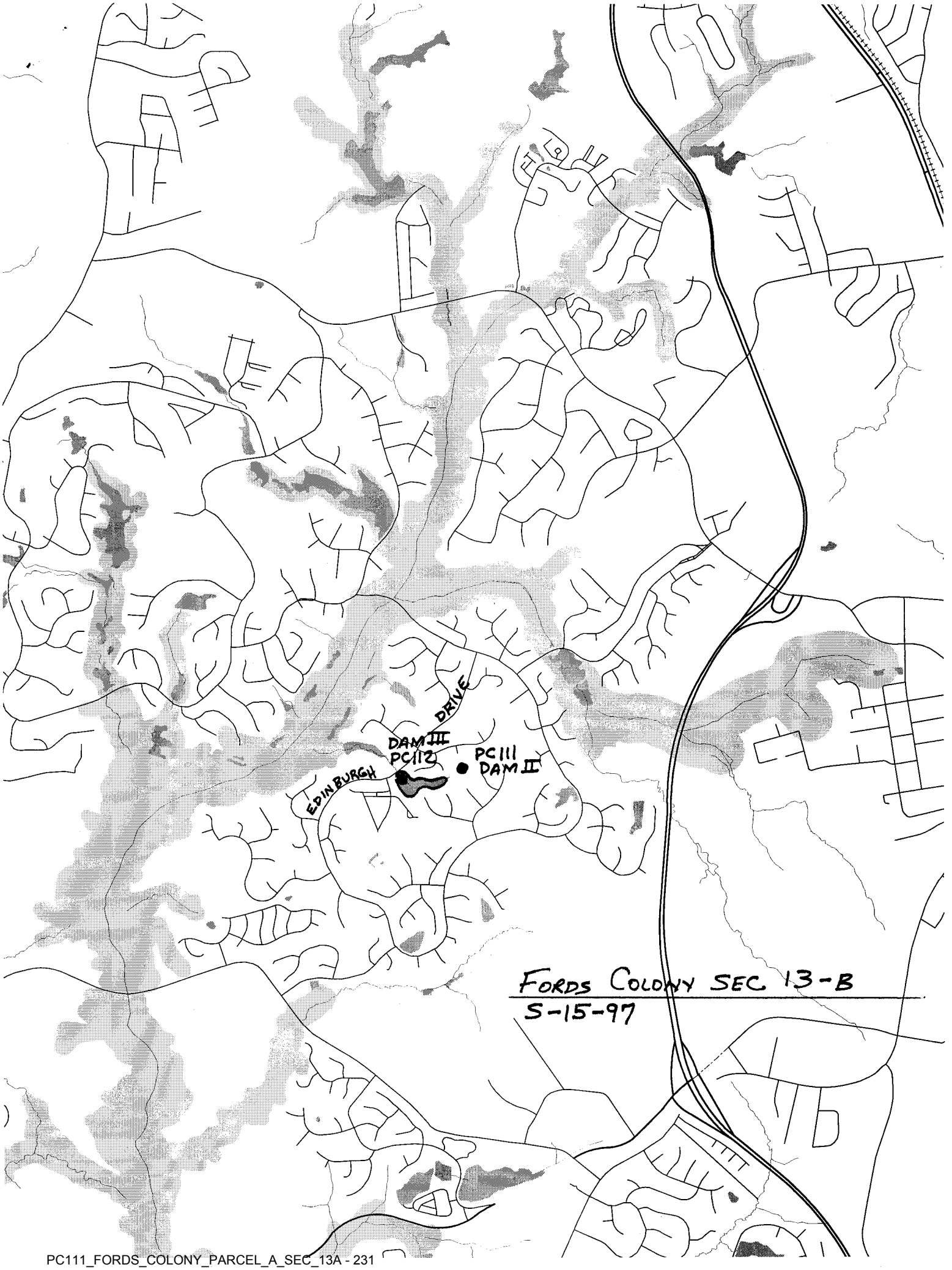
Improvement Code 01
Structure Used As
Use Group
Occupancy Load
Type Construction VB
Zoning Approved
Zoning Disapproved
Plan Approved
Plan Disapproved

PLAN REVIEW FEE
PERMIT FEE

Notes: Pond Buffer 6/29/07 (AYC)

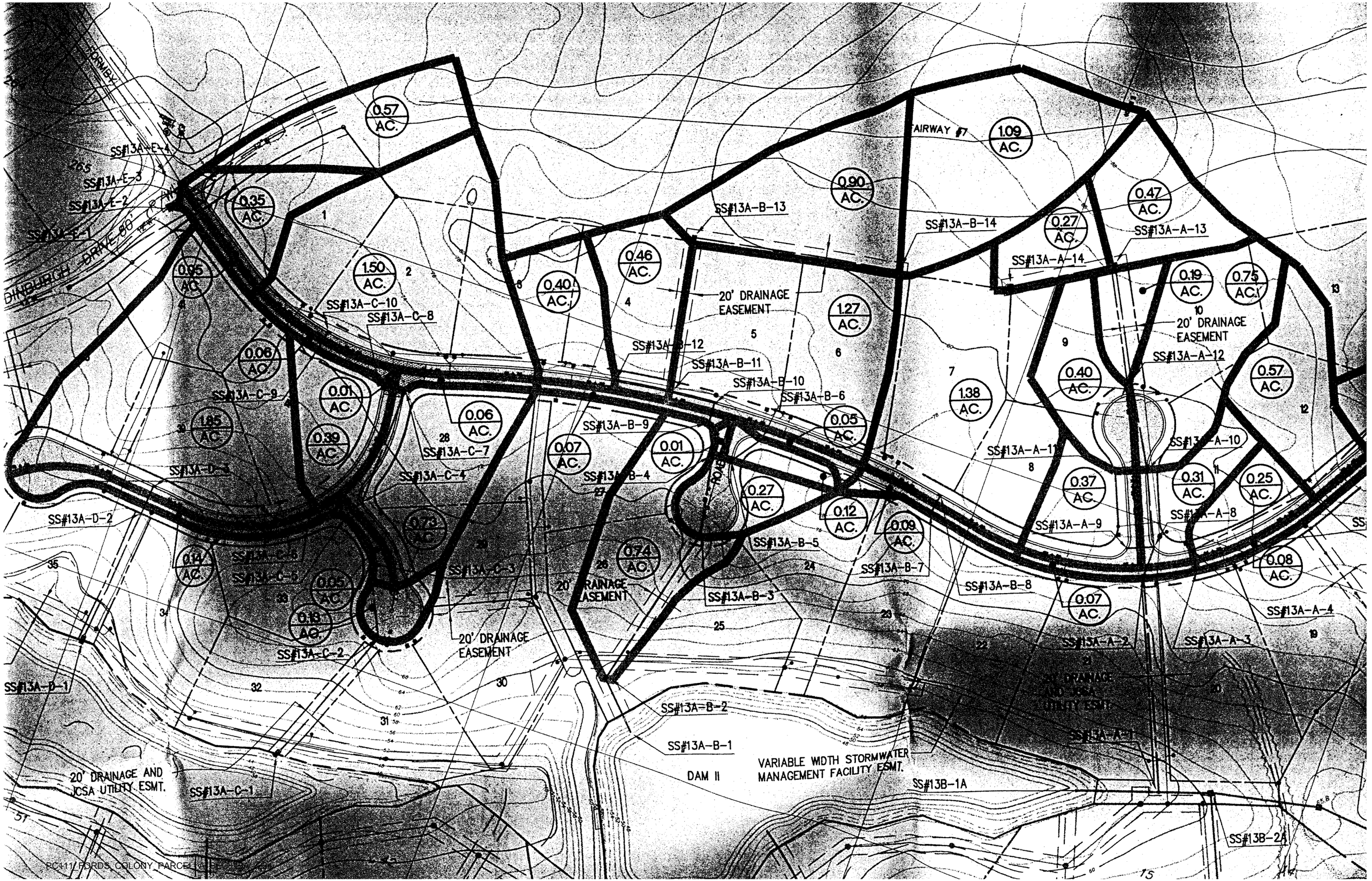

ADJACENT SECT.
S-82-98
FC SEC14B
SECTION
14–B
TAX MAP (37–2)(1–5)
ZONED R–4
DRAINS TO
PC 112
TO CENTERVILLE ROAD
NEWS ROAD
SR 663
PUBLIC SERVICE AREA
A-14
A-7
A-6b
A-6a
A-2
A-4
A-3
B-1
THE LINKS
GOLF CART PATH
POMMATAN CREEK
COLD SPRING
POMMATAN ENTERPRISES, INC.
WINGATE ESTATE
CHARLES NEW
THE WIFORD FAMILY TRUST
SPRINGHILL SUBDIVISION

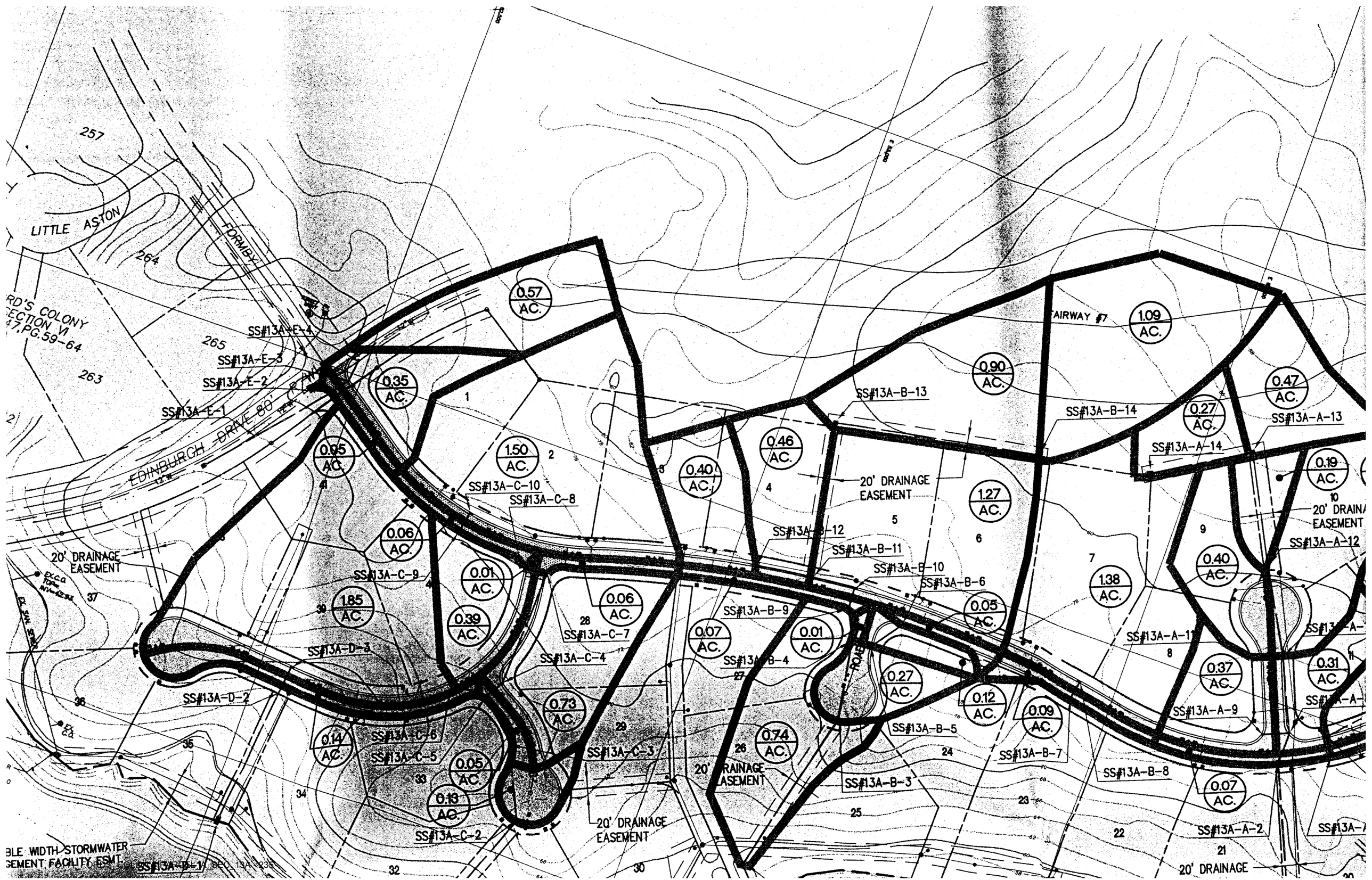
OAK HOLLOW
DRIVE
13-A
WATERFORD DOWNS
PC 111
DAM II
RIDGE CROSSING
EDIN BURGH
PC 112
DAM III
13-B
(BRIGADOON)
BLENHEIM
BIRKDALE
EASTBURY
STONE
WESTBURY


EDINBURGH
DRIVE
DAM III
PC112
PC111
DAM II
FORDS COLONY SEC. 13-B
5-15-97

A-6a
A-6b
A-13d
A-13a
A-13e
A-13b
A-13c
A-14a
A-14b
A-9b
A-9a
A-30
35.5 AC.
33.3 AC.
2.1 AC.
24.5 AC.
48.4 AC.
49.1 AC.
83.5 AC.
95.1 AC.
24.4 AC.
21.7 AC.
27.1 AC.
21.5 AC.
(WATERFORD DOWNS)
(TURNBERRY)
(BRIGADOON)
EDINBURGH DRIVE
BROADMOOR
SOUTHPORT
DORNOCH
BALMORAL
SAMOSET
ORMSKIRK
WURLSTON
BLACKLAKE
SEMINOLE
PC 151
PC 154
PC 153
PC 156
PC 111 (II)
PC 112 (II)
PC 155
PC 095(I)
PC 095(II)

OAK HOLLOW
DRIVE
RIDGE CROSSING
13-A
WATERFORD DOWNS
PC111
DAM II
EDIN BURGH
PC112
DAM III
13-B
(BRIGADOON)
BLENHEIM
BIRKDALE
EAST BURY
STONE
WESTBURY


FORMBY
EDINBURGH DRIVE 80' R/W
SS#13A-E-4
SS#13A-E-3
SS#13A-E-2
SS#13A-E-1
0.57 AC.
0.35 AC.
0.95 AC.
1.50 AC.
SS#13A-C-10
SS#13A-C-8
0.06 AC.
SS#13A-C-9
0.01 AC.
1.85 AC.
0.39 AC.
SS#13A-D-3
SS#13A-D-2
0.14 AC.
SS#13A-C-6
SS#13A-C-5
0.05 AC.
0.13 AC.
SS#13A-C-2
SS#13A-D-1
20' DRAINAGE AND JCSA UTILITY ESMT.
SS#13A-C-1
0.06 AC.
SS#13A-C-7
SS#13A-C-4
0.73 AC.
SS#13A-C-3
20' DRAINAGE EASEMENT
0.07 AC.
0.01 AC.
SS#13A-B-9
SS#13A-B-4
0.74 AC.
0.40 AC.
0.46 AC.
SS#13A-B-13
20' DRAINAGE EASEMENT
SS#13A-B-12
SS#13A-B-11
SS#13A-B-10
SS#13A-B-6
SS#13A-B-5
SS#13A-B-3
SS#13A-B-2
SS#13A-B-1
DAM II
VARIABLE WIDTH STORMWATER MANAGEMENT FACILITY ESMT.
SS#13B-1A
SS#13B-2A
FAIRWAY #7
1.09 AC.
0.90 AC.
1.27 AC.
0.05 AC.
0.27 AC.
0.12 AC.
0.09 AC.
SS#13A-B-14
SS#13A-B-7
SS#13A-B-8
1.38 AC.
0.47 AC.
0.27 AC.
SS#13A-A-13
SS#13A-A-14
0.19 AC.
0.75 AC.
20' DRAINAGE EASEMENT
SS#13A-A-12
0.40 AC.
0.57 AC.
SS#13A-A-11
SS#13A-A-10
0.37 AC.
0.31 AC.
0.25 AC.
SS#13A-A-9
SS#13A-A-8
0.08 AC.
0.07 AC.
SS#13A-A-4
SS#13A-A-3
SS#13A-A-2
SS#13A-A-1
20' DRAINAGE AND JCSA UTILITY ESMT.


LITTLE ASTON
FORMBY
EDINBURGH DRIVE 80' R/W
RD'S COLONY
ECTION VI
47, PG. 59-64
257
264
265
263
SS#13A-E-4
SS#13A-E-3
SS#13A-E-2
SS#13A-E-1
0.57 AC.
0.35 AC.
1.50 AC.
0.95 AC.
SS#13A-C-10
SS#13A-C-8
0.06 AC.
SS#13A-C-9
20' DRAINAGE EASEMENT
0.01 AC.
1.85 AC.
0.39 AC.
SS#13A-D-3
SS#13A-D-2
0.06 AC.
SS#13A-C-7
SS#13A-C-4
0.73 AC.
SS#13A-C-6
SS#13A-C-5
0.14 AC.
0.05 AC.
0.13 AC.
SS#13A-C-2
SS#13A-C-3
20' DRAINAGE EASEMENT
0.40 AC.
0.46 AC.
SS#13A-B-13
20' DRAINAGE EASEMENT
SS#13A-B-12
SS#13A-B-11
SS#13A-B-10
SS#13A-B-6
SS#13A-B-9
0.07 AC.
0.01 AC.
SS#13A-B-4
0.27 AC.
0.74 AC.
SS#13A-B-5
SS#13A-B-3
0.05 AC.
0.90 AC.
1.27 AC.
0.12 AC.
0.09 AC.
SS#13A-B-7
SS#13A-B-8
0.07 AC.
SS#13A-A-2
20' DRAINAGE
FAIRWAY #7
1.09 AC.
SS#13A-B-14
0.27 AC.
SS#13A-A-14
0.47 AC.
SS#13A-A-13
0.19 AC.
20' DRAINAGE EASEMENT
SS#13A-A-12
1.38 AC.
0.40 AC.
SS#13A-A-11
0.37 AC.
SS#13A-A-9
0.31 AC.
BLE WIDTH STORMWATER
EMENT FACILITY ESMT.
SS#13A-D-1
SEC. 13A-235